Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Nunavut Regional Office
Iqaluit, NU X0A 0H0

Your file - Votre référence
2AM-WTP1826

October 12, 2018

Our file - Notre référence
CIDM# 1229627

Richard Dwyer
Manager of Licensing
Nunavut Water Board
Gjoa Haven, NU X0B 1J0

Sent via email:licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) review of the Waste Rock Management Plan – Whale Tail Pit Project under Agnico Eagle Mines Limited's Type "A" Water Licence No. 2AM-WTP1826.

Dear Mr. Dwyer,

Thank-you for the email notice, received on September 12, 2018, regarding the September 2018 Version 3 Waste Rock Management Plan for the Whale Tail Pit Project.

CIRNAC reviewed the plan and comments are provided pursuant to its mandated responsibilities from the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

If you have any questions or require further information with respect to this matter, contact me at (867) 975-3877 or email michelle.blade@canada.ca, or Ian Parsons at (867) 222-9278 or email ian.parsons@canada.ca.

Regards,

Michelle Blade
Resource Coordinator, Water Resource Division

Cc. Spencer Dewar, Director, Resource Management Directorate – CIRNAC, NRO
Justin Hack, Manager of Field Operations – CIRNAC, NRO

Canada

Memorandum

To: Richard Dwyer, Manager of Licensing, NWB

From: Michelle Blade, Regional Coordinator, Water Resource Division – CIRNAC, NRO

Date: October 12, 2018

Re: **Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) review of the Waste Rock Management Plan – Whale Tail Pit Project under Agnico Eagle Mines Limited's Type "A" Water Licence No. 2AM-WTP1826.**

Applicant:	Agnico Eagle Mines Limited (AEM)
Representatives:	Jamie Quesnel and Ryan Vanengen
Project:	Whale Tail Pit Project
Region:	Kivalliq

A. BACKGROUND

On July 11, 2018, the Minister of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) approved Agnico Eagle Mines Limited's (AEM) Whale Tail Pit Project Type 'A' Water Licence No. 2AM-WTP1826 application. The Whale Tail Pit Project is a gold deposit located near Baker Lake, Nunavut.

The Waste Rock Management Plan is to be reviewed by interested parties and approved by the Nunavut Water Board (NWB) as per Part B Item 15 of Water Licence 2AM-WTP1826, prior to operation of the Whale Tail Pit.

In addition, the Waste Rock Management Plan is one of three management plans to be updated prior to operation of the Starter Pit (i.e. Quarry 2) within the Whale Tail Pit area, and construction of the Waste Rock Storage Facility (WRSF) Berm. This is stated in Part B Item 15 of the Whale Tail Pit Water Licence which states "that commitments made with respect to submissions received during the technical review of the Application, as well as final submissions and issues raised during the 2017-2018 Public Hearing process are to be taken into account." Table 1 is in CIRNAC's March 19, 2018 final submission. AEM subsequent March 26, 2018 submission agreed to Table 1. In accordance with Table 1, the Waste Rock Management Plan was reviewed with particular attention paid to the steps involved in waste rock segregation. For clarity,

many aspects of waste rock management are/will-be also addressed in CIRNAC's review of the Whale Tail Pit Water Quality and Flow Monitoring Plan, and Acid Rock Drainage (ARD) and Metal Leaching (ML) Plan.

B. RESULTS OF REVIEW

CIRNAC recommends the NWB not approve the September 2018 Version 3 Waste Rock Management Plan for the Whale Tail Pit Project until the outstanding concerns are appropriately addressed.

CIRNAC has overall outstanding concerns regarding the quality of post-closure seepage from the WRSF. It is incumbent on AEM to alleviate these concerns and demonstrate that the Whale Tail Project is able to proceed without post-closure long-term treatment.

CIRNAC has repeatedly indicated that AEM's assumption that the WRSF, and the WRSF cover material, will be constructed solely of "clean" waste rock with low ARD/ML potential may be overly optimistic.

AEM has relied heavily on the data and experience it has obtained from its Meadowbank Gold Mine Project in carrying out its assessment of the Whale Tail Pit Project. However, there is little evidence to suggest that the geology, hydrogeology and waste rock geochemistry of the Whale Tail Pit are similar to that of the Meadowbank Gold Mine Project pits. On the contrary, laboratory tests show that the average leachable arsenic of the Whale Tail Pit waste rock is about 0.86 mg/L while that of the Meadowbank Gold Mine Project is 0.002 mg/L (i.e. 429 times greater).

