AGNICO EAGLE

2AM-MEL1631 Water Licence Amendment

Technical Comment Responses

Submitted to:

Nunavut Water Board

Submitted by:

Agnico Eagle Mines Limited – Meliadine Division

November 13, 2020

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CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-1**
Re:	**Total Dissolved Solids (TDS) Thresholds**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM provide an evidence-based rationale for the proposed revisions to the TDS threshold.

Agnico Eagle's Response to Recommendation:
We would like to refer CIRNAC to the KivIA-WL-TC-2 response for details on development of an upper bound set of predictions for TDS to support the request to revise discharge criteria for TDS.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-2**
Re:	**Works Related to Additional Deposits (Discovery, Pump, Fzone, and WES-NORMEG**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM Confirm their intention to develop other deposits referenced in the application, and if so, provide additional information on the deposits not currently included in the Type "A" Water Licence, and plans for their development and mining.

Agnico Eagle's Response to Recommendation:
Agnico Eagle would like to clarify that this application only includes the development of the access roads to the deposits as part of the 2015 Project Certificate and does not include the mining of the Discovery, Pump, Fzone, and WES-NORMEG deposits. Proposed changes to water consumption, additional surface laydown area, and WRSF3 Extension are not related to the above listed deposits, but are related to the mining of the Tiriganiaq deposit. For clarity, mining of the Discovery, Pump, Fzone, and WES-NORMEG deposits were all included in the 2014 FEIS, and 2015 Project Certificate.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-3**
Re:	**Water Balance Clarifications**		

Recommendation Made by Interested Party:

CIRNAC recommends that AEM provide clarification regarding the following:

1. *The threshold applied in the management of CP5 water quality for RO treatment of TDS before discharge.*

2. *The rationale for diverting water from CP1 to SP3.*

Agnico Eagle's Response to Recommendation:

Part 1

The CP5 water treatment threshold for RO treatment of TDS was set at 1,400 mg/L in 2019 and to 3,500 mg/L in 2020.

Part 2

Agnico Eagle refer CIRNAC to the approved SETP design report (Agnico Eagle 2020). The rationale for diverting water from CP1 to SP3 is consistent with the approved SETP design report. This design report was reviewed by ECCC, CIRNAC, and KIA and approved by NWB on September 9, 2020.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-4**
Re:	**WRSF3 Expansion and Updated Waste Management Strategy**		

Recommendation Made by Interested Party:
CIRNAC recommends that AEM:

1. *Clarify the additional deposits referenced as the basis for extension of WRSF3*

2. *Provide additional information on the lithological and geochemical nature and extent of waste rock from these additional deposits.*

Agnico Eagle's Response to Recommendation:
Part 1

Agnico Eagle would like to clarify that this application only includes the development of the access roads to the deposits as part of the Project Certificate and does not include the mining of the Discovery, Pump, Fzone, and WES-NORMEG deposits. The proposed WRSF3 Extension is triggered by the cancellation of the WRSF-2 and the mining of the Tiriganiaq pit, which is approved under the current water licence, and is not related to the above listed deposits. The extension is required to accommodate tonnage original planned to be stored at the WRSF 2. No change to the mine plan is part of this application.

Part 2

Agnico Eagle does not consider that the geochemical information related to the other deposit is relevant for this amendment as no change to the mine plan is included in the application. However, Agnico Eagle would refer CIRNAC to the FEIS Geochemical Baseline Report (Golder 2014) located on the NIRB registry for additional information.

Reference:

Golder (Golder Associates Ltd.). 2014, SD6-3 Geochemical Characterization of Waste Rock, Ore, Tailings and Overburden – Meliadine Gold Project, Nunavut, April 2017

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-5**
Re:	**Validation of Proposed Total Dissolved Solids (TDS) Discharge Criteria**		

Recommendation Made by Interested Party:
CIRNAC recommends that the proposed TDS discharge criteria Effluent Quality Criteria (i.e., MAC of 3,500 mg/L and MGC of 5,000 mg/L) and Site-Specific Water Quality Objective (SSWQO) at the edge of the mixing zone (1,000 mg/L) be considered for review by the NWB when the results of all monitoring efforts and laboratory tests are made available and reviewed to confirm that the proposed criteria are properly validated.

Agnico Eagle's Response to Recommendation:
The Water Quality Management Optimization Plan (WQ-MOP) was developed by Agnico Eagle to provide a procedure to determine acceptable discharge criteria and in-lake monitoring objectives in Meliadine Lake. The validation monitoring study (Phase 2 of the WQ-MOP) was conducted between June 5 to October 4, during the period when water was discharged to Meliadine Lake. The monitoring included three components: water quality monitoring (discharge and receiving environment), toxicity testing (discharge and receiving environment), and plume delineation studies. Additional toxicity testing outside of the WQ-MOP was also conducted. The results of these studies are described in detailed in the attached Revision 4 of the WQ-MOP report (Attachment WL-TC-1) and are summarized as follows:

- The monitoring data confirm that the diffuser is working as planned and that water being released to Meliadine Lake is safe to the environment, fish, and other aquatic life
- The discharge has not been acutely toxic
- The maximum average concentration (MAC) TDS concentration of 3,500 mg/L and maximum grab concentration (MGC) TDS of 5,000 mg/L will remain protective of the receiving environment
- Chronic toxicity has not been observed at the edge of the mixing zone
- An edge of the mixing zone TDS benchmark or site-specific water quality objective (SSWQO) of 1,000 mg/L remains protective of the environment
- TDS concentrations will incrementally increase in the near-field area with continuing discharge, but concentrations will remain below the in-lake benchmark, and safe for aquatic life. Concentrations in the mid-field will not be discernable from background and reference area concentrations.

