



March 22nd, 2018

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

**Re: Agnico Eagle Mines – Meliadine Division Response to the Updated Water Management Plan and Updated Environmental Management & Protection Plan comments from CIRNAC and ECCC**

Dear Mr. Dwyer,

As requested, the following information and comments are intended to address the comments outlined in the reports below:

- Re: Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) Technical Review Comments on the Water Management and Environmental Management Protection Plans for the Meliadine Gold Project – Agnico Eagle Mines Limited.
- RE: 2AM-MEL1631 – Agnico Eagle Mines Limited – Meliadine Gold Project – Water Management Plan and Environmental Management and Protection Plan (EMPP)

Should you have any questions or require further information, please do not hesitate to contact me.

Regards,

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Environmental Compliance Counselor



**CIRNAC Comment:** AEM has stated that relevant information is located in their AEMP Report as well as other relevant management plans.

**Recommendation:** CIRNAC recommends that AEM input all required information into their EMPP as stipulated by their water licence. CIRNAC finds this way of reporting to be very cumbersome as now CIRNAC, other interveners and interested parties would have to read a number of documents to validate if AEM are actually meeting the requirements of for this plan. As well AEM do not list all of the specific management plans we would have to read

AEM Response:

The Environmental Management and Protection Plan (EMPP) describes the overall intent and direction for environmental management at Agnico Eagle Meliadine Gold Project. This document outlines and describes project-specific management plans, mitigation measures, adaptive management and other standards and requirements for specific areas of environmental management.

- a) Agnico Eagle will add the Comprehensive Receiving Environment monitoring in the next version of the plan
- b) The general linkage between monitoring results and adaptive management response is explained in the EMPP. Detailed adaptive measures are specific to the affected record and therefore described in the associated management plan
- c) Tables explaining sampling and analyses plans will be added in the next version of the plan
- d) Already in the plan (Appendix B)
- e) Tables will be added to the plan to include these monitoring

**CIRNAC Comment:** Several items in the EMPP, including but not limited to, Table 4.1, 4.2, 4.4 as well as items listed in 3 above, are now either missing or have been removed from the current version of this document.

**Recommendation:** CIRNAC recommends that AEM provide justification or reasoning as to why these items have been removed.

AEM Response:

Table 4.1 - Water Quality Regulated, General Aquatic, and Verification Monitoring for the Project during Construction, Operations, and Closure, Table 4-2-List of Constituents in Each Parameter Group and Table 4-4 - Internal and External Record Keeping were added to the document. The introduction section, Details about the mine location, activities, facilities, phases, etc was modified to include mine location, activities, facilities, phase, etc as per the updated mine plan will be added to the document.

Agnico considers the Section 3.2 - Discussion of changing the scope of the project (and thus plans) in times of economic hardship or putting the mine in care and maintenance if faced with severe economic hardship in accordance with the provisions outlined in the



Preliminary Closure and Reclamation Plan (NIRB requirement's to discuss plans in times of economic hardships) is addressed correctly in the plan.

Table 4.3 summarizes inspection procedures, qualitative risk level and frequency for all mine components.

**CIRNAC Comment:** AEM also references Appendix X which CIRNAC could not find.

**Recommendation:** CIRNAC recommends that AEM provide clarification as to which document they meant to reference.

AEM Response:

Reference to Appendix X was a mistake and should have been referred to Appendix B Rating curves predicting TSS and TDS concentration.

**CIRNAC Comment:** After reviewing the water management plan CIRNAC could not find details on the underground sumps and stopes as it pertains to water.

**Recommendation:** CIRNAC recommends that AEM provide as much detail as possible in how they are controlling and mitigating the water entering the underground workings.

AEM Response:

A description of the underground water management system (i.e., sumps, pumping) has been added to the Groundwater Management Plan (Appendix A of the Water management plan). The information has been added as Section 4.2.1. A piping and instrumentation diagram has also been included as Appendix E to the Groundwater Management Plan.

**CIRNAC Recommendation:** CIRNAC recommends that AEM clarify/indicate the mitigation measures planned for any unexpected seepage flooding in the Underground Mine mitigating the water entering the underground workings.

AEM Response:

Detailed mitigation measures under greater than expected groundwater inflows was added to the March 2019 Groundwater Management Plan (Appendix A of the Water Management Plan).

