Environment and Climate Change Canada | Environnement et Changement climatique Canada

Prairie & Northern Region
Environmental Protection Branch
9250 – 49th Street NW
Edmonton, AB T6B 1K5

April 25, 2018

via email to: Alex.Chernoloz@agnicoeagle.com

Alex Chernoloz
Environmental Compliance Counselor
Agnico Eagle Mines Limited
Meliadine Division
Rankin Inlet, NU X0C 0G0

Dear Mr. Chernoloz:

Subject: Metal Mining Effluent Regulations – Evaluation of 1st Environmental Effects Monitoring Study Design, Meliadine Gold Mine, NU

This letter is to advise you that Environment and Climate Change Canada has reviewed your Environmental Effects Monitoring (EEM) biological study design report entitled "Meliadine Gold Mine EEM Cycle 1 Study Design", received August 18, 2017. The review of study design reports takes into account information requirements in the *Metal Mining Effluent Regulations (MMER)* of the *Fisheries Act* and also offers comments on the study based on the EEM Technical Guidance Document and generally accepted standards of good scientific practice.

The compiled review comments and recommendations are attached. Comments in bold indicate where further information is required to meet regulatory requirements and should be addressed for the review of the report to be completed.

Regulated facilities are now required to submit reports to the Environmental Effects Monitoring Electronic Reporting system (EEMER). It is no longer necessary to submit electronic or paper copies directly to the authorization officer. If you have questions regarding EEMER, please contact ec.esee-eem.ec@canada.ca.

Should you have any questions or concerns regarding the EEM program or wish to discuss the review of the study design, please do not hesitate to contact me at (780) 717-4884 or at erik.allen@canada.ca.

Sincerely,

Erik Allen
Environmental Effects Monitoring Coordinator

Canada

cc:

Susanne Forbrich	Environment and Climate Change Canada, Edmonton
Cristina Ruiu	Environment and Climate Change Canada, Regina
Curtis Didham	Environment and Climate Change Canada, Iqaluit
Jessica Huza	Agnico-Eagle Mines Limited

Attachment: Review Comments and Recommendations on 'Meliadine Gold Mine EEM Cycle 1 Study Design', August 2017 submission

Review Comments and Recommendations on 'Meliadine Gold Mine EEM Cycle 1 Study Design', submitted August 2017

The following comments and recommendations are based on a review of the report by members of a Technical Advisory Panel (TAP). The TAP consists of representatives from Environment and Climate Change Canada (ECCC), Nunavut Water Board (NWB) and Indigenous and Northern Affairs Canada (INAC).

Action items

1. The report describes a biological monitoring study to assess the effects of effluent discharged to Meliadine Lake during the dewatering of Lake H17, which occurred from August to October 2016. There has been no further deposit from this final discharge point (MEL-D-1) and the dewatering infrastructure was dismantled in October 2016. A permanent discharge point (MEL-14) has since been constructed, upstream of MEL-D-1. There was no discharge from MEL-14 in 2017, however it is understood that effluent will be discharged in 2018. On p. 14, the report indicates that effluent discharged from MEL-14 is expected to have higher concentrations of constituents than the dewatering effluent.

   Given that the discharge from MEL-D-1 occurred two years before the biological monitoring study planned for 2018, and the likelihood of a more concentrated effluent discharging from MEL-14 in 2018, the proponent is recommended to relocate the study to assess for the effects of effluent from MEL-14.

   Note that if there is no discharge from MEL-14 in 2018, the proponent would be recommended to conduct the biological monitoring study in the area previously exposed to the MEL-D-1 discharge.

2. p. 5. What type of effluent will be discharged from MEL-14 in 2018? Will the effluent be treated? How will the discharge rate compare to the dewatering of Lake H17?

3. p. 5. The MMER require a description of the manner in which effluent mixes within the exposure area, including an estimate of the effluent concentration at 250 m from the FDP (MMER Sched. 5, 11(a)). **Please provide this information for the MEL-14 final discharge point, where available.**

4. p. 5. The proponent is recommended to conduct a plume delineation study once the MEL-14 effluent discharge begins. Please provide a description of the methods that will be used to delineate the effluent plume.

