Environment Canada Environnement Canada

Environmental Protection Operations Directorate (EPOD)
Prairie and Northern Region (PNR)
5019 - 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

August 14, 2015

EC file: 6100 000 008 /002
NIRB file: 03MN107
NWB file: 2AM-MEA081

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

Via e-mail: licensing@nwb-oen.ca

RE: Consolidated Comments on Agnico Eagle Mines Ltd.'s Meadowbank Gold Project 2014 Annual Report

Attention: Phyllis Beaulieu

On July 3, 2015, Environment Canada (EC) provided partial comments to the Nuanvut Impact Review Board (NIRB) concerning Agnico Eagle Mines Ltd.'s (the Proponent) Meadowbank Gold Project (the Project) *2014 Annual Report* (the Report). On August 14, 2015, EC provided NIRB with additional comments related to the Report. EC is providing the Nunavut Water Board (NWB) with consolidated comments on the Report below for NWB's information. EC also reminds the Proponent of the requirement to comply with its obligations under relevant legislation; including the *Canadian Environmental Protection Act, 1999;* the pollution prevention provisions of the *Fisheries Act;* the *Migratory Birds Convention Act, 1994;* and the *Species at Risk Act*.

Effects Monitoring

1. In general, EC found the Report to be well-done and that it reached valid conclusions. EC has not identified changes to the monitoring programs other than some points of clarification noted below.

2. The Freshet Action Plan is dated April 2014, and some of the management practices and references would have changed with the end of mining at Goose Pit, and other changes in the mine plan. EC recommends that the next iteration of the Freshet Action Plan be updated in the first quarter of 2016 with current mine plan information.

3. In Section 2.2.1.6, NP-2 Outlet and Vault Road Culvert, reference is made to total suspended solids (TSS) management, and notification being made to the Department of Fisheries and Oceans (DFO) in the event of TSS discharge.

Following a recent change to how EC and DFO share responsibilities for the *Fisheries Act*, this would now fall under EC's purview. The contact information should be amended to EC for TSS-related issues in waterbodies.

4. The 2014 Freshet Action Plan describes how snow and ice removal will be used as management methods to mitigate impacts on the environment. The plan does not identify the snow/ice disposal locations. EC recommends that future iterations of the Freshet Action Plan identify snow/ice disposal locations that are compatible with the goal of mitigating impacts on the environment.

5. Section 2.7, Fuel Tank Farms, of the 2014 Freshet Action Plan describes freshet water management issues and actions associated with the fuel tank farms. Section 2.7, Fuel Tank Farms, Appendix 1; 2014 Freshet Action Plan Procedure provides additional detail. EC notes that the following additional information should be provided:
   - A description of the contingency measure(s) that would be implemented in the event that water in the containment area does not meet discharge criteria should be provided for the following sections:
     - Section 2.7.2, Baker Lake Tank Farms, 2014 Freshet Action Plan; and
     - Sections 2.7.2, Baker Lake Tank Farms; and 2.7.3, Vault Tank Farm, of Appendix 1 of the 2014 Freshet Action Plan Procedure.

6. Section 5.1 of the Technical Note "Meadowbank Water Quality Forecasting Update Based on the 2014 Water Management Plan" (February 2015) in Appendix C of the 2014 Water Management Plan summarizes the limitations of the mass balance model as follows:
   - In order to simplify the model, the mass balance model assumes the following:
     - Pond and pits are completely mixed systems,
     - No change in the water quality of the Mill Effluent; and
     - A monthly time-step.
   - The mass balance model is based on a limited set of water quality analysis results provided by the Proponent:
     - Water quality data provided for ST-21 is taken from samples collected at the surface of the North Cell TSE Reclaim Pond,
     - Limited water quality data available for the Mill Effluent; and
     - Limited water quality data for some of the inflows and outflows of the Reclaim Pond.

   Section 5.3 of the same Technical Note provides recommendations which address these limitations and are intended to improve the accuracy of the water quality model. EC agrees that additional studies, tests and monitoring, as described in Section 5.3 Recommendations, are needed to strengthen the water quality model, and EC supports implementation of the recommendations provided in Section 5.3 of the Technical Note, in order to improve the accuracy of the water quality model.

