



Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2AM-WTP1830
Our file - Notre référence
GCDocs# 108715339

January 19, 2023

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
E-mail: licensing@nwb-oen.ca

**Re: Crown-Indigenous Relations and Northern Affairs Canada's Review of the
Whale Tail Dike West Abutment Thermal Berm Design Report for water licence
2AM-WTP1830.**

Dear Mr. Dwyer,

Thank you for your December 20, 2022, invitation to review the Whale Tail Dike West Abutment Thermal Berm Design Report submitted by Agnico Eagle Mines Limited for the water licence referenced above.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the report pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. Please find CIRNAC comments and recommendations in the attached Technical Memorandum.

If there are any questions or concerns, please get in touch with me at Aminul.Haque@rcaanc-cirnac.gc.ca or Andrew Keim at (867) 975-4550 or Andrew.Keim@rcaanc-cirnac.gc.ca.

Sincerely,

Aminul Haque
Regional Water Management Coordinator



Technical Review Memorandum

Date: January 17, 2023

To: Richard Dwyer, Manager of Licensing, Nunavut Water Board

From: Aminul Haque, Regional Water Management Coordinator, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada's Review of the Whale Tail Dike West Abutment Thermal Berm Design Report for water licence 2AM-WTP1830

Region: ☐ Kitikmeot ☒ Kivalliq ☐ Qikiqtani

A. BACKGROUND

On December 20, 2022, the Nunavut Water Board (NWB) invited interested parties to submit comments on the Whale Tail Dike West Abutment Thermal Berm Design Report (the report). The report is submitted by Agnico Eagle Mines Limited (the licensee) as part of the requirements of the Water Licence (2AM-WTP1830) for its Whale Tail Mine project, a satellite deposit of the Meadowbank Mine. The Whale Tail Mine is located on the bigger Amaruq property in the Kivalliq Region of Nunavut. The Amaruq property is a 408 km² site located approximately 150 km north of the hamlet of Baker Lake and approximately 50 km northwest of the Meadowbank Mine.

Whale Tail Dike separating Whale Tail Pit from Whale Tail Lake South was constructed in the fall of 2018 and commissioned in 2020. In August 2022, the licensee observed soil settlement on the Eastern abutment of the dike, which allowed water to ingress, rapid thawing of the Eastern abutment foundation and the development of cracks on the crest and sloughing of the dike slope in that area. The licensee constructed an Eastern abutment thermal berm in the fall of 2022 to stabilize the dike and re-establish permafrost in that sector. Under the current proposal, the licensee wants to construct a similar thermal berm at the Western abutment of Whale Tail Dike to prevent possible water ingress and rapid thawing of the Western abutment foundation as observed in the Eastern abutment.

CIRNAC provides the following comments and recommendations pertaining to the report. A summary of the subjects of recommendations can be found in Table 1. Documents reviewed as part of this submission can be found in Table 2 of Section B. Detailed technical review comments can be found in Section C.



Table 1: Summary of Recommendations

Recommendation Number	Subject
R-01	Berm Construction Materials
R-02	Berm Stability
R-03	Berm Performance
R-04	Dike Safety
R-05	Dike Review Board
R-06	Reports

B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) lists the documents reviewed under the submission and references during the review.

Table 2: Documents Reviewed and Referenced

Document Title	Author, File No., Rev., Date
Whale Tail Dike West Abutment Thermal Berm Design Report	Agnico Eagle Mines Limited, December 12, 2022
Agnico Eagle Meadowbank Complex – Whale Tail Dike Remediation Work	Agnico Eagle Mines Limited, September 22, 2022
As-Built Report of Whale Tail Dike	Agnico Eagle Mines Limited (prepared by SNC-Lavalin Inc.), June 05, 2020
Design Report of Whale Tail Dike	Agnico Eagle Mines Limited (prepared by SNC-Lavalin Inc.), May 10, 2018
Water Licence 2AM-WTP1830	Nunavut Water Board, July 11, 2018



C. RESULTS OF REVIEW

1. Berm Construction Materials

Comment:

The Whale Tail Dike West Abutment Thermal Berm Design Report mentioned, “The berm will be constructed of non-acid generating material (NAG), non-metal leaching waste rock determined as per the Operational ARD-ML Sampling and Testing Plan.” A similar statement was made in the Whale Tail Dike Remediation Work document outlining the work for the Eastern Abutment Thermal Berm. However, none of the reports identified the source(s) of the waste rock. Therefore, it is not clear if the on-site waste rock will be used or if it will be sourced from another location.

