TECHNICAL REVIEW

OF

APPLICATION FOR AMENDMENT TO TYPE A WATER LICENCE 2AM-MEL1631

FOR THE

MELIADINE GOLD PROJECT

Prepared By:

KIVALLIQ INUIT ASSOCIATION

November 6, 2020

WITH SUPPORT FROM

Hutchinson Environmental Sciences Ltd.	**And**	**GeoVector Management Inc.**

Prepared For:

Nunavut Water Board

KIA- P.O. Box 340, Rankin Inlet, Nunavut, X0C 0G0, Tel: (867) 645-2800, Fax: (867) 645-3855

Executive Summary

The Kivalliq Inuit Association (KIA) has completed a technical review of Agnico Eagle Mines Limited's (Agnico Eagle) Type A Water Licence 2AM-MEL1631 Amendment Application submitted to the Nunavut Water Board (NWB) on August 27, 2020. Agnico Eagle submitted the application seeking permission for the following amendments to their license:

- Updated total dissolved solids thresholds to Meliadine Lake;
- Increased annual freshwater consumption;
- Additional laydown areas;
- Updates to the waste management strategy;
- Construction of site access roads; and
- Updated Interim Closure and Reclamation Plan

KIA first wishes to reiterate that it does not support an increase in the TDS discharge criteria for either the effluent or at the edge of the mixing zone. Rankinmiut have expressed concern with Agnico Eagle's proposal to increase the discharge criteria from an IQ perspective. In general, discharges to Meliadine Lake from CP1 have degraded Inuit perception of the waterbody as a traditional drinking water source, and the proposed increase in TDS criteria will exacerbate those concerns. Mitigation continues to be preferable to relaxing the water quality standard.

Agnico Eagle's IR response package addressed a number of KIA technical comments and information requests, resolving 10 of 13 issues for the purposes of this technical review. However, the following issues remain unresolved and have been caried forward. They are summarized as follows:

- KIA-IR#1: Agnico Eagle has not satisfactorily justified the need to increase TDS discharge criteria to Meliadine Lake. Additional information is still required to demonstrate that available management options to circumvent the need to discharge water from CP1 at the proposed new TDS threshold have been exhausted. We specifically highlight opportunities for improved source control from runoff which may still be a feasible alternative to the requested 3,500 mg/L TDS discharge criterion.
- KIA-IR#9: Significant concern remains around Agnico Eagle's capacity to implement the short-term saline groundwater management strategy at the Meliadine Site. Available groundwater storage required to implement the medium-term strategy will become insufficient after mid-May 2021, yet implementation of the waterline to manage groundwater in the long term will not be possible until at least 2022.
- KIA-IR#11: KIA requests 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.

KIA's technical review highlighted several additional concerns with Agnico Eagle's application. New technical concerns are summarized as follows:

- KIA-TC#1: We have recommended Agnico Eagle develop a SSWQO for chloride at the edge of the mixing zone and within the receiving environment of Meliadine Lake as the largest contributor

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to TDS in Meliadine effluent in the event that a shift in the ratios of parameters contributing to TDS occurs.

- KIA-TC#2: Additional rationale is required to justify the use of average water quality values for the water quality model. We further recommended that Agnico Eagle discuss the implications of using more conservative inputs to predict water quality outputs for Meliadine Lake.
- KIA-TC#3: We are concerned Agnico Eagle did not include a model source term for TSF runoff. We are concerned that this may result in an underprediction of water quality concentrations from that source and hamper their source term mitigation planning.
- KIA-TC#4: KIA is concerned that insufficient design capacity of CP1 and D-CP1 may be encountered under high precipitation scenarios due to climate change causing dike or containment pond failures. KIA has identified two key water management alternatives that Agnico Eagle may implement to reduce elevated TDS discharges to Meliadine Lake in the event of containment failure. These would help to address community concerns of impacts to that waterbody and are as follows:
    - A lower treatment threshold for the CP5 RO system could contribute to lower TDS concentrations in Meliadine Lake.
    - Diversion of all water from CP1 to Melvin Bay.
- KIA-TC#5: Agnico Eagle indicates that soil and water monitoring will be used to determine whether the Rankin Inlet Facility area may be a source of future contamination. The ICRP does not include soil and water quality objectives that must be met to evaluate the closure criteria for the Rankin Inlet Facilities.

KIA wishes to highlight that discussions with Agnico Eagle regarding security and water compensation are ongoing and have yet to be resolved. We anticipate providing an update to the board in our final submission.

KIA also wishes to highlight the overarching concern that Agnico Eagle has not meaningfully investigated the diversion of all site contact water from CP1 to the marine environment for discharge. We encourage Agnico Eagle to investigate the waterline for surface contact water management at the Meliadine Project.

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1. Introduction

The Kivalliq Inuit Association (KIA) has completed a technical review of Agnico Eagle Mines Limited's (Agnico Eagle) Type A Water Licence 2AM-MEL1631 Amendment Application submitted to the Nunavut Water Board (NWB) on August 27, 2020. Agnico Eagle submitted the application seeking permission for the following amendments to their license:

- Updated total dissolved solids thresholds to Meliadine Lake;
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- Updated Interim Closure and Reclamation Plan

The KIA represents Inuit beneficiaries of the Nunavut Agreement in the Kivalliq Region. In particular, the KIA manages Inuit Owned Lands (IOL) in the region with the main aim of promoting self-reliance and social well-being of Inuit now and in the future. The KIA manages IOL to support sustainable economic development opportunities for Inuit if it is completed in an environmentally and socially responsible manner.

The review was completed with support from Hutchinson Environmental Sciences Ltd. and GeoVector Management Inc. to ensure that the potential impacts and benefits were comprehensively assessed through scientific and socio-economic best practices, and to ensure Inuit Qaujimajatuqangit (IQ) values continue to be incorporated into impact determination, mitigation, project design and monitoring.

The documents reviewed consisted of the following:

- NWB Application for Water Licence Amendment Form
- Type A Water Licence 2AM-MEL1631 Amendment (Main Document)
- Appendix A – Water Balance and Water Quality Forecast
- Appendix B – Water Quality Management and Optimization Plan
- Appendix C – Water Management Plan
- Appendix D – Mine Waste Management Plan
- Appendix E – Prefeasibility Level Design WRSF3 & Water Management Infrastructure
- Appendix F – Road Drawings
- Appendix G – Security
- Appendix H – Impact Assessment of the Diversion of Site Runoff to Melvin Bay on the Flow and Water Level Regimes of Meliadine Lake
- Appendix I – Supplement Information Guideline (SIG)
- Appendix J – NPC Conformity Determinations
- 2AM-MEL1631 Water Licence Amendment Information Request Responses. September 30, 2020. Submitted to the Nunavut Water Board.

