AGNICO EAGLE

2AM-WTP1826
Technical Comment Responses
Whale Tail Pit – Expansion Project

Submitted to:
Nunavut Water Board

Submitted by:
Agnico Eagle Mines Limited – Meadowbank Division

October 7, 2019

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TECHNICAL COMMENT SUMMARY

As part of Agnico Eagle's approach to respond to the Technical Comments, Agnico Eagle facilitated a meeting with each Intervenor to collectively review the Technical Comments submitted to verify the understanding of the request, review Agnico Eagle's position and intent to respond, and have an open discussion with the parties. Meetings were held with:

- ECCC (September 19 in Edmonton);
- KivIA (September 20 in Winnipeg);
- CIRNAC (September 24-25 in Iqaluit); and
- DFO and KivIA (September 30 in Edmonton and Yellowknife).

Based on the meetings listed above and responses provided as part of this response package, Table 1 below provides an overview of Agnico Eagle's position of the Technical Comment status and the remaining items that require some additional discussion that will occur prior to the public hearing.

Table 1: Agnico Eagles Assessment of Technical Comments

ID	Theme	Subject	TC	Status
CIRNAC				
CIRNAC-TRC#1	WRSF	Delayed Waste Rock Storage Facility Interflow Seepage	1) CIRNAC recommends that AEM confirm the modelling presented in response to CIRNAC IR#3 incorporated interflow seepage loadings from both the Whale Tail and IVR WRSFs, under the 1% cover contamination scenario. 2) Consistent with best practice in mine closure, a site should be stable (both physically and chemically) before being classified as closed. CIRNAC recommends that the temporal scope of the closure phase be extended until water quality concentrations have stabilized after interflow breakthrough. 3) CIRNAC recommends that AEM indicate any changes to the Interim Closure and Reclamation Plan (ICRP) and post-closure monitoring program that would be necessary to detect and evaluate potential impacts to surface water receivers after interflow breakthrough has occurred. In addition, the monitoring duration should be extended to capture interflow breakthrough and subsequent stabilization of contaminant concentrations in Mammoth Lake. 4) CIRNAC recommends that AEM identify any changes to the financial security arrangement that would be needed to address uncertainties related to water quality impacts associated with interflow breakthrough. 5) A key assumption used in the modelling was that initial flows in the cover would be limited to a 30 cm interaction depth. CIRNAC recommends that AEM demonstrate that the selected interaction depth is appropriate for the coarse granular material that will be used to construct the WRSF covers. This should include empirical evidence of the assumed interaction depth being observed under similar conditions (i.e., monitoring results from other covers constructed of "run of mine" coarse materials). 6) AEM indicates their revised modelling is conservative, in part, because the mass loads will decrease over time as leachable material is depleted within the cover. CIRNAC recommends that AEM clarify the length of time required to deplete the inventory of leachable arsenic present in the WRSF covers. An order of magnitude estimate would be sufficient (e.g., 10, 100 or 1,000+ years). 7) Although interflow volumes are predicted to increase, AEM's modelling is based on the assumption that mass loadings from interflow seepage will remain constant over time. CIRNAC recommends that AEM present the rationale and/or empirical evidence to support this important assumption. 8) As stated by CIRNAC during NIRB and NWB processes for the Approved Project and the NIRB process for the proposed Expansion Project, near-term temperature and seepage monitoring at the Whale Tail site (or other sites such as Meadowbank) during operations will not provide sufficient information to accurately predict the timing and magnitude of interflow impacts. CIRNAC recommends that AEM indicate what additional monitoring or research information it will collect to confirm their predictions of interflow impacts are accurate, and specify their adaptive management commitments if total arsenic in Mammoth Lake project above the SSWQO. CIRNAC would recommend AEM provide an acceptable adaptive management strategy during closure and/or post-closure that does not rely on long term water treatment.	Part 1-3 = Resolved Part 4 = Resolved pending further meetings with CIRNAC on security/ICRP Part 5-8 = Resolved
CIRNAC-TRC#2	WRSF	Revised Thermal Cover Modelling & Potential Water Quality Impacts	1) CIRNAC recommends that AEM file O'Kane 2019b to the NWB Public Registry. 2) CIRNAC recommends that AEM indicate: a) the total volume of non-PAG/ML rock required to construct the proposed 4.7 m thick thermal cover; b) the surplus volume of non-PAG/ML rock that will remain after construction of the 4.7 m cover and other site infrastructure; and c) the incremental cover thickness that could be constructed with the surplus volume of non-PAG/ML rock. 3) CIRNAC requests that AEM specify the stockpile volume of surplus non-PAG/ML rock (and other granular materials) that will remain readily available and accessible to support care and maintenance requirements that may be necessary during interim closure and post-closure. 4) CIRNAC recommends that AEM perform water quality modelling to validate their qualitative conclusion that thaw depths penetrating through the thermal cover (as described in O'Kane 2019a and O'Kane 2019b) will not result in unacceptable water quality impacts to Mammoth Lake. The temporal scope of the modelling should be of sufficient duration to ensure it captures interflow breakthrough and subsequent stabilization of parameter concentrations.	Part 1-3 = Resolved Part 4 = Pending results of model scenario
CIRNAC-TRC#3	WRSF	WRSF Uncertainty	1) CIRNAC recommends that the ICRP, explaining the work and/or research that has been done to minimize the uncertainty regarding post-closure water quality impacts due to the Waste Rock Storage Facility, is submitted to the NWB as part of the Whale Tail Expansion technical review. 2) CIRNAC requests AEM specify in the ICRP their adaptive management commitments if seepage from the WRSFs is greater than predicted during interim closure, closure, and post-closure. CIRNAC would recommend AEM provide an acceptable adaptive management strategy during closure and/or post-closure that does not rely on long term water treatment.	Resolved = pending further meetings with CIRNAC on security
CIRNAC-TRC#4	Waste Rock	Waste Rock Management Alternatives	CIRNAC seeks clarification if ML/PAG or non ML/NPAG waste rock disposal into the IVR Pit is being evaluated as part of this Whale Tail Expansion application; and if so, that the details of the ML/PAG or non ML/NPAG waste rock disposal into the IVR Pit is provided as part of this technical review for interested parties to evaluate whether the practice might be an effective waste rock management alternative at the Whale Tail site.	Resolved
CIRNAC-TRC#5	Management Plans	Prior Management Plan Revisions	CIRNAC recommends that AEM provide a disposition table summarizing if and how the Department's October, 2018 input on prior versions of the Management Plans for the Approved Project have been incorporated into the revised submissions. A separate response should be provided for each of CIRNAC's comments and recommendations. This information will be used to confirm the adequacy of the revised Management Plans to mitigate potential environmental impacts associated with the Expansion Project.	Resolved

ID	Theme	Subject	TC	Status
ECCC				
ECCC-TC1	Water Quality	Flooded Pit Reconnection	ECCC recommends that: · The Proponent base the timing of reconnection of the flooded pits to surface waters on monitoring done post-flooding over a sufficient time frame to demonstrate conditions in the pits (e.g., mixing behaviour, water clarity, chemistry) will meet water quality objectives for discharge. · The NWB include a condition in the Water Licence that water quality objectives for the pit waters be identified prior to the end of operations (i.e., 2026) and include thresholds for implementing treatment.	Resolved
ECCC-TC2	Water Quality	Closure of the Groundwater Storage Ponds	ECCC recommends that the Proponent: · Clarify the options for closure of the GSPs. · Identify what would constitute appropriate water quality to change from backfilling the GSPs. · Identify impacts to post-closure pond water quality if the GSPs are not covered.	Resolved
ECCC-TC3	Water Quality	Removal of Seepage from Model Inputs	ECCC recommends that the Proponent: · Identify monitoring that will be done to ground-truth the prediction of negligible seepage from the waste rock storage facility (WRSF). · Use monitoring results to inform ongoing water quality model and water balance updates.	Resolved
ECCC-TC4	Water Quality	Wet Climate Years – Water Management Plan	ECCC recommends that the Proponent: · Identify the type, extent, timing and duration of water management issues associated with wet climate years that could potentially be encountered for the combined Approved Project and the proposed Expansion Projects. · Clarify how the proposed mitigation measures would address the type, extent, timing and duration of potential water management issues associated with wet climate years for the combined Approved Project and proposed Expansion Projects. · Update the Water Management Plan to incorporate the information requested above.	Resolved
ECCC-TC5	Water Quality	Landfarm Management Plan	ECCC recommends that the Proponent: · Clarify whether the quality of water from the landfarm is to be used as screening criteria for discharge to the IVR Attenuation Pond. · Include the discharge of landfarm contact water to the attenuation pond in the next update of the water management schematic flowsheets (Appendix B of Appendix G.5: Whale Tail Pit – Water Management Plan, Version 4).	Resolved
ECCC-TC6	Landfarm	Landfarm Acceptance Criteria	ECCC recommends that the Proponent follow soil restrictions in order to avoid microorganism toxicity, as outlined in the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils	Resolved
ECCC-TC7	Waste Rock	Active Layer Depth	ECCC recommends that the Proponent provide the actual depth of the active layer in the project area and compare it to the regional active layer depth that was used in the modelling. Should there be differences in depth, ECCC recommends that the Proponent clarify why the regional active layer depth was used instead of the actual active layer depth.	Resolved
ECCC-TC8	Management Plans	Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (Errata)	ECCC recommends that in the next plan update the Proponent reference the MDMER in Section 2.2.1 (TSS), Table 2.1 (Existing Federal TSS Guidelines) and Section 5.1.2 (Standard Operating Procedure for Monitoring and Management During Dewatering).	Resolved
DFO				
DFO-TC2.1	Fish	Accounting of potential impacts to fish and fish habitat as a result of widening of haul road	DFO –FFHPP requests the Proponent provide clarification regarding how the existing Letter of Advice (11--HCAA--CA6--00006) specific to the Whale Tail Haul Road: 2.1.1. Accounts for changes to the amount of fish habitat impacted by works, activities and undertakings associated with widening the haul road from 6.5m to 15m 2.1.2. Addresses potential negative impacts of works, activities and undertakings associated with water crossings on the proposed 15m haul road expansion	Resolved = pending request for review application
DFO-TC2.2	Fish	Water use volume requirements and source lakes	DFO – FFHPP requests the Proponent: 2.2.1 Clarify how authorized volumes in water licence 2AM---WTP1826 are adequate given updated water withdrawal requirements suggest exceedances; provide specific reference to: a) the updated total annual water volume requirements for Nemo Lake during operations; b) the updated total annual water use for dust suppression for Nemo Lake during operations; and, c) the volume requirements associated with operational geological drilling for small lakes and ponds proximate to drilling sites (see also 3.3.3).	Resolved

ID	Theme	Subject	TC	Status
			2.2.2 Clarify how the under ice volume of 6,170,000m3 was derived from information in FEIS Addendum 6---M; provide specific locations of values, and calculations 2.2.3 Provide: a) a consolidated list of waterbodies that will be used as water sources for operational geological drilling, and the volumes that are expected from each waterbody; and, b) clarification regarding which waterbodies will replace Lakes A47, Lake A49, Lake A50, Lake A51, Lake A52, Lake A53 as summer water sources for operational drilling	
DFO-TC2.3	Fish	Downstream Environment	DFO –FFHPP requests the Proponent clarify: 2.3.1 If quantitative information specific to waterbodies requested in DFO---FFHPP Technical Comment 3.4.7 will be provided: a) as part of a Fisheries Act Authorization application post---certificate amendment, or b) if information will be provided prior to the completion of the NWB review of the Water Licence Amendment application.	Resolved = pending submission of the Fish Habitat Offsetting Plan, as part of the *Fisheries Act* Authorization application
KivIA				
KivIA-WL-TC#1	Fish	Mercury concentrations in fish	AEM has not provided details on how the peak-increase-factor used to predict increased mercury concentrations in lake trout in the project area were calculated or definitive management and mitigative actions in the instance that predicted mercury concentrations in lake trout were exceeded. We request additional detail to address: 1. the methodology used to determine the peak-increase-factor for lake trout in the project area, specifically, why the value of 2.67 was used in contradiction of the stated methods which gave a range of 3.6-4.4 for PIFs, and 2. how any impacts from greater than anticipated mercury concentrations resulting from the project can be adequately mitigated.	Resolved
KivIA-WL-TC#2	Water Quality	Removal of pit walls from water quality model predictions	Please reintroduce the pit walls as source terms to the water quality model to more conservatively predict water quality concentrations in the receiving environment. Management and mitigation measures should be proposed along with a discussion of their effectiveness should concentrations of parameters of potential concern, including both phosphorus and arsenic, approach their respective discharge criteria and low action level thresholds. Also see “KivIA-WL-TC#12 Early warning trigger development”.	Resolved
KivIA-WL-TC#3	Water Quality	Cryo-concentration in water quality model assumptions	Please update the water quality model to include cryo-concentration. This update should be provided as soon as possible but no later than 30 days prior to the public hearings to provide sufficient time for technical review	Resolved
KivIA-WL-TC#4	Waste Rock	Uncertainty in Waste Rock Seepage Estimates	Please provide results from the flood routing analysis and the range of seepage and runoff that can be accommodated by the attenuation ponds and comment on their ability to handle increased variance in runoff or climatic extremes. Please compare these inflows to the 1:1000-year flood event analysis to provide confidence that relatively extreme events can be adequately managed through current water management infrastructure and the attenuation ponds.	Resolved
KivIA-WL-TC#5	Thermal model	Thermal Modelling of Permafrost	Please incorporate existing climate change projections for the next 50-80 years (e.g., the Overland et al. 2013 data cited in the Water Management Plan) into thermal modelling to provide a more accurate estimate of the fate of permafrost in the vicinity of the pits during closure and post-closure. Please demonstrate the stability of the pits and the robustness of the hydrogeological predictions regarding groundwater dynamics given the increased rate of permafrost thawing that is expected (due to the combined effects of climate change and pit flooding).	Resolved
KivIA-WL-TC#6	Water Quality	Climatic inputs for water quality model	Please update the water management plan with the decision tree for water quantity management as committed to in the EIS technical hearings in June 2019 and within the response to KivIA-WL-IR#34.	Resolved = further meetings to discuss options
KivIA-WL-TC#7	Water Balance	Climate Change and Project Timeline	Please provide water balance results for the wet weather scenario as described.	Resolved
KivIA-WL-TC#8	WRSF	Addressing a Changing Climate in Project Design	Please demonstrate the long-term feasibility of the current closure plan under climate change (i.e., beyond 2085), especially with respect to permafrost dynamics beneath water bodies and in the WRSF.	Resolved
KivIA-WL-TC#9	Water Quality	Arsenic and ARD mitigation on Whale Tail Pit Wall	We therefore request AEM provide documentation to support the assertion that water treatment can effectively reduce arsenic concentrations to safe levels. We further request AEM provide documentation to support an increased fill rate, and what the greatest potential rate may be, for the pits intended to prevent ongoing oxidation of the pit walls. Given the uncertainty in the occurrence of arsenic in the pit walls and their contribution to concentrations during closure, we request AEM ensure treatment of pit water quality is addressed under security. We request the NWB include a condition within the water licence requiring AEM to develop an adaptive management plan that identifies thresholds and timelines for	Resolved

