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ECCC File: 6100 000 008/ 002, 014
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May 27, 2019

via email at: info@nirb.ca

Erin Reimer
Technical Advisor I, Monitoring Officer
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU X0B 0C0

Dear Erin Reimer:

RE: 03MN107, 16MN056 – Agnico Eagle Mines Ltd. – Meadowbank Gold Mine and Whale Tail Pit Projects – 2018 Annual Report

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Impact Review Board (NIRB) regarding the above-mentioned annual report and is submitting comments via email. ECCC's specialist advice is provided based on our mandate, in the context of the *Canadian Environmental Protection Act*, the pollution prevention provisions of the *Fisheries Act*, the *Migratory Birds Convention Act*, and the *Species at Risk Act*.

The following comments are provided:

1. Dustfall Sampling Technique

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report Appendix 39: Meadowbank and Whale Tail 2018 Air Quality and Dustfall Monitoring Report. April 2019.
- ASTM International. Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter) D1739-98. Reapproved 2017.
- Environment and Climate Change Canada. Meadowbank Gold Project and Whale Tail Project – 2017-2018 Annual Monitoring Report. ECCC Responses to NIRB Recommendations. December 2018.

- Environment and Climate Change Canada. Technical Review Submission to the Nunavut Impact Review Board Respecting the Whale Tail Pit Expansion Project Proposed by Agnico Eagle Mines Limited. May 2019.

Comment

The Proponent indicated that dustfall sampling would be conducted in accordance with the ASTM method, and states that, “*ASTM methods suggest collection of the dustfall sample at 2-3 m height on a utility pole to prevent reentrainment of particulates from the ground, and to reduce vandalism and potential for wildlife interaction. For locations DF-1 – DF4, samples were collected in this manner*” (Page 6, Air Quality and Dustfall Monitoring Report). However, the Proponent also indicated that dustfall samplers would be placed on the ground along haul roads and at remote sites (instead of on poles at a height of two meters as prescribed by ASTM).

The Proponent noted that the reason for the modification of the method was the difficulty in constructing and deploying a large number of sampling stands. The Proponent conducted a study in 2012 with a small number of samples and did not find a significant difference in dustfall rates between samples on the ground versus at a two meter height. The Proponent also indicated that they plan to conduct a supplemental study in 2019 to confirm that dustfall canisters deployed on the ground align with those measured on stands.

As previously indicated by ECCC (in both the ECCC 2018 Response to the NIRB Recommendations and in the ECCC Technical Review Submission for the Whale Tail Pit Expansion Project) the placement of dustfall canisters on the ground can have negative implications on data quality. According to ASTM (2017), at heights below two meters, there is a wider variability in the concentration of particles subject to settling. Sampling close to the ground also increases the chances that measured dustfall can be influenced by accumulated snowfall and interference by wildlife. Therefore, to remove the possible biases in data and to be able to compare measured dustfall to Alberta guidelines appropriately, the dustfall sampling method should be consistent with the ASTM method and consistent across all sites.

ECCC Recommendation(s)

ECCC continues to recommend that the Proponent conduct dustfall sampling for all sampling locations according to the ASTM method (2017), specifically at a sampling height of two meters.

2. Canadian Ambient Air Quality Standards

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report. April 2019.

- Environment and Climate Change Canada. Technical Review Submission to the Nunavut Impact Review Board Respecting the Whale Tail Pit Expansion Project Proposed by Agnico Eagle Mines Limited. May 2019.

Comment

Since completion of the environmental assessments for the Meadowbank Gold Mine and Whale Tail Pit Projects, the Canadian Council of Ministers of the Environment have established new Canadian Ambient Air Quality Standards (CAAQS) for nitrogen dioxide (NO₂; November 3, 2017). As previously indicated by ECCC in the Technical Review Submission for the Whale Tail Pit Expansion Project, ECCC recommends that monitoring results be compared to the most stringent air quality standards applicable to a given area. The CAAQS are not intended to be used as enforceable standards at the Project perimeter. Rather, they are used to evaluate the nature and severity of the Project's impact on regional air quality. The passive air quality monitoring for NO₂ produces annual averages that can be compared with the annual NO₂ CAAQS.

Recommendations(s)

ECCC recommends that the Proponent:

- Provide a comparison of annual average concentrations of NO₂ to the CAAQS in future Air Quality Monitoring Reports.
- Update relevant Management Plans to include the CAAQS.

3. Dust Suppression Activities

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Sections 4.2.1 and 4.2.3.1. April 2019.