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This technical review follows directly from our completeness and initial technical review submitted to the NWB on September 22, 2020. Agnico Eagle responded to those information requests on September 30, 2020. Our assessment of their responses and information requests that have been carried forward to the technical review stage are provided in Section 3. New technical comments are provided in Section 4.

2. Summary of Unresolved and Technical Comments

KIA first wishes to reiterate that it does not support an increase in the TDS discharge criteria for either the effluent or at the edge of the mixing zone. Rankinmiut have expressed concern with Agnico Eagle's proposal to increase the discharge criteria from an IQ perspective. In general, discharges to Meliadine Lake from CP1 have degraded Inuit perception of the waterbody as a traditional drinking water source, and the proposed increase in TDS criteria will exacerbate those concerns. Mitigation continues to be preferable to relaxing the water quality standard.

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    - A lower treatment threshold for the CP5 RO system could contribute to lower TDS concentrations in Meliadine Lake.
    - Diversion of all water from CP1 to Melvin Bay.
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KIA wishes to highlight that discussions with Agnico Eagle regarding security and water compensation are ongoing and have yet to be resolved. We anticipate providing an update to the board in our final submission.

KIA also wishes to highlight the overarching concern that Agnico Eagle has not meaningfully investigated the diversion of all site contact water from CP1 to the marine environment for discharge. We encourage Agnico Eagle to investigate the waterline for surface contact water management at the Meliadine Project.

3. Detailed Information Requests and Follow-up Technical Comments

3.1 Proposed TDS targets and alternatives to manage CP1 water

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#1.
IR Directed To:	Agnico Eagle
Subject:	Proposed TDS targets and alternatives to manage CP1 water
Reference:	Main Application Document Table 2-4: Comparison Between Alternatives to Manage CP1 Water.
Issue/Concern:	Insufficient evidence has been provided to demonstrate that an increase in TDS discharge criteria is required. A comparison of alternatives to manage water in CP1 is provided in Table 2-4 intended to demonstrate why an increase in TDS discharge criteria is the preferred option to manage water in CP1. However, it does not appear that improved water treatment options have been explored. The only upgrade proposed to treat outflows from

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	CP1 outlined in the alternatives table is to *"Upgrade Reverse Osmosis system to treat brine under CP1 ice cap"*. The alternatives analysis neglects to consider improvements to water treatment for the containment ponds feeding into CP1. We specifically highlight CP5 and the associated existing reverse osmosis (RO) treatment system which is proposed to only operate when water within CP5 exceeds 3500 mg/L TDS. Both CP5 and CP4 receive runoff with elevated TDS from WRSF 1, and CP6 will receive runoff with elevated TDS from WRSF 3. Runoff from the ore storage pads may also contain elevated TDS. These collection ponds are subsequently pumped to CP1. It is conceivable that water quality in CP1 could be improved by: • Operating the existing RO system for discharges from CP5 to CP1 at lower concentrations of TDS, • Improving the RO system for CP5, • Adding an RO systems to CP4 and CP6, or water from those locations with elevated TDS (e.g. >1,400 mg/L) to CP5 to receive water treatment, and • Diverting water from the ore storage pads with elevated TDS (>1,400 mg/L) to CP5 to receive treatment. While we understand that elevated TDS in CP1 in 2019 and 2018 were caused, in part, by higher TDS concentrations in waste rock storage facility runoff, it is not clear whether this runoff still poses a significant concern. Agnico Eagle states that improvements to water quality have been achieved by *"optimizing waste rock waste deposition"* to *"minimize TDS loadings reporting to CP1"*. Further information is required to determine whether these improvements in combination with water treatment will provide Agnico Eagle sufficient operational flexibility while still meeting the existing TDS water licence discharge criteria of 1,400 mg/L. While we acknowledge that monitoring data presented to the Water Management Working Group and summarized in the WQMOP demonstrates minimal short term impacts of discharges above the current TDS criteria of 1,400 mg/L, we reiterate that the community has expressed concern with the higher discharge criteria from an IQ perspective and that mitigation is preferable to relaxing the water quality standard.
Information Request	Please provide evidence that an increase in discharge criteria is required for the project. This discussion should include an evaluation of improved water treatment in collection ponds that feed into CP1, specifically CP4, CP5 and CP6, so that reviewers can determine Agnico Eagle's capacity to meet the existing 1,400 mg/L TDS discharge criterion for CP1. It should also consider the improvements to water quality that have been achieved by optimizing waste rock deposition, and whether further improvements to water quality could be achieved by diverting high TDS water from the ore storage pads to collection ponds with associated RO treatment systems to reduce TDS loading to CP1.
Agnico Eagle's Response	Agnico Eagle consider that the KIA-WL-IR-1 should be consider as a technical comment, however the information below is what we have available at this stage of the process.

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	First, we would like to refer the KIA to ECCC-IR-4 response for the rationale behind the needs to review the TDS discharge threshold in Meliadine Lake. Secondly, Agnico Eagle evaluated several alternative for reducing the loading in CP-1 as presented in the section 2.4 of the Project Description. The contributions of TDS loading from CP4, CP5 and CP6 have a relatively low impact on the total TDS loading in CP1. Based on our current understanding of the Site Water Quality, removing CP4, CP5 and CP6 loadings from CP1 would reduce the total TDS loading to CP1 by an average of approximately 14% and implementing Reverse Osmosis Treatment would not result in a significant change. Finally, Agnico Eagle would like to reiterate that the optimization of the water rock deposition is the most promising option to improve water quality in CP1, however the impact of this change would be observed in the next couple of years as: • Mining of the open pits generate, at first, a large volume of overburden that need to be capped with open pit waste rock for geotechnical stability reasons; • The flushing of the TDS loading from the underground waste rock is dependent of the precipitation observed on site.
KIA Response	We appreciate Agnico Eagle's assertion to both KIA and ECCC that a 3,500 mg/L discharge criterion for TDS is required due to the discrepancy between *"modelled concentrations and the trends that are seen in the monitoring data"* and that the model does not *"represent the peaks in concentration that may occur on a higher resolution time scale due to variations in weather and site conditions…[including] ice formation in CP1".* We further appreciate Agnico Eagle's desire for *"flexibility for the operation"* that would be provided through a 3,500 mg/L TDS criterion. Finally, we acknowledge that the information provided in WQ-MOP (Rev2 and Rev3) in addition to the information provided to the Water Management Working Group validate that effluent discharged from the EWTP to Meliadine Lake over the 2020 open water season has not resulted in acute toxicity at the end of pipe nor chronic toxicity at the edge of the mixing zone. It is unclear however why additional source control of runoff from the waste rock facilities has not been considered. Runoff and seepage from WRSF 1 and 3 report to CP-4, CP-5 and CP-6. Volumetrically (from Water Balance for CP1 in APPENDIX B Tabulated Water Balance Results), it appears that these sources make up the majority of water reporting to CP1 from key project areas serving as a source of TDS (WRSFs, ore stockpiles and the TSF). It is unclear why treatment water from these key containment ponds is not a viable option to improve water quality in CP1 and provide the necessary operational flexibility to mitigate peaks in concentrations within CP1. We further note that average concentrations presented in "Appendix C Average Year Scenario CP1 Average Monthly Dissolved Concentrations" are almost uniformly below the existing TDS discharge criterion of 1,400 mg/L (with the exception of August 2020, which has now passed) indicating that only minor additional source control may be required to mitigate the peaks and continue meeting the existing TDS discharge criterion.