Agnico Eagle also conducted a study to evaluate the mixing and assimilation of discharge in the Meliadine Lake south basin. This study considered yearly discharge between June and October for 2018 to 2028, and year-to-year accumulation of discharge in the receiving environment. For 2018 to 2020, measured TDS concentrations in the discharge were used (measured TDS ranged from 1,000 and 1750 mg/L during these three years). For 2021 to 2028, TDS concentrations in discharge were set to 3,500 mg/L. Predicted dilution and mixing for 2020 under this study was confirmed by the monitoring data collected under the WQ-MOP. The results of this study are described in detailed in the attached three-dimensional hydrodynamic model report (Attachment WL-TC-2) and are summarized as follows:

- Measured data from 2018 to 2020 provided a solid dataset to validate the model. There was very close agreement between TDS modelled and observed concentrations, giving a high level of confidence in the forecast modelled TDS concentrations.
- Minimum dilution at the edge of the mixing zone following a multi-year simulation is estimated at 25:1, which is aligned with past studies. Observed dilutions reached a minimum of 41:1 over the past three years of discharge, supporting the modelling results.
- TDS concentrations in the receiving environment remained below the interim benchmark through the life of mine.
- Maximum modelled TDS concentration reached about 180 mg/L over the multi-year simulation.
- Discharge disperses outside of the mixing zone at very small concentrations into the rest of the Meliadine Lake south-basin. The general lake circulation indicates the discharge plume to be carried towards the southeast basin of Meliadine Lake with a return current near the lakebed towards the northwest. In other words, discharge is well mixed and well diluted when exiting the mixing zone.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-6**
Re:	**Surface Contact Water Management and Waterline Discharge to Melvin Bay**		

Recommendation Made by Interested Party:

CIRNAC recommends that AEM provide:

1. *Information on how AEM's site water management strategy would change if the NIRB approves AEM's waterline application.*

2. *Relevant additional details related to expected changes in site facilities (ponds, treatment plants, etc.) and operations of these facilities that would result in association with the proposed waterlines should they be approved by the Nunavut Impact Review Board.*

Agnico Eagle's Response to Recommendation:

Part 1

Meliadine site water management strategy would be similar. Surface Contact Water will still report to the same Collection Ponds and being stored in CP-1. Saline Water from the Underground Mine will still report to the Saline Ponds.

The change would be related to the capacity of moving water to Melvin Bay as the Waterline would provide an opportunity to increase the daily discharge volume to Melvin Bay, from the existing volumes conveyed by trucks plus the stored inventory of saline water can be depleted.

Part 2

Collection ponds and Treatment Plants will remain similar. The only proposed change is related to the increase in capacity of the Saline Effluent Treatment Plant and to the maintenance of the Waterline. There may be other changes to be evaluated based on the comments from the NIRB process.

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-WL-TC-7**
Re:	**Reclamation Security Estimate Update**		

Recommendation Made by Interested Party:
CIRNAC recommends that the quantum of security estimate for the Meliadine Gold Mine project be set at $68,136,616.

Agnico Eagle's Response to Recommendation:
Agnico Eagle appreciates the recommendation and is looking forward to discuss the details of the proposed change in security with CIRNAC. Agnico Eagle will report back to NWB once we reach agreement with CIRNAC and KIA on the Reclamation Security.

ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

Interested Party:	**ECCC**	**Rec No.:**	**ECCC-WL-TC-1**
Re:	**Characterization of Actiflo treatment sludge deposited to CP1**		

Recommendation Made by Interested Party:
ECCC looks forward to receipt of the requested information prior to the technical meetings s.

Agnico Eagle's Response to Recommendation:
Evaluation of the options for alternative sludge disposal is still ongoing. However, Agnico Eagle will commit that the sludge from the EWTP will not be deposited in CP1 for the discharge season 2021 and the primary option will be to direct the sludge to a saline pond.

Sludge characterization is presented in Attachment WL-TC-4.

Interested Party:	**ECCC**	**Rec No.:**	**ECCC-WL-TC-2**
Re:	**Clarification of water balance re: application for additional volumes**		

Recommendation Made by Interested Party:
ECCC requests clarification as to where the additional freshwater volumes of water end up, and how the process water that reports to the tailings will affect TDS loadings going into CP3 and CP1.

Agnico Eagle's Response to Recommendation:
The additional fresh water will be recirculated in the mill at the tailings filter press. The water content of tailings after placement will remain on average 17%, therefore, no impact on TDS loadings at CP3 and CP1 is expected from the TSF.