AEM's model predictions on the post-closure WRSF seepage water quality show that the 4.7-metre "clean" cover needs to be almost contaminant-free to avoid long-term post-closure water treatment for arsenic. While CIRNAC acknowledges the steps that AEM is taking to reduce this risk, there continues to be high uncertainty regarding the robustness of the waste rock segregation program to provide "clean" construction and cover material for the WRSF – and therefore feasibility to achieve no long-term treatment of post-closure seepage water from the WRSF.

Furthermore, the Waste Rock Management Plan does not explicitly address current uncertainties related to the post-closure quality of seepage from the WRSF, and provide mitigation strategies for the still probable but less favourable modelling outcomes.

AEM's model results indicate that if 2% of the cover material is arsenic leaching material, long-term water treatment may be required. CIRNAC recommends the NWB not approve the September 2018 Version 3 Waste Rock Management Plan for the Whale Tail Pit

project until it contains a waste rock segregation program that demonstrates with a higher degree of confidence that non ARD/ML waste rocks are being used as WRSF cover material.

Summary of Review Findings and Recommendations

#	Reference	Finding / Recommendation
1	S.2.5	**Finding:** The long-term environmental performance of the WRSF is dependent on maintaining all waste rock with elevated ARD/ML within the frozen core of the facility (i.e., below the maximum depth of the active zone). AEM's initial designs were based on the assumption the cover would only be 2 m thick. Responding to CIRNAC's request, AEM conducted additional thermal modelling that included climate change predictions. Based on that modelling, it was determined that the cover thickness would need to be increased to 4.7 m to control potential ARD/ML. There is currently uncertainty regarding the accuracy of climate change predictions and, by extension, the required cover thickness may change in the future as additional information becomes available. **Recommendation:** To ensure the environmental protection of the site, we recommend that the long-term thermal performance of the WRSF be re-modelled every 10 years after the end of the closure phase (i.e., after cover placement). The modelling should incorporate all site-specific monitoring data and the most up-to-date climate change predictions available at the time.
2	S.2.5	**Finding:** The Plan states: "*However, due to the short duration of the proposed Project, climate change related effects to the Project are likely negligible*." The statement does not apply to the waste rock that will be stored on site in perpetuity. The waste rock will be exposed to potential climate change related effects long after the short operational phase of the project. **Recommendation:** The text should be modified to clarify that the waste rock represents a permanent source of potential contamination and that it will be subjected to climate change effects.
	Table 3.4	**Finding:** Table 3.4 provides the projected waste rock tonnages used for pad and road construction as well as for water management structures. However, no projected tonnages for the construction of WRSF (waste rock storage facility) cover are given. **Recommendation:** CIRNAC recommends that the projected tonnages of waste rocks used for the construction of WRSF cover be provided.
3	S.5.1	**Finding:** The closure phase, which is scheduled to end in 2029, will be followed by 18 years of post-closure monitoring (i.e., until 2047). Importantly, the Plan states: "*Kinetic leaching tests, mineral depletion calculations and consideration of the scale and site differences between laboratory tests and field conditions suggest a time lag to possible ARD development at site of more*

		than a decade." Further, the Plan indicates: "*The delay to onset of ARD from the bulk of PAG waste rock and ore is expected to be substantially longer than the seven years of mine construction and operations*." Both of these statements emphasize the uncertainty and extended time-frame associated with the on-set of contaminated seepage from the WRSF. This justifies the need for an extended period of post-closure monitoring to confirm the site is chemically stable. **Recommendation:** We support the current assumption that post-closure monitoring continue to 2047 (i.e., 18 years after closure). However, we recommend that AEM prepare and submit a comprehensive review of all monitoring data and other evidence at least 3 years prior to making final decisions regarding the end of site monitoring.
	Table 5.1	**Finding:** The Plan states that *"Most of the waste rock lithologies to be disturbed by mining are NPAG including komatiite, iron formation, basalt, southern greywacke and diorite units. Together, these lithologies comprise approximately 68% of the waste rock (41.8 Mt). These units will not require means to control ARD.*" The above statement is inaccurate as CIRNAC notes that although in Table 5.1, komatiite south, iron formation, and diorite are classified as having no ARD potential, Table A.1 of AEM's Operational ARD-ML Sampling and Testing Plan shows that only 71% of komatiite south, 69% of iron formation, and 70% of diorite are actually predicted as having no ARD potential. **Recommendation:** CIRNAC recommends that quantitative data, if available, be used to avoid possible confusion and more importantly, misplacement of any PAG and/or ML material in the WRSF cover or as construction.
	S.5.1	**Finding:** The Plan states that "*All waste material will be sampled and tested during operations to confirm their ARD and ML potential in support of waste segregation. Based on results to date, a sulphur content of 0.1 wt% appears to be a suitable threshold to identify PAG material.*" CIRNAC notes that no result is presented or provided to prove or substantiate the suitability of using the 0.1 wt% sulfur as a suitable threshold to identify PAG material and that the MEND (2009) guideline emphasizes that "It is important to note that a % S cut-off should NOT be used as the only means of assessing ARD potential unless the minimum NP value is known. Even low levels of sulphide can lead to ARD if the NP is insufficient to neutralize the resulting acid." **Recommendation:** CIRNAC recommends that the suitability of using the 0.1 wt% sulfur as threshold be substantiated with data