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	Agnico Eagle's response has not provided the additional information requested to demonstrate that available options to circumvent the need to discharge water from CP1 at higher concentrations have been exhausted. We also reiterate that the community has expressed concern with the higher discharge criteria from an IQ perspective and the perception of Meliadine Lake as a traditional drinking water source is changed with the suggested increase in discharge criteria. Mitigation continues to be preferable to relaxing the water quality standard from an IQ perspective. **Recommendation:** 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.

3.2 Diversion of CP1 water to waterline

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#2.
IR Directed To:	Agnico Eagle
Subject:	Diversion of CP1 water to waterline
Reference:	Main Application Document Table 2-4: Comparison Between Alternatives to Manage CP1 Water Appendix H Meliadine Lake Assessment; Section 2.0 Methods
Issue/Concern:	Agnico Eagle has indicated it is moving forward with the option to divert CP1 water into the waterline as part of their sustainable water management of CP1. It is unclear how Agnico Eagle is moving forward with this option considering: • The water balance presented in this application does not provide for a scenario where CP1 water is diverted from Meliadine Lake. This is important given the increase in freshwater use proposed as part of this application; • The waterline application currently before the NIRB specifically states that it does not include the discharge of blended effluent (surface contact water and groundwater); • The daily discharge volume requested in the NIRB application (maximum of 12,000 m^3/day) is insufficient to accommodate surface contact water (Jamie Quesnel, Agnico Eagle. Teleconference with KIA on September 16, 2020), and • No modelling has been conducted to assess the environmental effects of discharging blended effluent to Melvin Bay.
Information Request	Please clarify how Agnico Eagle is moving forward with the option to divert CP1 water into the waterline. To support this approach to water management at the Meliadine site, Agnico Eagle should also provide an updated water balance and water management plan for the Meliadine site that accounts for the diversion of all water to Melvin Bay,

	and update the application before the NIRB to accommodate diversion of some or all surface contact water in CP1 to the marine environment.
Agnico Eagle's Response	Agnico Eagle refers KIA to the Saline Effluent Discharge to the Marine Environment Application currently under NIRB's review as saline water management is not part of this application and details would be provided on this option if the Waterline is deemed approved by NIRB. The diversion of surface water to the waterline is an alternative within this application but is contingent if the waterline is approved by NIRB. Based on the NIRB's process map for the Saline Effluent Discharge to the Marine Environment, discharge is now postponed to 2022 and Agnico Eagle would need to discharge the water to Meliadine Lake during the discharge season 2021 and a good portion of the discharge season in 2022 due to the delay on the Waterline file. These project schedule delays related to the implementation of the Waterline combine with the recent water quality monitoring results in CP1 support the requirement of maintaining the discharge to Meliadine Lake into the Water Licence with an updated TDS threshold discharge criteria. Agnico Eagle needs this flexibility to derisk the operation while maintaining high environmental operational mitigations that are protective of Meliadine Lake and considers that the implementation of adaptive management measures to divert a percentage of CP1 water to the Waterline.
KIA Response	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.

3.3 TDS measurements

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#3.
IR Directed To:	Agnico Eagle
Subject:	TDS measurements
Reference:	Appendix B: WQMOP Phase 3
Issue/Concern:	Water quality monitoring results provide both laboratory measured and calculated values for TDS. It is unclear what value Agnico Eagle will use to evaluate compliance with the proposed 3,500 mg/L TDS maximum average concentration, or the 5,000 mg/L TDS maximum grab sample concentration. Potential confusion as to what values will be used may also occur when evaluating whether the adaptive management thresholds as outlined in Table 2: "Surface water quality adaptive management strategy for CP1 discharge to Meliadine Lake", have been exceeded.
Information Request	Please clarify whether Agnico Eagle will be relying on measured TDS, calculated TDS, or a combination of the two when evaluating

	compliance with the discharge criteria and determining when to implement adaptive management strategies. Please include a comparison between the accuracy of calculated vs measured values.
Agnico Eagle's Response	Agnico Eagle refers KIA to prior responses provided by Agnico Eagle on this subject, in particular response to KIA-1 (Maximum Allowable Effluent Concentration) provided in the WQ-MOP Update IR Responses dated June 25, 2020. It is Agnico Eagle's preference to use calculated TDS to evaluate compliance with thresholds for discharge and at the edge of a mixing zone, and in decision-making with respect to adaptive management. Calculated TDS concentrations account for the contribution of major cations (e.g., sodium, potassium, calcium, and magnesium) and anions (e.g., bicarbonate, chloride, and sulfate), which account for the majority of the TDS in natural waters, groundwater, and Mine water associated with this application, and other specific ions (e.g., fluoride, silica, and nitrate), which also feature as natural and contributing TDS components in these water sources. The derivation of calculated TDS concentrations is from the sum of the analytical results for each of the contributing ions from a water sample using the formula in Standard Methods (Method 1030E, APHA 2012; Eqn 1). The analytical resolution associated with the laboratory analysis of each of the contributing ions results in a very accurate and reliable estimate of TDS. TDSCalc (mg/L) = (0.6 x Total Alkalinity as $CaCO_3$) + Sodium + Magnesium + Potassium + Calcium + Sulfate + Chloride + Nitrate + Fluoride + Silicate [Eqn 1.] Where: Nitrate is the NO_3^- anion (multiply nitrate as nitrogen result by 4.427); Silicate is the SiO_3^{2-} anion (multiply reactive silica as SiO_2 result by 1.266). Measured TDS is a specific analysis provided by analytical laboratories, and therefore, like each of the analyses undertaken to measure the concentration of ions in a water sample, is also a certified or accredited analysis. The basis for this analysis is the evaporation of a known volume of filtered water sample at a specified temperature and measuring the dried residue, which constitutes the TDS. This method is subject to laboratory interferences that can reduce the accuracy of this measurement, especially in waters that have low TDS. For example, waters with proportionately high calcium, magnesium, and chloride concentrations, such as those associated with Meliadine Mine, can form a hygroscopic (i.e., absorbs ambient water) residue that will continue to absorb water under normal laboratory conditions, thereby biasing the measurement higher than actual (APHA 2005; Evaristo-Cordero pers. comm. 2011). Figure 3-1 show summary data that supports Agnico Eagle's position. The box and whisker plot shows a more consistent relationship between chloride with calculated TDS concentrations compared to measured TDS concentrations in discharge from CP1 and Meliadine Lake (i.e., the edge of mixing zone, mid-field, and reference locations; the receiving environment) from data collected during the Emergency Amendment to Meliadine Lake (June to August 2020). Using calculated TDS concentrations means that changes in the amount of TDS in waters associated with Meliadine Mine will be detected with more certainty than if measured TDS concentrations are used. Therefore, the use of calculated TDS concentrations is expected