KIVALLIQ INUIT ASSOCIATION (KIVIA)

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-1**
Re:	**Proposed TDS targets and alternatives to manage CP1 water**		

Recommendation Made by Interested Party:
Agnico Eagle should characterize the expected reductions in TDS loading achieved by optimizing waste rock deposition on a yearly basis and provide a discussion of the potential reductions in TDS concentrations in CP1 through further refinement of source controls. The intended goal of this information is to demonstrate the feasibility of maintaining the existing TDS water quality criterion.

Agnico Eagle's Response to Recommendation:
We would like to refer KivIA to the KivIA-WL-TC-2 response for details on development of an upper bound set of predictions for TDS to support the request to revise discharge criteria for TDS.

For purposes of a predictive water balance and water quality model, quantities and placement of waste rock was based on the schedule as outlined in the Waste Management Plan (V7, July 2020). Waste rock will be used for surface construction, underground rockfill, closure cover material, or placed within one of the WRSFs. This placement sequence and schedule was used in the water quality forecast (both the lower bound and the upper bound predictions). Further optimization of waste rock placement will be considered during operations and will be based on site conditions or as an adaptive management response to monitoring results.

Opportunities for treatment at the individual containment ponds will not be feasible. As described in the Water Management Plan (V10, August 2020), the volume available in the containment ponds CP2 (once constructed), CP3, CP4, CP5, and CP6 is small relative to CP1. These ponds (CP2, CP3, CP4, CP5, and CP6) were not designed to attenuate water but were designed to manage freshet and summer precipitation runoff. Ponds CP2, CP3, CP4, CP5, and CP6 were designed to manage water from their catchment areas for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall. In contrast, CP1 was designed to contain water from the entire site for a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet plus a 1:1000 return 24-hour extreme rainfall (Water Management Plan). To manage water at site, it needs to be pumped from the smaller CPs to the main attenuation pond where the water can either be stored or treated.

In order to treat water with a reverse osmosis plant, the quantity and quality of water needs to be consistent. The quantity and quality of water in CP2, CP3, CP4, CP5, and CP6 is not consistent in and between years. For this reason, it would not be practical to install a treatment system at various source CPs. It is more efficient and practical to treat water at one central location. Additional details related to the feasibility of implementing treatment at various source is provided in response to the KIA-WL-TC-4. Moreover, Agnico Eagle would like to clarify that based on the technical information collected at this point, presented to the members of the Water Management Working Group and integrated into the WQ-MOP Rev4, the increase in TDS discharge criteria does not results in any additional adverse effect to the Meliadine Lake. We still consider that the increase of the TDS discharge criteria is a reasonable request that would secure water management at site.

It is important to recall that the need for discharges to Meliadine Lake from the Meliadine Mine has always been a key component of the Project design, and Agnico Eagle has designed the Project and this Application in a manner that is respectful of the IQ that has been shared that Meliadine Lake is an important lake for fishing and for drinking water for Rankinmiut The KIA participated in all stages of the initial NIRB (2014) and NWB (2016) processes relating to the Meliadine Mine, and has not identified material concerns relating generally to discharges to Meliadine Lake previously.

Through the public consultation process for the Meliadine FEIS and the Traditional Use Study (FEIS, Volume 9), Meliadine Lake was identified as an important drinking water source, including use for making tea, by local residents (Agnico Eagle 2014). Domestic fishing is an important part of the Inuit way of life, and most of the waterbodies in the study area are fished for Lake Trout and Arctic Char. Therefore, the fish health program incorporated Lake Trout as the large-bodied fish species. Based on IQ and community consultation, the importance of clean water and the health of fish and birds was emphasized by the Elders and other people in the communities who rely on these resources for traditional use. Elders have previously expressed concerns regarding potential adverse effects due to the project on drinkability of water and fish populations in waterbodies in the entire Meliadine watershed. Therefore, two distinct programs are included in the AEMP: the Meliadine Lake study and the Peninsula Lakes. In addition, a framework for responding to changes has been identified to allow Agnico Eagle to respond quickly and early to any unexpected changes in Meliadine Lake or the Peninsula Lakes. Agnico Eagle is confident in its conclusions that the proposed revised TDS limit will not adversely impact drinkability or fish populations, and that the monitoring and response framework previously developed will continue to ensure the discharge is protective of the aquatic environment.

Agnico Eagle is committed to including IQ and public concerns stemming from IQ, where practical, in the design of management and monitoring plans for the Project. Agnico Eagle will continue active engagement with communities and Inuit organizations. In addition, feedback will be sought on the reporting of results to the local communities so that it is of relevance and meaning to them. This consultation and engagement should lead to further inclusion of IQ, as it becomes available, in updates to the design and implementation of environmental programs. This approach will help ensure that the combination of science and IQ leads to monitoring that meets the expectations of KIA, community members and government.