ID	Theme	Subject	TC	Status
			treatment or other mitigation should water quality not be suitable for discharge during closure. This is intended to ensure water quality is suitable for discharge by the intended start of post closure in 2043.	
KivIA-WL-TC#10	Groundwater	Implications of rock fracturing on groundwater volumes	Please provide a quantity estimate of relative groundwater contributions from rock fracturing.	Resolved
KivIA-WL-TC#11	Water Quality	Alternative Effluent Discharge Locations	Please provide results of the quantitative assessment of D1 and D5 lakes as alternative discharge locations. Please explain under what circumstances these lakes would be considered as alternative discharge locations.	Resolved = assessed per Project Certificate T&C
KivIA-WL-TC#12	Water Quality	Early warning trigger development	Please provide a schedule as to when trigger and threshold values will be developed and applied, providing confidence AEM will follow the procedures and protocols laid out in their CREMP that are dependent on them. This schedule should include at least 30 days for KivIA technical review of the triggers and thresholds. We further recommend that the NWB incorporate a feasible schedule for the development and implementation of the triggers and threshold values into the project terms and conditions.	Resolved
KivIA-WL-TC#13	Mine Plan	IVR High Pit Walls As Mitigation	The KIA submits that the feasibility of proposed mitigation should be demonstrated prior to approval. Please provide the conceptual design of the overburden capped pit wall for technical review. The design should indicate the slope at which the IVR Pit high walls will be mined, the depth to which overburden will be added, the type of erosion protection that will be used and how the integrity of the overburden coverage and erosion protection will be assured.	Resolved
KivIA-WL-TC#14	Closure	Fate of Equipment	Please include removal of equipment and machinery from the underground and transport to secure disposal off site in the RECLAIM cost estimate.	Resolved
KivIA-WL-TC#15	Water Quality	Inuit Input into Closure Objectives	Please confirm that water quality in the pits will meet CCME criteria for Protection of Aquatic Life or site-specific water quality objectives as applicable prior to breaching dikes.	Resolved
KivIA-WL-TC#16	Water Quality	High TSS Concentrations during Construction	Please apply a short term maximum TSS limit for dike construction that meets either CCME or MDMER guidelines.	Resolved
KivIA-WL-TC#17		Overburden for Closure	Please explain why lake bed sediments are not considered adequate for use in the revegetation of mine and road footprint areas during closure.	Resolved
KivIA-WL-TC#18	Water Quality	Water Quality Contingencies	Please describe how any high arsenic loadings from pit walls could be isolated and treated in order to maintain pit water quality within CWQG levels and provide evidence of the feasibility of the proposed management option.	Resolved
KivIA-WL-TC#19	Incinerator	Testing of Used Oil/Waste Fuel	Please describe the monitoring schedule for testing the quality of used oil/waste fuel to ensure it meets standards for incineration. Please include details on how many samples are tested annually, where the used oil/waste fuel is stored while awaiting test results, and the rationale for the frequency of testing.	Resolved
KivIA-WL-TC#20	Fish	Conceptual Fish Habitat Offsetting Plan	Please provide more details on the Fish Habitat Offsetting Plan, including overall approach, timeline, monitoring, complementary measures and contingency options. This information can be provided during the regulatory phase of the project; we recommend the NWB include this requirement as a condition of the water licence and include appropriate time for review by the KivIA and other intervenors as appropriate.	Resolved = pending further updates during the *Fisheries Act* Authorization application
KivIA-WL-TC#21	WRSF	Waste Rock Storage Facility Design	The thermal modeling that recommends the use of a thermal cap of 4.7 metres appears to be reasonable. However, the KivIA requests that AEM establish a sufficient number of thermistor strings in the Whale Tail WRSF and the bedrock beneath and in close proximity to the WRSF in order to ensure that the modeling is updated with local project data instead of thermistor readings from the Portage WRSF at the Meadowbank Gold Mine. This local data will best determine how effective the ARD/ML material has been isolated within the WRSF. In addition, it will allow for a better understanding of the depth and distribution of the active layer as it is related to permafrost distribution should be determined with the additional thermistor strings that will be established in the Whale Tail WRSF. This will also better determine the effectiveness of the 1) freeze back in the WRSF, 2) the water retention ability and capacity of WRSF dike, and 3) the impact of water flow from the WRSF on the water quality in Mammoth Lake.	Resolved

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

Interested Party:	**CIRNAC**	**Rec No.:**	**CIRNAC-TRC#1**
Re:	**Delayed Waste Rock Storage Facility Interflow Seepage**		

Information Request / Recommendation Made By Interested Party:

1) CIRNAC recommends that AEM confirm the modelling presented in response to CIRNAC IR#3 incorporated interflow seepage loadings from both the Whale Tail and IVR WRSFs, under the 1% cover contamination scenario.

2) Consistent with best practice in mine closure, a site should be stable (both physically and chemically) before being classified as closed. CIRNAC recommends that the temporal scope of the closure phase be extended until water quality concentrations have stabilized after interflow breakthrough.

3) CIRNAC recommends that AEM indicate any changes to the Interim Closure and Reclamation Plan (ICRP) and post-closure monitoring program that would be necessary to detect and evaluate potential impacts to surface water receivers after interflow breakthrough has occurred. In addition, the monitoring duration should be extended to capture interflow breakthrough and subsequent stabilization of contaminant concentrations in Mammoth Lake.

4) CIRNAC recommends that AEM identify any changes to the financial security arrangement that would be needed to address uncertainties related to water quality impacts associated with interflow breakthrough.

5) A key assumption used in the modelling was that initial flows in the cover would be limited to a 30 cm interaction depth. CIRNAC recommends that AEM demonstrate that the selected interaction depth is appropriate for the coarse granular material that will be used to construct the WRSF covers. This should include empirical evidence of the assumed interaction depth being observed under similar conditions (i.e., monitoring results from other covers constructed of "run of mine" coarse materials).

6) AEM indicates their revised modelling is conservative, in part, because the mass loads will decrease over time as leachable material is depleted within the cover. CIRNAC recommends that AEM clarify the length of time required to deplete the inventory of leachable arsenic present in the WRSF covers. An order of magnitude estimate would be sufficient (e.g., 10, 100 or 1,000+ years).

7) Although interflow volumes are predicted to increase, AEM's modelling is based on the assumption that mass loadings from interflow seepage will remain constant over time. CIRNAC recommends that AEM present the rationale and/or empirical evidence to support this important assumption.

8) As stated by CIRNAC during NIRB and NWB processes for the Approved Project and the NIRB process for the proposed Expansion Project, near-term temperature and seepage monitoring at the Whale Tail site (or other sites such as Meadowbank) during operations will not provide sufficient information to accurately predict the timing and magnitude of interflow impacts. CIRNAC recommends that AEM

indicate what additional monitoring or research information it will collect to confirm their predictions of interflow impacts are accurate and specify their adaptive management commitments if total arsenic in Mammoth Lake project above the SSWQO. CIRNAC would recommend AEM provide an acceptable adaptive management strategy during closure and/or post-closure that does not rely on long term water treatment.

Agnico Eagle's Response to Information Request / Recommendation:

Part 1

The modelling presented in response to CIRNAC TRC#3 has incorporated interflow seepage loadings from both the Whale Tail and IVR WRSFs, under the 1% contamination scenario.

Part 2

Agnico Eagle disagrees with this recommendation to extend the temporal scope of the closure phase. Several monitoring programs will be performed to confirm that the physical and chemical behavior of the WRSF is performing as predicted during operation and closure phases. Refer to Agnico Eagle's response to CIRNAC-TRC#3 for details regarding the proposed physical and chemical monitoring.

Part 3

Agnico Eagle does not consider that any change to the Interim Closure and Reclamation Plan and post-closure monitoring program would be necessary to detect and evaluate potential impacts to surface water receivers after interflow breakthrough has occurred. The evolution of the cover system layer (near-surface) is expected to exhibit much greater variability than the evolution of the waste rock placed at depth within the WRSF due to seasonal and diurnal temperature variation, precipitation effects, oxidation processes, and physical, chemical, and biological degradation of materials. The model has used conservative loading rates developed from geochemical testing, and conservative assumptions surrounding the effective depth of interaction (EDI) for both runoff and interflow from the WRSFs.

Agnico Eagle considers that the 6 years of monitoring during operation and 18 years of monitoring during the closure of the site should be sufficient to achieve this objective. Agnico Eagle refers CIRNAC to the existing Water Licence conditions Part E Item 7, 8 and 9:

> *7. The Licensee shall submit an updated Water Management Plan on an annual basis to the Board for review following the commencement of Operations. The Plan must include an updated Water Balance. The Water Management Plan shall include an action plan to be implemented if predicted re-flooded pit water quality indicates that treatment is necessary.*
>
> *8. The Licensee shall submit a Water Quality Model for pit re-flooding and for WRSF contact water mixing into Mammoth Lake post-Closure as part of the Water Management Plan which shall be re-calibrated as necessary and updated annually following commencement of Operations. The results and implications of the predictive model shall be reported to the Board.*

> *9. The Licensee shall, on an annual basis during Closure, compare the predicted water quantity and quality within the pit and lake, to the measured water quantity and quality. Should the difference between the predicted base case values and measured values be 20% or greater, then the cause(s) of the difference(s) shall be identified and the implications of the difference shall be assessed and reported to the Board.*

Throughout this time period, the water balance and water quality model will be compared to monitoring data and calibrated on an annual basis. There will be sufficient time to recognize changes from the predicted water quality and take corrective action in the form of adaptive management. One potential such action could involve the direction of runoff and interflow from the Whale Tail WRSF to the flooded pit lake, rather than directly into Mammoth Lake through a spill way. The attenuating capacity of the flooded pit lake would serve to reduce the load from the WRSF that enters Mammoth Lake, ultimately reducing the effects of the WRSF runoff and interflow that are seen in Mammoth Lake.

Part 4

Agnico Eagle does not consider that any change to the financial security arrangement would be needed to address uncertainties related to water quality impacts associated with interflow breakthrough

Part 5

The site and downstream receiving water quality model submitted as part of the Water Licence Amendment Application (Golder 2019) accounts for an effective depth of interaction (EDI) of 30 cm to calculate mass released through runoff over the WRSFs. Additionally, there is an EDI of 4.7 m applied in the model to calculate mass released through interflow through the WRSFs once interflow begins. In total, this results in a total EDI of 5 m. Both of the mass releases (runoff and interflow) assume the 3D surface (vertical and horizontal surfaces) of the WRSFs. The reader is referred to part 7) of this response for additional details on the application of loading sources in the WRSFs.

The EDI of runoff (or overland flow) was based on Sharpley (1985) which summarizes typical depth of interaction for different soils, slope aspects and rainfall intensities. Sharpley indicates a typical interaction depth of 2 cm for sandy loam on a 20% slope with rainfall intensity of 50 mm/hr. Baker Lake A (Environment Canada, 2019), intensity-duration-frequency (IDF) curves suggest the maximum rainfall intensity (1:100 5-minute storm) would be 50 mm/hr. An EDI approximately one order of magnitude greater than suggested by Sharpley (1985) for finer-textured soils for similar rainfall intensity was selected to maintain a high degree of conservatism due to the uncertainty around this parameter.

Agnico Eagle notes CIRNAC's recommendations to *"include empirical evidence of the assumed interaction depth being observed under similar conditions"*, however studies to capture runoff rates or EDI in similar environments have indicated that surface runoff does not occur on the landform scale (Fretz 2010 and Momeyer 2014). This is supported by the very low fraction of precipitation reported as runoff from modelling (<5%) (O'Kane 2019).

Part 6

A prediction on the time to deplete the arsenic in the cover needs to also consider typical background concentrations in rocks. It is the enrichment above typical concentrations that causes a potential water quality risk.

The waste rock that requires management for the project has been shown to have arsenic contents greater than 75 mg/kg, whereas the predicted arsenic content of the cover material will be around 20 mg/kg and in the 1% contamination scenario approximately 30 mg/kg. For the expected case, this concentration is within an average range, similar to crustal rocks around the planet as referenced by Price (1997).

The 1% contamination scenario would only need to deplete 10 mg/kg of arsenic to be within typical arsenic concentrations, and regardless of depletion, well below the cut-off threshold for the cover. Depleting 10 mg/kg would be on the order of 100 years, or similar to the earliest prediction for interflow to occur.

Part 7

The loading rates (e.g., mg As/kg/month) used in the water quality prediction model for the leaching of arsenic (and other parameters) are constant based on steady and slowly declining rates established in the laboratory (Golder 2018). Using a constant rate, when in fact it slowly declines over time, results in a conservative water quality prediction.

The loading rate is applied to the entire three-dimensional surface area of the cover over the 4.7 m cover depth assuming it behaves like typical waste rock. The resulting chemistry prediction takes into account the mass of rock in the cover, the length of time of weathering and assumes that at interflow breakthrough, all of the rock in the cover has wet-up. This is expected to add another layer of conservatism to the water quality prediction as the loading rate used will be based on fresh rock and not 100 years of weathering.