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	to provide more consistent and reliable results when tracking temporal and spatial trends and assessing conformity to thresholds. From the perspective of other northern mining operations, calculated TDS is used rather than measured TDS for the Snap Lake AEMP consistent with recommendations in the Water Licence (MVLWB 2012). Rationale for the application of calculated TDS in the Snap Lake AEMP is provided in Golder (2013).
KIA Response	Comment is considered resolved.

3.4 Chronic toxicity monitoring results

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#4.
IR Directed To:	Agnico Eagle
Subject:	Chronic toxicity monitoring results
Reference:	Appendix B: WQMOP Phase 3; Appendix B Available 2020 Discharge Monitoring Results Collected Between 3 June 2020 and 17 July
Issue/Concern:	Sampling requirements as outlined in Section 3.1 "Water Quality Sampling" and Section 3.2 "Sampling for Toxicity Testing" in v2 of the WQMOP indicate that *"Samples will be collected at the depth with the highest conductivity for toxicity testing."* It is not clear what depth samples were collected for chronic toxicity testing in Appendix B, "Available 2020 Discharge Monitoring Results Collected Between 3 June 2020 and 17 July."
Information Request	Please clarify that samples collected for chronic toxicity testing at the edge of the mixing zone were done so at the depth with the highest conductivity and identify that depth with reference to concurrently collected water column profiles.
Agnico Eagle's Response	As stated in the WQ-MOP (Versions 2 and 3), samples for water quality and chronic toxicity testing at the edge of mixing zone stations are to be collected at the depth within the water column at these stations with the highest specific conductivity measurements. Agnico Eagle can confirm that this protocol was followed on each of the sampling occasions (see below, Table 4-1). It is noted, however, that if the highest specific conductivity was measured at the bottom depth of the water column, the sample was collected at the preceding depth (i.e., 1 m above the bottom measurement). This reduced the potential for the water sample to be influenced by lakebed disturbance resulting from the water column measurements and/or use of the water sample collection device in collecting water from that bottom depth.
KIA Response	Comment is considered resolved.

3.5 Consideration of IQ in closure objectives

IR Source:	Kivalliq Inuit Association

IR Number:	KIA-IR#5.
IR Directed To:	Agnico Eagle
Subject:	Consideration of IQ in closure objectives
Reference:	Appendix G; ICRP Section 2.4 Engagement; Section 5.2.1.3 Closure Objectives and Criteria
Issue/Concern:	Agnico Eagle notes that community *"Concerns on the various Project impacts are included as part of the effects assessments and recommendations are considered when developing mitigation and monitoring plans."* It is unclear whether these community concerns and IQ have been carried forward into the Closure Objectives and Criteria as outlined in closure objectives, criteria and action/measures that will be implemented to close the site.
Information Request	Please clarify how IQ has been incorporated into the closure objectives and criteria for all project areas with a particular focus on new project components currently under review by both the NWB and the NIRB.
Agnico Eagle's Response	At this stage of the Meliadine Mine operation and approval process for the current Water Licence Amendment, an ICRP is required for the NWB and the NIRB. As outlined in Section 2.4 of the ICRP, Agnico Eagle will continue engagement throughout the mine life and closure phase. IQ solicited throughout these phases, as well as ongoing monitoring programs, will inform final closure and will be provided in the Final Closure and Reclamation Plan. Agnico Eagle is committed to continued consultation during operations to support closure objectives and goals.
KIA Response	Comment is considered resolved.

3.6 Evaluation of impacts to Meliadine Lake water levels from alternative water management approaches

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#6.
IR Directed To:	Agnico Eagle
Subject:	Evaluation of impacts to Meliadine Lake water levels from alternative water management approaches
Reference:	Appendix H Meliadine Lake Assessment
Issue/Concern:	Appendix H presents *"the methods and results of the potential impacts of diverting the Project site runoff away from Meliadine Lake to Melvin Bay."* It is unclear whether the model scenario considers the diversion of all site contact water (i.e. all water in CP1) or just site runoff. This scenario is important given the increase in freshwater use requested as part of this amendment application to the NWB and the understanding that an environmental assessment has not been completed on the diversion of all site contact water from CP1 to the waterline.

Information Request	Please clarify whether Appendix H characterizes the diversion of all water in CP1 to Melvin Bay. If it does not, please update the evaluation of water levels in Meliadine Lake to account for that scenario.
Agnico Eagle's Response	Agnico Eagle confirms that the diversion considered in the assessment was based on the surface runoff diverted away from Meliadine Lake and not on the projected contact water volumes from CP1. The baseline water levels of Meliadine Lake are primarily influenced by surface runoff. The contact water volumes at CP1 comprise both surface runoff and contact water inflows from the pits. The pit contact water inflows are expected to be small relative to the surface runoff component. Thus, the assessment considered the diversion of surface runoff only. As stated in the assessment, the diverted area was assumed to include the entire A and B sub-watershed areas (i.e., 32 km^2), while the actual diverted area is expected to be smaller (i.e., 4.8 km^2). This results in a conservative assessment of the potential impacts of the diversion on the baseline water levels of Meliadine Lake, as concluded. Under baseline conditions, water levels in Meliadine Lake vary by approximately 30 cm under average conditions during the open water season. The impacts of the diversion are not expected to be measurable (i.e., a decrease of 1 cm during the open water season is expected compared to baseline conditions).
KIA Response	Comment is resolved, but please see KIA technical comment titled "Water Management Alternatives" for follow up concerns.