The need for ongoing community consultation is also incorporated in NIRB Project Certificate No. 006, TC 103:

> "The Proponent is encouraged to consult with the Kangiqliniq Hunters and Trappers Organization and the Kivalliq Socio-Economic Monitoring Committee and to make all reasonable efforts to engage Elders and community members of the Kivalliq communities in order to have community level input into updates to its monitoring plans, programs and mitigative measures. This type of engagement will ensure that these programs and measures have been informed by traditional activities, cultural resources, and land use as such may be implicated or impacted by ongoing Project activities. All plans are to include a feedback mechanism for consulting with residents of the Kivalliq, including the provision of 57 results from the Proponent's wildlife monitoring programs to each community."

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-2**
Re:	**Diversion of CP1 water to waterline**		

Recommendation Made by Interested Party:
KIA appreciates the information provided and considers this comment resolved for the purposes of this technical review.

However, KIA continues to request Agnico Eagle investigate the diversion of all site contact water from CP1 to the marine environment for discharge. KIA also reiterates it does not support the increase in TDS discharge criteria.

Agnico Eagle's Response to Recommendation:
Diversion of site contact water from CP1 to the marine environment is part of the alternative section of this application and Agnico Eagle will provide that information once the Waterline is approved. This approach has been approved before such as the one used for Whale Tail Expansion Project with the Alternative Discharge to Lakes D1 and D5.

We would request NWB to include into the licence the required information for this alternative, which Agnico will submit for approval, 6 months prior to diversion of surface contact water to the Waterline. The information would consist of an update of the:

- Water Management Plan;
- Water Balance and Water Quality Surface; and,
- Groundwater Management Plan.

Additionally, Agnico Eagle would like to clarify that based on the technical information collected at this point, presented to the members of the Water Management Working Group and integrated into the WQ-MOP Rev4, the increase in TDS discharge criteria does not results in any additional adverse effect to the Meliadine Lake. We still consider that the increase of the TDS discharge criteria is a reasonable request that would secure water management at site.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-3**
Re:	**TDS measurements**		

Recommendation Made by Interested Party:
Comment is considered resolved.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-4**
Re:	**Chronic toxicity monitoring result**		

Recommendation Made by Interested Party:
Comment is considered resolved.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-5**
Re:	**Consideration of IQ in closure objectives**		

Recommendation Made by Interested Party:
Comment is considered resolved.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-6**
Re:	**Evaluation of impacts to Meliadine Lake water levels from alternative water management approaches**		

Recommendation Made by Interested Party:
Comment is considered resolved, but please see KIA technical comment titled "Water Management Alternatives" for follow up concerns.

Agnico Eagle's Response to Recommendation:
Agnico Eagle refers the KivIA to the response provided in KIA-WL-TC-4 for further details.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-7**
Re:	**Design capacity for CP1 and D-CP1**		

Recommendation Made by Interested Party:
KIA appreciates the information provided and considers this comment resolved. It has however raised additional concerns. Please see KIA technical comment titled "Water Management Alternatives" for follow up concerns.

Agnico Eagle's Response to Recommendation:
Agnico Eagle refers the KivIA to the response provided in KIA-WL-TC-4 for further details.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-8**
Re:	**Groundwater inflows and storage capacity**		

Recommendation Made by Interested Party:
This comment is partially resolved.

The KIA agrees that saline water management is not part of the current NWB amendment, however on-site water management is a key part of the water management strategy.

Concerns surrounding ground water storage capacity are addressed in KIA-IR#9.

Agnico Eagle's Response to Recommendation:
Agnico Eagle refers KivIA to the response provided in KIA-WL-TC-9 for further details.

Interested Party:	KivIA	Rec No.:	KIA-WL-IR-9
Re:	Viability of medium-term strategy to manage saline groundwater		

Recommendation Made by Interested Party:
Therefore, the KIA reiterates their request for Agnico Eagle to clarify their capacity to implement the medium-term strategy to manage saline groundwater without exceeding the current discharge limit to Melvin Bay of 1,600 m3/day.

Please outline contingencies to manage saline groundwater in the medium term until the waterline has been permitted and brought online (i.e. 2022 at the earliest) with a particular focus on saline groundwater management in 2021. We specifically request Agnico Eagle discuss how changes to the mining schedule (i.e. reducing the rate of mining) may reduce the volume of saline groundwater on site requiring management.

Agnico Eagle's Response to Recommendation:
Agnico Eagle has assessed the conducted sensitivity analyses for storage and management of saline groundwater prior to the waterline be permitted and operational.

Table KIA-WL-9-1 presents an overview of the yearly storage capacity for the different saline water ponds and pits under various scenarios. The scenarios include a lower-bound or base case and an upper-bound which consists on a sensitivity analysis of the increased hydraulic conductivity of the bedrock. These projections do not include the option of grouting. The data indicates that Agnico Eagle will have the capacity to store the saline groundwater until the waterline had been approved in 2022.