Recommendation:

(R-01) CIRNAC recommends that the licensee provides the aggregate source(s) and type(s) for the NAG and non-metal leaching materials for both eastern and west abutment thermal berms construction.

2. Berm Stability

Comment:

The Whale Tail Dike West Abutment Thermal Berm Design Report mentioned, “The passes of heavy construction equipment will compact the rockfill.” Therefore, we can understand that heavy construction equipment will compact the berm rockfill. However, there is concern that the compaction only by heavy equipment travel will not be adequate and uniform to ensure the berm’s stability.

Recommendation:

(R-02) CIRNAC recommends that the licensee takes appropriate additional measures to uniformly compact the rockfill and submit the results with the “as-built report.”

3. Berm Performance

Comment:

Thermal analysis (Section 7.2.1) in the Whale Tail Dike Design Report mentioned that settlements near the upstream end of the thermal berm are unavoidable. Although such a settlement is not critical, the design report said that it should be reflected in the maintenance plan. In addition, section 12.1 of the Whale Tail Dike Design Report mentioned, “The performance of the thermal berm at the east abutment could be monitored with thermistor strings as well.” However, the licensee did not provide any maintenance plan or monitoring for the eastern and west abutment thermal berms.



Recommendation:

(R-03) CIRNAC recommends that the licensee provide maintenance and monitoring plans for both eastern and west abutment thermal berms to ensure the desired performance.

4. Dike Safety

Comment:

In the Whale Tail Dike Remediation Work document licensee mentioned that the “Plans for a thermal berm were included in the ‘Design Report of Whale Tail Dike’ approved by the NWB on July 16, 2018, as a **potential mitigation** in case of thawing of that sector due to permafrost degradation.”. However, thermal analysis (Section 7.2.1) in the Whale Tail Dike Design Report indicated, “...there is potential for failure of the upstream slope of the dike.” and “In order to prevent excessive settlement and potential instability below the upstream slope of the dike at the east abutment, the construction of a “thermal berm” upstream of the dike is recommended.” Therefore, it can be assumed that the Eastern Abutment Thermal Berm was part of the original dike design and should have been constructed before the commissioning of the dike in 2020, not after two years in the fall of 2022.

Moreover, thermal analysis (Section 7.2.1) in the Whale Tail Dike Design Report also mentioned, “Thawing will be faster at the west abutment, where the esker upstream of the dike is expected to completely thaw after 3 to 4 years of operation.” Therefore, it is possible that the thawing observed in both the east and west abutment is an indication of potential dike hazards.

Recommendation:

(R-04) CIRNAC recommends that the licensee conduct a geotechnical survey to ensure Whale Tail Dike’s safety and operational requirements and identify potential issues, if any.

5. Dike Review Board

Comment:

The Whale Tail Dike West Abutment Thermal Berm Design Report mentioned, “This plan was strongly supported by the Meadowbank Dike Review Board (MDRB) as per their recommendation received on September 16, 2022.” However, the licensee did not provide the list of recommendations from MDRB.

Recommendation:

(R-05) CIRNAC recommends that the licensee provide the report and recommendations provided by the Meadowbank Dike Review Board (MDRB).



6. Reports

Comment:

For the construction of the Eastern abutment thermal berm, the Whale Tail Dike Remediation Work document mentioned, “Due to the constraint of the northern climate, work is scheduled to start on an initial lift of that berm on September 23, 2022, before freezing conditions.” As per the NWB Water Licence 2AM-WTP1830 Part D Item 16, the licensee is required to provide an “as-built report,” including a work completion summary and final drawing within 90 days of work completion to NWB. However, CIRNAC did not receive any confirmation for such a report for the construction of the Eastern abutment thermal berm.

Recommendation:

(R-06) CIRNAC recommends that the licensee provide the “as-built report” for the Eastern abutment thermal berm for review.