**CIRNAC Comment:** CIRNAC has also found that even though AEM has provided the locations of the culverts and channels within the road system of the mine, CIRNAC could not find the detailed engineered construction drawings.

**Recommendation:** CIRNAC recommends that AEM provide the detailed construction drawings.



AEM Response:

The As-built reports of the culverts and channels were submitted through the Nunavut Water Board. The culverts and channels without a submitted As-built Report either haven't been built (planned in 2019) or are part of a system that will be presented as a whole once all the components are built. The Water Management Plan (March 2019) has been updated to state which culverts/channels have been built, and if they have not, when the expected construction period is.

**ECCC Comment:** Turbidity trigger limits have been identified based on a correlation determined for turbidity and total suspended solids (TSS) in CP1. The approach is conservative, but ECCC notes that the regression line is based on only eight data points, and recommends that ongoing/periodic calibration/confirmatory paired samples be done. This will also update the relationship between turbidity and TSS if there are changes in particle sizes and characteristics over time, which would affect the correlation. The TSS-turbidity approach is also referenced in Section 3.9.4 of the Water Management Plan (Effluent Water Treatment Plant [EWTP]).

**Recommendation:** ECCC recommends that the Proponent include a provision for ongoing calibration of the TSS/turbidity correlation for CP1 discharges in the next updates of the EMPP and the Water Management Plan.

AEM Response

Agnico will continue to gather calibration/confirmatory paired samples in the future to increase the amount of data to strengthen the correlation. This point has been added to the March 2019 Water Management Plan.

**ECCC Comment:** Section 3.2 of the Water Management Plan states that:

- Water quality guidelines will meet regulatory criteria of the Licence (described in Appendix F).
- Design capacity for the EWTP will support various return periods: 1:100 wet year spring freshet; 1:2 mean year spring freshet, plus a 1:1000 return 24 hour extreme rainfall.
- Design capacity of pumping from CP5 to CP1 is sufficient to ensure that D-CP5 and CP5 will be able to manage the water from its catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall.
- Design pumping capacity of each of the other water management dikes (D-CP3, D-CP4, and D-CP6) and associated ponds (CP3, CP4, and CP6, respectively) will be able to manage the water from their respective catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall.

ECCC is unclear of the intent of some of the wording used in this section and clarification on the following would be helpful:



- Clarify that it is water quality that will meet regulatory criteria (i.e., delete “guidelines”).
- Clarify if 1:2 mean year spring freshet is correct. Designing for a 1:100 wet year should also accommodate a 1:2 mean year; but the reverse will not be true. Therefore, “or” should not be used between the two scenarios.
- Clarify the use of 3/7 and whether that is for a design standard.
- **Recommendation:** ECCC recommends that the Proponent provide the clarifications of the wording in Section 3.2 of the Water Management Plan that were specified above and include any necessary changes in the next update of the Water Management Plan.

#### AEM Response

Wording has been adjusted in March 2019 Water Management Plan to state water quality will meet regulatory criteria. As per the design report, D-CP1 can manage a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hour extreme rainfall.

The use of 3/7 is based on an allowable 3-day delay in pumping from CP5 to CP1 during a 7-day, 1:100 year freshet.

**ECCC Comment:** Beginning July 2018, water stored in pond CP5 was treated through a Reverse Osmosis (RO) system and then pumped through the EWTP for treatment (prior to discharge into Meliadine Lake). It is unclear if the flow from the RO Plant is routinely treated through the EWTP, or if their circumstances when it would be blended or directly discharged downstream of the EWTP (as implied in Section 3.3 of Appendix F: Water Quality and Flow Monitoring Plan).

**Recommendation:** ECCC recommends that the Proponent provide clarification of the effluent flow path(s) from the RO Plant to/through the EWTP.

#### AEM Response

The following was added to this section of the March 2019 Water Management Plan: “Agnico Eagle may also discharge RO effluent directly to CP1. At no times, is RO effluent discharged to Meliadine Lake without being treated through the EWTP.”

**ECCC Comment:** Under the water licence, the Proponent is required to provide monthly monitoring reports, which include all the data collected for the general monitoring specified in the licence. This data would be useful in evaluating the quality of effluent and other water flows at site on an ongoing basis; however, the monthly reports have not included analytical results. Monthly reporting is not described under Section 5 of Appendix F: Water Quality and Flow Monitoring Plan. Appendix H: 2019 Water Balance and Quality Forecast Results does not include water quality information beyond limited total dissolved solids (TDS) values at selected sites.