Comment

Section 4.2.3.1 of the 2018 Annual Report describes locations of some dust suppressant applications (using Tetraflake) to the all-weather access road (AWAR) which occurred on July 9th 2018, as well as in 2017. Section 4.2.1 indicates that water trucks were also used for dust suppression. However the proponent did not provide details regarding the use of road watering. In addition, no information was provided regarding dust suppressant activities for the Whale Tail Haul Road.

Finally, the Proponent did not indicate how dust suppressant activities were triggered, and whether they were in response to dustfall measurements, active particulate matter monitoring, visual dust observations, or community input (e.g., complaints).

Recommendations(s)

ECCC recommends that the Proponent provide more details regarding dust suppressant activities, including detail on the following:

- The use of road watering, including timing, frequency, and volumes applied.
- Dust suppressant activities for the Whale Tail Haul Road.
- How dust suppressant activities were triggered, including the use of dustfall measurements, active particulate matter monitoring, visual dust observations, and an account of community input on the issue of dust.

4. Reconnecting Flooded Pits

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Section 4.4.2. April 2019.
- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 8: Meadowbank 2018 Water Management Report and Plan. April 2019.

Comment

Flooding of the mined-out pits will occur until 2030, using both passive and active methods. ECCC advises that prior to reconnecting flooded pits to surrounding waterbodies, the water quality of the pits must be demonstrated to have stabilized and be consistently acceptable for discharge to the receiving environment. Thus, an extended period of water quality monitoring will be required following flooding.

ECCC notes that the interval (approximately 3 to 4 years) between active flooding of the pits and the proposed timing of dike breaching (i.e., approximately 2030) may not allow sufficient time to demonstrate stable and acceptable pit water quality. Further, the 2018 Annual Report and 2018 Water Management Report and Plan indicate that dike breaching is contingent on pit water quality meeting aquatic guidelines and/or site-specific criteria. However, these documents do not address the need to demonstrate stability and long-term acceptability of pit water quality. Monitoring results must demonstrate that water quality is stable and consistently meets guidelines/criteria prior to reconnecting flooded pits to fish bearing waterbodies.

Recommendation(s)

ECCC recommends that the Proponent, in conjunction with the 2019 Annual Report, revise management and monitoring plans that are relevant to reconnecting flooded pits with surrounding fish bearing waterbodies to clarify that dike breaching is dependent on demonstrating that pit water quality has stabilized and is consistently acceptable for discharge to the receiving environment.

5. Laboratory Detection Limits

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Section 4.4.3. April 2019.

Comment

Water quality prediction models for the Meadowbank Gold Mine include a Probable scenario and a Possible Poor End scenario. Measured water quality (yearly mean and lower 25th percentile) for Portage Pit (ST-17 and ST-19), Goose Pit (ST-20), Vault Pit (ST-23) and Phaser Pit (ST-41 and ST-42) were compared to the predicted values (2 model scenarios), water license discharge criteria to Third Portage Lake and Wally Lake, the MDMER and the CCME water quality guidelines for the protection of aquatic life. These criteria are used as a guide to identify potential parameters of concern.

Per Section 4.4.3.1 of the 2018 Annual Report, many of the predicted values for the Probable and Possible Poor End scenarios have differences greater than +/- 20% when compared to the measured values. Several potential contributing causes were identified, including the following, "*Some accredited laboratory water quality measurements have detection limits that are higher than the predicted values. This is particularly true for dissolved metal analysis, such as cadmium, iron, lead, nickel, molybdenum, selenium, thallium and zinc*" (Page 58).

ECCC has previously (2016 Annual Report review) noted this issue and raised concern regarding laboratory detection limits that are higher than the predicted values.

Recommendation(s)

ECCC continues to recommend that the Proponent seek out laboratories with sufficiently low detection limits to be able to properly assess samples, thereby supporting comparison of measured data to predicted values.

6. Managing Missing Data

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 8: Meadowbank 2018 Water Management Report and Plan, Appendix C – 2019 Meadowbank Water Quality Forecasting Update, Table 3-4. April 2019.

Comment

Table 3-4 of the 2019 Meadowbank Water Quality Forecasting Update provides the parameter concentrations used in the Water Quality Forecast Model. ECCC notes that fifteen data points (comprised of some, but not all, of the data points for total chromium, strontium, thallium and uranium) in Table 3-4 contain no measured data and are

assigned a value of zero, per Footnote (4) which reads: “*No data. Assume negligible*” (Page 51).