7. Section 3.3, Monitoring, states that: ”*Concentrations of ammonia, nitrate and nitrite are parameters that are monitored on a monthly basis as part of this sampling campaign of the TSF* [tailings storage facility] *reclaim water at station ST-21.*

In the Water Quality Forecasting - Update based on the 2014 Water Management Plan Report (SNC, 625618-0000-40ER-0001), a maximum ammonia concentration in the TSF reclaim water is evaluated in order to meet the CCME [Canadian Council of Ministers of the Environment] *guidelines for the Protection of Aquatic Life in the Portage and Goose Island Pits once flooding activities are completed. If this concentration is exceeded before the end of the flooding operation, measures could be undertaken to lower the ammonia concentration, as well as nitrate and nitrite if required, in the TSF reclaim pond prior to the transfer of TSF reclaim water to the pits.*

Ammonia treatment technologies that could be further investigated, if the need arises, include: i) Biological nitrification / denitrification during the summer months. ii) In-situ volatilization of ammonia during the summer months. iii) Ammonia removal by snow making."

EC notes that Section 3.3, Monitoring, lists the same potential ammonia treatment technologies as were listed in the previous Ammonia Management Plan (Feb 2013). EC has previously identified the following potential concerns with these treatment technologies: Given the problems with trying to do snowmaking at Ekati's Misery site, EC has concerns with attempting ammonia removal by snow making. In addition, the in-situ volatilization of ammonia during the summer months could result in air quality issues.

As a result of these concerns, EC has previously recommended that further ammonia treatment options be explored. In response to this recommendation, the Proponent stated that assessment for alternative ammonia treatment will be provided in the final closure plan (i.e. one year prior to closure).

EC recommends that, if the same ammonia treatment options are retained in future iterations of the Ammonia Management Plan, that potential concerns are flagged for future consideration with respect to:

- in-situ volatilization of ammonia during the summer months (i.e. potential air quality issues); and
- ammonia removal by snow making (i.e., Northern challenges).

8. Concerning the Core Receiving Environmental Monitoring Program (CREMP):
   - EC notes that the CREMP was written in a clear and concise manner and was very well done. EC has no comments.

9. Concerning the Groundwater Monitoring Report Section 3.1 MW-02-02:
   - The sampling methods used at this well indicate that the well was purged 130 L until dry. EC notes that this is not the preferred method as a dry well screen can result in oxidation of metals, causing them to drop out of solution and to their concentrations to be underestimated in the sample. The preferred method is to undergo low flow purging and sampling to gain a more representative sample without drying out the well screen. The report does indicate that low flow sampling was not possible at this location due to a malfunction, but future sampling years should strive to achieve low flow purging and sampling and to not dry out the well screen.

10. Concerning Appendix G2 Follow Up AEM Report – Seepage Water From Waste Rock Storage Facility – Sample Collection ST-16:
    - Table 2 appears to have the last two (2) columns cut off.
    - Units for bioassay tests should be corrected to “LC50” rather than “CL50”.
    - Winter DO measurements in Lake NP-2 are suggested.

11. Concerning Appendix C1 2014 Water Management Report and Plan:
    - Section 2.2.1 Pit name changes were confusing and should be clarified early in the document.
        - From Figures 2.2 and 2.4, it appears to be:
        - Portage N – Pit A
        - Portage Center – Pit B
        - Portage S – Pit C/D (not clear how demised?)
        - Portage Pushback – Pit E
    - Errata: Page 24 references Figure 2.9; this should be Figure 3.3.
    - Section 3.1.9.3 (East Dike Seepage Collection) and Table 3.8 require clarification. The text preceding the table refers to East Dike Seepage in connection with volumes pumped to Second Portage Lake. The table title refers to Mill seepage volumes and the column header refers to RSF seepage pumped back to NC TSF. The numbers presented in the table are counter-intuitive with higher volumes during freeze-up and no/low discharge during May-July. Review of the monitoring reports clarified that this was correct and due to effluent quality (turbidity). It would be useful to have this in the report to clarify what appear to be anomalous results.
    - Section 3.2 states that: “*The current objective is to ensure the water meets CCME Guidelines for the Protection of Aquatic Organisms (CCME) before the dike is breached.”* As EC has previously noted (and the Proponent has agreed), there are a number of parameters that do not have Canadian Council of Ministers of the Environment (CCME) Guidelines and, in these cases, the pit water quality should match background water quality of the lake, falling within the range of its natural variability. EC anticipates this will be detailed in the Closure and Reclamation Plan. There are similar references in 3.2.1 for Goose Pit and in 3.2.3 for Vault Pit reflooding and in Section 6.0 - Conclusion.