Table KIA-WL-9-1. Projected saline storage requirements vs. available storage through time

Year	Lower-bound Base Case Saline Storage Requirement[1] (m^3)	Upper-Bound Saline Storage Requirement[2] (m^3)	Saline Pond / Open Pit Storage Capacity (m^3)			
			SP1	SP4[3,4]	Tiri2	Total[5]
2021	355,026	494,769	32,000	*272,122*	1,152,852	1,184,852
2022	490,044	792,423	32,000	*272,122*	1,152,852	1,184,852
2023	589,676	975,080	32,000	*272,122*	1,152,852	1,184,852
2024	287,033	836,437	32,000	*272,122*	1,152,852	1,184,852
2025	148,590	673,616	32,000		1,152,852	1,184,852
2026	154,590	535,794	32,000		1,152,852	1,184,852
2027	145,590	392,793	32,000		1,152,852	1,184,852

Notes:
1. Saline water storage requirement for given year applying Base Case predictive groundwater inflow model
2. Saline water storage requirement for given year applying 3x k-value bulk bedrock sensitivity analysis predictive groundwater inflow model
3. The capacity of SP4 has been updated based on the as-built capacity (previous design value presented in the 2020 Water Management Plan was 233,133 m^3)
4. *Italicized, gray* values are contingency storage only
5. Excludes contingency storage
6. Storage requirements assume discharge through the proposed waterline begins July 1st 2023

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-10**
Re:	**Future freshet management**		

Recommendation Made by Interested Party:
Comment is considered resolved.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-11**
Re:	**Water Retention Dikes and Berms**		

Recommendation Made by Interested Party:
The CP2 Pond/Berm has the closest proximity to the largest lake near the Meliadine gold mines infrastructure. The KIA looks forward to reviewing the data from the detailed geotechnical investigation and the resulting detailed design and any possible adjustments to the design philosophy.

However, before the KIA considers this issue resolved for the purpose of this technical review the KIA would request that Agnico Eagle provide comments on the possibility of CP2 being used for short term contact water storage during the 2021 freshet due to saline water capacity of CP1 being reached by mid-May, 2021.

Please refer to the KIA comments in KIA-IR-10.

Agnico Eagle's Response to Recommendation:
Although the geotechnical investigation and detailed design have not yet been initiated, it is expected that CP2 will follow a similar design basis as all other collection ponds on site and be sized for a storage capacity for 3/7 of a 1:100 wet precipitation freshet after which minimal water levels will be maintained in the pond. Increasing the ability of the pond to store a larger volume of water is expected to be challenging given the tight space between the proposed WRSF3 footprint expansion, pond location and Meliadine Lake. Changing the design philosophy to store water for a longer period of time could impact the surrounding permafrost, which given the ponds proximity to Meliadine Lake and potential for seepage, would be undesirable.

Although final decisions regarding the design basis will be made following the geotechnical investigation, the possibility of CP2 being considered for additional contact water storage during the 2021 freshet is therefore not believed to be appropriate at this time.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-12**
Re:	**Vertical GTS's will be installed to a minimum of 7 metres below the original ground elevation**		

Recommendation Made by Interested Party:
This comment is considered resolved for the purpose of this technical review.

The KIA looks forward to reviewing the thermistor data, final designs and as-built reports for Pond/Berm CP-2. The KIA appreciates the thermistor data provided by Agnico Eagle from the downstream slope of Berm CP-6.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-IR-13**
Re:	**Lessons Learned from Other Projects.**		

Recommendation Made by Interested Party:
This comment is considered resolved for the purpose of this technical review. The KIA looks forward to reviewing the final designs and as-built reports from Tetra Tech for WRSF-3 and Berm CP-2.

Agnico Eagle's Response to Recommendation:
Agnico Eagle acknowledges the information provided to the information request addresses KivIA's needs for this matter.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-TC-1**
Re:	**SSWQOs for Total Dissolved Solids Constituents**		

Recommendation Made by Interested Party:
We recommend developing a SSWQO for chloride at the edge of the mixing zone and within the receiving environment as the largest contributor to TDS in Meliadine effluent.

Agnico Eagle's Response to Recommendation:
Due to the strong and consistent relationship between TDS and chloride in Meliadine effluent, Agnico Eagle does not believe that an SSWQO for chloride at the edge of mixing zone and within the receiving environment is necessary at this time. A chloride SSWQO would be redundant with the existing TDS SSWQO; furthermore, the monitored TDS concentrations in 2020 at edge of mixing zone were well below both the TDS SSWQO and the generic CCME long-term guideline for chloride (120 mg/L), indicating negligible risk.

Although there is not an imminent need for a chloride SSWQO, Agnico Eagle agrees that the consideration of chloride toxicity could be integrated through adaptive management, which could ultimately entail development of an SSWQO for chloride. Suggestions for how this could be implemented include:

- Continue to monitor the composition of TDS in effluent
    - Monitoring of effluent in 2019–2020 indicates consistency in composition, with approximately 50% of the TDS contributed by chloride (see response to CIRNAC-WL-TC-5 and Attachment WL-TC-1).
    - If predictions of chloride proportion increase to 60% in effluent, based on an annual discharge average, then the development of a chloride SSWQO would be warranted.
    - If proportions of chloride remain stable or decrease over time, no SSWQO is necessary.
- Preliminary screening of chloride at edge of mixing zone—the generic long-term CCME guideline of 120 mg/L is currently used as a benchmark within the AEMP. Agnico Eagle will continue to monitor TDS composition at the edge of mixing zone, and if the generic guideline of 120 mg/L is approached (i.e., measured concentrations at edge of mixing zone are greater than 75% of the guideline) than a chloride SSWQO would be advanced.
- Derivation methods—If SSWQO development is triggered by either of the above considerations, the process would follow the CCME (2007) derivation procedures, which entail screening of toxicity data for reliability and relevance, normalization of toxicity data to toxicity modifying factors in the receiving environment (e.g., water hardness), fitting of data using a species sensitivity distribution curve, and adoption of the HC5 as the SSWQO.