5. p. 8. The MMER require a description of the reference and exposure areas where the biological monitoring studies will be conducted (Sched. 5, s. 11(b)), and a description of and scientific rationale for the selection of fish and benthic invertebrate sampling areas (Sched. 5, s. 12(b), 13(a)). It is acknowledged that the report provided information on the sampling areas in Meliadine Lake that were proposed to monitor the discharge from MEL-D-1. **Please provide a description of the relocated exposure sampling areas to assess the effects of effluent discharged from MEL-14, including a revised study area map indicating the location of sampling sites for EEM fish and benthic invertebrate surveys. The proponent should also indicate whether or not current reference areas are suitable for comparison to the relocated exposure area. If additional reference areas are needed, please provide a description as required.**

6. p. 16. The study design proposes the collection of a single sentinel species, three-spine stickleback. It is noted that three-spine stickleback have been the most abundant species in previous surveys; however, the proponent is recommended to include a second sentinel species, as per the EEM Technical Guidance Document (TGD, Section 3.3). Please provide

additional information for a second sentinel species, including rationale for the species selected, target sample sizes, sampling methods, and endpoints to be assessed. If there are concerns over the size of the population and potential impacts of sampling on the second sentinel species, a non-lethal survey could be considered.

7. p. 16. For small-bodied fish surveys, the TGD recommends collection of 20 immature fish to aid in the analysis of effect endpoints (Section 3.3.3). Please describe the fish sampling techniques to be used for the collection of immature fish.
8. p. 17. The proponent is recommended to determine fish age from otoliths. While there may some uncertainty in the results due to the small size of ageing structures, ageing data could be compared to length frequency distributions to determine age classes. Ageing results should be independently verified as recommended in the TGD (Section 3.9.6). Please describe QA/QC protocols for the fish ageing data.
9. p. 21. The report proposed to sample for benthic invertebrates in profundal areas (8 to 10 m depth) near the location of the MEL-D-1 diffuser. As noted in Comment #1, the sampling area should be relocated to assess exposure to effluent from the MEL-14 discharge point. As part of the description of the relocated benthic sampling areas requested in Comment #5, please indicate the distance from the MEL-14 discharge point. If the effluent from MEL-14 will be discharged from a diffuser at depth, sampling nearby profundal areas may be appropriate. However, if the discharge is from shore and exposure is greatest in littoral areas, the proponent could consider locating benthic stations in this habitat, provided the substrate is suitable. Similar consideration should be given to the selection of fish sampling areas near the MEL-14 discharge.
10. p. 23. Please describe the methods for the collection of water samples from fish and benthic sampling areas. The study design did not appear to propose water sample collection for the fish sampling areas; the proponent should ensure that water quality monitoring is conducted at fish and benthic sampling areas as required (MMER, Sched. 5, s. 7(2)(b)).

Other items

11. p. 16. Ensure that sampling effort with different fishing methods is proportionally similar between exposure and reference areas, to avoid any potential confounding effects related to size selection bias.
12. p. 16. Note that the recommended level of effort to achieve sample sizes in the fish survey is 7 days per sampling area.
13. p. 16. Ensure balances are sufficiently sensitive and field lab conditions appropriate for weighing small-bodied fish.
14. p. 22. The proponent is recommended to sort subsamples rather than pooling them in the field, in order to evaluate variability within stations and determine the appropriate number of subsamples for future studies (TGD, Section 4.4.2).
15. p. 27. Regarding QA/QC protocols for benthic sorting, note that if sorting efficiency does not meet the criterion of <10% of total organisms missed, the samples should be resorted. If subsampling is used, 10% of samples should be assessed for precision and accuracy. If estimates differ from true counts by >20%, the method should be modified to achieve higher accuracy, or the entire sample should be sorted (TGD, Section 4.6.4).