Meliadine Gold Project Water Licence Amendment Application

Technical Review of Application For Amendment To Type A Water Licence 2AM-MEL1631

Rankin Inlet, Nunavut.
November 30, 2020

KIA's Role

- KIA represents Inuit and administers certain provisions of the Nunavut Agreement in the Kivalliq Region.
- KIA's mission is to represent Inuit in a fair and democratic manner in the development, protection, administration and advancement of their rights and benefits; and to promote economic, social, political and cultural well-being.
- The aim of Inuit Owned Land management is to administer those Lands to promote self-reliance and the cultural and social well-being of Inuit now and in the future.
- Inuit Owned Lands must be managed in such a way as to sustain and enhance the value of the lands.

Review Objectives

- Ensure that the potential impacts and benefits were comprehensively assessed
- Ensure Inuit Qaujimajatuqangit values were incorporated into impact determination, mitigation, project design and monitoring

Review History – Initial Assessment

- AEM submitted an Amendment Application to their Type A Water Licence 2AM-MEL1631 on August 27, 2020 seeking permission for the following amendments:
  - Updated total dissolved solids thresholds to Meliadine Lake;
  - Increased annual freshwater consumption;
  - Construction of additional laydown areas;
  - Updated waste management strategy;
  - Construction of site access roads; and
  - Updated Interim Closure and Reclamation Plan.

- KIA completed a completeness and initial technical review on September 22, 2020 highlighting 13 information requests and initial technical concerns.

Review History – Initial Assessment

- AEM responded to KIA's initial set of 13 information requests, resolving most by:
  - Providing additional clarifications regarding TDS measurement approaches, toxicity monitoring, water management and geotechnical concerns
  - Reiterating their commitment to including IQ throughout all phases of the mine.
  - Committing to update their Freshet Management Plan to reflect the decommissioning of the P-Area.

Review History – Initial Assessment

- The following three information requests remained unresolved and were caried forward to the technical review stage:
  - AEM had not adequately addressed KIA's request to investigate opportunities for improved source control from runoff to prevent the need for increase discharge criterion.
  - AEM had not clearly committed to divert all site contact water to the forthcoming waterlines.
  - Concerns remain surrounding the viability of the proposed short- and medium-term saline groundwater management strategies.

Technical Review

- KIA submitted our technical review to the NWB on November 6, 2020 highlighting 5 new technical concerns in 5 new areas:
    1. Develop an effluent and receiving environment site specific water quality objective for chloride.
    2. Justification for the use of average values for the water quality model.
    3. Missing source term for runoff from the tailings storage facility in the water quality model.
    4. Potential insufficient design capacity of CP1 and D-CP1.
    5. Inclusion of soil and water quality objectives in closure criteria for Rankin Inlet Facilities.
- AEM responded to those technical concerns November 13, fully resolving issue 5.

Outstanding Information Requests and Technical Concerns

3 /13 Information Requests outstanding

4 / 5 Technical Comments outstanding or partially outstanding

KIA-IR#1

Proposed total dissolved solids targets and alternatives to manage CP1 water

- KIA was concerned that insufficient evidence had been provided demonstrating the need for increased TDS discharge criteria.
- KIA also highlighted the community had become concerned with the discharge of TDS rich effluent to Meliadine Lake
- KIA are still not satisfied that additional source controls are not possible
- AEM maintains that further source control is not viable to reduce the overall TDS loadings to Meliadine Lake, indicating that treatment of water from CP2, CP3, CP4, CP5, and CP6 was not feasible

KIA-IR#1

Proposed total dissolved solids targets and alternatives to manage CP1 water

- KIA maintains that CP5 already has a Reverse Osmosis installed and it is not clear why a similar approach is not viable for the other CPs receiving elevated TDS water from key project infrastructure
- KIA is still requesting additional clarity on available approaches to reduce TDS loadings to CP1 should ongoing discharges to Meliadine Lake be required

KIA-IR#2

Diversion of CP1 water to waterline

- KIA continues to request that AEM divert all contact water from CP1 to the waterlines when they become available
- AEM suggests that NWB leave open the option to discharge CP1 via waterlines by requiring an update of the:
  - Water Management Plan;
  - Water Balance and Water Quality Surface; and,
  - Groundwater Management Plan.
- AEM justifies this approach by referencing the approach to using the Alternative Discharge to Lakes D1 and D5 for the Whale Tail Project. However, additional permitting is still required to implement this approach