The above approach is similar to that applied at other Northern mine sites (e.g., Ekati, Gahcho Kué, Giant Mine), is science-based, and is in alignment with regulatory systems for benchmark development.

References

CCME (Canadian Council of Ministers of the Environment). 2007. A Protocol for the Derivation of Water Quality Guidelines for the Protection of Aquatic Life. In: Canadian Environmental Quality Guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-TC-2**
Re:	**Water Quality Model Inputs**		

Recommendation Made by Interested Party:
To add confidence in the inputs values provided for the water quality model in terms of concentrations for the main camp STP effluent, WRSF runoff loading, ore stockpile runoff loadings and loadings from the tailings storage facility runoff facility, we recommend that Agnico Eagle provide the range in values and justification for the use of the average instead of a more conservative value as well as justification for the use of the 25% reduction in TDS concentrations from Channel 1. We further recommend how model outputs would be impacted if a more conservative 75th percentile values were used as inputs into the water quality model with a particular focus on impacts to Meliadine Lake.

Agnico Eagle's Response to Recommendation:
Agnico Eagle requested an increase to the TDS discharge criteria (from 1,400 mg/L to 3,500 mg/L, maximum average concentration) because TDS concentrations in CP1 have been trending upward and have exceeded the regulated discharge limit of 1,400 mg/L.

The August 2020 submission for the Type A Water Licence Amendment included an updated Site Water Balance and Water Quality Model forecast (Appendix A with the submission). This model used less conservative assumptions including: average monthly concentrations, dry year runoff volumes, not accounting for ice formation (and thus cryo-concentration in CP1), potential lags in releases, a year over year reduction in source terms by 25%, and assigning undisturbed land cover types (with associated source terms) within the mine footprint area. Based on this, results from the August model are considered to represent a lower bound set of predictions.

Since submission of the original application and based on comments received during the information request process, Agnico Eagle has taken the opportunity to re-evaluate various inputs to the model including assumptions, source water quality, processes, site conditions, and monitoring data (including data from 2019 and 2020). Precipitation and runoff was higher in 2019 as compared to 2020, so inclusion of data from both years introduced an observed range in natural environmental variability. A high-level mass balance for CP1, with these new inputs, was completed (Figure 1; Attachment WL-TC-3). Results from this model are considered to represent an upper bound set of predictions for the Life of Mine.