12. Concerning Appendix A – Water Balance, only the first two Tables for 2014 were reviewed and several questions arose:
    - On the first table (page 49), for the South Cell TSF, it is unclear why the starting pond volume is zero for most of the months. It appears that the total outflow number was used to carry forward to the next month rather than the end-of-month volume. Please clarify. This does not appear to have propagated any errors for volumes taken forward for the end of month volumes.
    - On page 50, the Goose pit has runoff inflows shown all year, which runoff for all the other site infrastructure is zero outside the thaw season. Does this more accurately refer to minewater inflows from groundwater and Second Portage Lake?
    - Section 6.0 states: “*Since December 2013, the East Dike seepage has been redirected to Second Portage Lake in order to reduce this water from entering the site wide system. This also reduced the in-pit pumping requirements (to the former Portage Attenuation Pond before it became the South Cell TSF in Oct 2014) and subsequently the water treatment required in 2014. This seepage*

collection system recovered around 40% of the estimated total volume in 2014. The other 60% was allowed to flow into the Portage pit and was subsequently pumped to the Portage ATP before it became the South Cell TSF in November, 2014." However, the Water Balance table on Page 50 shows zero for east dike seepage going into the Portage Pit, which contradicts the text and potentially underestimates those contributions by 60%.

- Again, for Portage Pit and Vault Pit, does "runoff" refer to all inflows including surface flows and minewater?
- On page 50, the Vault Attenuation Pond appears to have an error in End-of-Month volume for June, which fails to subtract the outflow from the previous month's balance and propagates the error plus some other calculation problems, through the rest of the end of month volumes.

13. Concerning Appendix C – Water Quality Forecasting Update, a high-level review was done of this report, and some general comments and questions were identified:
    - The mill effluent concentrations used for copper and iron are in the dissolved form, with the rationale provided that solids will tend to decant in the TMF. It would be more conservative to use total measurements, rather than dissolved, or to demonstrate that a high proportion actually does precipitate in the tailings. Figure 4-3 presents Total Copper and Figure 4-5 presents Total Iron compared to dissolved forms, which is not normally done.
    - It may be useful to compile the background concentrations of the full list of parameters (with some measure of the variability) for comparison to predicted levels, where there are no CCME guidelines.
    - An estimate of Total Suspended Solids should be included or an assumption of treated levels used to factor this in.
    - Table 4-2 refers to ammonia as ionized – is this meant to be total ammonia?
    - How are minewater inflows incorporated, i.e. if there are saline groundwater inputs?
    - EC supports ongoing annual updates with monitoring data, as outlined in the report recommendations.

<u>Compliance Monitoring</u>

14. No authorizations from EC have been issued. No onsite inspections of the Project were completed by EC Environmental Enforcement in 2014. The Proponent submitted five (5) off-site inspections for the Project (four (4) quarterly and one (1) annual report) in accordance with the *Metal Mining Effluent Regulations*. No non-compliance was identified during the inspections that required any enforcement actions.

For clarification on any aspect of this submission, please contact Michael I. Mohammed at (867)-669-4737 or michael.mohammed@ec.gc.ca

Sincerely,

Michael I. Mohammed
Senior Environmental Assessment Coordinator

cc: Loretta Ransom; Acting Head, Environmental Assessment North (NT & NU), PNR-EPOD
EC Internal Distribution