		and analysis before it could be applied.
	S.5.1	**Finding:** The Plan states that "*Arsenic leaching material will be evaluated based on a strong correlation between total and leachable arsenic in the current results, which indicates that material below 75 mg/kg is not expected to result in waste rock contact water quality above the EQC.*" CIRNAC notes the absence of data to substantiate the above claim. **Recommendation:** CIRNAC recommends that the suitability of using total arsenic content as proxy for leachable arsenic be substantiated with data and analysis before it could be applied.
	S.5.1	**Finding:** The Plan states that "*As part of the planning and execution of the waste rock management strategy, waste rock presenting geological characteristics leading to metal leaching such as arsenic will be managed in the Whale Tail WRSF in order to ensure their encapsulation and geochemical stability. Certain type of waste rock material or lithology will be placed in specific locations within the WRSF in order to provide sufficient cover of NPAG/NML waste rock material to prevent metal leaching and ensure geochemical stability.*" CIRNAC finds this waste rock management execution plan too vague to be practical. For example, the specific locations for certain type of waste rock material or lithology need to be specific (both the locations and the types of waste rock). **Recommendation:** CIRNAC recommends that specific details be included to make the plan implementable.
4	S.5.3	**Finding:** The Plan indicates that Final design details for the Whale Tail WRSF will be provided to the regulators for approval at least 60 days prior to construction. The Final design details were not included with this Plan. **Recommendation:** CIRNAC recommends that construction of the WRSF does not begin until after the Final design details are approved by the NWB.
5	S.5.1	**Finding:** The Section states that the combined duration of construction and operations is 7 years. Elsewhere the document indicates that the duration would be 4 years. **Recommendation:** The text should be modified accordingly.
	S.7	**Finding:** The Plan states that tailings from the project will be stored in the Meadowbank TSF (tailings storage facility). CIRNAC notes that AEM has proposed to place tailings from the Whale Tail Project into the Goose and Portage Pits of the Meadowbank project. **Recommendation:** CIRNAC recommends that the alternative tailings disposal option be discussed.
6	S.9.3	**Finding:** The Plan indicates that hydrodynamic modelling of the

		Whale Tail Pit Lake occurred in 2008. Based on our understanding, we believe the modelling was done in 2018. **Recommendation:** The text should be modified accordingly.
	S.9.3	**Finding:** Based on recent hydrodynamic modelling (which was requested by CIRNAC) AEM concluded that arsenic loadings from the vicinity of the flooded Whale Tail Pit (post-closure) will not have a significant effect on water quality in the short and long-term. However, we draw attention to the fact that this conclusion was reached without any field data to validate assumptions regarding the hydrogeological flow regime in the vicinity of the pit (i.e. no groundwater well data has been provided to assess groundwater flows). Instead, AEM continues to use water elevations in local lakes to infer likely groundwater flows. This continues to represent an important uncertainty regarding the post-closure water quality in the flooded pit. As indicated during the EA and Water Licencing processes, CIRNAC recommended that AEM install groundwater monitoring wells in 2018 as a means to obtain hydrogeological field data prior construction and operation. However, AEM declined to provide hydrogeological field data to date and, as a result, the uncertainty remains. **Recommendation:** CIRNAC recommends the groundwater field data collected to date be provided to CIRNAC for review, and a strategy for collecting the baseline hydrogeological field be discussed, agreed upon, and implemented between CIRNAC and AEM prior to disturbance of, or excavation below, the Whale Tail Pit project water table.
6	General	**Finding:** The Plan does not address Adaptive Management requirements such as triggers, action levels and management responses that will be used throughout the waste rock management process. **Recommendation:** An Adaptive Management section should be incorporated into the Plan. The section should address credible failure modes and events that could compromise the predicted performance of waste rock management.