Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
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Your file - Votre référence
2AM-MEA1526
Our file - Notre référence
CIDM#1259636

August 23, 2019

Mr. Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
E-mail: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's comments on 2AM-MEA1526 Pore Water Quality Monitoring Program V1 July 2019

Dear Mr. Dwyer,

Thank you for your July 26, 2019 invitation to comment on the above-referenced monitoring program.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) reviewed the Pore Water Quality Monitoring Program document pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*.

The purpose of the Pore Water Quality Monitoring Program is to "*characterize and monitor the chemical composition of the pore water that exists in the tailings during operation and confirm predictions for mine closure.*" However, direct monitoring and sampling of tailings pore water were ruled out by Agnico Eagle Mines Limited (AEM) because of operational challenges in piezometer or monitoring well installation and safety concerns. AEM proposed to monitor the quality of the reclaim water and the mill effluent slurry to calculate and obtain indirectly the chemical composition of the tailings pore water. This proposed monitoring approach is based on the following two key assumptions: (1) "*The chemical composition of the tailings pore water is expected to be controlled by the chemical composition of the mill effluent and the reclaim water"* and (2) *"Geochemical reactions within the tailings solids themselves are not expected to influence pore water chemistry.*"

CIRNAC has the following concerns with this approach and its assumptions:

1. the chemical composition of tailings pore water would in general be different from that of the overlying water covering the tailings in the pit;
2. the mill effluent slurry and the reclaim water would influence directly the chemical composition of the overlying water in the pit, instead of the tailings pore water;
3. many other factors (e.g., degree of mixing, freeze-thaw cycle, precipitation-evaporation, geochemical reactions in the pit, flux at the tailings-overlying water interface, etc.), in addition to the chemical composition of the mill effluent slurry and that of the reclaim water, would also influence the chemistry of the overlying water;
4. the rate of sulfide mineral oxidation would be inhibited or reduced in tailings under subaqueous conditions. However, oxidation and other geochemical reactions (e.g., dissolution, precipitation, reduction, etc.) between tailings and pore water would in general still occur, which would result in changes in the chemical composition of tailings pore water;
5. the chemical composition of tailings pore water would in general vary with burial depth; and,
6. physicochemical and geochemical parameters such as pH, turbidity, electrical conductivity, oxygo-reduction potential, and dissolved oxygen could normally be obtained accurately by direct measurements only.

In addition, CINRAC notes that pore water can be sampled and monitored by other means without the installation of piezometers or monitoring wells.

CIRNAC requests AEM to either redesign the monitoring program or provide justifications for the proposed approach and the details on how each of the physicochemical and geochemical parameters of tailings pore water will be calculated from that of the mill effluent slurry and the reclaim water for further review.

CIRNAC appreciates the opportunity to participate in this review. If there is any question, please contact me at (867) 975-4555 or david.zhong@canada.ca.

Sincerely,

David Zhong
Regulatory and Science Advisor