KIA-IR#2

Diversion of CP1 water to waterline

- KIA is concerned this approach indefinitely defers diversion of water from CP1 to the waterlines
- KIA is further concerned as to whether AEM's proposed approach would be sufficient given use of the waterlines may also require an amendment to the Environmental Assessment of the marine environment as well as the project certificate.
- KIA recommends AEM incorporate diversion of all CP1 water to the waterlines as part of the current proposals before the NWB and NIRB to help address concerns with water quality in Meliadine Lake
- Local concerns raised now result from an improved local understanding of CP1 discharges to Meliadine Lake

KIA-IR#9

Viability of medium-term strategy to mange saline groundwater

- Available saline water storage capacity is expected be exceeded by mid-May 2021 while the waterline will not be available to discharge until late 2022
- KIA is concerned with the viability of the short and medium term approach to manage saline groundwater, particularly because the waterline has yet to be permitted.
- AEM has provided additional information indicating the Tiriganiaq-2 open pit can be used to store excess saline groundwater until the waterline is available.

KIA-IR#9

Viability of medium-term strategy to mange saline groundwater

- KIA is concerned with the proposed approach because:
  - The mine plan indicates ongoing advancement of Tiriganiaq-2 in 2021 and 2022. It is unclear how the pit can be used to manage saline water while still being mined
  - The available storage outlined by AEM for Tiriganiaq-2 does not change between 2021 and 2027. It is unclear how AEM calculated the storage volume available in Tiri-2
- AEM should clarify the feasibility of the short and medium strategies to manage saline groundwater
- AEM should also clarify contingency options to manage saline groundwater if the waterlines are not completed within the expected timeline

KIA-TC#1

Site Specific Water Quality Objectives for Total Dissolved Solids Constituents

- The main parameters that make up total dissolved solids can be independently toxic, however the current ratios of these substances in the effluent permit greater tolerance by aquatic biota.
- Should the chemistry of the effluent change and alter the ratio of constituents, the effluent could become more toxic.
- KIA recommended that AEM develop a site specific water quality objective for chloride, the key constituent of total dissolved solids discharged from the Meliadine Mine, in the event the chemistry of the effluent changes.

KIA-TC#1

Site Specific Water Quality Objectives for Total Dissolved Solids Constituents

- AEM has agreed to develop a Site-Specific Water Quality Objective for chloride should the proportion of chloride in the effluent meet or exceed 60% as compared to the current approximate 50% contribution
- KIA accept this proposal and suggest that AEM incorporate this adaptive management approach and into a consolidated Adaptive Management Plan for the project.

KIA-TC#2

Water quality model inputs

- KIA was concerned that inputs selected by AEM for application within the water quality model may limit its ability to accurately predict TDS concentrations in the discharges to Meliadine Lake.
- AEM has responded by updating the Site Water Balance and Water Quality Model relying largely on observed site conditions and monitoring data from 2019 and 2020
- The updated model provides additional confidence in the accuracy of the model outputs

KIA-TC#2

Water quality model inputs

- The updated model clarifies that CP1 water may approach or exceed 3,500 mg/L TDS under some conditions, including when cryo-concentrated
- KIA suggests that this updated model provides additional rationale for AEM to proceed with diverting all site water to the waterlines as part of the current application

KIA-TC#4

Water management alternatives

- KIA was concerned CP1 may not have sufficient capacity to manage extreme rainfall (>95th percentile) events
- Current wet weather modeling did not appear to account for a scenario such as the rainfall during summer 2019
- KIA recommended consideration of alternate water management strategies, specifically:
  - Reduce the TDS treatment threshold for the reverse osmosis plant in CP5 to increase discharge flexibility by providing dilution to elevated TDS waters in CP1
  - Investigate impacts to water levels in Meliadine Lake if all water from CP1 was diverted to the waterlines for discharge in Melvin Bay.

KIA-TC#4

Water management alternatives

- AEM has indicated that additional treatment via Reverse Osmosis would result in significantly more saline groundwater requiring management – *“similar to adding 2 to 3 underground mines to the Project”*
- KIA accept that larger scale water treatment may not feasible in the short term, but may be a viable option when the waterlines are available.
- KIA requests AEM commit to diverting all CP1 water to Melvin Bay once the option is available provided water quantity modeling indicates this will not adversely affect Meliadine Lake

KIA-TC#5

Rankin Inlet facilities closure objectives

- AEM indicates that soil and water monitoring will be used to determine whether the Rankin Inlet Facility area may be a source of future contamination.
- KIA recommends the Interim Closure and Reclamation Plan be updated with soil and water quality objectives that must be met to evaluate the closure criteria for the Rankin Inlet Facilities.
- AEM has agreed to update the Interim Closure and Reclamation Plan accordingly as well as the related management and monitoring plans.
- KIA is also working with AEM to finalize an updated value for reclamation security.