ECCC further notes that no measured values of zero were reported in Table 3-4 among the actual data of affected parameters (i.e., total chromium, strontium, thallium and uranium), and some of the measured results for total chromium and thallium exceed CCME water quality guidelines (long term) or other comparison criteria used to identify potential parameters of concern.

No justification has been provided for assigning a zero value for missing data, and this approach is not supported by the actual water quality measurements.

Recommendation(s)

ECCC recommends that the Proponent:

- Propose another method for managing missing monitoring data (rather than arbitrarily assigning a value of zero), and provide an accompanying rationale.
- Provide a discussion on why missing chromium and thallium data are assumed negligible in the water quality forecast model when some of the observed measured concentrations exceed CCME water quality guidelines.
- Provide a discussion on why there is no data for fifteen data points in Table 3-4 of the 2019 Meadowbank Water Quality Forecasting Update.

7. Mercury Monitoring Plan

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 51: CREMP Addendum, Appendix A: Mercury Monitoring Plan for Whale Tail South Area, Version 2 (March 2019). April 2019.

Comment

Section 3.1 (Surface Water & Depth Profiles) of the Mercury Monitoring Plan states that samples will primarily be collected as surface level grabs rather than at 3 m depth (which is the protocol for regular CREMP samples). The rationale provided for this sampling approach is that the CREMP baseline data indicates that lakes within the flood zone tend to be well mixed. A consultant’s report (Azimuth 2016) is referenced, but the report and baseline monitoring data are not provided to support this conclusion.

According to Section 3.2 of the Mercury Monitoring Plan, grab samples targeting the top 3 – 5 cm will be collected annually, with sediment core samples collected at a minimum every three years. This section further states that consultation with Agnico’s academic research partner at the University of Waterloo has indicated that grab samples collected in the manner described in Azimuth (2015), Appendix B, are appropriate for analysis of mercury in sediment. However, the report referenced has not been provided to support this conclusion.

Recommendation(s)

ECCC requests that the Proponent provide any associated monitoring data for the following consultant reports to support the proposed approaches of (1) collecting only surface level grabs, rather than monitoring vertical water quality and (2) collecting sediment grab samples, rather than annual core samples:

- Azimuth (Azimuth Consulting Group Partnership). 2016. Whale Tail Pit Core Receiving Environment Monitoring Program (CREMP) 2014-2015 Baseline Studies. Prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Vancouver, BC. January, 2016.
- Azimuth (Azimuth Consulting Group Partnership). 2015. Core Receiving Environment Program: 2015 Update. Prepared by Azimuth Consulting Group Inc., Vancouver, BC for Agnico-Eagle Mines Ltd., Vancouver, BC. November, 2015.

8. Possible Acid Rock Drainage/ Metal Leaching

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Section 3.1 Dikes and Dams. April 2019.

Comment

In the Annual Report, the Proponent states the following:

“The Central Dike seepage is normally pumped back into the South Cell. From September to October 2017 the seepage was transferred to Goose Pit as a mitigation measure. This measure, combined with an adapted tailings deposition plan was effective in reducing the seepage flow rate. As a result, the average seepage rate at Central Dike decreased from 540 m³/h in 2017 to 263 m³/hr at the end of 2018 and is following the trend from the 2017 seepage modelling done by Golder.

In the summer of 2017 the water in the downstream pond became orange and this was associated with rapid temperature variation. This event was investigated by chemical analysis and was found to be caused by the precipitation of iron oxide from bacterial process. As predicted this event re-occurred in the summer of 2018.

The current mitigation strategy to reduce the risk related to seepage includes the following:

- *increased surveillance frequency (instrumentation review, site observation)*
- *presence of a backup pumping unit in the downstream area to maintain enough pumping capacity in case of a sudden seepage increase*
- *revised tailings & water management strategy to minimise the amount of water stored into the South Cell while maximising tailings coverage against Central Dike and Saddle Dam 4” (Page 16)*

ECCC notes that it is possible that the orange or rusty colour observed in the water downstream could be an evidence of the oxidation of iron sulphide thereby creating acid

rock drainage/metal leaching (ARD/ML). Iron-oxidizing bacteria helps to accelerate the oxidation of iron in cases where they are present in the water. If this is the case, and has resulted in ARD/ML, it is not clear how the proposed mitigation strategy provided by the Proponent will reduce/prevent the amount of iron oxide or the iron-oxidizing bacterial process (thereby preventing the incidence of ARD/ML).

Additionally, the Proponent did not indicate whether the orange coloured water was tested for ARD or indicate the pH value of the water in order to confirm or eliminate ARD/ML activity.

