



Environmental Protection Operations Directorate  
Prairie & Northern Region  
5019 52<sup>nd</sup> Street, 4<sup>th</sup> Floor  
P.O. Box 2310  
Yellowknife, NT X1A 2P7

ECCC File: 6100 000 179/001  
NIRB File: 08MN053

September 4, 2020

Via email to: [info@nirb.ca](mailto:info@nirb.ca)

Nunavut Impact Review Board  
29 Mitik Street  
P.O. Box 1360  
Cambridge Bay, NU X0B 0C0

**RE: 08MN053 - Nunavut Impact Review Board – Mary River Phase 2 - Baffinland Iron Mines Corporation request for unresolved concerns for the Phase 2 Mary River Project Proposal**

Baffinland Iron Mines Corporation (herein referred to as ‘the Proponent’ or ‘Baffinland’) has requested that unresolved waste rock management items be addressed at the water licensing stage of the Project Application. ECCC is satisfied with this approach, provided the Proponent commits to resolving the outstanding comments as detailed below.

The Acid Rock Drainage/Metal Leaching (ARD/ML) and thermal modeling issues for the Waste Rock Facility (WRF) have been raised by ECCC since the early stages of review of the Phase 2 Mary River Project Proposal. These concerns consist of the following items:

- 1. ECCC recommends that the Proponent assess all samples with Acid Base Accounting (ABA) and Shake Flask Extraction (SFE).**
- 2. ECCC recommends that the Proponent assess a wide range of samples without relying on the 0.2 wt. % S cut off, in order to ensure that no PAG rock is misclassified as non-AG rock and that the Proponent adopt Golder’s recommendation that all samples be submitted for ABA and SFE testing on an ongoing basis.**

Items 1 and 2 have been partially resolved with the following commitment made in the Proponent’s March 13, 2020 Response to Intervenor Comments on the Waste Rock Management Plan (WRMP) Revision 2:

“Baffinland commits to implementing the recommendation of confirmatory testing of blasthole samples for ABA analysis and SFE. Since the amount of waste rock excavated will vary on a month to month basis, the sampling frequency will include a minimum of one (1) sample every 40,000 tonnes.

Additionally, Baffinland will collect confirmatory grab samples per the Waste Rock Facility QA/QC Monitoring Plan, which will include a minimum of ten (10) samples from different areas of the WRF and material classifications for a full suite of analyses.”

A path forward has been proposed by Baffinland to evaluate the use of 0.2 wt % sulphur as a cutoff threshold because the use of 0.2wt % sulphur as a segregation criteria for PAG/non-PAG is still outstanding issue for ECCC yet to be resolved. Baffinland has stated that this will be further evaluated and in Baffinland’s revised Waste Rock Management Plan (WRMP) Revision 3, the Proponent states:

“The current WRF is representative of a very small percentage of the overall waste rock that will be deposited as part of the Nuluujaak Pit development (<2%). Baffinland intends to complete an annual sampling program (minimum 1 sample per 40,000 tonnes of blasted waste rock) on representative waste rock that will be submitted for ABA and SFE testing. This testing will be used to further develop Baffinland’s geochemical database. The results of this program will be integrated in the 2021 revision of the WRMP and will be used to validate the performance of the modified criteria. This analysis will inform the need to refine the current NAG/PAG classification criteria and allow Baffinland to evaluate the need to adjust the site’s sampling and testing capacity/capabilities.”

**3. ECCC recommends that the proponent not use sulphide content only to classify Potentially Acid Generation and non-Acid Generating rock.**

**4. ECCC recommends that the proponent verify whether there are layers of the lifts that are not frozen within the Waste Rock Facility.**

The thermal assessment is still outstanding. This has also been flagged by CIRNAC, and a path forward to address this recommendation has been proposed by Baffinland to deal with this outstanding issue during the Nunavut Water Board review processes instead of before the Nunavut Impact Review Board. In their letter to Baffinland dated Aug. 25, 2020, CIRNAC requested that Baffinland commit to the following:

CIRNAC # 1: Thermal Model Key Infrastructure

1. Prior to the approval of the revised version of the Waste Rock Management Plan (or during the Water Licence Amendment process, subject to Nunavut Water Board requirements) Baffinland shall provide a heat balance and relationship of the heat generation associated with the exothermic reaction of PAG waste rock deposited and soluble sulphates and demonstrate that the current design of the waste rock facility will maintain permafrost conditions in the long term (closure and beyond).
2. Baffinland shall perform an oxygen balance of the waste rock facility and correlate it with soluble sulphates. This will provide understanding of the process of ARD generation and the performance of the waste rock facility.

3. Baffinland shall continue thermal monitoring and update the thermal model to 3D. Baffinland shall develop a detailed site wide program to monitor the thaw consolidation and soil deformation under Phase 2 structures, compare results with the FEIS Addendum and identify mitigation measures where required on an annual basis.

ECCC supports CIRNAC's request to the Proponent to carry out items 1, 2 and 3 (CIRNAC #1, Thermal Model Key Infrastructure), as such an approach will also address our outstanding concern with hot spots and heat sources that have not been specifically identified.

**5. ECCC recommends that the Proponent provide clarification on potential treatment or mitigation measures for high sulphate, given the high levels of sulphate measured in the Waste Rock Facility in 2019, and given the use of ferric sulphate in the treatment process currently used.**

Item 5 is partially resolved, and can be addressed further in the NWB processes which regulates mine effluent discharges (and via the Proponent's compliance with the *Metal and Diamond Effluent Regulations*' (MDMER) requirement for non-acutely lethal effluent). Baffinland acknowledged in the Response to Intervenor Comments on the WRMP Revision 2 dated March 13, 2020:

"... [there are] elevated sulphate concentrations in the Waste Rock Facility (WRF) pond and is investigating process changes such as recycling of sludge and use of alternate coagulants and polymers to reduce sulphate concentrations in the WRF effluent. Baffinland conducted monthly acute lethality testing from the Waste Rock Facility water treatment plant effluent with compliant results in 2019. Water quality monitoring will continue in 2020 as per Baffinland's Water Licence and MDMER sampling requirements"

ECCC further commented on the sulphate issue in our review of the Treatment Construction Report, and received the following response in Baffinland's July 7, 2020 letter regarding "*Comments on the Mine Site Waste Rock Facility Pond Expansion and Drainage System Construction Summary Report, and the Waste Rock Water Treatment Plant Construction Summary Report*":

"Appendix E prediction are pre-treatment and not indicative of the final post-treatment results. Baffinland conducted monthly acute lethality testing from the Waste Rock Facility WTP effluent with compliant results in 2019. Baffinland will continue to monitor the sulphate levels in the WTP effluent and will evaluate the need for potential treatment following the results of the update water balance and quality modeling in 2021. Water quality monitoring will continue in 2020 as per Baffinland's Water Licence and MDMER sampling requirements."

Given that treatment is not expected to remove sulphate, the pre-treatment concentrations remain outstanding, and ECCC supports the Proponent's continued evaluation of this parameter.

ECCC thanks the Nunavut Impact Review Board for the opportunity to provide comments on this matter. If there are any questions or concerns, please contact me at [margaret.fairbairn@canada.ca](mailto:margaret.fairbairn@canada.ca).

Sincerely,

A handwritten signature in black ink, appearing to read "Margaret". The signature is fluid and cursive, with a long, sweeping tail that extends to the right.

Margaret Fairbairn  
Acting Regional Director