**Recommendation** ECCC acknowledges that data will be available in the Annual Report to be submitted March 31, 2019 so is not requesting past data at this time. However,



ECCC recommends that going forward, analytical data be included in the monthly monitoring reports as required by the water licence. This requirement should be included in the Reporting section of the Water Quality and Flow Monitoring Plan.

#### AEM Response

Agnico will include analytical data in the monthly monitoring reports as required by the Water Licence starting April 2019

**ECCC Comment:** Water treatment will be done at a rate of 12,000 m<sup>3</sup>/day, less the 312 m<sup>3</sup>/day of sludge returned back to CP1. It is not clear what parameters the treatment sludges will contain in addition to TSS and treatment residuals.

Table 16 states that at closure, the Proponent will breach water retention dikes D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6 once water quality monitoring results meet discharge criteria to allow water to naturally flow to the outside environment. It is unclear if the sludge quality has been characterized to evaluate any issues with sediment quality once the pond is again connected to surface waters (noting that there will be the potential for seasonal fish use).

**Recommendation:** ECCC recommends that the Proponent complete a characterization of treatment sludge to identify potential closure concerns with sediment quality in the sludge disposal area.

#### AEM Response

Agnico Eagle is currently evaluating the requirements for the installation and commissioning of a Multiflo™ secondary TSS treatment system. The sludge produced by the secondary treatment system would then be transported to the Process Plant where it would be filter-pressed and disposed of in the Tailings Storage Facility. Updates regarding the timeline for the potential secondary treatment option will be provided in the 2020 Water Management Plan. In the interim, Agnico Eagle will assess the feasibility of sampling EWTP sludge in 2019 at a location prior to its discharge to CP1. A sampling schedule and analysis profile will then be determined to provide an appropriate sludge quality characterization if feasible. This characterization would be used to evaluate any issues regarding the sediment quality within the pond prior to its reintroduction to the outside environment.

**ECCC Comment:** Several parameters are at levels that appear to be anomalous:

- The August 2018 monthly average cyanide concentration is shown as 25.003 mg/L. The next highest concentration is 0.19 mg/L and most results were in the 0.005 – 0.033 mg/L range.
- In August 2018 phosphorus was reported to be 59 mg/L, which is 1-2 orders of magnitude higher than the other averages reported.
- Nitrogen compounds were elevated in Feb. 2017, with nitrate at 116.39 mg/L, ammonia at 7.9 mg/L, and nitrite at 8.01 mg/L. Levels since that time have been considerably lower.

**Recommendation:** ECCC recommends that the Proponent provide clarification on the cause of the elevated parameter concentrations, and in particular:



- Clarify whether the anomalous cyanide result is a real value, or if there was a transcription or other error. If there was a sample with this level of cyanide, the source should be identified.
- Verify the phosphorus value reported for August 2018.
- Identify the reason for elevated nitrate, nitrite and ammonia for Feb. 2017.

#### AEM Response

The cyanide and phosphorus anomalies were the result of transcription errors. The errors were corrected in the March 2019 Water management plan. While correcting these errors, it was also noticed that the same transcription error resulted in erroneous values for pH, turbidity, TSS, TKN, sulphate, nitrate and nitrite. The corrected values are included in the March 2019 Water management plan and mean August 2018 as follows:

pH = 7.72  
turbidity = 27.5  
TSS = 50.0 mg/L  
CN = 0.005 mg/L  
TKN = 7.5 mg/L  
Sulphate = 3625 mg/L  
Nitrate = 0.608 mg/L  
Nitrite = 0.065 mg/L  
TOC = 2.4 mg/L  
DOC = 2.4 mg/L

With respect to the February 2017 nitrate, nitrite and ammonia, the high monthly average is due to one sampling event (February 24) believed to be conducted without proper flushing of the DDH prior to sample collection. Thus, the results from this sampling event are similar to those observed in underground contact water (i.e., sump water). For instance, the February 24, 2017 DDH sample produced nitrate, nitrite and ammonia results of 344 mg/L, 23.5 mg/L and 300 mg/L, respectively. Whereas Sump 125 (contact water) results from February 12, 2017 show nitrate, nitrite and ammonia concentrations equal to 435 mg/L, 27.2, mg/L and 400 mg/L, respectively. Considering the similarity, it can be assumed that the February 24, 2017 DDH sample was contaminated with drilling water.