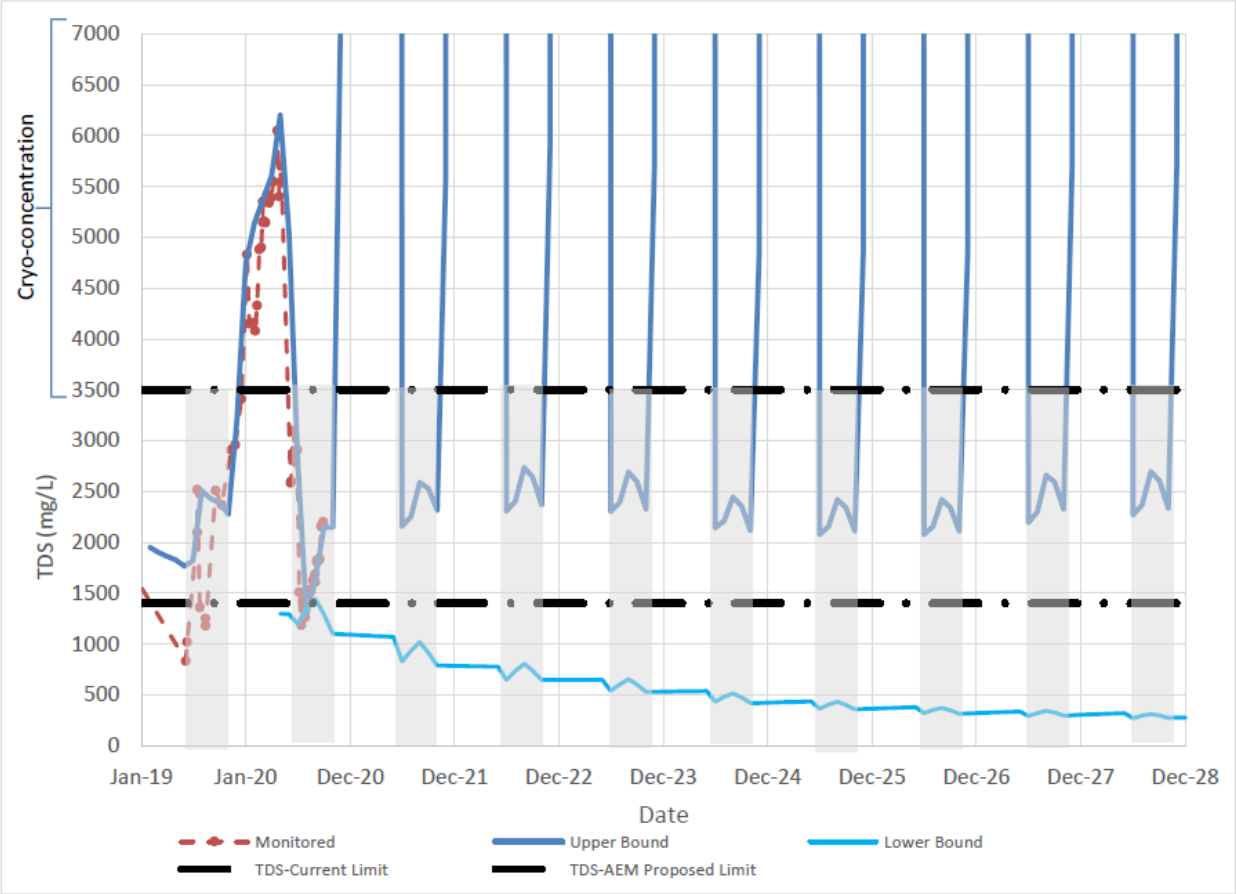

Figure 1. Monitored and Forecasted TDS Concentration in CP1

To address concerns raised by interveners on the model predictions and input source terms, specific changes and updates made to the water balance and water quality forecast model to develop the upper bound set of predictions. These changes in inputs were largely informed by site conditions and/or monitoring data collected in 2019 and 2020. These revised inputs include:

- Runoff coefficients were adjusted by using pumping volumes records from the containment ponds
- Climate measurements from 2019 and 2020 were used
- Within the main footprint area, landcovers assigned as natural (in the lower bound model) were adjusted to low or high disturbed areas (as based on recent surveys and site photos)
- Runoff quality from high disturbed areas (assumed to improve by 25% each year in the lower bound model) was kept constant through the model
- As freshet is a key component of the water balance, the timestep for June was adjusted to weekly instead of monthly
- The effect of ice melt was applied for the last two weeks of June

- Cryo-concentration was applied to CP1
- The starting concentration 2020 under-ice concentration in the containment ponds was adjusted to reflect measured under-ice concentrations (in the lower bound model, the predicted number was less than measured)
- The loading term from the tailings facility and the waste rock facilities were adjusted based on recent data

The lower bound and the upper bound set of predictions are expected to represent the range of conditions that could occur at the site. The models will be updated annually with the most recent data and will be used to guide daily operations at the site.

Although TDS concentrations in the discharge are expected to be less than 3,500 mg/L during most times of the year, the proposed limit of 3,500 mg/L provides operational flexibility and avoids circumstances that would require future emergency amendment applications.

These upper bound predictions support the request by Agnico Eagle for higher TDS discharge limits. Additional studies on discharge and receiving environment water quality and toxicity were conducted in 2020 (see response to CIRNAC-WL-TC-5). These studies demonstrated that discharge at these TDS concentrations is not acutely toxic and will not result in adverse effects in the receiving environment.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-TC-3**
Re:	**CP3 TDS loading to CP1**		

Recommendation Made by Interested Party:
It is recommended that Agnico Eagle update the water quality model with actual data as TDS concentrations from runoff from the TSF to CP3 become available and that in the interim be applied for drystack tailings runoff obtained from other projects which have employed similar techniques.

Agnico Eagle's Response to Recommendation:
We would like to refer KIA to the KivIA-WL-TC-2 response for evidence and rationale related to updates to the model that included using site-based monitoring data collected in 2019 and 2020 from various facilities.

The water model for the upper bound scenario was updated with recent monitoring data from the TSF.

Interested Party:	**KivIA**	**Rec No.:**	**KIA-WL-TC-4**
Re:	**Water Management Alternatives**		

Recommendation Made by Interested Party:
We recommend Agnico Eagle reduce the CP5 TDS treatment threshold to improve their capacity to manage TDS concentrations in CP1. We further recommend that a CP5 treatment threshold be developed as part of adaptive management based on both TDS concentrations and water levels in CP1 to improve Agnico Eagle's capacity to comply with existing or proposed discharge criteria to Meliadine Lake.

We also recommend Agnico Eagle update Appendix H to assess the affect water levels in Meliadine Lake from diverting all site contact water to the Waterline as it becomes available. This model update will help determine whether diversion of all on site water is feasible to address IQ concerns with current impacts to water quality in Meliadine Lake, and manage water levels in CP1.

Agnico Eagle's Response to Recommendation:
Agnico Eagle explored the potential of reducing at the source the TDS loading to CP1 from the different collection ponds on site, such as CP5. The Updated Water Balance and Water Quality Forecast presented in Attachment WL-TC-3 (SNC 2020) shows a high-level mass balance for CP1 based on monitoring data from 2019 and 2020. The TDS mass balance shows that CP-5 only contributed from 7 to 28% of the overall load to CP1. Removing all TDS coming from CP-5 from the system would not have resulted in concentration below the 1,400 mg/L criteria in CP1. Moreover, the main loads of TDS reporting to CP1 are coming from areas that report directly to CP1 and that are not captured by the other collection ponds (35 to 74%).