Part 8

Agnico Eagle has undertaken an in-depth design of the Whale Tail and IVR WRSFs during operations, closure and post-closure phases. Performance modeling and sensitivity analyses to critical engineering parameters was conducted, which includes thermal modelling under different climate change scenarios, namely RCP 6.0 and RCP 8.5; landform water balance; water balance and water quality forecasts; and a Failure Modes and Effects Analysis Workshop for the Waste Rock Storage Facilities of the Expansion Project.

Agnico Eagle is also developing a comprehensive monitoring program for the WRSFs which includes several types of instruments to measure the properties and evolution of the air and water phases within the WRSFs. This will provide a more thorough assessment of the thermal regime and reduce the

uncertainty from parametric assumptions made in the WRSFs models with the goal of confirming the seepage rates before reaching the closure phase.

Current adaptive management plans for ARD/ML rock, water and waste include mitigation measures to identify, manage and adapt the operations phase in a way that any potential impacts are not extended to the closure and post-closure phases of the project. Agnico Eagle will updated the Water Management Plan, Waste Management Plan, and Interim Closure and Reclamation Plan to include adaptive management tables 60 day following reception of the amended water licence. These changes will include the specific adaptive management strategies that will be implemented in the WRSF to meet water quality objectives, chemical and physical stability of the WRSFs during the operations, closure, and post-closure phases.

References:

Agnico Eagle (Agnico Eagle Mines Limited). 2019. Operational ARD-ML Sampling and Testing Plan – Whale Tail Pit Expansion Project. April 2019. Version 5.

Fretz, N. M. 2010. Multi-Year Hydrologic Response of Experimental Waste-Rock Piles in a Cold Climate: Active-Zone Development, Net Infiltration, and Fluid Flow. University of British Columbia.

Golder (Golder Associates Ltd.). 2018. Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailings, Overburden and Sediment – Whale Tail Pit Project. November 2018. Ref No. 1789310_182_RPT_Rev1.

Golder. 2019. Mine Site and Downstream Receiving Water Quality Predictions, Whale Tail Pit – Expansion Project. May 2019. Ref No. 18108905-308-RPT-Rev0.

Momeyer, S. A. 2014. Hydrologic Processes in Unsaturated Waste Rock Piles in the Canadian Subarctic. University of British Columbia.

O'Kane (O'Kane Consultants). 2019. Landform Water Balance Modelling of Whale Tail and IVR WRSF. May 10, 2019.

Price W. 1997. Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. Reclamation Section, British Columbia Ministry of Energy and Mines. April 1997.

Sharpley, A. 1985. Depth of surface soil-runoff interaction as affected by rainfall, soil slope, and management. *Soil Science Society of America Journal, 49*(4), 1010-1015.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-TRC#2
Re:	Revised Thermal Cover Modelling & Potential Water Quality Impacts		

Information Request / Recommendation Made By Interested Party:
1) CIRNAC recommends that AEM file O'Kane 2019b to the NWB Public Registry.

2) CIRNAC recommends that AEM indicate: a) the total volume of non-PAG/ML rock required to construct the proposed 4.7 m thick thermal cover; b) the surplus volume of non-PAG/ML rock that will remain after construction of the 4.7 m cover and other site infrastructure; and c) the incremental cover thickness that could be constructed with the surplus volume of non-PAG/ML rock.

3) CIRNAC requests that AEM specify the stockpile volume of surplus non-PAG/ML rock (and other granular materials) that will remain readily available and accessible to support care and maintenance requirements that may be necessary during interim closure and post-closure.

4) CIRNAC recommends that AEM perform water quality modelling to validate their qualitative conclusion that thaw depths penetrating through the thermal cover (as described in O'Kane 2019a and O'Kane 2019b) will not result in unacceptable water quality impacts to Mammoth Lake. The temporal scope of the modelling should be of enough duration to ensure it captures interflow breakthrough and subsequent stabilization of parameter concentrations.

Agnico Eagle's Response to Information Request / Recommendation:
Part 1
Agnico Eagle refers CIRNAC to Appendix A of this response package, which presents the Thermal Model of Whale Tail Waste Rock Storage Facility under RCP8.5 prepared by O'Kane Consultants in June 2019.

Part 2
a) The total volumes of non-PAG/ML rock required to construct the proposed 4.7 m thick thermal cover of each WRSF are:

- Total Whale Tail WRSF cover system volume – 6,698,800 m³
- Total IVR WRSF cover system volume – 4,085,000 m³

b) After the construction of all the infrastructure identified in the application documents, the estimated surplus of Non-PAG/ML material is 7.20 Mm^3.

c) The estimated incremental thickness of the thermal cover would be about 3.5 m.

Part 3
The estimated surplus of Non-PAG/ML material is 7.20 Mm^3.

Part 4
Agnico Eagle commits to completing the requested modelling scenario and producing results for the technical meeting.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-TRC#3
Re:	WRSF Uncertainty		

Information Request / Recommendation Made By Interested Party:
1) CIRNAC recommends that the ICRP, explaining the work and/or research that has been done to minimize the uncertainty regarding post-closure water quality impacts due to the Waste Rock Storage Facility, is submitted to the NWB as part of the Whale Tail Expansion technical review.

2) CIRNAC requests AEM specify in the ICRP their adaptive management commitments if seepage from the WRSFs is greater than predicted during interim closure, closure, and post-closure. CIRNAC would recommend AEM provide an acceptable adaptive management strategy during closure and/or post-closure that does not rely on long term water treatment

Agnico Eagle's Response to Information Request / Recommendation:
Part 1
Several monitoring programs will be deployed to confirm that the physical and chemical behavior of the WRSF is performing as predicted during all project phases and post-closure. As part of project development studies, the geochemical characteristics of the cover material were assessed using industry best practice. To further support the findings, operations will collect and analyze up to 40,000 samples per year to comprehensively capture the geochemical characteristics of the cover material. Once the characteristics of the rock is well understood, its use in the cover or NAG stockpile will be tracked using the mine dispatch system to ensure it is placed in the appropriate location.

The chemical performance of the WRSF will be linked to the physical properties of the pile, which will be monitored by:

- Thermistor strings extending near surface, to depth and into foundation materials;
- Near surface water content and matric suction sensors;
- Thermal conductivity sensors near surface;
- Differential pressure sensors at depth and near surface;
- Meteorological monitoring;
- QA/QC of cover system construction; and
- Water quality monitoring of observed seepage/run-off (if observed).

The WRSF is not expected to produce significant run-off or interflow for at least 80 years after its placement. The water quality model assumes if run-off occurs, run-off will interact with the top 30cm of the pile. If run-off is observed, the chemistry of that water will be compared to the model to validate the prediction to ensure an appropriate level of conservatism was used for the site water quality predictions, with adjustments made to the model if necessary.

The chemistry of the interflow material will represent material that has been leaching for nearly 100 years. Up until interflow begins, all incident precipitation would have migrated downward into the pile and frozen. Assuming there will be no water to sample during operations or during closure (18 years post operations), grab samples of the cover could be collected and tested with instantaneous leach tests in the laboratory (e.g. shake flask extraction tests) to confirm rates of oxidation and potential water quality expected in interflow. Given the cold climate on site and resulting very slow rates of oxidation, grab samples every five years would likely be appropriate to monitor rates of oxidation. Approximately 10 – 15 depths/locations could be targeted based on the water content sensors; although safety will need to be considered when finalizing location selections as the top of the pile may be the only safe location to collect material.

Part 2

Agnico Eagle refers CIRNAC to response CIRNAC-TRC#1 part 8 for details on the adaptive management strategy during closure and/or post-closure.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-TRC#4
Re:	Waste Rock Management Alternatives		

Information Request / Recommendation Made By Interested Party:
CIRNAC seeks clarification if ML/PAG or non ML/NPAG waste rock disposal into the IVR Pit is being evaluated as part of this Whale Tail Expansion application; and if so, that the details of the ML/PAG or non ML/NPAG waste rock disposal into the IVR Pit is provided as part of this technical review for interested parties to evaluate whether the practice might be an effective waste rock management alternative at the Whale Tail site.

Agnico Eagle's Response to Information Request / Recommendation:
Disposal of ML/PAG and/or ML/NPAG waste rock from the West/North IVR Pit into the South/East IVR Pit prior to reflooding of the pit is not planned as part of this Whale Tail Expansion application; as per the project description, the IVR Waste Rock Storage Facility has sufficient space for waste rock mined from the IVR. However, Agnico Eagle considers that operational flexibility may provide an opportunity to consider the option to backfill the South/East IVR Pit as a potential alternative waste rock management activity as part of the Mine's adaptive management plan. As a potential alternative management option, Agnico Eagle believes that the details of the disposal strategy to the IVR Pit are not required as part of this technical review. However, in the event that the alternative disposal option to backfill South/East IVR Pit prior to reflooding becomes a possibility, the disposal plan/options would be evaluated, and an updated waste rock management plan submitted to the Board for technical review. This plan would not be linked to managing environmental risk but would include an assessment of the effects to the closure condition of the reflooded IVR pit lake and Whale Tail Pit.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-TRC#5
Re:	Prior Management Plan Revisions		

Information Request / Recommendation Made By Interested Party:
CIRNAC recommends that AEM provide a disposition table summarizing if and how the Department's October, 2018 input on prior versions of the Management Plans for the Approved Project have been incorporated into the revised submissions. A separate response should be provided for each of CIRNAC's comments and recommendations. This information will be used to confirm the adequacy of the revised Management Plans to mitigate potential environmental impacts associated with the Expansion Project.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle completed a review of CIRNACs comments on Management Plans throughout the Approved Project process (2016-2018). A summary table provided in Appendix B of the response package, presents the comments received during the Completeness Review, Information Requests, Technical Comments, Final Written Statements, NIRB Terms and Conditions, NWB Water Licence Decision, and Fulfillment of Terms and Conditions of the Approval Project on the following plans:

- CREMP Addendum Mercury Monitoring Plan
- Haul Road Management Plan
- Water Quality and Flow Management Plan
- Water Management Plan
- Waste Rock Management Plan
- Operational ARD-ML Sampling and Testing Plan
- Groundwater Monitoring Plan
- Thermal Monitoring Plan

ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

Interested Party:	**ECCC**	**Rec No.:**	**ECCC-TC1**
Re:	**Flooded Pit Reconnection**		

Information Request / Recommendation Made By Interested Party:

ECCC recommends that:

- *The Proponent base the timing of reconnection of the flooded pits to surface waters on monitoring done post-flooding over a sufficient time frame to demonstrate conditions in the pits (e.g., mixing behaviour, water clarity, chemistry) will meet water quality objectives for discharge.*
- *The NWB include a condition in the Water Licence that water quality objectives for the pit waters be identified prior to the end of operations (i.e., 2026) and include thresholds for implementing treatment.*

Agnico Eagle's Response to Information Request / Recommendation:

Agnico Eagle considers the water quality prediction for arsenic is conservative and will not approach the prediction of 0.021 mg/L. If this prediction is not correct, the pit lake will not be reconnected until it has reached the SSWQO of 0.025 mg/L as per Water Licence condition Part E Item 10:

> *10. The Licensee shall not breach dikes until the water quality in the re-flooded area meets CCME Water Quality Guidelines for the Protection of Aquatic Life, baseline concentrations, or appropriate site-specific water quality objectives. Subject to the Board approval, if water quality parameters are above CCME Guidelines, a site-specific risk assessment must be conducted to identify specific water quality objectives for the site that are protective of the aquatic environment.*

In this situation pit lake water will overflow in the Mammoth Lake, through a design infrastructure such as a spillway or pumping system and would have to meet MDMER criteria prior to discharge.

The basis to confirm the prediction will be established long before the pit lake approaches being full and Agnico Eagle is planning to use monitoring data collected during operations (6 years) and closure (18 years) to inform and update water quality forecasts on an annual basis to validate predictions as per Water Licence condition Part E Items 7, 8, and 9.

> *7. The Licensee shall submit an updated Water Management Plan on an annual basis to the Board for review following the commencement of Operations. The Plan must include an updated Water Balance. The Water Management Plan shall include an action plan to be implemented if predicted re-flooded pit water quality indicates that treatment is necessary.*
>
> *8. The Licensee shall submit a Water Quality Model for pit re-flooding and for WRSF contact water mixing into Mammoth Lake post-Closure as part of the Water Management Plan, which shall be re-calibrated as necessary and updated annually following commencement of Operations. The results and implications of the predictive model shall be reported to the Board.*

9. The Licensee shall, on an annual basis during Closure, compare the predicted water quantity and quality within the pit and lake, to the measured water quantity and quality. Should the difference between the predicted base case values and measured values be 20% or greater, then the cause(s) of the difference(s) shall be identified and the implications of the difference shall be assessed and reported to the Board.

Based on 24 years of updating the water quality forecast and adaptively managing measured conditions if required, Agnico Eagle considers it is not necessary to delay pit lake reconnection and water quality objectives for the pit lake should be established as part of the Final Closure Plan.

Interested Party:	ECCC	Rec No.:	ECCC-TC2
Re:	Closure of the Groundwater Storage Ponds		

Information Request / Recommendation Made By Interested Party:

ECCC recommends that the Proponent:

- *Clarify the options for closure of the GSPs.*
- *Identify what would constitute appropriate water quality to change from backfilling the GSPs.*
- *Identify impacts to post-closure pond water quality if the GSPs are not covered.*

Agnico Eagle's Response to Information Request / Recommendation:

At the completion of underground mining, the ICRP highlights that the primary closure option for the groundwater storage ponds (GSPs) is backfilled with NPAG rock. This is completed after any remaining water in the GSPs has been pumped to the underground workings. However, other closure alternatives may be considered, which will be evaluated prior to the end of operations. Alternatives may include retaining one or all the ponds as shallow pond features in the closure landscape.

The option to retain the ponds as surface water features would be based on a number of factors, including availability of NPAG mine rock, any benefits of capping the lake bed or excavating the lakebed sediment (depending on lakebed sediment quality) compared to backfilling, but most importantly determining their added value as surface water features in the closure landscape and their potential to support aquatic life and wildlife.