3.7 Design capacity for CP1 and D-CP1

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#7.
IR Directed To:	Agnico Eagle
Subject:	Design capacity for CP1 and D-CP1
Reference:	Appendix C Water Management Plan; Section 3.2 Water Management Structures Design Criteria
Issue/Concern:	The design criteria provided for the water management systems indicates that the Effluent Water Treatment Plant (EWTP) is sufficient to ensure that D-CP1 and CP1 are able to manage the surface contact water from the entire site for a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hour extreme rainfall. However, the water levels in CP1 that resulted in the 2020 emergency amendment were not due to a greater than usual spring freshet, but (in part) to extreme rainfall (>95th percentile) over a three-month period in the summer. With greater uncertainty in precipitation and snowmelt due to climate change the reader is not confident in the water management criteria being used to ensure the capacity of D-CP1 and CP1 for surface contact water.

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Information Request	Please provide: • a rationale to support the use of a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hour extreme rainfall design criteria, • an analysis of the resilience of current water management infrastructure using 2019 precipitation data preceded by a 1:100 year freshet to demonstrate Agnico Eagle's capacity to ensure CP1 and D-CP1 will not be at risk under similar circumstances, and • discuss the feasibility of upgrading the capacity of D-CP1 and CP1 to increase infrastructure resilience to extreme wet years.
Agnico Eagle's Response	Agnico Eagle consider that the KIA-WL-IR-7 should be consider as a technical comment, however, at this time we have provided additional information below. First, Agnico Eagle would like to clarify that storage should not being considered as a viable alternative for the management of surface contact water. This would not resolve the water management challenges related to elevated TDS concentration in CP1 and storing more water in CP1 could lead to degradation of permafrost in the CP1 vicinity and additional risks to manage. Secondly, Agnico Eagle would like to inform KIA that the rationale behind the use of a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hr extreme rainfall design criteria for Dike D-CP1 is outlined in the approved design report for the facility (Tetra Tech EBA, 2016). Section 4.2 (Dike Classification and Consequence of Failure) of Tetra Tech EBA, 2016 states: "*CDA (2007) provides recommendations and directions for dam/dike classification based on the consequences of failure. The consequences of dam/dike failure are evaluated in terms of loss of life, environmental and cultural values, and infrastructure and economics. The dike classification for D-CP1 is determined to be "Significant" due to the following consequences of failure:* • Loss of Life: None or unspecified due to no permanent resident downstream of D-CP1; • Economic/Social Losses: This dike only; no temporary or permanent infrastructures downstream of D-CP1; and • Environmental/Cultural Losses: Potential of temporary deterioration of fish habitat in Lake H1 and a small portion of Meliadine Lake due to release of a moderate volume of contact water collected in the CP1 pond." Section 4.3 (Inflow Design Flood and Earthquake Levels) further explains: *"Extreme wet year spring freshet from snow-melt or high-intensity short-term rainfall events are normally critical to the design of a dike*

	with a limited short-term discharge capability, which is the case for D-CP1. The resulting water level rise in the pond from a short-term flood event tends to be greater than that under a longer precipitation event. The longer event allows time for excess water to be pumped to a water treatment plant from where the water is treated and discharged. *The inflow design flood (IDF) for a given classification is suggested in CDA (2007). Based on a classification of "Significant", the annual exceedance probability (AEP) of between 1/100 and 1/1,000 is recommended in CDA (2007). For the design of D-CP1, it has been assumed that no water would flow or be pumped out from the CP1 pond during spring freshet or during an extreme rainfall event. The IDF adopted for D-CP1 meets the most critical of the following cases:* • Spring freshet for a 1 in 100 return wet year; • Spring freshet for a mean (1 in 2 return) year plus a 1 in 1,000 return 24-hour extreme rainfall event; • Maximum monthly total rainfall for a mean (1 in 2 return) year plus a 1 in 1,000 return 24-hour extreme rainfall event; or • Maximum monthly total rainfall for a 1 in 100 return wet year." The Meliadine Independent Review Board (MIRB) made no specific comment regarding the CDA classification or IDF evaluation of D-CP1 during their first annual review in 2019, although they did concur with the overall design approach of the structure. The primary seepage control measure for D-CP1 (what stops water from flowing through the dike) is a geomembrane liner system that is keyed in under the original ground to the bedrock and/or competent permafrost (key trench). The remainder of the dike consists of various rockfill and esker materials, none of which are impermeable (water can penetrate this material) when unfrozen. This material protects the liner system and keeps the foundation of the dike and the ground underneath below a temperature of zero Celsius. Therefore, the only way for the dike to hold more water is to increase the top elevation of the liner. This is not possible without considerable risk of damaging the existing liner system, downstream seepage control structures and critical instrumentation. In addition, raising the liner elevation would increase the risks to the dike by increasing the possibility of thawing the ground underneath. If the foundation of the dike unfreezes, the liner could settle and possibly break, which could result in a failure and permanent damage to the dike.
KIA Response	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.

3.8 Groundwater inflows and storage capacity

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#8.
IR Directed To:	Agnico Eagle

Subject:	Groundwater inflows and storage capacity
Reference:	Appendix C Water Management Plan; 4.1.2 Underground Water Management; Table 12: Predicted Groundwater Inflow to the Underground Mine (2017 to 2032) Sub-Appendix A Groundwater Management Plan
Issue/Concern:	Table 12 summarizes groundwater predictions for each year of mine life. Groundwater inflows have been greater than initially anticipated requiring an increase in the amount of groundwater trucked to the marine environment in 2019, and the current waterline application before the NIRB. It is not clear whether the assumptions used to develop the predicted inflow values are conservative, or whether Agnico Eagle has sufficient capacity on site to manage a potential deviation from the predicted groundwater inflows. While the design saltwater storage capacity for *"Groundwater and Water Primarily Influenced by Underground Workings"* for each structure at the mine is presented in the Groundwater Management Plan, it is unclear how much storage capacity will be available in each year of the mine life. This information will help evaluate the viability of the short- medium- and long-term management strategies.
Information Request	Please clarify how the predicted groundwater inflow values have compared to actual inflows and provide a discussion as to the conservativeness of the predicted daily inflow values. Please summarize the saline groundwater storage capacity for each year of the mine life and compare these values to the predicted annual inflow. Note that these comparisons should be made both without access to the waterline (i.e. the short- and medium-term management strategies) and with access to the waterline (i.e. the long-term management strategy).
Agnico Eagle's Response	Agnico Eagle refers KIA to the Saline Effluent Discharge to the Marine Environment Application currently under NIRB's review for additional information related to the alternative of diverting CP1 water into the Waterline. Saline water management is not part of this application and details would be provided on this option if the Waterline is deemed approved by NIRB.
KIA Response	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.

3.9 Viability of medium-term strategy to manage saline groundwater

IR Source:	Kivalliq Inuit Association

IR Number:	KIA-IR#9.
IR Directed To:	Agnico Eagle
Subject:	Viability of medium-term strategy to manage saline groundwater
Reference:	Appendix C Water Management Plan; Section 3.4.2 Medium-Term Management Strategy; Section 3.4.2.1 Saltwater Treatment Plant (SWTP) – Desalination
Issue/Concern:	Agnico Eagle states that they will *"utilize contingency saline water storage ponds until inflows can be reduced or treatment/discharge is capable of managing inflows."* Agnico Eagle also notes that the combined treatment rate of the two saltmaker units was approximately 70% lower than design criteria. Given the failure of the two saltmakers to meet design criteria, it is unclear whether the proposed medium-term strategy to manage groundwater is viable.
Information Request	Please clarify Agnico Eagle's capacity to implement the medium-term strategy to manage saline groundwater without exceeding the current discharge limit to Melvin Bay of 1,600 m^3/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.
Agnico Eagle's Response	Agnico Eagle refers KIA to the Saline Effluent Discharge to the Marine Environment Application currently under NIRB's review for additional information related to the alternative of diverting CP1 water into the Waterline. Saline water management is not part of this application and details would be provided on this option if the Waterline is deemed approved by NIRB.
KIA Response	Issue considered not resolved. In Appendix C Water Management Plan, Appendix A Meliadine Groundwater Management Plan Agnico Eagle states, "*Based on forecasted groundwater inflow values and the medium-term strategy described here, it is expected that saline water storage capacity will be at capacity by mid-May 2021. Thus, short- and medium-term strategies described in this section are not sustainable.*" We are concerned, as per Agnico Eagle's response to information request CIRNAC-WL-IR-2, "*the implementation of the Waterline alternative would not happen until after freshet 2022*." Therefore, leaving insufficient groundwater storage capacity on site between mid-May 2021 and June-2022. Furthermore, in section 3.1 of Appendix C Water Management Plan Agnico Eagle states, *the mitigated inflows over 2019 measured up to 394 m^3/day. It is important to note that as mining advances, inflow rates are susceptible to rapid and sustained increase if water bearing structures are intercepted within stopes, where grouting is not*

	possible." Adding further uncertainty in the mine's ability to handle groundwater inflows. While saline water management is not part of the current NWB amendment, the KIA reiterates that on-site water management is a key part of the water management strategy. 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 m^3/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.

3.10 Future freshet management

IR Source:	Kivalliq Inuit Association
IR Number:	KIA-IR#10.
IR Directed To:	Agnico Eagle
Subject:	Future freshet management
Reference:	Appendix B Freshet Management Plan March 2020; Section 3.1 P-Area Risk Management
Issue/Concern:	Agnico Eagle indicates that the P-Area is to be decommissioned by Q2 of 2020, however the P-Area appears to remain an active part of the Freshet Management Plan. Removal of key infrastructure used to manage freshet may increase the volume of water reporting to CP1 during freshet resulting in potential concerns with the integrity of CP1 and D-CP1 as was seen in 2019.
Information Request	Please clarify how freshet will be effectively managed and the integrity of CP1 and D-CP1 preserved once the P-area has been decommissioned (i.e. Freshet 2021).
Agnico Eagle's Response	The storage capacity of CP1 and design of D-CP1 incorporate the catchment area of the entire site, including that of the P-Area. Therefore, decommissioning of the P-Area will not change the volume of water reporting to CP1 as runoff from the P-Area watershed will still report to CP1. Agnico Eagle will update the Freshet Management Plan prior to the 2021 freshet to reflect the decommissioning of the P-Area.
KIA Response	Comment is considered resolved.

3.11 Water Retention Dikes and Berms

Review Comment Number	KIA-IR#11.

Subject/Topic	Water Retention Dikes and Berms
References	Appendix C, Section 3.6.2, Page 19.
Summary	Berms are constructed with entirely till core
Importance of issue	Berm CP2 and pond CP-2 are in very close proximity to Meliadine Lake.
Detailed Review Comment	Given the proximity and slope of the area around Berm CP2 and pond CP-2 to Meliadine Lake, will the proponent use an impervious liner system in Berm CP-2 to help ensure that contact water from WRSF 3 does not enter Meliadine Lake?
Information Request	The KIA requests that the proponent provide the technical details of installing an impervious liner system in Bern CP-2 to help ensure that contact water from WRSF 3 does not enter Meliadine Lake.
Agnico Eagle's Response	Agnico Eagle consider that the KIA-WL-IR-11 should be consider as a technical comment, however information highlighted below is being provided to KIA. Agnico Eagle would like to explain that although the detailed design of Pond CP2 and Berm CP2 has not yet been started, it is expected that these structures will function in an identical manner as to the three (3) other approved Collection Pond/Thermal Berm facilities on site: Pond/Berm CP3, Pond/Berm CP4 and Pond/Berm CP6. Contact water from the associated waste facilities flows to the collection pond (TSF to CP3, WRSF1 to CP4 and WRSF3 to CP6). Each collection pond is designed for short-term water storage only, with a capacity for 3/7 of a 1:100 wet precipitation year freshet with designed pumping capacities to support the maximum operating levels. Minimal water is stored in the CPs after the spring freshet is pumped to CP1, with water levels kept below the low point of bedrock, so that each CP retains the capacity for an extreme rainfall event. The thermal berms associated with collection ponds CP3, CP4 and CP6 were not designed to impound water. Each thermal berm was designed to aggrade or preserve the permafrost in the original ground below the center of each berm to a top permafrost elevation of at least 2.0 m higher than the maximum operating water elevation in the collection pond. Therefore, it is the preservation or aggradation of the permafrost underlying each berm that reduces the potential seepage, not the physical material of the berm. The monitoring of thermistors installed in each thermal berm provide assurance that the design intent of the structures is being fulfilled. As CP3, CP4 and CP6 have all shown to be successful approaches to the management of site contact water from our waste facilities, Agnico Eagle and the designer feel comfortable advancing the same design approach for CP2 at this stage of the process. However, a detailed geotechnical investigation will be conducted prior to detailed design and adjustments to the design philosophy, such as the addition of a liner system, may be made after analysis of the results. Please refer to the approved "Design Report for CP3, CP4, CP Berms, Berm2, Channel3 and Channel4, Meliadine Project, Nunavut" (Tetra Tech, 2018) and "Design Report for CP6 and CP6 Berm, Meliadine Project, Nunavut" for further details regarding the approved design basis of these structures.
KIA Response	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.

3.12 Thermal Monitoring

Review Comment Number	KIA-IR#12.
Subject/Topic	Thermal Monitoring
References	Appendix C, Section 3.6.2.1, page 20.
Summary	Vertical GTS's will be installed to a minimum of 7 metres below the original ground elevation.
Importance of issue	Given the proximity to a large lake such as Meliadine Lake it is possible that a talik may have developed parallel to the lake shore and therefore in close proximity or beneath the currently planned location of Berm CP-2.
Detailed Review Comment	A lack of permafrost in close proximity or beneath the currently planned location of Berm CP-2 could allow contact water from WRSF 3 to enter Meliadine Lake.
Information Request	The KIA requests that the proponent provide the current thermal data available for the area downslope of WRSF 3, Berm CP-2 and Berm CP-6 to the edge of Meliadine Lake.
Agnico Eagle's Response	Agnico Eagle would like to clarify that talik conditions surrounding Lake B7, as well as under former Lakes H19 and H20 were suspected preceding the detailed design of CP3, CP4 and CP6. As such, single bead thermistors were installed during the geotechnical drilling campaigns in order to guide their detailed design. A similar approach is planned prior to the detailed design of Pond/Berm CP2: a geotechnical investigation will classify overburden in the vicinity, determine depth to bedrock and thermistors will be installed to assess permafrost conditions. The figures below present the thermistor data located in the downstream slope of Berm CP-6. It should be note the thermistors haven't been in place for a full year, however to date the berm appears to be fulfilling its function and the underlying ground has remained frozen.
KIA Response	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

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	the thermistor data provided by Agnico Eagle from the downstream slope of Berm CP-6.

3.13 Lessons Learned from Other Projects.

Review Comment Number	KIA-IR#13.
Subject/Topic	Lessons Learned from Other Projects.
References	Appendix G, ICRP Update, Main Document, Appendix D, Lessons Learned from Other Projects.
Summary	There are no references to lessons learned regarding permafrost development in WRSF or the water retention dikes and berms that collect the contact water from these dikes and berms.
Importance of issue	Contact water spills have occurred from water retention dikes and berms at the Whale Tail mine site WRSF.
Detailed Review Comment	Given the proponent's 10+ years of operations experience in the Kivalliq Region a more in-depth "Lessons Learned" of permafrost development in WRSF and the water retention dikes and berms should be readily available for use in the design, construction and monitoring of this particular aspect on mine site infrastructure.
Information Request	The KIA requests that a more in-depth "Lessons Learned" of permafrost development in WRSF, the water retention dikes and berms that collect the WRSF contact water be made available. In addition, the proponent should show how these "lessons Learned" have been used to better inform the design, construction and monitoring of the WRSF 3, Berm CP-2 and Berm CP-6.
Agnico Eagle's Response	Agnico Eagle has been actively committed to Mine Dike Review Boards, geotechnical inspections, 3rd party reviews, adaptive management and research for the design, construction and monitoring of all waste and water infrastructures. Detailed design of all water and waste management infrastructure at Meliadine has been completed by Tetra Tech and utilizes the company's more than 50 years of permafrost engineering experience. Agnico Eagle will consider KIA's recommendation in the final design of WRSF3 and Berm CP-2. It should be noted that the design of Pond/Berm CP-6 was approved by the NWB in March 2020 and the as-built report was submitted September 2020.
KIA Response	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.

4. New Technical Comments

4.1 SSWQOs for Total Dissolved Solids Constituents

Review Comment Number	KIA-TC#1

Subject/Topic	SSWQOs for Total Dissolved Solids Constituents
References	Meliadine Site Water Balance and Water Quality Model dated 21 August 2020, Section 2.1 Water Management Table 1, Section 2.2.2 General Water Quality Inputs and Assumptions
Summary	The TDS at the Meliadine Mine site is comprised primarily of chloride, sodium, calcium, sulphate and carbonate. These parameters can be independently toxic, however the current ratios of these substances permit greater tolerance by aquatic biota than would be expected if exposed to each parameter individually. Should the chemistry of the effluent change and alter the ratio of constituents, the effluent could become more toxic. Therefore, the independent parameters that make up the TDS are important in their own right and it is recommended that SSWQOs be developed for the key constituent of TDS in the event the chemistry of the effluent changes.
Importance of issue	A shift in the ratio of parameters comprising TDS could result in effluent which is more toxic. To preserve the aquatic biota in Meliadine Lake it is recommended that SSWQOs be developed for the main constituent of the TDS.
Detailed Review Comment	According to Agnico Eagle, "*the water quality model provides prediction for conventional constituents: TDS, Nutrients: Total dissolved phosphorus and total ammonia and dissolved metals: aluminum, arsenic, copper, lead, nickel and zinc. In addition, concentrations of total phosphorus, aluminum, arsenic, copper, lead, nickel, and zinc were calculated only for the EWTP*." The total dissolved solids (TDS) mixture on site is dominated by chloride, sodium, calcium, sulphate and carbonate; these parameters can be independently toxic though their current ratios appear to permit greater tolerance by aquatic biota. Chloride provides the greatest proportional contribution to Meliadine Site TDS (approximately 50%) and has been documented to be both acutely and chronically toxic at concentrations within the Meliadine discharges. The acute and chronic CCME water quality guidelines are 120 mg/L and 640 mg/L. These concentrations are lower than those found in Meliadine Effluent. The chronic threshold is also lower than would be associated with the proposed 1000 mg/L TDS target for the edge of the mixing zone. Given that not all constituents of the effluent are conservative, the relative ratios may change in the receiving environment resulting in either an increase or decrease in toxic potential of the effluent. Development of a chloride specific SSWQOs would provide additional confidence that effluent will not result in acute or chronic toxicity either at the end of the pipe or in the receiving environment.
Recommendation	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.