Another aspect to consider is the volume of water reporting to the Collection Ponds. 2019 and 2020 were quite different in terms of precipitation; 2019 could be considered as a wet year and 2020 as a dry year. In 2019, a total volume of 157,074 m3 of water was pumped out of CP5 and 70% of this volume was treated by the RO and discharge to Meliadine Lake. In 2020, a total volume of 96,879 m^3 was pumped out of CP5, 16% of this volume was treated by the RO and discharge to CP1. As you can notice, in 2019, the treatment of 70% of the water transfer from CP5 didn't prevent the water in CP1 to exceed the 1,400 mg/L discharge target.

At the exception of CP1 which was design to be the Attenuation Pond of the site, the other Collection Ponds were design to manage peak flow events. Reverse Osmosis systems are not designed to treat peak flows event as the membrane system needs to have steady flow with steady TDS concentration going to optimize treatment efficiency and get an permeate with low TDS concentration.

We also need to take in consideration the RO treatment by-product. RO treatment results in a considerable production of brine which range in between 20 to 30% of the treated water inflows. The capacity of the current RO unit is 2,000 m^3/day and running the RO at full capacity generate 400 to 600 m^3/day of brine. This brine is having a similar water quality signature than the Saline Water from the Underground Mine. Based on the Saline Water inflows monitored in 2020, this addition of brine to the Saline Pond would be similar of adding 2 to 3 underground mines to the Project.

All these factors shows that the implementation of pre-treatment to the collection ponds would not results in a sustainable solution that would be robust enough to prevent future emergency situation at CP1. Additionally, Agnico Eagle would like to clarify that based on all the technical information collected at this point, presented to the members of the Water Management Working Group and integrated into the WQ-MOP Rev4, the increase in TDS discharge criteria does not result in any additional adverse effect to the Meliadine Lake. We still consider that the increase of the TDS discharge criteria is a reasonable request that would secure water management at site.

Interested Party:	KivIA	Rec No.:	KIA-WL-TC-5
Re:	Rankin Inlet facilities closure objectives		

Recommendation Made by Interested Party:
Update the ICRP with soil and water quality objectives that must be met to evaluate the closure criteria for the Rankin Inlet Facilities. The parameter suite should specifically include hydrocarbons to evaluate the success of closing the Bulk Fuel Storage Facilities as well as chloride to evaluate potential residual contamination for the activities associated with the conveyance, treatment and discharge of saline groundwater.

A post closure monitoring plan for the Rankin Inlet Facility should be, at minimum, conceptually developed to evaluate the closure criteria. This issue may be resolved through a commitment to include these updates in the next iteration of the ICRP. This will provide increased confidence that Agnico Eagle will successfully be able to remove "any contaminated soils from the facilities".

Agnico Eagle's Response to Recommendation:
The future versions of the Meliadine Interim Closure and Reclamation Plan (ICRP) will include additional details on the closure and post-closure soil and water quality monitoring programs, as information becomes available from operational data and from future versions of applicable management plans. Applicable management plans for Meliadine to be used to define contaminated soil management and water quality monitoring program include:

- Water Quality and Flow Monitoring Plan
- Water Management Plan
- Spill Contingency Plan
- Landfarm Management Plan
- Itivia Oil Handling Facility
- Oil Pollution Emergency Plan for Meliadine Mine Fuel Farm in Rankin Inlet

These plans will be updated during operations and will be referred to in the next versions of the Meliadine ICRP. The Meliadine Final Reclamation and Closure Plan will include the soil and water quality monitoring program for closure and post-closure. The closure and post closure monitoring plan could include parameters such as hydrocarbons and chloride to evaluate potential residual contamination, based on the applicability of those parameters for the area.

The water quality objectives for closure and post-closure For the Meliadine site, including the Rankin Inlet facilities, will represent baseline conditions or national water quality objectives such as the CCME or site-specific water quality objectives (SSWQO). The final SSWQO that will be applied for closure will be developed prior to closure and presented in the Meliadine Final Closure and Reclamation Plan, or in previous versions of the plan if available. The same process will apply for soil quality criteria objectives for closure and post-closure

In terms of reclamation cost estimate for the financial security (SLI 2020), a provision for contaminated soil management and soil characterization is provided, including contaminated soil excavation and transportation to the on-site landfarm, on-site remediation in the landfarm and excavation and off-site disposal for heavily contaminated soil, representing a total of $976,510. Contaminated soil investigation costs are also included, representing $125,000. A provision is also included in the financial security calculation for monitoring programs, including water and soil monitoring among other programs. An annual budget of $955,000 is allocated for monitoring programs for the period of closure (3 years), and $477,500 annually for the period of post closure (7 years).

Agnico Eagle considers these amounts reasonable for this type of assessment within the ICRP.