Should the GSPs be retained as surface water features, it is expected that their target water quality would be consistent with the closure water quality objectives set for Whale Tail Lake (including the IVR and Whale Tail pits). In meeting closure water quality objectives in the ponds, they will be acceptable to support aquatic life and be safe for wildlife through post-closure. To support this option as part of the ICRP process, Agnico Eagle will provide an assessment of the ponds supporting this projection prior to the end of operations.

In meeting closure objectives, negligible impacts to aquatic life and wildlife would therefore be predicted in the post-closure landscape. The ponds would not be expected to be influenced by Project-related sources in closure and post-closure. After closure and in post-closure, no contact water will drain to either of the GSPs; GSP-2 and GSP-3 are assumed to flow naturally to the IVR WRSF Pond that will be directed to the reflooded IVR pit lake, and GSP-1 is expected to flow directly to reflooded Whale Tail Pit lake.

Interested Party:	ECCC	Rec No.:	ECCC-TC3
Re:	Removal of Seepage from Model Inputs		

Information Request / Recommendation Made By Interested Party:

ECCC recommends that the Proponent:

- *Identify monitoring that will be done to ground truth the prediction of negligible seepage from the waste rock storage facility (WRSF).*
- *Use monitoring results to inform ongoing water quality model and water balance updates.*

Agnico Eagle's Response to Information Request / Recommendation:

Part 1

Agnico Eagle is currently updating WRSF monitoring plans. The monitoring program will include installation of thermistor strings within the WRSF and into the foundation materials to monitor temperature during the operations and closure periods. These thermistor strings will provide confidence that the WRSF is freezing back at depths and at rates similar to those predicted by modelling, thereby limiting water movement from the base of the pile.

Additionally, the monitoring program will include installation of near surface water content and matric suction sensors early in the operations period to confirm the surface water balance of the WRSF cover system. Confirmation of the cover system's surface water balance will provide updated estimates of net percolation to the underlying waste rock and reduce uncertainty in long term seepage rates from the WRSF. Additional monitoring is also proposed to reduce uncertainty in the WRSF performance. The reader is referred to the response for CIRNAC-TRC#1 for additional details.

The monitoring program will also contain more instruments to reduce uncertainty in the thermal regime and water balance of the WRSF such as: thermal conductivity sensors, differential pressure sensors and a meteorological monitoring station.

Agnico Eagle disagrees with ECCC's conclusion that "Modeling was done on the basis of average climactic conditions and that may under-represent the potential for seepage contributions in wet years.". A synthetic climate database was developed as an input to cover system modeling where daily precipitation was not applied considering solely the daily average amount (i.e., modelling included both wet and dry years as well as large and small precipitation events) (O'Kane 2019).

Part 2

Data obtained from WRSF monitoring will be reviewed regularly and integrated into annual updated of the site-side water and load balance.

References:

O'Kane. 2019. Thermal Modelling of the Whale Tail and IVR WRSFs. Report No. 948-011-R-013. July 23, 2019.

Interested Party:	ECCC	Rec No.:	ECCC-TC4
Re:	Wet Climate Years – Water Management Plan		

Information Request / Recommendation Made By Interested Party:

ECCC recommends that the Proponent:

- *Identify the type, extent, timing and duration of water management issues associated with wet climate years that could potentially be encountered for the combined Approved Project and the proposed Expansion Projects.*
- *Clarify how the proposed mitigation measures would address the type, extent, timing and duration of potential water management issues associated with wet climate years for the combined Approved Project and proposed Expansion Projects.*
- *Update the Water Management Plan to incorporate the information requested above.*

Agnico Eagle's Response to Information Request / Recommendation:

Determination of Wet Year Precipitation

Wet precipitation years corresponding to the 10-year and 100-year return periods were derived based on the daily precipitation record from the Baker Lake A Environment and Climate Change Canada (ECCC) Station (ID2300500) precipitation data (1950 – 2018). A frequency analysis was performed on the annual precipitation values derived from the dataset. The resulting annual precipitation is shown in Table ECCC-TC4-1 for the 10-year and 100-year return periods. Average precipitation statistics, available from previous studies (Agnico Eagle 2016), are also presented for comparison.

The precipitation was further corrected for undercatch, using a factor of 1.15 for rainfall and 1.55 for snow-water-equivalent, following previous studies (Agnico Eagle 2016). These factors were developed by ECCC to correct for underestimations of precipitation inherent to measurement limitations, particularly substantial in northern climates, as discussed by Mekis and Hogg (1999). The annual precipitation corrected for undercatch is also shown in Table ECCC-TC4-1.

To assess the potential impact of recent climate on the wet year predictions, the frequency analysis was also performed on the Baker Lake record from 2000 to 2018. The results indicate a slightly lower average annual precipitation but higher wet precipitation values. Given the smaller dataset, the impact of extreme values has a larger impact. The high precipitation in 2018 (highest on record) has a significantly higher impact on the predicted precipitation for the 18-year dataset than for the 68-year dataset (**Error! Reference source not found.**). Given the project life (under 10 years), we do not anticipate a major change in climate that would require the use of the smaller, less robust dataset.

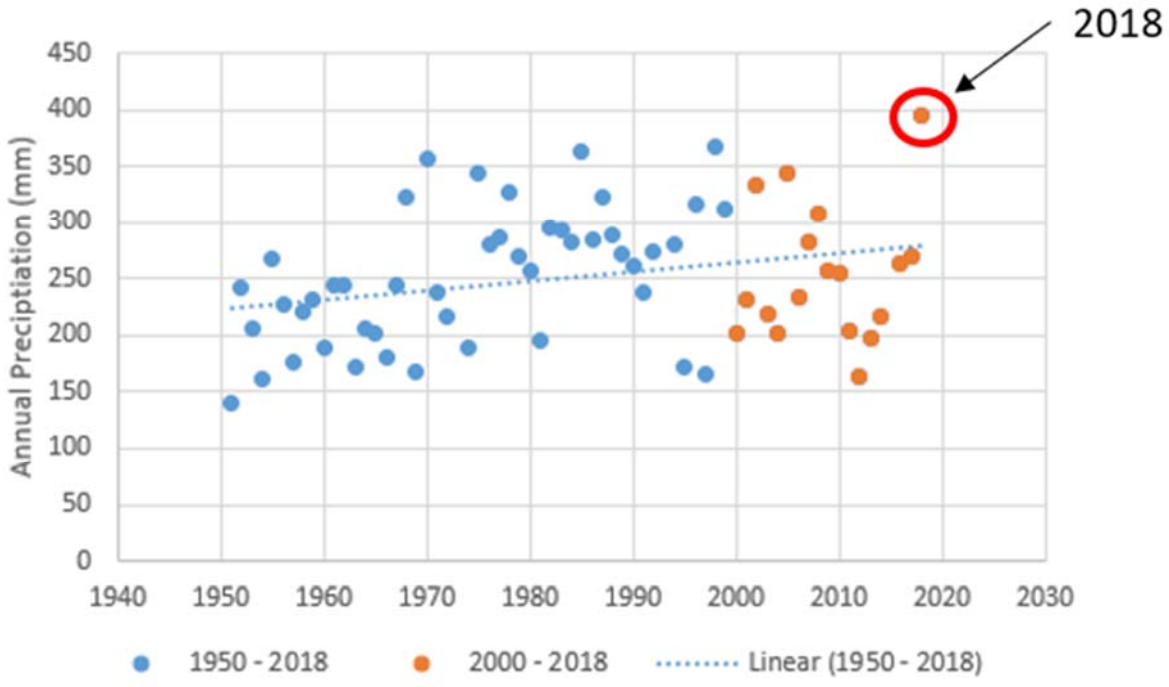
The total annual average precipitation presented in Table ECCC-TC4-1 was also compared with the precipitation used in the O'Kane thermal model (296 mm). The annual average precipitation, based on archived precipitation records (i.e., records uncorrected for undercatch) are comparable.

Table ECCC-TC4-1: Annual Precipitation Frequency Analysis Results for Baker Lake

Return Period	1950 - 2018			2000 - 2018		
	Annual Precipitation (mm)		~Equivalent Year in Record	Annual Precipitation (mm)		~Equivalent Year in Record
	From Baker Lake Record	With Undercatch Factor		From Baker Lake Record	With Undercatch Factor	
Average	248.7[1]	323.0	1967	243.9	316.8	2006
10yr – Wet	330.4	429.1	2002	335.5	435.8	2002
100yr – Wet	397.1	515.8	2018	451.9	587.0	- [2]

1. Derived in previous studies (Agnico Eagle 2016)
2. Exceeds record maximum annual precipitation

Figure ECCC-TC4-1. Annual Precipitation for Period of Record (Baker Lake A)



Wet Year Water Balance Results

The model was run under average conditions with the exception of the following two years in the simulation time, where the wet precipitation years, corresponding to the 10-year and 100-year return periods, were applied:

1) October 2019 to September 2020, to assess the 2019 / 2020 winter. Over this particular winter, excess water from the Whale Tail Attenuation Pond is pumped to GSP-1. This is the peak contact water year for the saline water ponds.

2) October 2024 to September 2025, to assess the 2025 hydrological year. This is the year with the ultimate site footprint, resulting in the maximum water to be managed overall.

The monthly water quantity exceedances beyond the current permitted site capacity are presented in Table ECCC-TC4-2. These water quantity exceedances are expected to occur in the freshet of 2020 (June) from the Whale Tail Attenuation Pond. Following the freshet, there are no additional expected water quantity exceedances during operations.

Table ECCC-TC4-2. Water Management Exceedances for the Whale Tail Expansion Project under Wet Year Conditions

Year	Return Period	Monthly Exceedance (m^3/month)	
		10-yr - Wet	100-yr - Wet
2019 / 2020 (June)	10yr/100yr	145,000	232,000
2021	Average	0	0
2022	Average	0	0
2023	Average	0	0
2024 / 2025	10yr/100yr	0	0

Wet Year Water Management

The Expansion Project has been planned with contingency water management storage to manage contact water during upset conditions. For example, GSP3 could be used for temporary storage when not used for saline water management. This storage has sufficient capacity to manage the potential water quantity exceedances occurring during the freshet as discussed above and can be used to hold excess contact water temporarily until it can be treated by the water treatment plant during the remaining open water season (July to September). During this time, at maximum capacity, the excess water can be treated and discharged within two weeks.

The above water management strategy, plus other alternatives, will be incorporated in the adaptive management section of the water management plan. Agnico Eagle is committing to include adaptive management strategies in the appropriate plan 60 days following reception of the amended water licence.

References:

Agnico Eagle. 2016. Meadowbank Mine – Amendment/Reconsideration of the Project Certificate (No. 004/ File No. 03MN107) and Amendment to the Type A Water Licence (No. 2AM-MEA1525). Volume 6, Appendix 6-C. Submitted to the Nunavut Impact Review Board, June 30, 2016.

Mekis, Eva, and Hogg, Willam D. 1999. Rehabilitation and Analysis of Canadian Precipitation Time Series, Atmosphere-Ocean 37 (a) 1999, 53-85.

Interested Party:	ECCC	Rec No.:	ECCC-TC5
Re:	Landfarm Management Plan		

Information Request / Recommendation Made By Interested Party:

ECCC recommends that the Proponent:

- *Clarify whether the quality of water from the landfarm is to be used as screening criteria for discharge to the IVR Attenuation Pond.*
- *Include the discharge of landfarm contact water to the attenuation pond in the next update of the water management schematic flowsheets (Appendix B of Appendix G.5: Whale Tail Pit – Water Management Plan, Version 4).*

Agnico Eagle's Response to Information Request / Recommendation:

Water that collects in the landfarm during operations will be analyzed for Water Licence 2AM-WTP1826 Schedule 1 Table 1 Group 4 monitoring parameters, but will not be screened against any criteria prior to discharge to the adjacent IVR Attenuation Pond. These results will be used to inform internal management practices, such as spraying the water onto windrows to increase moisture content, treating the water through the skimmer, or transferring the water via water truck to the tailings storage facility at Meadowbank. Water that is transferred to the attenuation pond from the landfarm is expected to be low volumes, as per our experience at Meadowbank, which will be incorporated into the water within the pond that is directed through the operational water treatment plant (O-WTP) prior to discharge to the receiving environment. Water accumulating in the landfarm will not be discharged to the receiving environment.

During operations, and while the landfarm is active in closure, water accumulating inside the bermed area will be sourced from direct precipitation or from the thawing of contaminated snow and ice that was deposited to the landfarm during winter.

As per the Whale Tail Pit – Landfarm Design and Management Plan (Agnico Eagle 2019), non-contaminated snow will be removed as much as possible during winter to minimize the quantity of spring melt water inside the berm. Following snowmelt, any contaminated product left from winter spill clean-up operations will be padded up and transferred to hazardous waste disposal storage before transfer offsite for further treatment or disposal.

For the NWB surface water quality modelling assessment, during operations and closure, water that comes into contact with the landfarm as per the site water balance (i.e., through runoff over the surface area of the material within a landfarm) was accounted for in the site water quality model.

The discharge of landfarm contact water to the IVR Attenuation Pond will be included in the next update of the water management schematic flowsheets.

Interested Party:	**ECCC**	**Rec No.:**	**ECCC-TC6**
Re:	**Landfarm Acceptance Criteria**		

Information Request / Recommendation Made By Interested Party:
ECCC recommends that the Proponent follow soil restrictions in order to avoid microorganism toxicity, as outlined in the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle has been operating the Meadowbank landfarm since 2012 and has been successful in doing so. Each summer, after completion of screening and mixing activities, we have been able to take remediated material out of the landfarm. In addition, we are seeing progress each year in our piles showing that microbial activity is going on. In 2018, the National Research Council of Canada completed an audit of our landfarm and concluded that microbial population was in typical number and that it was able to effectively degrade contaminants.

The Whale Tail Expansion Project proposed Landfarm Management Plan builds on the experience gained at Meadowbank and we are confident that monitoring proposed is sufficient to ensure successful landfarm operations.

Interested Party:	ECCC	Rec No.:	ECCC-TC7
Re:	Active Layer Depth		

Information Request / Recommendation Made By Interested Party:
ECCC recommends that the Proponent provide the actual depth of the active layer in the project area and compare it to the regional active layer depth that was used in the modelling. Should there be differences in depth, ECCC recommends that the Proponent clarify why the regional active layer depth was used instead of the actual active layer depth.

Agnico Eagle's Response to Information Request / Recommendation:
Active layer depth in the region is variable. Monitoring stations at Baker Lake and Ukkusiksalik National Park suggest that the active layer in the tundra is less than 2.0 m and 0.6 m, respectively (Circumpolar Active Layer Monitoring Network).

The development of the 4.7 meters cover was based on an active layer depth in the WRSF of 4.2 meters during operations and closure with an additional 0.5 meters for contingency. The active layer was determined by preliminary 1D steady-state numerical modelling and further confirmed by O'Kane's 2D transient model. Both simulations considered predicted effects of climate change (O'Kane 2019).

Material properties for the cover system and waste rock materials were calibrated based on observed ground temperature measurements obtained from thermistors in Meadowbank's WRSFs (O'Kane 2019). Numerical modelling considered the effect of slope angle, slope aspect, wind exposure on thermal conditions within the WRSF. Modelling of the WRSF cover system indicates a greater thaw depth in the WRSF than observed regional data. Thus, the thaw depth simulated by numerical modelling, rather than the less conservative regional thaw depth, was used in support of the detailed design of the Whale Tail and IVR WRSF cover system.

Reference:
O'Kane. 2019. Thermal Modelling of the Whale Tail and IVR WRSFs. Report No. 948-011-R-013. July 23, 2019.

Interested Party:	ECCC	Rec No.:	ECCC-TC8
Re:	Water Quality Monitoring and Management Plan for Dike Construction and Dewatering (Errata)		

Information Request / Recommendation Made By Interested Party:
ECCC recommends that in the next plan update the Proponent reference the MDMER in Section 2.2.1 (TSS), Table 2.1 (Existing Federal TSS Guidelines) and Section 5.1.2 (Standard Operating Procedure for Monitoring and Management During Dewatering).

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle agrees with ECCC's comment and will update the Plan accordingly in the next revision to the Plan.

FISHERIES AND OCEANS CANADA (DFO)

Interested Party:	DFO	Rec No.:	DFO-TC2.1
Re:	Accounting of potential impacts to fish and fish habitat as a result of widening of haul road		

Information Request / Recommendation Made By Interested Party:
DFO –FFHPP requests the Proponent provide clarification regarding how the existing Letter of Advice (11---HCAA---CA6---00006) specific to the Whale Tail Haul Road:

2.1.1. Accounts for changes to the amount of fish habitat impacted by works, activities and undertakings associated with widening the haul road from 6.5m to 15m

2.1.2. Addresses potential negative impacts of works, activities and undertakings associated with water crossings on the proposed 15m haul road expansion

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle's position is that the general design of the Haul Road was approved under the existing Letter of Advice; however, the widening of the Haul Road and related extensions to existing culverts will be addressed under a new Request for Review application for approval under the recently revised *Fisheries Act*. The Request for Review application will be consistent with the DFO Fish and Fish habitat Policy Statement (dated August 2019). The application will include updated predictions of hydraulic flows in the culverts, demonstrating that the proposed widening of Haul Road poses minimal risk to passage of fish.

Interested Party:	DFO	Rec No.:	DFO-TC2.2
Re:	Water use volume requirements and source lakes		

Information Request / Recommendation Made By Interested Party:

DFO – FFHPP requests the Proponent:

2.2.1 Clarify how authorized volumes in water licence 2AM---WTP1826 are adequate given updated water withdrawal requirements suggest exceedances; provide specific reference to:

- *a) the updated total annual water volume requirements for Nemo Lake during operations;*
- *b) the updated total annual water use for dust suppression for Nemo Lake during operations; and,*
- *c) the volume requirements associated with operational geological drilling for small lakes and ponds proximate to drilling sites (see also 3.3.3).*

2.2.2 Clarify how the under ice volume of 6,170,000m3 was derived from information in FEIS Addendum 6---M; provide specific locations of values, and calculations 2.2.3 Provide:

- *a) a consolidated list of waterbodies that will be used as water sources for operational geological drilling, and the volumes that are expected from each waterbody; and,*
- *b) clarification regarding which waterbodies will replace Lakes A47, Lake A49, Lake A50, Lake A51, Lake A52, Lake A53 as summer water sources for operational drilling*

Agnico Eagle's Response to Information Request / Recommendation:

Response 2.2.1

The expectation is that the conditions of the amended Water Licence will reflect the updated requirements for Nemo Lake (i.e., 209,544 m^3/year for camp use, truck shop, drilling water - pits, cement mixing and also including 72,240 m^3/yr for dust suppression) and water sources for operational geological drilling (i.e., maximum of 109,135 m^3/yr from lakes/ponds proximal to drilling sites and which could include sources such as Nemo, Mammoth, and Whale Tail lakes) provided in Agnico Eagle's previous reply to the DFO Information Request (DFO-IR2; Agnico Eagle 2019a).

Response 2.2.2

For calculating under-ice volumes, hydrological statistics were extracted from the elevation-volume table (Table A-19) provided in Appendix 6-M of the Final Environmental Impact Statement (FEIS) for the Approved Project. The calculations assumed a 2-m ice thickness during winter and that the available volume of water for withdrawals was 10% of the under-ice volume, measured by the volume of water under an elevation of 154.1 m (6,169,226 m^3).

Response 2.2.3

Agnico Eagle is committed to avoiding any residual impacts to fish and fish habitat during operational drilling. Within the Project footprint, waterbodies listed as losses within the Conceptual Fish Habitat Offsetting Plan (Agnico Eagle 2019b) will continue to be used for operational drilling prior to dewatering

of those waterbodies for mining infrastructure or activities. Waterbodies not directly affected by the Project footprint may also be used as sources for operational drilling, including the following:

- Relatively shallow ponds unlikely to support fish throughout the year, including Lake A113 and Lake A54, where water withdrawals will not exceed a 5 cm decrease in water levels, measured during operational drilling
- Relatively deep lakes with large volumes of available water for withdrawals, including Whale Tail Lake South Basin, Nemo Lake, Mammoth Lake, and Lake A20 (where available water for withdrawals is defined as 10% under-ice volumes)

In summary, Agnico Eagle is confident that the proposed water withdrawals for Nemo Lake and Mammoth Lake listed for mine operations, combined with the annual maximum requirements of operational drilling in the reply to DFO-IR2 (Agnico Eagle 2019a). will not result in residual effects to fish and fish habitat in selected source waterbodies.

References:

Agnico Eagle (Agnico Eagle Mines Limited). 2019a. 2AM-WTP1826 Information Request Responses Whale Tail Pit – Expansion Project. Submitted to Nunavut Water Board. August 1, 2019.

Agnico Eagle. 2019b. Whale Tail Pit – Expansion Project Conceptual Fish Habitat Offsetting Plan. April 2019.

Interested Party:	DFO	Rec No.:	DFO-TC2.3
Re:	Downstream Environment		

Information Request / Recommendation Made By Interested Party:

DFO –FFHPP requests the Proponent clarify:

2.3.1 If quantitative information specific to waterbodies requested in DFO---FFHPP Technical Comment 3.4.7 will be provided:

a) *as part of a Fisheries Act Authorization application post---certificate amendment, or*
b) *if information will be provided prior to the completion of the NWB review of the Water Licence Amendment application.*

Agnico Eagle's Response to Information Request / Recommendation:

Previously provided predictions for potential downstream changes in surface areas, as part of Agnico Eagle's reply to DFO Technical Comment 3.4.7 (Agnico Eagle 2019), will be updated using recently collected bathymetry data for Lake A76, A12, and A15 as representative downstream habitats for conservatively predicting downstream changes to fish habitat. Revised predictions will be submitted with the Fish Habitat Offsetting Plan as part of the *Fisheries Act* Authorization application. Agnico Eagle is also committed to apply mitigation, if required, to avoid downstream effects to fish and fish habitat during closure as part of the plan for reflooding the diked area.

Reference:

Agnico Eagle (Agnico Eagle Mines Limited). 2019. Technical Comment Responses Whale Tail Pit – Expansion Project. Submitted to Nunavut Impact Review Board. May 29, 2019.

KIVALLIQ INUIT ASSOCIATION (KivIA)

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-1**
Re:	**Mercury concentrations in fish**		

Information Request / Recommendation Made By Interested Party:
AEM has not provided details on how the peak-increase-factor used to predict increased mercury concentrations in lake trout in the project area were calculated or definitive management and mitigative actions in the instance that predicted mercury concentrations in lake trout were exceeded.

We request additional detail to address:
1. the methodology used to determine the peak-increase-factor for lake trout in the project area, specifically, why the value of 2.67 was used in contradiction of the stated methods which gave a range of 3.6-4.4 for PIFs, and

2. how any impacts from greater than anticipated mercury concentrations resulting from the project can be adequately mitigated.

Agnico Eagle's Response to Information Request / Recommendation:
Part 1
The original estimation of peak increase factors (PIFs; Azimuth 2017 [Appendix C of this response package]) followed best management practices (HESL 2016), with some site-specific modifications to take target fish species and short impoundment time into consideration (a summary is provided in Section 3.1 of the 2019 technical memorandum). In short, two models (Bodaly and Johnston), each targeting two "top predator" species (northern pike and walleye), were coupled with site-specific characteristics to estimate a range of peak fish mercury concentrations. The mean of the predictions was used as our estimate for lake trout (shown in Figure 3-6 of Azimuth 2017); the 95% confidence interval of baseline fish mercury concentrations for a 550-mm lake trout was then applied to the mean. In the 2017 report, modifiers were estimated to account for the reduction in peak mercury concentrations due to short life span of flooding and were applied to the estimated peak mercury concentrations. In the 2019 revised estimates, the latter modifiers for short reservoir life span were removed.

In the KivIA comment there appears to be some confusion regarding the PIFs from the 2017 report. The Mean PIFs cited in the "Detailed Review Comment" for walleye and for northern pike were from Figure 3-5, which summarized the data (from Quebec and Manitoba reservoirs) used to calculate the modifiers for short reservoir life span. These were not the PIFs estimated using the Bodaly and Johnston models with site-specific characteristics (see above).

Part 2

The prediction of changes in fish mercury concentrations (see Azimuth 2017 [Appendix C of this response package] for approved project and Azimuth 2019 for Expansion Project) were based on models developed for long-term hydroelectric reservoirs. A major difference for the Whale Tail Expansion Project relative to those hydroelectric reservoirs is that flooding will be temporary, which should result in a faster decrease to baseline or near-baseline fish mercury concentrations. Thus, the period of highest predicted fish mercury concentrations is expected to be during operations and will be monitored according to the Mercury Monitoring Plan (Agnico Eagle 2018) and managed following best management practices (HESL 2016).

Monitoring (Agnico Eagle 2018) of fish mercury concentrations will be conducted in conjunction with Environmental Effects Monitoring under the Metals and Diamond Mine Effluent Regulation. The determination of when measured fish tissue concentrations exceed model predictions will consider the 95% upper confidence limit of the mean prediction estimate, which is 1.76 mg/kg (wet weight) for a 550-mm lake trout (Section 3.2 of the Azimuth 2019 technical memorandum). As stipulated in the Mercury Monitoring Plan, further risk-based analyses will be implemented in the event that monitoring results exceed these model predictions. As per best management practices (HESL 2016), appropriate risk communication options will be pursued commensurate with predicted risks to ensure that local residents in Baker Lake are not exposed to elevated mercury risks associated with the project.

References:

Agnico Eagle Mines Ltd. 2018. Whale Tail Pit. CREMP Addendum – Appendix A: Mercury Monitoring Plan for Whale Tail South Area. Prepared by Agnico Eagle in July 2018.

Azimuth Consulting Group Partnership (Azimuth). 2017. Whale Tail Pit Project: Predicted Changes in Fish Mercury Concentrations in the flooded area of Whale Tail Lake (South Basin). Prepared for Agnico-Eagle Mines in February 2017.

Hutchinson Environmental Sciences Ltd (HESL). 2016. Best Management Practice – Small Hydropower and Methyl Mercury. Prepared for Ontario Waterpower Association, February 2016.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-2
Re:	Removal of pit walls from water quality model predictions		

Information Request / Recommendation Made By Interested Party:
Please reintroduce the pit walls as source terms to the water quality model to more conservatively predict water quality concentrations in the receiving environment. Management and mitigation measures should be proposed along with a discussion of their effectiveness should concentrations of parameters of potential concern, including both phosphorus and arsenic, approach their respective discharge criteria and low action level thresholds.

Also see "KivIA-WL-TC#12 Early warning trigger development".

Agnico Eagle's Response to Information Request / Recommendation:
The vertical face of the pit wall is not a significant source of arsenic or phosphorus. In the water quality model, any volume of rock from the pit used to predict loadings is treated like waste rock, meaning it must have a high surface area (i.e., small particle size) to leach per unit of mass (loading rates are in mg of element per unit of mass of rock, per time unit, or mg/kg/month). The vertical pit walls are composed of bedrock, which can be considered large boulders and therefore have extremely low surface areas. Typically, only a centimetre or two will react on the vertical face of the bedrock and have negligible impact on water quality. The small particles responsible for leaching can only remain on the benches.

Industry standard practice is to be conservative on the horizontal bench, which is where over-drilling and blast fragmentation typically leaves some rubble and small grained material that can leach. The current model assumes that up to 1 m in vertical depth of each horizontal bench over the entire surface area of the pit behaves like waste rock, which also includes the first metre of the vertical pit wall. In the field this is not actually possible as the benches are also cleared of rubble and this over-estimation in reactive material more than accounts for the minor reaction face on vertical pit walls.

During operations and in closure the prediction of pit contact water will be compared to the prediction model that assumes pit bench reactivity only, also referred to as the NWB water quality model. Using the refined model submitted to the NWB, updating the water quality forecast will evaluate any deviations from predictions are detected as quickly as possible. This is part of the existing conditions of Water Licence 2AM-WTP1826 Part E Item 7, 8, and 9 that requires annual updates of the water balance, water quality, and comparisons between predictions and observed.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-3
Re:	Cryo-concentration in water quality model assumptions		

Information Request / Recommendation Made By Interested Party:

Please update the water quality model to include cryo-concentration. This update should be provided as soon as possible but no later than 30 days prior to the public hearings to provide sufficient time for technical review

Agnico Eagle's Response to Information Request / Recommendation:

The water quality model has been updated to include cryo-concentration; the model has also been updated to include biological phosphorus uptake rates and to include an updated effluent discharge plan. A description of the key assumptions for each of these updates are provided in the table below:

Table KivIA-WL-TC-3-3: Updated Design Parameters

Update	Assumption	Details
Cryo-concentration	Ice thickness	Assumed ice thickness = 2 m This is common practice for northern Canada modeling assumptions and is conservative when compared to site data.
	Timing of ice cover	The 2 m ice layer forms instantaneously on October 1 of every year and melts over a 30-day period in the subsequent June
	Concentrations in Ice	All water chemistry mass is excluded from the volume of water that freezes. This mass is transferred to the remaining free water below the ice cover.
Phosphorus Uptake Rate	Concept	Phosphorus is taken up by primary producers (e.g., plankton, algae, periphyton) in the lake over the summer period. Total phosphorus remains in the water column. With the onset of ice formation, the primary producers die and sink to the lake bed; the phosphorus taken up by these primary producers is removed from the water column and is locked in the sediment (sufficient under ice oxygen remains in the water column to limit phosphorus recycling to the water column). This is represented by the total mass uptake being calculated and removed from the water column only at the beginning of October.
	Locations	Phosphorus uptake rates were applied only to Mammoth Lake and Whale Tail Lake (South Basin).
	Nutrient Ratios	The phosphorus uptake rate is highly dependent on nutrient ratios of carbon to chlorophyll a, and phosphorus to carbon. Several ratios were assessed to provide an upper and lower bound phosphorus uptake rate using a combination of productivity-based relationships based on carbon to chlorophyll a ratios and phosphorus to carbon ratios sourced from the literature.
	Phosphorus Uptake Rate	Upper bound: P_{up} = 10^(1.035 log[TP] – 0.728) Lower Bound: P_{up} = [10^(1.035 log[TP] – 0.728)] / 3.33 where: P_{up} = phosphorus uptake rate (mg/L) TP = total phosphorus (mg/L)

Update	Assumption	Details
Effluent Discharge and Water Management	Discharge Location	Mammoth Lake only (no operational discharge to Whale Tail Lake (South Basin)
	Management of Water in Elevated Whale Tail Lake (South Basin)	Water is transferred from Whale Tail Lake (South Basin) to Mammoth Lake in volumes of approximately 3 to 4 Mm^3 per year between June and September, inclusive. This may be achieved through a combination of controlled overflow through the Whale Tail Lake South Diversion Channel, or by pumping.
	TSS Values	Effluent: 7.5 mg/L Pit lakes in post-closure: 1 mg/L Runoff from WRSF: 10 mg/L

Predicted concentrations for total arsenic and total phosphorus in Mammoth Lake and Whale Tail Lake (South Basin) for the updated water quality modelling are shown below in Figures 1 and 2.

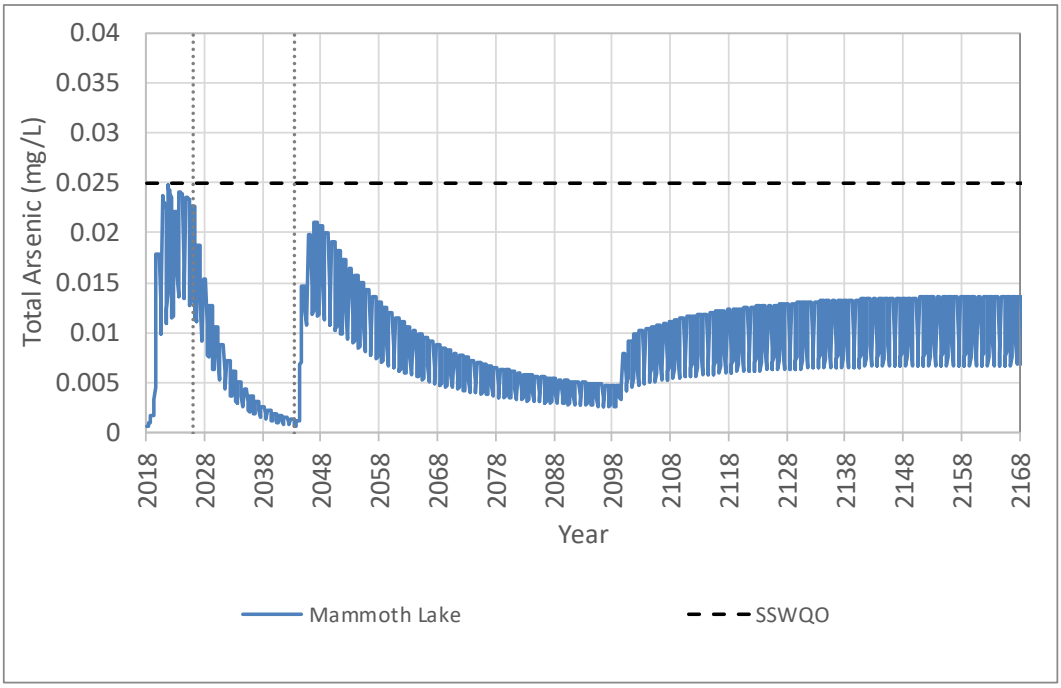


Fig 1a	Total arsenic concentrations in Mammoth Lake	*Created by:* KS *Checked by:* JF

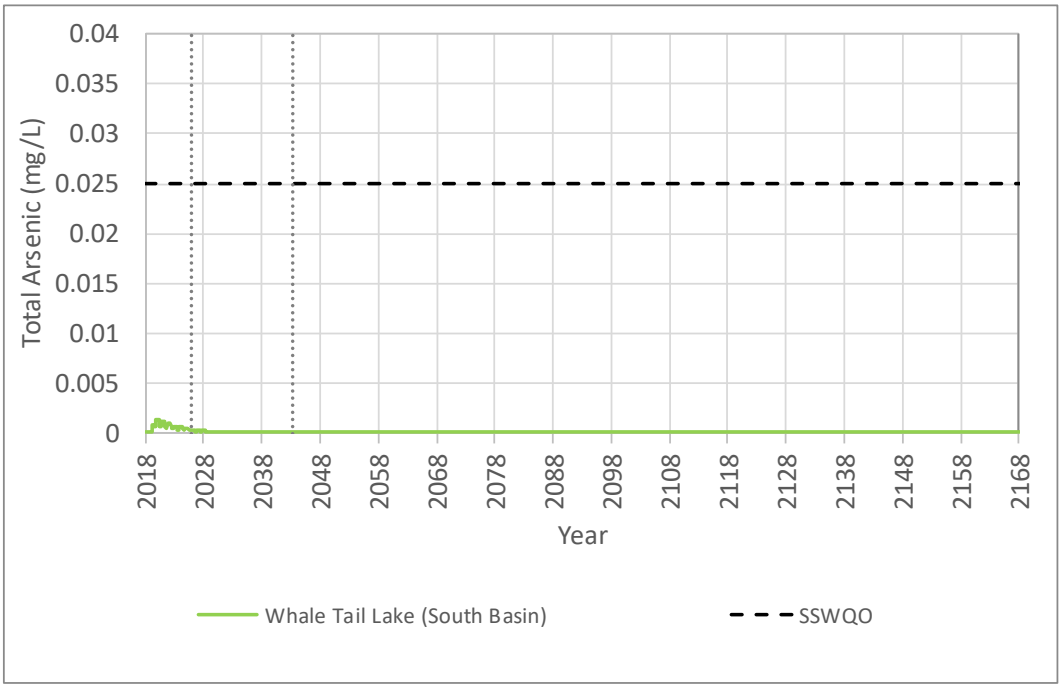


Fig 1b	Total arsenic concentrations in Whale Tail Lake (South Basin)	*Created by:* KS *Checked by:* JF

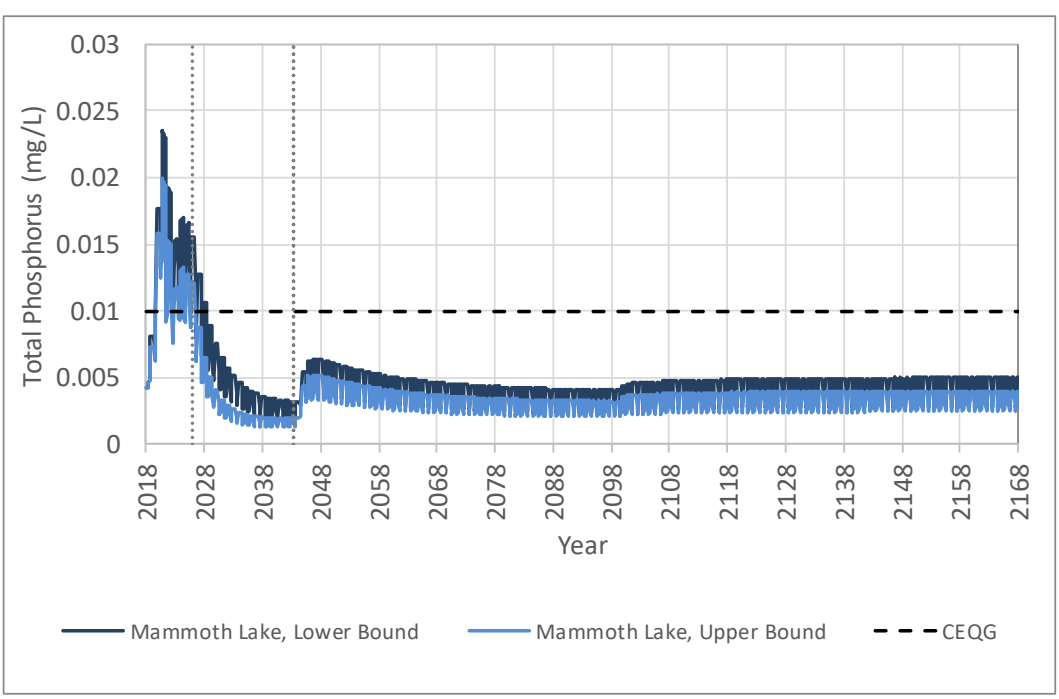


Fig 2a	Total phosphorus concentrations in Mammoth Lake	*Created by:* KS *Checked by:* JF

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-4
Re:	Uncertainty in Waste Rock Seepage Estimates		

Information Request / Recommendation Made By Interested Party:
Please provide results from the flood routing analysis and the range of seepage and runoff that can be accommodated by the attenuation ponds and comment on their ability to handle increased variance in runoff or climatic extremes. Please compare these inflows to the 1:1000-year flood event analysis to provide confidence that relatively extreme events can be adequately managed through current water management infrastructure and the attenuation ponds.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle conducted 100-year and 1000-year recurrence flood routing analyses for the Whale Tail Attenuation Pond and the IVR Attenuation Pond. The data presented in the following response is summarized from SNC-Lavalin (2019).

For the flood routing analyses, the 100-year flood event was determined as a rapid snowmelt in 25 days of the 1:100-year snowpack, combined with a 1:2-year rainfall for 72 hours. The 1000-year flood event was determined as a rapid snowmelt in 13 days of the 1:1000-year snowpack, combined with a 1:2-year rainfall for 72 hours. Pumping is assumed to start 3 days after the beginning of spring freshet. A runoff coefficient of 1.0 was used, assuming the soil would be fully saturated during the event.

Table KivIA-WL-TC-4-4 compares the effect of 1:100-year and 1:1000-year flood events on the infrastructure during the first half of the expansion project. The infrastructure was designed to contain a 1:100-year flood. However, some overflow would be present in the attenuation pond for a 1:1000-year flood; the water levels would rise by 0.2 m above the maximum allowed water level (MAWL). This represents a potential overflow volume of 4,650 m^3, a relatively small volume compared to the capacity of the infrastructures.

Table KivIA-WL-TC-4-*5*: Phase II-A, 1:100 & 1:1000-Yr Flood Simulation Comparison

Structure	Initial Water Level	Max. Allowed Water Level (MAWL)	Overflow Elevation	1:100-year Obtained Max. Water Level (OMWL)	1:1000-year Obtained Max. Water Level (OMWL)	1:100-year OMWL ≤ MAWL (Y/N)	1:1000-year OMWL ≤ MAWL (Y/N)	Active Volume
	(m)	(m)	(m)	(m)				(Mm^3)
IVR Pit	Dry	148.0	149.0	83.4	91.2	Yes	Yes	5.99
WT Pit	Dry	140.9	141.9	5.7	12.3	Yes	Yes	37.70
WT Attenuation Pond	141.4	146.0	146.0	146	146.2	Yes	No	0.17

The same analysis was done for Phase II-B of operations. This phase refers to the post-2022 period defined by the IVR Attenuation Pond entering operations. The addition affects the hydrological balance of the Whale Tail site. Table KivIA-WL-TC-4-2 compares the effect of 1:100-year and 1:1000-year flood events on the infrastructure during that phase. Due to the increased storage capacity provided by the additional pond, the 1:1000-year flood events can be contained and reaching the maximum allowed water level.

Table KivIA-WL-TC-4-2: Phase II-B, 1:100 & 1:1000-Yr Flood Simulation Comparison

Structure	Initial Water Level	Max. Allowed Water Level (MAWL)	Overflow Elevation	1:100-year Obtained Max. Water Level (OMWL)	1:1000-year Obtained Max. Water Level (OMWL)	1:100-year OMWL ≤ MAWL (Y/N)	1:1000-year OMWL ≤ MAWL (Y/N)
	(m)	(m)	(m)	(m)			
IVR Pit	60.5	148.0	149.0	79.7	89.5	Yes	Yes
WT Pit	2.1	140.9	141.9	5.1	8.5	Yes	Yes
IVR Attenuation Pond	163.0	163.9	163.8	163.7	163.9	Yes	Yes
WT Attenuation Pond	141.4	146.0	146.0	144.3	146.0	Yes	Yes

The supplementary volume from extreme weather events will be handled by conveying the water to the GSPs and other infrastructure for temporary storage. The combined storage capacity of the infrastructures (GSPs, ponds, pits) is sufficient to contain the 1:1000-year flooding event and more. Details on the deployment of this strategy will be included in the Water Management Plan following amended water licence reception.

A wet year water balance analysis has also been done which provides additional information on water inflows at the Whale Tail site on an annual basis. For the results of this analysis please refer to KivIA-WL-TRC-7.

Reference:

SNC 2019. Water Management & Infrastructures Prefeasibility Study (PFS) Report – Operation phase. Report No. prepared by SNC-Lavalin. 660109-2000-40ER-0001-01. 23 July 2019.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-5
Re:	Thermal Modelling of Permafrost		

Information Request / Recommendation Made By Interested Party:
Please incorporate existing climate change projections for the next 50-80 years (e.g., the Overland et al. 2013 data cited in the Water Management Plan) into thermal modelling to provide a more accurate estimate of the fate of permafrost in the vicinity of the pits during closure and post-closure.

Please demonstrate the stability of the pits and the robustness of the hydrogeological predictions regarding groundwater dynamics given the increased rate of permafrost thawing that is expected (due to the combined effects of climate change and pit flooding).

Agnico Eagle's Response to Information Request / Recommendation:
Permafrost degradation below the pits is expected during and following the formation of the pit lakes. Changes in ground temperature in the next 50-80 years may affect the depth of the seasonal active layer near surface; however, the rate of permafrost degradation below the pits will be initially controlled by the temperature of lake in the pit not ground temperature during pit refilling and immediately following closure when the pit lake is fully formed.

Predicted permafrost degradation, resulting from the pit lake temperature, was incorporated in the hydrogeological model and this is presented in Golder (2018a). Whale Tail Pit lake is predicted by thermal analysis to be connected to the deep sub-permafrost groundwater 11 years into filling and for the permafrost below the pit lake to fully degrade below pit footprint over 50 years. The IVR Pit lake is predicted to be within permafrost during mining and flooding and for the permafrost below the pit lake to fully degrade over 1000 years following the formation of the pit lake.

Permafrost degradation was predicted along a 2D section, with the section orientation selected to be parallel to the long axis of the lake (Golder 2018a). This orientation was purposely selected to produce a conservatively fast rate of degradation, as it assumes that the width of the lake is infinitely wide (in the 3rd dimension) where the lake is present. In reality, land with permafrost beneath it is present at the sides of the lake (i.e., lake is not infinitely wide), which will result in the permafrost degradation being slower than predicted. Therefore, although climate change was not included in the post closure thermal analysis (Golder 2018a), the degradation rates are conservative for the purposes of the hydrogeological assessment based on the orientation of the section and corresponding assumed influence of the lakes.

Although permafrost degradation rates are inferred to occur slower than assumed in the hydrogeological model, uncertainty in the permafrost degradation rate will not have a significant effect on groundwater fluxes predicted from the pit lake. As presented in Golder (2018b), during post closure, maximum groundwater fluxes are predicted immediately after pit refilling, as the groundwater flow system re-equilibrates from storage losses during mining, and then decreases thereafter, even as the permafrost

degrades. Following the flooding of the pit lake, predicted groundwater fluxes from the pit lake to the groundwater flow system decreased from approximately 4 m^3/day one year after flooding to 1.5 m^3/day after 300 years (Golder 2018b). These discharges are low in comparison to surface water exchange, and even if the peak discharge rate was assumed as the long-term steady state flow for the system, the conclusions of the environmental assessment would not be affected indicating that the permafrost degradation rate from pit lake development is not a significant factor in the hydrogeological analysis.

References:

Golder Associates Ltd. 2018a. Whale Tail Pit Expansion Project – Pit Lake Thermal Assessment in Support of Hydrogeological Post-Closure Analysis. 16 November 2018.

Golder Associates Ltd. 2018b. Hydrogeological Assessment and Modelling Whale Tail Pit – Expansion Project. November 2018.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-6
Re:	Climatic inputs for water quality model		

Information Request / Recommendation Made By Interested Party:
Please update the water management plan with the decision tree for water quantity management as committed to in the EIS technical hearings in June 2019 and within the response to KivIA-WL-IR#34.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle agrees with KivIA's recommendation and will update the Water Management Plan with the decision tree and action items for water quantity 60 days following the reception of the amended water licence.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-7**
Re:	**Climate Change and Project Timeline**		

Information Request / Recommendation Made By Interested Party:
Please provide water balance results for the wet weather scenario as described.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle refers KivIA to the ECCC-TC-4 response for the water balance results for the wet weather scenario.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-8**
Re:	**Addressing a Changing Climate in Project Design**		

Information Request / Recommendation Made By Interested Party:
Please demonstrate the long-term feasibility of the current closure plan under climate change (i.e., beyond 2085), especially with respect to permafrost dynamics beneath water bodies and in the WRSF.

Agnico Eagle's Response to Information Request / Recommendation:
The impact of climate change on the WRSF cover system active layer was evaluated under two separate climate change scenarios: representative concentration pathway (RCP) 6.0, and RCP8.5 (Appendix A of the response package). While increasing air temperatures may affect the depth of the active layer in the WRSF, the same air temperature increase will result in changes in precipitation patterns as well as evaporative conditions at site. Changes to evaporative conditions and precipitation patterns will result in a lower likelihood of infiltration in the WRSF. As a result, modelled thermal conditions in the WRSF in closure and post-closure indicate that the WRSFs will have a low probability of mobilizing ML/ARD products from waste rock under both climate change scenarios considered.

Changes in ground temperature in the next 50-80 years may affect the depth of the seasonal active layer near surface; however, the rate of permafrost degradation below the pits will be primarily controlled by temperature of the lake in the pit, not by ground temperature during pit refilling and immediately following closure when the pit lake has fully formed. Over the longer term, increasing temperatures may result in the formation of open talik below smaller lakes that presently do not have open talik connecting them to the sub-permafrost groundwater flow system, and a general shallowing of the regional permafrost system.

References:
O'Kane. 2019a. Thermal Modelling of the Whale Tail and IVR WRSFs. Report No. 948-011-R-013. July 23, 2019.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-9
Re:	Arsenic and ARD mitigation on Whale Tail Pit Wall		

Information Request / Recommendation Made By Interested Party:
We therefore request AEM provide documentation to support the assertion that water treatment can effectively reduce arsenic concentrations to safe levels. We further request AEM provide documentation to support an increased fill rate, and what the greatest potential rate may be, for the pits intended to prevent ongoing oxidation of the pit walls.

Given the uncertainty in the occurrence of arsenic in the pit walls and their contribution to concentrations during closure, we request AEM ensure treatment of pit water quality is addressed under security.

We request the NWB include a condition within the water licence requiring AEM to develop an adaptive management plan that identifies thresholds and timelines for treatment or other mitigation should water quality not be suitable for discharge during closure. This is intended to ensure water quality is suitable for discharge by the intended start of post closure in 2043.

Agnico Eagle's Response to Information Request / Recommendation:
Increasing fill rate during closure would require pumping water from another large lake such as Nemo, D1 or D5 Lakes. Agnico Eagle will assess these alternatives as adaptive management options that will be part of the final closure plan.

Agnico Eagle completed geochemical testing to support the assumption related to the exclusion of the pit wall source to the model and does not consider treatment of pit water quality is required to be included under security. Source term related to the pit wall would be validated during the 6 years of operation and if any change are required, it would be capture as part of the Final Closure Plan. Agnico Eagle refers KivIA to response to KivIA-WT-TC-2 response for additional details related to the pit wall source terms.

Agnico Eagle would like to clarify that the existing water licence already includes conditions that require the proponent to develop adaptive management strategies during operation and closure and refers the KivIA to Water Licence condition Part E Item 7, 8, and 9:

> *7. The Licensee shall submit an updated Water Management Plan on an annual basis to the Board for review following the commencement of Operations. The Plan must include an updated Water Balance. The Water Management Plan shall include an action plan to be implemented if predicted re-flooded pit water quality indicates that treatment is necessary.*
>
> *8. The Licensee shall submit a Water Quality Model for pit re-flooding and for WRSF contact water mixing into Mammoth Lake post-Closure as part of the Water Management Plan which shall be*

re-calibrated as necessary and updated annually following commencement of Operations. The results and implications of the predictive model shall be reported to the Board.

9. The Licensee shall, on an annual basis during Closure, compare the predicted water quantity and quality within the pit and lake, to the measured water quantity and quality. Should the difference between the predicted base case values and measured values be 20% or greater, then the cause(s) of the difference(s) shall be identified, and the implications of the difference shall be assessed and reported to the Board.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-10
Re:	Implications of rock fracturing on groundwater volumes		

Information Request / Recommendation Made By Interested Party:
Please provide a quantity estimate of relative groundwater contributions from rock fracturing.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagles experience at Meadowbank is that blast damage is minimal (less than one meter), and that freeze back will reduce inflows to the open pit. For the Whale Tail Expansion Project, no freeze back was assumed, which was considered conservative with respect to predicting groundwater inflows to the pit. Although blasting may locally increase the fracturing near the pit wall surface; the flow through that zone of enhanced fracturing is controlled by the hydraulic gradient between the pit and the attenuation pond (closest surface water feature) and the properties of the bedrock away from the pit wall (i.e., between the pit and the attenuation pond). The attenuation pond is located approximately 100 meters from the crest of Whale Tail pit, which indicates that blast damage can have minimal effect on the gradient driving flow towards the pit (it would reduce the length over which the hydraulic head drop is measured by up to 2% if 1 m blast damage is assumed).

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-11**
Re:	**Alternative Effluent Discharge Locations**		

Information Request / Recommendation Made By Interested Party:
Please provide results of the quantitative assessment of D1 and D5 lakes as alternative discharge locations.

Please explain under what circumstances these lakes would be considered as alternative discharge locations.

Agnico Eagle's Response to Information Request / Recommendation:
Discharge to D1/D5 is not part of the current water management strategy. Assessment will be completed as per proposed Project Certificate Terms and Conditions and further details will be included in the Water Management Plan following amendment of the Water Licence as presented in KivIA-WL-TC-6 response.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-12
Re:	Early warning trigger development		

Information Request / Recommendation Made By Interested Party:
Please provide a schedule as to when trigger and threshold values will be developed and applied, providing confidence AEM will follow the procedures and protocols laid out in their CREMP that are dependent on them. This schedule should include at least 30 days for KivIA technical review of the triggers and thresholds.

We further recommend that the NWB incorporate a feasible schedule for the development and implementation of the triggers and threshold values into the project terms and conditions.

Agnico Eagle's Response to Information Request / Recommendation:
Azimuth is developing trigger and threshold values specific to the Whale Tail study area lakes according to methods outlined in the Core Receiving Environment Monitoring Program (CREMP): Design Document (Azimuth, 2012 and 2015 versions).

The new area-specific trigger and threshold values for Whale Tail will be incorporated into the formal statistical analysis conducted as part of the 2019 CREMP report (to be submitted at the end of Q1 2020 as part of the 2019 Whale Tail Project Annual report).

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-13
Re:	IVR High Pit Walls As Mitigation		

Information Request / Recommendation Made By Interested Party:
The KIA submits that the feasibility of proposed mitigation should be demonstrated prior to approval.

Please provide the conceptual design of the overburden capped pit wall for technical review. The design should indicate the slope at which the IVR Pit high walls will be mined, the depth to which overburden will be added, the type of erosion protection that will be used and how the integrity of the overburden coverage and erosion protection will be assured.

Agnico Eagle's Response to Information Request / Recommendation:
The conceptual design of the thermal capping and overburden protection procedures used at Agnico Eagle for the future IVR Pit is provided below.

As stated in the Mine Act 1.135, unconsolidated materials must be placed a minimum of two meters from the pit crest. Overburden units such as tills are prone to freeze-thaw and erosion from surface run-off. If overburden were simply pulled back from the crest by two meters, it would erode or flow to be within the two-meter limit. A four-meter rock-cap is put in place, ideally during winter, on top of the overburden units.

The cap itself is considered unconsolidated materials by the Mines Act and so it must be a minimum of 2 meters from the crest. If the bench below were to have the predicted average expected performance as analyzed by the designers, the back-break of the bench below will be 2.5 meters. However, in certain geological units with presence of particular structures the back-break can be as high 7 m. According to the design, this would be within the Komatiite units or geotechnical domains prone to planar failure. Therefore, the thermal cap will always be a minimum of 2.0 m plus the anticipated back-break of the next bench to be compliant with the Mines Act.

The other situation where armoring may be used is when the bedrock is highly weathered and fractured due to the interaction the rock has had with the overburden. To limit the chance of rock-fall, a thermal cap may extend over top of overburden and bedrock providing armoring to both units (see Figure KivIA-WL-TC-13-1).

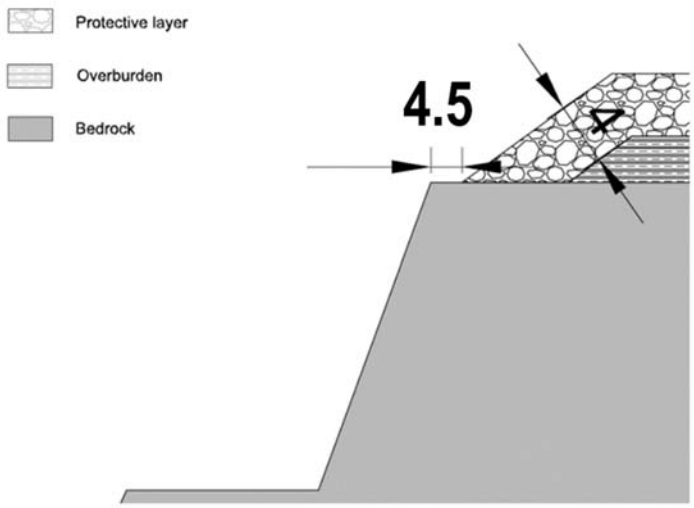


Figure KivIA-WL-TC-13-1: Thermal Capping of overburden only

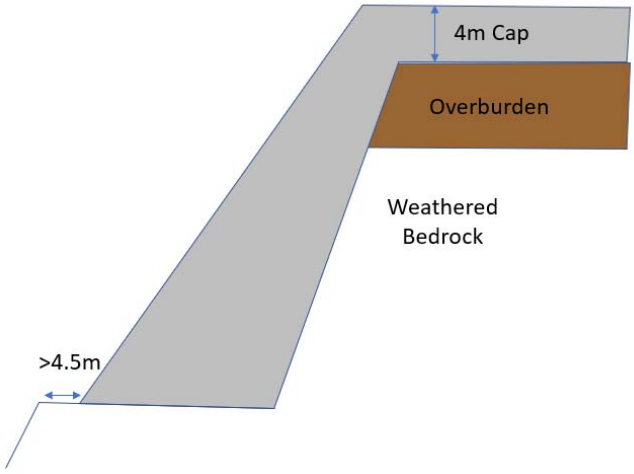


Figure KivIA-WL-TC-13-2: Thermal cap over weathered bedrock

Based on the experiences at Whale Tail Pit both the scenarios highlighted in Figure KivIA-WL-TC-13-1 and Figure KivIA-WL-TC-13-2 are expected at the IVR deposit. The thermal cap and armoring height will vary based on the height of tills, and degree of weathering in the bedrock. Till height is not expected to exceed 10 m, and the combination of till and weathered bedrock is not expected to exceed 14 m in height. The worst-case scenario will be for a 14 m high thermal cap required and the horizontal distance or footprint associated with that height is summarized as follows:

- 14 m horizontal distance will be required to have a repose rock fill cap 4 m over the crest of the bench;

- 2.5-7 m offset from the toe of the cap to the next bench is required to account for the back-break of the bench below;
- 2 m offset to be compliant with the Mines Act 1.135.

The total horizontal distance required is 23.5 m as a worst-case scenario. This is approximately 13-15 m in additional horizontal distance required around the perimeter of the pit beyond the rock mechanics design by designers. The exception to the thermal capping practice will be in the presence of lakebed sediments, or sediments comprised mostly of silts or clays. Lakebed sediments are low strength and prone to liquefaction. If lakebed sediments are of sufficient thickness, they will require a buttress prior to thermal capping. The buttress is wider than a thermal cap and will vary based on the lakebed sediment height.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-14**
Re:	**Fate of Equipment**		

Information Request / Recommendation Made By Interested Party:
Please include removal of equipment and machinery from the underground and transport to secure disposal off site in the RECLAIM cost estimate.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle disagrees with including removal of equipment in the RECLAIM cost estimate at this time, as leaving the equipment and machinery underground is common practice in the North.

In addition, closure modelling reinforces that flux of water underground relative to surface water exchange is low and any potential residual contamination will have a negligible impact on the surface and underground water quality.

Agnico Eagle commits that equipment will be cleaned and drained as appropriate.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-15**
Re:	**Inuit Input into Closure Objectives**		

Information Request / Recommendation Made By Interested Party:
Please confirm that water quality in the pits will meet CCME criteria for Protection of Aquatic Life or site-specific water quality objectives as applicable prior to breaching dikes.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle agrees that water quality in the pits will meet CCME criteria or SSWQO prior to breaching dike, as per existing Water Licence condition Part E, item 10:

> 10. The Licensee shall not breach dikes until the water quality in the re-flooded area meets *CCME Water Quality Guidelines for the Protection of Aquatic Life*, baseline concentrations, or appropriate site-specific water quality objectives. Subject to the Board approval, if water quality parameters are above *CCME Guidelines*, a site-specific risk assessment must be conducted to identify specific water quality objectives for the site that are protective of the aquatic environment.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-16**
Re:	**High TSS Concentrations during Construction**		

Information Request / Recommendation Made By Interested Party:
Please apply a short term maximum TSS limit for dike construction that meets either CCME or MDMER guidelines.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle is not planning to build any dike into a water body for operational requirements of the Whale Tail Expansion Project. Added dams and dikes included in the project application are on-land constructions and no generation of high TSS concentrations during construction is predicted to occur. In addition, all construction work around the A53 lake area will happen following the completion of the fishout activities of Lake A53 as this lake will be delisted as per Schedule 2 regulation.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-17
Re:	Overburden for Closure		

Information Request / Recommendation Made By Interested Party:
Please explain why lakebed sediments are not considered adequate for use in the revegetation of mine and road footprint areas during closure.

Agnico Eagle's Response to Information Request / Recommendation:
Lakebed sediments do not have adequate geotechnical properties for use in the revegetation of mine and road footprint areas during closure.

According to Meadowbank Mine experience, lakebed sediments consist of water saturated and soft soils. From a geotechnical point of view, soft soils have a tendency towards fluidization and are difficult to dewater and consolidate. Lakebed sediments would need to be preconditioned for improvement of their strength prior to use on road maintenance or other uses. The high saturation of predominantly fine-grained materials within the lakebed sediments would have little shear strength, leading to a reduced workability and an increased fluidization tendency of the material during freeze and thaw cycles, which could lead to instability issues and added sediments in surface contact water.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-18
Re:	Water Quality Contingencies		

Information Request / Recommendation Made By Interested Party:
Please describe how any high arsenic loadings from pit walls could be isolated and treated in order to maintain pit water quality within CWQG levels and provide evidence of the feasibility of the proposed management option.

Agnico Eagle's Response to Information Request / Recommendation:
The highest arsenic concentrations from the pit are expected to occur when the pit is at full depth prior to flooding. As outlined in the geochemical baseline study, arsenic leaching is from the oxidation of sulphides and more exposure of the pit will result in higher loadings. As the pit begins to fill up with water, sulphide reactivity will stop in the flooded levels, which will decrease loading of arsenic.

Based on the expected geochemical behavior of the pit and the annual model validation, operations will be able to know if there may be deviations in water quality during flooding. The highest arsenic concentrations in closure are in September 2026, when the Whale Tail Pit is predicted to see total concentrations up to 0.13 mg/L. This is due to the model assuming a constant load from the pit walls entering a very small volume of water throughout the summer. The arsenic concentrations rapidly decrease as more volume is added to the Whale Tail Pit and are below the expected treatment ability of the plant (between 0.1 and 0.07 mg/L As) by the end of 2027. The water treatment plant on site will remain at closure, and concentrations in the pit will be closely monitored throughout the flooding process. Should concentrations be higher than predicted, and be shown to potentially impact the receiving environment, the water treatment plant can be used to reduce concentrations in the pit lake during the first years of flooding to ensure conditions remain on the predicted trend.

Another option would be to increase the pit filling rate to slow down the release rate of arsenic or to implement in situ water treatment within the pit during flooding process. Potential mitigation options for the flooded pit lake water quality will be included in the Adaptive Management Plan, as per CIRNAC TRC-#3.

Interested Party:	**KivIA**	**Rec No.:**	**KivIA-WL-TC-19**
Re:	**Testing of Used Oil/Waste Fuel**		

Information Request / Recommendation Made By Interested Party:
Please describe the monitoring schedule for testing the quality of used oil/waste fuel to ensure it meets standards for incineration. Please include details on how many samples are tested annually, where the used oil/waste fuel is stored while awaiting test results, and the rationale for the frequency of testing.

Agnico Eagle's Response to Information Request / Recommendation:
The proposed Whale Tail Pit Expansion Project Incinerator and Composter Management Plan builds on the Approved Meadowbank Incinerator and Composter Management Plan. It was prepared to comply with used oil testing guidelines identified in the Government of Nunavut *Environmental Guideline for Used Oil and Waste Fuel*.

At Meadowbank and Whale Tail, one sample of used oil is tested per year and we are not storing used oil until yearly results are received. It is used as it becomes available.

Since implementation, Agnico Eagle has been successful in deviating oil from the hazardous waste stream in addition to reduce fuel consumption.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-20
Re:	Conceptual Fish Habitat Offsetting Plan		

Information Request / Recommendation Made By Interested Party:
Please provide more details on the Fish Habitat Offsetting Plan, including overall approach, timeline, monitoring, complementary measures and contingency options. This information can be provided during the regulatory phase of the project; we recommend the NWB include this requirement as a condition of the water licence and include appropriate time for review by the KivIA and other intervenors as appropriate.

Agnico Eagle's Response to Information Request / Recommendation:
Section 1.2 states that "during the regulatory phase of the Project, two separate offsetting/compensation plans will be developed to clearly distinguish and support the final applications" (p. 3) under the Fisheries Act and MDMER

Agnico Eagle will have two offsetting plans that will be part of one package; the same offsetting measure (sill between Whale Tail Lake and Lake A18) will be applied to Section 35 and Section 36 losses for the Expansion Project.

Section 8.1.1 states that "the timeline for the offsetting measures will be determined during the regulatory phase" (p. 30);

Agnico Eagle provided an update on the timeline of the implementation of the offsetting measure for the Expansion Project as part of the discussion of the offsetting measure with DFO and KivIA on September 30. Agnico Eagle will continue to involve KivIA in future fish offsetting meetings with DFO. Final details on monitoring plans for the Expansion Project will be provided with the *Fisheries Act* Authorization application.

Section 8.1.2 states that "any changes that may be required to the monitoring plan due to the Project expansion will be addressed during the regulatory phase" (p. 30);

Agnico Eagle provided an update on the monitoring plans as part of the meeting with DFO and KivIA on September 30. Agnico Eagle will continue to involve KivIA in future fish offsetting meetings with DFO. Final details on monitoring plans for the Expansion Project will be provided with the *Fisheries Act* Authorization application.

Section 9 states that "during the review of the FEIS and the regulatory phase, AEM will consult with stakeholders including the KIA…to address contingency options" (p. 37); and

Although Agnico Eagle is confident that the proposed offsetting measures will meet the requirements of DFO's offsetting policy under the *Fisheries Act*, Agnico Eagle will continue to consult with stakeholders on potential contingency options through the water licence process. An update on the contingency options

were provided as part of the meeting with DFO on September 30. Agnico Eagle will continue to involve KivIA in future fish offsetting meetings with DFO. The final list of contingency options will be provided in the *Fisheries Act* Authorization application.

Appendix C states that "if there is agreement that the proposed projects are suitable, more detailed study designs will be developed during the regulatory phase" (p. 1 of 11).

Agnico Eagle is presently in discussion with DFO on potential studies to be used as complementary measures. The complementary measures, if required for the offsetting plan, will be used to address any uncertainty with the effectiveness of the proposed offsetting measure to meet offsetting objectives. Agnico Eagle will continue to involve KivIA in future fish offsetting meetings with DFO.

Interested Party:	KivIA	Rec No.:	KivIA-WL-TC-21
Re:	Waste Rock Storage Facility Design		

Information Request / Recommendation Made By Interested Party:
The thermal modeling that recommends the use of a thermal cap of 4.7 metres appears to be reasonable. However, the KivIA requests that AEM establish a sufficient number of thermistor strings in the Whale Tail WRSF and the bedrock beneath and in close proximity to the WRSF in order to ensure that the modeling is updated with local project data instead of thermistor readings from the Portage WRSF at the Meadowbank Gold Mine. This local data will best determine how effective the ARD/ML material has been isolated within the WRSF. In addition, it will allow for a better understanding of the depth and distribution of the active layer as it is related to permafrost distribution should be determined with the additional thermistor strings that will be established in the Whale Tail WRSF. This will also better determine the effectiveness of the

1) freeze back in the WRSF,
2) the water retention ability and capacity of WRSF dike, and
3) the impact of water flow from the WRSF on the water quality in Mammoth Lake.

Agnico Eagle's Response to Information Request / Recommendation:
Agnico Eagle agrees with KivIA's recommendation. As such, Agnico Eagle is working on the detailed engineering design of the thermal rock cover and the monitoring program for the Whale Tail and IVR Waste Rock Storage Facilities. Both documents will be submitted to regulators as part of the 60-day construction notice phase of the WRSFs.

The main purpose of the WRSFs monitoring program is to reduce uncertainty in the predicted performance of the WRSF cover system and the risk of seepage from the WRSF resulting in effects to water quality in the receiving environment. An overview of the monitoring program currently in preparation include:

Thermistor strings extending near surface to depth and into foundation materials. These sensors will:

- Quantify volumes and depth of waste rock thawing near surface, reducing the uncertainty in the volume of PAG waste rock that can potentially produce PAG/ML products;
- Confirm predicted freeze-back times to reduce uncertainty in the time-frame for closure/post-closure; and
- Confirm that slower internal freeze-back is 'encapsulated' as predicted by modelling, reducing uncertainty in basal seepage rates.

Near surface water content and matric suction sensors. These sensors will:

- Confirm uncertainty and variability in cover system material hydraulic properties leading to greater confidence in modelling results;
- Confirm uncertainty around heat re-distribution effect resulting in deeper that (beyond 4.7 m) observed in modelling leading to greater confidence in modelling results;
- Confirm modelling predictions of development of saturated zones driving air flow regime;
- Confirm surface water balance to reduce uncertainty in predicted volume and timing of seepage and/or interflow.

Thermal conductivity sensors near surface. These sensors will:

- Confirm bulk thermal conductivity properties leading to greater confidence in modelling results (No studies have yet been completed on bulk thermal conductivity properties)

Differential pressure sensors at depth and near surface. These sensors will:

- Confirm conceptual model that convective cooling occurs
- Provide a basis for understanding mechanisms causing observed temperatures if measurements aren't as predicted

Meteorological monitoring including:

- Snow depth sensors and/or snow surveys, rainfall measurements, air temperature and net radiation measurements
- Detailed meteorological monitoring will constrain the surface water balance and reduce uncertainty in the variability of performance of the cover system due to spatial variability.