Recommendation(s)

ECCC recommends that the Proponent test the orange coloured water for ARD/ML and demonstrate how the proposed mitigation will reduce/prevent the incidence of the ARD/ML downstream if it is found to be occurring.

9. Long-tailed Duck Mortalities

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Table 12.6: Project Related Mortality (Waterbirds). April 2019.
- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 45: Wildlife Monitoring Summary Report, Section 4.5.6 Wildlife Mortality. April 2019.

Comment

Two Long-tailed ducks were found dead on separate occasions (September 17 and 20, 2018) near the Assay Lab and suspected to have collided with the building. The report indicates that “no actions” were taken.

There are several factors that may have contributed to these incidents including, poor weather and low visibility, lighting attraction, and presence of reflective surfaces or large windows. Understanding whether any of these factors came into play could help prevent similar mortalities in the future at this specific location.

Recommendation(s)

ECCC recommends that the Proponent:

- Report all migratory bird incidents and mortalities to: ec.dalfnord-wednorth.ec@canada.ca and ec.eenordrpnnu-eanorthpnrnu.ec@canada.ca.
- Provide an assessment of the various factors listed above to determine if any were factors in the September 17 and 20, 2018 mortalities.

10. PRISM and Breeding Bird Monitoring Program

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 45: Wildlife Monitoring Summary Report, Section 14.4 Recommendations (Breeding Bird Monitoring). April 2019.

Comment

Section 14.4 of Appendix 45 states that analysis of PRISM (Program for Regional and International Shorebird Monitoring) data in 2015 showed community indices were variable with little difference in overall trends between mine and control plots.

ECCC reviewed the 2015 analysis of the PRISM data and is of the view that more analysis of the data would be helpful to inform the future of this monitoring program and/or to support a change to the monitoring objective.

Section 14.4 also recommends that a North American Breeding Bird Survey Route (BBS) be established in 2019. ECCC generally supports this recommendation but has concerns with the proposed monitoring frequency in TEMP (i.e. every 3 years) and potential for observer variation. An alternative design may need to be considered to ensure that this work is a valuable contribution to the national monitoring program.

Recommendation(s)

ECCC recommends that the Proponent:

- Contact ECCC at ec.eenordrpnnu-eanorthpnrnu.ec@canada.ca to discuss the future of the PRISM and BBS monitoring program.
- Following discussions with ECCC complete additional analysis of the 2015 PRISM data to fully inform the future of the monitoring program and/or support a change to the monitoring objective.

11. Fish-out Waterbird Observations

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report, Appendix 43: Whale Tail 2018 Fishout Report. April 2019.

Comment

As part of the Fish-out Diving Waterbird Protection Plan, observations of diving waterbirds are to be collected to inform risks and placement of gill nets during the fish-out.

ECCC reviewed the Fish-Out Report and did not see a summary of the waterbird observations. A summary does not appear to be included in the 2018 Wildlife Monitoring Summary Report either.

Recommendation(s)

ECCC recommends that the Proponent provide the waterbird observations associated with the Whale Tail fish-out and confirm that no by-catch incidents occurred.

12. Marine Mammal and Seabird Observer Report

Reference(s)

- Agnico Eagle Mines Limited. Meadowbank Gold Project 2018 Annual Report Appendix 55: Marine mammal and seabirds observer (MMSO). April 2019.
- Environment and Climate Change Canada. Meliadine Gold Project 2018 Annual Report – Review Comments Submitted to the NIRB. May 2019.
- Gjerdrum, C., D.A. Fifield, and S.I. Wilhelm. 2012. Eastern Canada Seabirds at Sea (ECSAS) standardized protocol for pelagic seabird surveys from moving and stationary platforms. Canadian Wildlife Service Technical Report Series No. 515. Atlantic Region. vi + 37 pp.

Comment

ECCC reviewed the MMSO Report and has concerns about the quality of the data provided. The surveys also do not appear to have follow established ECCC seabird survey protocols (Gjerdrum et al. 2012). This is consistent with ECCC's review of the Proponent's Meliadine Project MMSO report. ECCC has initiated discussions with Proponent to address these concerns.

ECCC Recommendation(s)

ECCC recommends that the Proponent provide staff with adequate training to implement established ECCC seabird survey protocols.

Should you require further information, please do not hesitate to contact me at (867) 669-4732 or Emily.Nichol@canada.ca.

Sincerely,

[original signed by]

Emily Nichol
A/Senior Environmental Assessment Coordinator

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU)