# Agnico Eagle Mines Limited – Meadowbank Division

# Whale Tail Pit Groundwater Monitoring Plan
# Responses to ECCC and CIRNAC reply

**January 15 2019**

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# ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#1** |
| **Re:** | **Updates on the Groundwater Monitoring Plan** | | |

**ECCC's Original Recommendation:**
*ECCC recommends that the Groundwater Monitoring Plan specify how frequently the Plan will be reviewed for potential updates and recommends that the Plan be reviewed and updated on an annual frequency.*

**Agnico Eagle Original Response to Recommendation:**
*The Groundwater Monitoring Plan will be reviewed annually and updated if required. If changes to the plan are necessary, it will be included with the annual report as per our License requirements.*

*The update process presented in the groundwater monitoring plan is aligned with the principles of adaptive management presented in the water licence 2AM-WTP 1826 Part D Item 25.*

*For clarification, Agnico Eagle will comply with Water Licence 2AM-WTP 1826 Part B Item 13 which describes the groundwater monitoring plan update process.*

**ECCC Recommendation:**
*ECCC recommends that a statement be included in the Ground Water Monitoring plan that the Proponent commits to reviewing the plan annually and updating if required.*

**Agnico Eagle Reply:**

Agnico Eagle agreed to review the plan annually and update the plan if required. This statement will be added to the Groundwater Monitoring plan in the next revision of this plan.

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#2** |
| **Re:** | **Seepage Surveys** | | |

**ECCC's Original Recommendation:**
*ECCC recommends that the Proponent provide rationale for the timing and frequency of the seepage survey.*

**Agnico Eagle Original Response to Recommendation:**
*Agnico Eagle will comply with the Water Licence 2AM-WTP 1826 Schedule I Table 2 – Monitoring program. Seep (ST-S-1 to TBD) will be monitored on a Monthly or as found basis during operation and closure.*

*Agnico Eagle clarified that the bi-annual periodic seepage surveys presented in the groundwater management plan refers to the process initiated at Meadowbank with the support of SNC-Lavalin in 2017. Total inflow to the pit will be monitored throughout the year. The purpose of the seepage surveys is to identify if there are preferential pathways, such as enhanced permeability zones, for inflow of groundwater to the pit. These surveys can only be undertaken during the summer months when the ice in the walls of the pit has melted and when there is water to observe and sample. Previous experience at other mines has found that these pathways do not change over the summer months, and the biannual monitoring in the first year is to confirm this observation is applicable to the Project. The objective of the periodic seepage surveys is to complete a thorough analysis of the groundwater infiltration within the pit (i.e. Seep (ST-S-1 to TBD)) in order to characterize the different groundwater sources and implement the principles of adaptive management.*

**ECCC Recommendation:**
*ECCC recommends that the first year (i.e., biannual) results of the periodic seepage survey be used to determine the frequency for the following years. If the biannual monitoring results of the first year are either inconsistent or inconclusive with respect to determining preferential pathways, then biannual monitoring (i.e., early summer and late August) should be repeated in the following year(s).*

**Agnico Eagle Reply:**
Agnico Eagle will be collecting samples from Pit Seepage ''*ST-S-1 (Seeps – TBD)*'' on a monthly basis or as found as per NWB Water Licence 2AM-WTP1826 Schedule I Table 2 "Monitoring Program".

SNC-Lavalin will review the results of the seep water sample collected monthly and will complete a seepage assessment twice a year for the first two years and once a year starting in the third year. This assessment will take place until the end of operation and results will be presented in the annual report.

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#3** |
| **Re:** | **Groundwater Monitoring During Closure/Post-Closure** | | |

**ECCC's Original Recommendation:**

*ECCC recommends that the Proponent provide clarification on plans for groundwater monitoring past the operation phase.*

**Agnico Eagle Original Response to Recommendation:**

*Agnico Eagle will monitor groundwater if and as needed during the Closure and Post Closure phases as per Water Licence 2AM-WTP1826 monitoring requirements for this period. These will be established prior to the Closure phase in collaboration with ECCC and the Nunavut Water Board (NWB).*

**ECCC Response:**

*Groundwater monitoring during the Closure and Post Closure phases will help to assess potential water quality impacts from the project and inform water management decisions. ECCC looks forward to collaborating with the Proponent to develop closure-monitoring requirements prior to the closure phase.*

**Agnico Eagle Reply:**

Agnico Eagle agrees with ECCC.

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#4** |
| **Re:** | **Groundwater Monitoring Wells** | | |

**ECCC's Original Recommendation:**

*ECCC recommends that the Proponent describe whether and how groundwater monitoring wells will be established to monitor groundwater flow and quality in flow paths adjacent to the pit and Waste Rock Storage Facility (WRSF). In addition, ECCC recommends that the Proponent clarify whether any existing or planned groundwater monitoring wells will be displaced by the pit and/or by the WRSF, and if so, how groundwater data collection will be maintained.*

**Agnico Eagle Original Response to Recommendation:**

*Agnico Eagle clarified that the main objective of the Groundwater Monitoring Program Report developed for Meadowbank was to monitor potential seepage from the Tailing Storage Facility. This document has no relevance to the Groundwater Monitoring Plan.*

*Agnico Eagle also clarified that no groundwater flow is expected at the WRSF because the base of the WRSF will be frozen. Potential seepage is considered a surface water management issue; contact water will be collected at the toe of the waste rock storage facility and in the Contact Water Collection System of the WRSF. There is no groundwater flow path identified as this infrastructure is built above permafrost.*

*Based on this reasoning, no additional groundwater wells are planned to be installed on site.*

**ECCC Response:**

*ECCC's original recommendation pertained to monitoring of deep groundwater flows, and the need to maintain data collection as was recommended by SNC-Lavalin in their report that was part of the Groundwater Monitoring Program Report for Meadowbank. ECCC's original recommendation requested clarification on whether the Proponent will be installing and monitoring deep groundwater flow and quality in the area of the pit and the waste rock storage area, as well as if the mine footprint would displace any monitoring wells.*

*The SNC-Lavalin report for Meadowbank concluded that pit seeps do not provide a good representation of groundwater quality/quantity. The use of groundwater monitoring wells provides much better data for groundwater quality overall.*

*The Proponent's response does not clarify if or how groundwater monitoring wells have been established and if they have been established, how will they monitor deep groundwater flow and quality in flow paths adjacent to the pit and WRSF. The Proponent's response also does not clarify whether any existing or planned groundwater monitoring wells will be displaced by the pit and/or by the Waste Rock Storage Facility, and if so, how will groundwater data collection be maintained if ground water monitoring well are displaced*

**ECCC Recommendation:**

*ECCC continues to recommend that the Proponent describe if and how groundwater monitoring wells will be established to monitor groundwater flow and quality in flow paths adjacent to the pit and WRSF.*

*ECCC recommends that the Proponent clarify whether any existing or planned groundwater monitoring wells will be displaced by the pit and/or by the WRSF, and if so, how groundwater data collection will be maintained.*

**Agnico Eagle Reply:**

Agnico Eagle would like to clarify that no groundwater flowpath was established between the pit and the WRSF during the hydrogeological assessment of the project. The groundwater flowpath to the pit is located in the talik area between the Whale Tail Dike and the Whale Tail pit (i.e. under the former Whale Tail Lake). As the Westbay well is located in this talik area adjacent to the pit, Agnico Eagle considers that no additional well is required to be displaced by the pit and /or by the WRSF and that groundwater will be monitored from pit wall seeps.

Agnico Eagle would recommend being precautious when interpreting the SNC-Lavalin groundwater monitoring report issued for the Meadowbank project. The Groundwater Monitoring Plan developed for the Meadowbank Project has for primary objective the evaluation of the potential contamination from the Tailings Storage Facility towards Portage and Goose pits, and Second Portage and Third Portage Lakes. The Meadowbank Tailings Storage Facility is located in the dewatered Second Portage Lake arm and built above a talik area as were the Portage and Goose pits.

The Whale Tail Project is different from the Meadowbank Project as noted below:

- no Tailings Storage Facility is planned to be built in the area;
- the WRSF is built on frozen ground, and;
- the principal source of contaminant identified during the project environmental impact assessment is the arsenic leaching potential from some specific lithologies from the Whale Tail pit walls.

Groundwater flows will have a limited impact on the arsenic leaching process compared to the overall runoff water reporting to the pit. Agnico Eagle considers that the Whale Tail Project monitoring program developed in NWB Water Licence 2AM-WTP1826 was designed accordingly to these risks and is aligned with the project assessment.

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#5** |
| **Re:** | **Comparison of Monitoring Results Against Model Predictions** | | |

**ECCC's Original Recommendation:**

*ECCC recommends that the Groundwater Monitoring Plan outline how measured groundwater quality will be compared against base-case (i.e., expected) model predictions, and what steps would be taken should significant variations from model predictions be observed. For consistency of comparison, ECCC also recommends that the groundwater quantity results be compared against base-case (i.e., expected) model predictions. The Groundwater Monitoring Plan should be updated to include these details.*

**Agnico Eagle Original Response to Recommendation:**

*The groundwater monitoring data (i.e. quality and quantity) will be compiled in the water balance/water quality forecast and reported on an annual basis as per water licence 2AM-WTP1826 Part E Items 7 and 8. Groundwater quality in the inflow to the open pit will be compared to model predictions on an annual basis. If significant variations from model predictions are observed, the assumptions behind the data will be reviewed and the analysis updated if required. Variation that would be considered significant and indicate the need for data review and analysis include the collected water samples in the pit seepage indicating the TDS is more than 25% higher than the estimated water quality, on a rolling monthly average over six consecutive months. Additional information was also provided in the response to CIRNAC#4 recommendation.*

*Agnico Eagle also refers ECCC to Agnico Eagle responses to recommendations ECCC#1 and ECCC#4 which details the management plan and model update process.*

**ECCC Response:**

*When comparing groundwater quality and quantity monitoring results against model predictions, it is important to distinguish between base-case and worst-case scenario predictions. The Proponent's response does not address this aspect of the ECCC recommendation.*

**ECCC Recommendation:**

*ECCC recommends that the information provided in the Proponent's response describe how groundwater monitoring data will be compiled/compared/interpreted be incorporated into the Groundwater Monitoring Plan.*

*ECCC continues to recommend that the Groundwater Monitoring Plan outline how measured groundwater quality will be compared against base-case (i.e., expected) model predictions, and what steps would be taken should significant variations from base-case model predictions be observed. For consistency of comparison, ECCC also recommends that the groundwater quantity results be compared against base-case (i.e., expected) model predictions. The Groundwater Monitoring Plan should be updated to include these details.*

**Agnico Eagle Reply:**

Agnico Eagle believes that the process detailed in NWB Water Licence 2AM-WTP1826 Part E Items 7 and 8 is aligned with the recommendation from ECCC.

The annual "Water balance/Water quality forecast" will outline how each measured inflows and outflows to the water balance differ from the predictions in terms of quality and quantity. This report will also outline how these differences are impacting the overall water management strategy and if any modification is required to this strategy. The results will be compared to the base case and to the latest model prediction.

As the analysis of the groundwater flows will be included in the annual "Water balance/Water quality forecast", Agnico Eagle prefers to keep the data and results within these documents which will be appended to the Water Management Report and Plan and issued annually within the Annual Report.

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| **Interested Party:** | **Environment and Climate Change Canada (ECCC)** | **Rec No.:** | **ECCC#6** |
| **Re:** | **Monitoring Summary Table** | | |

**ECCC's Original Recommendation:**

*ECCC recommends including a tabular summary of the groundwater-monitoring program in the Groundwater Monitoring Plan, including the data specified in comment ECCC 5.*

**Agnico Eagle Original Response to Recommendation:**

*The Water Quality and Flow Monitoring Plan will comply with Water Licence 2AM-WTP 1826 Schedule I Table 2 – Monitoring program. Table 2 refers to the monitoring station related to groundwater monitoring requirements.*

*Agnico Eagle referred ECCC to the response to CIRNAC #4 recommendation for more details regarding the criteria/action levels definition.*

**ECCC Recommendation:**

*ECCC recommends incorporating Table 2, which was provided in the Proponent's response, into the Groundwater Monitoring Plan as it provides a summary of the groundwater monitoring program.*

**Agnico Eagle Reply:**

Agnico Eagle does not agree with ECCC that NWB Water Licence 2AM-WTP 1826 Schedule I Table 2 "Monitoring program" should be included in the Groundwater Monitoring Plan. This table is already included in the Water Quality and Flow Monitoring Plan.

# CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

**November 30, 2018 CIRNAC's reply to AEM's response on the Groundwater Monitoring Plan:**

*CIRNAC recommends the NWB not approve the November 2018 Version 2 Groundwater Monitoring Plan for the Whale Tail Pit Project as the plan does not require any groundwater monitoring wells (i.e. the installed 2016 Westbay Multiport Well System) be monitored during operations nor closure of the Whale Tail Pit Project as per Schedule I Table 2 of the 2AM-WTP1826 water licence. Further, thermal monitoring to validate groundwater conditions is not specified in the Plan. With respect to adaptive management, insufficient actions are described when certain water quantity and quality thresholds are exceeded. Overall, CIRNAC is concerned that comments #1-5 and #7-11 remain unresolved, many of which are essential to achieve the objective of a Groundwater Monitoring Plan.*

*CIRNAC remains disappointed that agreed-upon critical pre-development period field activities, scheduled for the summer of 2018 to further refine the site-specific hydraulic data, were unilaterally decided by AEM to not be conducted. And furthermore, that CIRNAC was not informed about this decision until October 17, 2018. CIRNAC therefore considers comments #1 and #5 regarding Nunavut Impact Review Board (NIRB) Project Certificate Term and Conditions #15 and #16, respectively, unresolved.*

*CIRNAC understands that AEM will be providing a rational as to why they have proceeded as they have with respect to Project Certificate term and condition #15 and #16.*

*At the October 17, 2018 meeting with AEM, CIRNAC requested thermal monitoring be included in the Groundwater Monitoring Plan to:*
*- validate and monitor the horizontal hydrogeological profile assumptions that continuous permafrost surrounding the Whale Tail Lake talik negates horizontal hydrogeological flow, in particular in the vicinity of the Whale Tail Pit 'north wall' area where metal leaching is of concern; and*
*- validate the vertical hydraulic head and groundwater quality changes in the AEM designated open and closed Whale Tail Lake talik during operations and closure.*

*Relevant thermal monitoring details are still not provided in the Groundwater Monitoring Plan. CIRNAC therefore considers comments #1 and #3 unresolved. CIRNAC requests Version 1 May 2018 Whale Tail Pit Thermal Monitoring Plan, referenced in the Version 2 November 2018 Whale Tail Pit Groundwater Monitoring Plan, be made available to the NWB and interested parties. CIRNAC reviewed the Thermal Monitoring Plan submitted to NIRB in May 2018 and concludes the proposed thermal monitoring is not adequate to properly document permafrost conditions, nor to identify changes in talik distribution and hydrogeological flow paths. CIRNAC understands that AEM will be providing a rational as to why they have proceeded as they have with respect to NIRB Project Certificate term and condition #10.*

*As per water licence No. 2AM-WTP1826, adaptive management "describes a way of managing risks associated with uncertainty and provides a flexible framework for mitigation measures to be implemented and actions to be taken when specified thresholds are exceeded". CIRNAC recognizes the information provided in section 2.5 of the Whale Tail Pit Groundwater Monitoring Plan, however considers model updating and calibration an insufficient action when certain thresholds are exceeded. For example, the aforementioned actions are*

*insufficient in addressing CIRNAC's concerns for AEM to meet their long-term commitments if Waste Rock Storage Facility (WRSF) water discharge or Whale Tail Pit water quality exceeds predictions and/or guidelines. In the October 17 and 18, 2018 meeting with AEM, it was agreed that AEM would provide options available for mitigation if arsenic concerns materialized. AEM would incorporate these mitigation measures in the plans. The current versions of the plans submitted to the NWB lack this information. CIRNAC requests AEM to identify which plan(s) will contain the details of the adaptive management strategies for arsenic concerns, and that the plan(s) are submitted to the NWB for review by interested parties prior to Whale Tail Pit dewatering activities taking place. At this time, CIRNAC considers comment #4 unresolved.*

*The seep sampling frequency and monitoring parameters also contradicts Part I Item 15 and Schedule I Table 2 of the 2AM-WTP1826 water licence. For comment #9, CIRNAC requests the seepage survey be conducted quarterly as per Part I Item 15 of the water licence. Considering the uncertainties and risks around long term water treatment, CIRNAC requests particular attention be paid to identifying and sampling seeps in the vicinity of lithologies with high acid rock draining and metal leaching (ARD/ML) potential.*

*The Plan indicates that CIRNAC will be informed if water concentrations exceed regulatory thresholds. Given the short duration of the mine life and the benefits of mitigating emerging concerns as early as possible, CIRNAC would appreciate AEM's proactive reporting if trigger levels are reached (comment #11).*

*In the absence of installing at least one additional deep groundwater monitoring well (comment #1), CIRNAC requests more frequent monitoring, data analysis and reporting to manage the uncertainties and long-term risks. CIRNAC will therefore address comments #7, #8 and #10 directly with the NWB as they involve modifying the water licence.*

*In summary, CIRNAC is generally satisfied with AEM's response to comment #6 however considers the remaining ten comments outstanding.*

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| **Interested Party:** | **Crown-Indigenous and Northern Affairs Canada (CIRNAC)** | **Rec No.:** | **CIRNAC#1** |
| **Re:** | **New Site-Specific Hydraulic Data** | | |

**CIRNAC finding (October 22, 2018):**

*Throughout the NIRB and NWB regulatory processes, CIRNAC expressed concerns regarding water quality in the flooded Whale Tail Pit after closure. Those concerns are related primarily to uncertainties associated with pit wall chemistry and flows that may discharge to the pit. CIRNAC repeatedly indicated that the uncertainties should be resolved through additional characterization of the groundwater regime. This included multiple recommendations that new field data be collected from new groundwater wells prior to mine development.*

*As per CIRNAC's submissions to the NWB, CIRNAC expected that its recommendations for additional hydrogeological characterization would be provided in the updated management and monitoring plans. This requirement is also captured in the NIRB Project Certificate Term and Condition #15 which requires that the Groundwater Monitoring Plan include "The collection of additional site-specific hydraulic data (e.g., from new monitoring wells) in key areas during the pre-development, construction and operation phases.". The Plan is also required to provide new information that allows for the "Definition of vertical and horizontal groundwater flows in the project development areas".*

*On October 17, 2018 AEM confirmed to CIRNAC that it has not installed any new monitoring wells since the Westbay multiport well. As a result, a single Westbay multiport well continues to be the only functioning groundwater sampling station on the Whale Tail property. While we acknowledge that the Westbay system is capable of providing important information to characterize the groundwater regime, a single station provides little information to define horizontal flow gradients. As such, there continues to be uncertainty regarding hydraulic gradients in the vicinity of the pit and, by extension, this introduces uncertainty regarding the post-closure water quality of the flooded pit.*

*AEM informed CIRNAC on October 17, 2018 that a Westbay sampling event scheduled for June 2018 was delayed until November 2018. The delay was reportedly required due to the presence of operational activities that rendered the well area unsafe during the original sampling event. No explanation was provided to justify the five-month delay during the critical pre-development period. Based on the above, AEM has not collected the new predevelopment site-specific hydraulic data as recommended by CIRNAC and required by the Project Certificate. However, the company has refined its desktop modelling of groundwater interactions with the pit. The refined modelling predicts that post closure arsenic concentrations in the flooded pit are likely to be below the applicable water quality criterion. There continue to be uncertainties regarding post closure water quality in the flooded pit but the revised modelling has helped to confirm that the negative implications associated with those uncertainties have reduced since the review of the Project's Application.*

*Notwithstanding the new modelling information presented by AEM, their analyses were conducted using data collected from a single groundwater monitoring location (i.e., the Westbay system) that may not be representative of conditions throughout the site. They also rely on the assumption that groundwater will flow northward, despite the fact that some lake levels are inconsistent with that assumption (i.e., Nemo Lake to the north is higher than Whale Tail Lake).*

*All factors considered, CIRNAC maintains that at least one additional deep groundwater well is desirable to characterize and validate AEM's assumptions regarding hydrogeological flows within the project area. The*

*information collected from the new well(s) would help to validate AEM's assumptions regarding groundwater flows in the vicinity of the pit. While CIRNAC appreciates that developing such wells is challenging, the successful installation of the Westbay well demonstrates it can be done and that it will provide valuable information.*

**CIRNAC recommendation (October 22, 2018):**

*Following consultation with relevant regulatory authorities (including CIRNAC), AEM should install at least one additional deep groundwater monitoring well that extends into the subpermafrost groundwater regime to the north of the Whale Tail Pit. In combination with the existing Westbay system, the new well(s) will help to characterize the local groundwater regime. Installation should occur prior to dewatering of the Whale Tail Lake – North Basin. In the absence of this information, CIRNAC would request more frequent monitoring, data analysis and reporting.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Agnico Eagle does not agree with CIRNAC recommendation. The installation of additional wells outside of the Westbay is not considered necessary to further characterize baseline conditions and reduce uncertainties regarding potential environmental effects of the project on the groundwater flow system. Potential hydraulic gradients and flow directions for baseline and long-term post-closure conditions can be derived from the relative lake elevations in the study area as described in Agnico Eagle's response to CIRNAC's recommendation regarding Background, Results of Review. During mining, flow will be towards the pit, and the relative elevation of the lake level behind the dike, in combination with the attenuation pond elevation and dewatered pit elevation can be used to estimate hydraulic gradient. Groundwater quality during operations can be verified during mining through the collection of samples from the pit sump and seepage faces along the pit walls in the summer months. Agnico Eagle refers CIRNAC to Agnico Eagle response to CIRNAC Background, Results of Review comments for further details.*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

Agnico Eagle sampled the Wesbay well in November 2018 and results will be provided to regulators by end of January 2019. Agnico Eagle is planning re-sampling the well in March 2019. As the Westbay well is located in the primary groundwater flow path related to the Whale Tail pit, Agnico Eagle continues to believe that the data collected from this single groundwater monitoring location is sufficient to complete the hydrogeological assessment of the project.

The updated thermal data was used as input for completing the review of the thermal and hydrogeological assessment presented to CIRNAC in June 2018 and a standalone document presenting the thermal data was provided to CIRNAC as discussed during the October 2018 meeting.

Based on the extensive hydrogeological modelling completed during the environmental assessment phase and hydrogeological modelling completed in June 2018 to address CIRNAC concerns, Agnico Eagle is of the opinion that no additional deep groundwater well is required.

As per NWB Water Licence 2AM-WTP 1826 Schedule I Table 2 "Monitoring Program", Agnico Eagle will sample seepage found on pit walls on a monthly basis or as found. In addition to this program, SNC-Lavalin will review

monthly seepage results and will complete a seepage assessment twice a year for the first two years and then annually starting in the third year. The results of this assessment will be provided within the annual report.

In addition to this, Agnico Eagle considers that the process detailed in Water Licence 2AM-WTP1826 Part E Items 7 and 8 is a strong tool to validate predictions made during the project environmental impact assessment compared to observation and data collected during operation.

The annual "Water balance/Water quality forecast" will outline how each measured inflows and outflows to the water balance differ in term of quality and quantity from the prediction. This report will outline also how these differences are impacting the overall water management strategy and if any modification is required to this strategy. The results will be compared to the base case and to the latest model predictions. Results of this annual assessment will be appended to the Water Management Report and Plan and included within the Annual Report.

Agnico Eagle is of the opinion that these elements should satisfy CIRNAC's requirement to conduct more frequent monitoring and data analysis should an additional well not be installed.

Agnico Eagle is awaiting direction from the Nunavut Water Board on the resolution of this item.

| Interested Party: | Crown-Indigenous and Northern Affairs Canada (CIRNAC) | Rec No.: | CIRNAC#2 |
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| Re: | Figure 2-2 | | |

**CIRNAC finding (October 22, 2018):**

*Linked to the previous point, the Groundwater Monitoring Plan makes no reference to future sampling from the Westbay system or any other groundwater wells that AEM plans to install. Instead, the Plan relies primarily on the sampling of groundwater that reports to the pit during the operational phase. While such data will be useful in efforts to detect water quality concerns that have already materialized, it will provide limited information in efforts to characterize the pre-development and post-closure hydrogeological conditions of the site.*

**CIRNAC recommendation (October 22, 2018):**

*AEM should incorporate well monitoring into the Groundwater Monitoring Plan to help identify, characterize and address potential hydrogeological risks associated with the Project. The well monitoring should include detailed descriptions regarding how the existing Westbay system and any new wells will be incorporated into the Groundwater Monitoring Plan (scheduled monitoring events of groundwater quality and flow, etc.).*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Agnico Eagle does not agree with CIRNAC recommendation, as the installation of additional wells outside of the Westbay is not considered necessary to further characterize baseline conditions and reduce uncertainties regarding potential environmental effects of the project on the groundwater flow system.*

*Agnico Eagle will report groundwater quality and flow on an annual basis as per water licence Part E Item 7 and 8 and refers CIRNAC to Agnico Eagle response to recommendation ECCC#4 for more details. Agnico Eagle provided a monitoring event schedule and refers CIRNAC to the Water Quality and Flow Monitoring Plan and water licence 2AM-WTP1826 Table 2. Agnico Eagle response to recommendation ECCC#6 is providing more details to this effect. Agnico Eagle will continue to evaluate the groundwater monitoring during the operation of the Whale Tail Project as per water licence requirement. Agnico Eagle refers CIRNAC to Agnico Eagle response to recommendation ECCC#1 which summarize the Groundwater Monitoring Plan update process specified in the water licence 2AM-WTP1826.*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

Please refer to Agnico Eagle response to CIRNAC #1 recommendation above.

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| **Interested Party:** | **Crown-Indigenous and Northern Affairs Canada (CIRNAC)** | **Rec No.:** | **CIRNAC#3** |
| **Re:** | **Thermal Monitoring** | | |

**CIRNAC finding (October 22, 2018):**

*The current Groundwater Monitoring Plan does not include any information related to additional site specific permafrost monitoring, mapping, and thermal analysis. Based on the documentation reviewed, CIRNAC has yet to see evidence confirming there is an open talik beneath Whale Tail Lake. Further, CIRNAC notes that these additional thermal analyses are also a requirement under NIRB Project Certificate Term and Condition #10.*

**CIRNAC recommendation (October 22, 2018):**

*Based on the importance of ground temperatures to the behaviour of the hydrological regime, CIRNAC recommends that additional site-specific permafrost mapping, monitoring, and thermal analysis be incorporated into the Groundwater Monitoring Plan, particularly in the vicinity of the north wall of the pit. Evidence should be provided demonstrating there is an open talik beneath Whale Tail Lake.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Agnico Eagle does not agree with CIRNAC recommendation. Thermal analysis was completed during the FEIS and Licence A application process to define the site-specific permafrost conditions on site. The Thermal monitoring program detailed in the Thermal Monitoring Plan (in response to Term and Condition #10) and the Waste Rock Management Plan provides the monitoring and thermal analysis described in the CIRNAC recommendation. Agnico Eagle submitted the Thermal Monitoring Plan to NIRB in May 2018 to comply with PC term and condition #10 & #14 and presented thermal analysis results which address TC #10 to CIRNAC during the meeting held in July 2018. Additionally, results of the additional thermal analysis completed on the regional permafrost for post closure conditions were presented in July 2018 and a report on this analysis titled: "Whale Tail Pit - Post Closure Hydrogeological Assessment for the Whale Tail Open Pit", dated June 27, 2018, was provided to CIRNAC by Agnico Eagle on October 12th (attachment to email from Agnico Eagle to CIRNAC).*

*The assumption of an open talik below south Whale Tail Lake is conservative with respect to the prediction of potential groundwater inflow to the dewatered open pit, as it allows for the potential interception of deeper saline groundwater. If an open talik is not present, inflows could be less than predicted and of better TDS quality. Long-term closure predictions with respect to arsenic loading are not expected to be affected by the assumption of an open or closed talik, as the permafrost will eventually degrade below the pit footprint and connect the shallow talik to the deeper flow system. Maximum rates of discharge from the pit lake presented in Agnico's Eagle's response to CIRNAC's recommendation regarding "Background, Results of Review" would still be applicable (maximum inflow of 13 m3/day to an outflow of 11 m3/day). The predicted and estimated maximum flows are negligible compared to the 3,000,000+ m3 of surface water exchanged annually post-closure when flows are re-established, based on average climate year watershed runoff. This indicates long-term lake levels will not be affected by the permafrost degradation and that the uncertainty in the presence of open talik is not critical to the long-term assessment of pit lake water quality, and that the present assumption of open talik is conservative with respect to predictions of groundwater inflow quantity and quality during operations.*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

Agnico Eagle maintains its position as per the October 22 2018 response and is awaiting direction from the Nunavut Water Board on the resolution of this item.

| Interested Party: | Crown-Indigenous and Northern Affairs Canada (CIRNAC) | Rec No.: | CIRNAC#4 |
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| Re: | Thresholds and Adaptive Management | | |

**CIRNAC finding (October 22, 2018):**

*Thresholds triggering implementation of adaptive mitigations are fundamental requirements of the adaptive management process to mitigate uncertainties and address emerging conditions. However, the current version of the Plan lacks any information related to thresholds and, more generally, adaptive management strategies AEM will implement to reflect site-specific conditions encountered at the project site. This is an important deficiency and, as a result, the current version of the Plan needs to be updated to incorporate clearly the adaptive management strategies.*

*Additionally, CIRNAC notes the inclusion of "Thresholds that will trigger the implementation of adaptive management strategies that reflect site-specific conditions encountered at the project site" in the Groundwater Monitoring Plan is required under NIRB Project Certificate Term and Condition #15.*

**CIRNAC recommendation (October 22, 2018):**

*CIRNAC recommends that AEM revise the Groundwater Monitoring Plan to include clear descriptions of the thresholds and adaptive management practices that will be used to identify, assess and respond to groundwater issues that have the potential to result in adverse environmental impacts.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Groundwater monitoring data will be compiled into a Project-specific database and evaluated for trends in groundwater data with respect to pit and underground inflow quantity and quality. Measured groundwater inflow rates will be compared to model predictions on an annual basis. If significant variations from model predictions are observed, the assumptions behind the data will be reviewed and the analysis updated if required. In addition, updates to the groundwater model will be made if operational changes occur as the open pit advances which could significantly alter groundwater inflow or quality.*

*Variations that would be considered significant include:*

- *Groundwater inflows to the mine, based on rolling monthly average of inflow over six consecutive months, is 20% higher than predicted groundwater inflow.*
- *Collected water samples that indicate that the TDS is more than 25% higher than the estimated water quality.*

*Observed inflow that is lower than expected with respect groundwater inflow and quality would not be of concern and/or effect water management plans on-Site. Model updates or analysis would therefore not be conducted if predicted inflow quantity and quality is higher than observed conditions. If the above variations are observed, the groundwater data would be assessed to evaluate trends, the potential causes of the greater than expected groundwater inflow quantity or quality, and the potential for long-term effect associated with the groundwater flow or quality. If the greater than predicted flows were correlated to a short-term effect such as freezing in the pit walls, changes in mining rate, freshet or transient drainage of a high storage feature, then further reassessment of groundwater inflows may not be required and the adaptive management of these short-term effects would be evaluated under the Water Management Plan (WMP). If the greater than predicted flows or quality would be considered as potentially long term, this may warrant review of the model calibration. The six-month averaging period of observation is based on observed seasonal variations in inflow quantities in*

*mines situated in permafrost regions. If model re-calibration is deemed necessary, future groundwater inflow quantity and quality would be predicted using this re-calibrated model and new results will be considered as part of the adaptive management of the groundwater quantity contribution to the WMP.*

*Modification of groundwater management strategies: the ponds, sumps and water conveyance strategies around the pit can be modified to mitigate the effect of additional groundwater volume or salinity prior to treatment and discharge. The water conveyance strategy will be evaluated and optimized during operations and closure to maintain post-closure commitments.*

**CIRNAC finding (November 30, 2018):**
*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**
As per commitment made during the October 17, 2018 meeting between CIRNAC and Agnico Eagle, options available for mitigation if arsenic concerns are materialized were included in the ARD-ML Sampling and Testing Plan.

Agnico Eagle maintains its previous position as per the October 22 2018 response and is awaiting direction from the Nunavut Water Board on the resolution of this item.

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| **Interested Party:** | **Crown-Indigenous and Northern Affairs Canada (CIRNAC)** | **Rec No.:** | **CIRNAC#5** |
| **Re:** | **S.3.1** | | |

**CIRNAC finding (October 22, 2018):**

*Based on the concerns regarding water quality in the flooded Whale Tail Pit after closure expressed by CIRNAC throughout the review processes, the Groundwater Monitoring Plan should describe how AEM will accomplish the following:*

*a. Conduct additional analyses to determine the approximate fill time for the Whale Tail Pit at closure;*

*b. Undertake a hydrogeological characterization study to assess the potential for arsenic and phosphorous diffusion from submerged Whale Tail pit walls;*

*c. If the results of the characterization study indicate a moderate to high potential for arsenic and/or phosphorous diffusion, perform detailed hydrodynamic modelling of the flooded pit lake prior to closure to evaluate meromictic conditions and flooded pit water quality; and*