4.2 Water Quality Model Inputs

Review Comment Number	KIA-TC#2

Subject/Topic	Water Quality Model Inputs
References	Appendix A Environmental Design Inputs and Assumptions, dated August 21, 2020 Section5.1 Modelled Constituents and Comparative Guidelines Table 8: Water Quality Inputs
Summary	Average values for parameters were used for concentrations from the waste rock pad, STP effluent main camp, WRSF runoff loading, ore stockpile runoff loadings and loadings from the tailings storage facility runoff. TDS concentrations from Channel 1 were reduced by 25% on an annual basis. Rationale for using the average and the 25% reduction instead of more conservative values were not provided. Sample size, range in values and justification of the values used is recommended.
Importance of issue	Averages may not be representative of data sets that are either data limited or severely skewed obstructing the models ability to accurately predict TDS concentrations in the effluent of the EWTP and determine the likelihood of the effluent meeting the proposed discharge criteria of 3,500 mg/L of TDS.
Detailed Review Comment	For the concentration of TDS from disturbed runoff to the site Agnico Eagle states, "*For TDS only, monthly average 2019 monitored concentrations from Channel 1 were assigned at a 25% reduction for the year 2020, with a continuing 25% decrease in subsequent years*." No justification for the 25% reduction is provided. For other parameter concentrations from the disturbed runoff to site Agnico Eagle states, "*average parameter concentrations (total fraction available only) derived from the waste rock pad (n=5).*" A sample size of five is considered a minimum amount of data and using an average based on such a small data set may not be representative of the data. The range of values obtained would provide greater insight into the appropriateness of the use of the average versus a more conservative value such as the 75th percentile. Average values for parameters were also used for concentrations from the STP effluent, main camp, WRSF runoff loading, ore stockpile runoff loadings and loadings from the tailings storage facility runoff. Rationale for using the average instead of a more conservative value such as the 75th percentile is needed.
Recommendation	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.

4.3 CP3 TDS loading to CP1

Review Comment Number	KIA-TC#3
Subject/Topic	CP3 TDS loading to CP1
References	Appendix A Meliadine Site Water Balance and Water Quality Model, Section 3.1 Average Year (Base Case) Scenario, Section 3.1.1 CP2, CP3, CP4, CP5, AND CP6
Summary	On site observations support the potential of elevated TDS concentrations in CP3 through TSF runoff. Due to a lack of data no input was included in the current water quality model from TSF runoff into CP3. It is recommended that a defensible interim value be used as input into the current model until actual data becomes available for an update.
Importance of issue	TDS concentrations in CP3 may be under predicted due to a lack of data from runoff from the TSF. It is recommended that an interim input value for drystack tailings runoff be used in the current model and the model be updated once actual data becomes available.
Detailed Review Comment	Agnico Eagle states, "*site observations on and surrounding the TSF in 2020 indicate that there is potential for an increased amount of TDS to reach CP3 via the runoff from the TSF. As limited monitoring data are available at this point, this is not currently predicted by the model; however, continued monitoring of the TSF will inform the model for future iterations.*" Failure to include TDS loadings from CP3 into CP1 may result in underpredicted concentrations in that containment pond. Limited monitoring data may also impede Agnico Eagle's capacity to identify a potential source of TDS to CP1 and implement source controls. It is important to include TDS concentrations in runoff from the TSF within the water quality model as it will improve the understanding of TDS loadings within CP1 and better inform potential management options.
Recommendation	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.

4.4 Water Management Alternatives

Review Comment Number	KIA-TC#4
Subject/Topic	Water Management Alternatives
References	Appendix C Water Management Plan; Section 3.2 Water Management Structures Design Criteria
Summary	Extreme rainfall (>95th percentile) over a three-month period in the summer of 2019 contributed to the need for emergency amendment to discharge effluent with high TDS concentrations (3,500 mg/L). Current wet weather modeling does not take such a scenario into consideration

	which causes concern that the CP1 and D-CP1 infrastructure may be jeopardized under similar or more extreme future scenarios which may arise as a result of climate change. To ensure water management integrity is maintained it is recommended that Agnico Eagle consider reducing the treatment threshold for the reverse osmosis plant at CP5 to increase discharge flexibility by providing dilution to high TDS water in CP1 or update the water level assessment flow and water level regimes in Meliadine Lake to incorporate the diversion of all site contact water to Melvin Bay.
Importance of issue	Insufficient design capacity of CP1 and D-CP1 may be encountered under high precipitation scenarios due to climate change causing dike or containment pond failure.
Detailed Review Comment	The design criteria provided for the water management systems indicates that the Effluent Water Treatment Plant (EWTP) is sufficient to ensure that D-CP1 and CP1 are able to manage the surface contact water from the entire site for a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hour extreme rainfall. However, the water levels in CP1 that resulted in the 2020 emergency amendment were not due to a greater than usual spring freshet, but were a result of, in part extreme rainfall (>95th percentile) over a three-month period in the summer in combination with elevated TDS concentrations. Agnico Eagle's response to KIA-IR-07 Design capacity for CP1 and D-CP1 provides sufficient evidence that the storage capacity of CP1 and D-CP1 cannot be feasibly increased. This reader is not confident that the current water management strategy is sufficient to ensure compliance with the design capacity of CP1 and D-CP1 under increasingly variable and extreme precipitation and snowmelt due scenarios that are expected under future climate conditions. Additional treatment and discharge options may be required to ensure that Agnico Eagle can continue to meet the current CP1 discharge criteria of 1,400 mg/L TDS, or the higher proposed discharge 3,500 mg/L of TDS. Other water management options should be investigated including reducing the treatment criteria at CP5 for implementation of the reverse osmosis plant. The reverse osmosis plant at CP5 is the only adaptive source control for TDS included as part of the water management infrastructure on site that can be rapidly implemented in response to varied conditions. Reducing the threshold for when treatment is implemented below the currently proposed 3,500 mg/L TDS (i.e. below the discharge criteria proposed for CP1) will provide an opportunity to dilute water stored in CP1 thus reducing TDS concentrations and increasing discharge flexibility. Another potential water management option supported by KIA would be to divert some or all water from CP1 to the waterline; this potential is discussed in the Waterline Application before the NIRB but is not accompanied by supporting modelling or documentation.
Recommendation	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

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	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.

4.5 Rankin Inlet facilities closure objectives

Review Comment Number	KIA-TC#5
Subject/Topic	Rankin Inlet facilities closure objectives
References	Appendix G ICRP Section 5.2.1 Rankin Inlet Facilities
Summary	Agnico Eagle indicates that soil and water monitoring will be used to determine whether the Rankin Inlet Facility area may be a source of future contamination. The ICRP should be updated with soil and water quality objectives that must be met to evaluate the closure criteria for the Rankin Inlet Facilities.
Importance of issue	The Rankin Inlet Facility will feature increased use due to Agnico Eagle's long-term approach to managing saline water at the Meliadine Site. Closure objectives for this site are required to provide confidence the location will not pose a long term liability to the local environment.
Detailed Review Comment	Agnico Eagle indicates that soil and water monitoring will be used to determine whether the Rankin Inlet Facility area may be a source of future contamination. However, closure criteria does not refer to soil or water quality objectives that must be achieved to determine whether the objective has been met.
Recommendation	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"*.

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