*d. Add these required activities to the site Groundwater Monitoring Plan. During meetings held in July and October 2018, AEM presented additional information related to the items noted above. However, the current version of the Groundwater Monitoring Plan does not include any descriptions of how each of the items will be achieved. Additionally, the description of AEM's plan to fulfill these requirements is requested in Project Certificate Term and Condition #16.*

**CIRNAC recommendation (October 22, 2018):**

*CIRNAC recommends that the Groundwater Monitoring Plan be revised to include all information specified in Project Certificate Term and Condition #16.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*The Project Certificate Term and Conditions #16 has already been fulfilled whereby a multi-level Westbay well system has been put in place to obtain groundwater quality data and flow data; a detailed post-closure hydrogeological and permafrost model were completed; a detailed diffusion model was completed to more adequately define the effects of this chemical process from submerged pit walls; and, a pit lake hydrodynamic model as well as a receiving lake (Mammoth Lake) hydrodynamic model were completed to assess the potential for meromixis and assess effects of all these processes. The results of these assessments were presented to CIRNAC in July 2018 and results pertaining to these assessments were again discussed during a meeting with CIRNAC in Iqaluit on October 17 and 18 2018. The results of the compendium of these studies indicated diffusion will not affect water quality in the pit lake; mass transfer to water is very low even under the conservative assumptions of the calculations. The study further determined that the seepage into and out of the pit lake are negligible in volume, particularly compared to surface water exchanged annually post-closure when flows are re-established based on average climate year watershed runoff. The combination of results corroborate to support that the hydrogeological regime around the pit lake is not critical to pit lake water quality.*

*The activities of monitoring and modeling updates have been included in the Water Management Plan. Agnico Eagle will comply with Water Licence 2AM-WTP 1826 Part E Item 8 which is describing the water quality forecast update process:*

> *''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."*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

This comment relates to NIRB Project Certificate No.008 and is thus not applicable to NWB Water Licence 2AM-WTP1826 Part B Item 14 management plan's approval process.

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| **Interested Party:** | **Crown-Indigenous and Northern Affairs Canada (CIRNAC)** | **Rec No.:** | **CIRNAC#9** |
| **Re:** | **Table 3.1** | | |

**CIRNAC finding (October 22, 2018):**

*While the current plan includes sampling of water collected in the base of the pit (i.e., ST-WT-10), no stations are provided to differentiate between different sources of loadings to the pit.*

**CIRNAC recommendation (October 22, 2018):**

*CIRNAC recommends that monitoring of pit seep quality be incorporated into the plan, particularly in the vicinity of lithologies with high acid rock draining and metal leaching (ARD/ML) potential.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Agnico Eagle does not agree with CIRNAC recommendation. Agnico Eagle is already committed to carrying out a seepage survey twice during the first year and once a year thereafter, wherever and out of whatever lithology seepage may be observed.*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

As per NWB Water Licence 2AM-WTP 1826 Schedule I Table 2 "Monitoring Program", Agnico Eagle will sample seepage found on pit walls:

''ST-S-1 (Seeps – TBD)'' on a monthly basis or as found"

In addition to this program, SNC-Lavalin will review monthly seepage results and will complete a seepage assessment twice a year for the first two years and annually starting in the third year. The results of this assessment will be provided within the annual report.

This will be included in the next revision of the Groundwater Monitoring Plan.

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| **Interested Party:** | **Crown-Indigenous and Northern Affairs Canada (CIRNAC)** | **Rec No.:** | **CIRNAC#11** |
| **Re:** | **Figure 3-1 & S.5.3** | | |

**CIRNAC finding (October 22, 2018):**

*The Plan indicates that the NWB, CIRNAC Inspector and KIA will be informed if water concentrations exceed applicable criteria (i.e., regulatory thresholds). However, no commitments are made to inform regulators if trigger levels have been reached.*

**CIRNAC recommendation (October 22, 2018):**

*To ensure regulatory authorities are aware of emerging issues, CIRNAC recommends that the same parties are also informed when trigger levels are reached.*

**Agnico Eagle's Response to Recommendation (October 22, 2018):**

*Agnico Eagle does not agree with this comment. As per the CREMP, triggers have been defined as early warning criteria that may lead to action. Exceedance of a trigger value does not necessarily imply that an adverse effect may be expected. The triggers may be based on absolute numbers or statistical criteria. As such, the objective of triggers is to raise yellow flags internally. To the contrary, thresholds are legal requirements or regulatory guidelines under which Agnico Eagle is allowed to operate.*

**CIRNAC finding (November 30, 2018):**

*Unresolved*

**Agnico Eagle Reply (January 15, 2019):**

Informing regulators if trigger levels have been reached is not a common practice at Agnico Eagle or other northern operations.

Agnico Eagle maintains its previous position as per October 22 2018 response and is awaiting direction from the Nunavut Water Board on the resolution of this item.