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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File: 2AM-MRY1325

April 20, 2020

Christopher Murray
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Email: christopher.murray@baffinland.com

Subject: Licence No: 2AM-MRY1325 Type “A”; Mary River Project, Baffinland Iron Mines Corporation; Phase 1 Waste Rock Management Plan

Dear Christopher Murray:

On January 6, 2020, the Nunavut Water Board (NWB or Board) distributed for public review the *Phase 1 Waste Rock Management Plan* (Plan) dated December 31, 2019 submitted by Baffinland Iron Mines Corporation (Baffinland or Licensee) as per the requirement under Part F, Item 3 of its Type “A” Water Licence No: 2AM-MRY1325 (Licence). The deadline for submissions was set for February 5, 2020. Comment submissions were received from Crown-Indigenous Relations and Northern Affairs (CIRNA) and the Qikiqtani Inuit Association (QIA) on February 5, 2020. In addition, Environment and Climate Change Canada (ECCC) submitted its review comments on February 11, 2020. The submissions were directed¹ to Baffinland for response. The Licensee responded with additional information², to which the QIA, CIRNA and ECCC provided their feedback³.

Copies of all documents received during the review of Plan can be accessed through the NWB’s Public Registry and FTP site using the following link:

¹ Assol Kubeisinova (NWB) to Christopher Murray (Baffinland), RE: Licence No. 2AM-MRY1325 Type “A”; Mary River Project, Baffinland Iron Mines Corporation; Phase 1 Waste Rock Management Plan – NWB Review, dated February 11, 2020.

² Christopher Murray (Baffinland) to Assol Kubeisinova (NWB), RE: Response to Intervenor Comments, Phase 1 Waste Rock Management Plan Revision 2 Mary River Project, Type ‘A’ Water Licence - 2AM-MRY1325 - Amend. No. 1, dated March 13, 2020.

³ Qikiqtani Inuit Association (QIA), dated April 16, 2020; Crown-Indigenous Relations and Northern Affairs (CIRNA), dated March 30, 2020; Environment and Climate Change Canada (ECCC), dated April 16, 2020.

[ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/4%20WASTE%20DISP%20\(F\)/F%203%20Waste%20Rock%20Mgmt%20Plan/](ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/4%20WASTE%20DISP%20(F)/F%203%20Waste%20Rock%20Mgmt%20Plan/)

In its review, the QIA provided its feedback on a number of issues:

- Discussion of the site water balance calculations and recommended improvements;
- Concerns about and recommendations to ensure waste rock facility (WRF) freezeback;
- Concerns about water quality predictions for the WRF pond and recommendations to refine the water quality model, provide for contingent amount of reagents for water treatment; and develop WRF water quality predictions for closure;
- Request for clarification on the volume and composition of the sludge resultant from WRF water treatment, disposal procedures, and sludge volume estimation; and
- Recommendations on expansion of WRF monitoring activities.

In its initial comment submission, CIRNA expressed its concern by means of the following:

- Request to provide further clarification to acid rock drainage and metal leaching (ARD/ML) determination for waste rock;
- Request to confirm if the capacity of the WRF pond is sufficient;
- Request for clarification on WRF pond sediment management;
- Recommendation for Baffinland to commit to adhering to the recommendations outlined in the technical documents submitted with the Plan;

ECCC recommended the following:

- Modify the definition of potentially acid generating (PAG) rock;
- Recommended modifications to geochemical testing of waste rock;
- Request to whether there are layers of the lifts that are not frozen within the WRF;
- Request to clarify the thickness of the WRF cover at closure; and
- Outlining mitigation measures for high sulphate concentration in WRF runoff.

The NWB made information requests in relation to:

- WRF inspections and monitoring procedures and frequencies;
- Mitigation measures should Baffinland deviate from the planned deposition strategy;
- Updates to references;
- Plans to improve the collection of water balance data; and
- Integration of climate change effects into the Plan.

The Licensee responded by providing the following information:

- The WRF water management system was designed based on actual hydrological measurements without any consideration of the water balance model;
- Commitments to:
 - Install a pressure transducer at the WRF pond;
 - Track water flow between the WRF pond and the Water Treatment Plant;
 - Track the inflows to the WRF catchment or treatment plant from other locations (e.g. mining operations); and
 - Install a totalizer on the Deposit 1 discharge to the WRF Pond.

- Discussion of water balance uncertainty;
- Commitment to develop a WRF water quality model;
- Clarification on sludge handling;
- Addition of instrumentation for monitoring of the expanded footprint of the WRF in 2020-2021;
- Commitment to modify the definition of potentially acid generating (PAG) rock;
- Commitment to Acid Base Accounting (ABA) and Shake Flask Extraction (SFE) of blasthole samples with a sampling frequency of one (1) sample every 40,000 tonnes;
- Commitment to investigate measures to reduce sulphate concentration in WRF effluent;
- Provided further clarification to acid rock drainage and metal leaching (ARD/ML) determination for waste rock;
- Provided information on WRF pond design;
- Provided more information on WRF pond sediment management; and
- Submitted the disposition table outlining the Licensee's commitments to adhere to the recommendations.

Providing feedback to the Licensee's response, the QIA noted: "QIA recommends that the NWB request additional revisions that (1) limit the operational flexibility of the lift placement strategy; and (2) define an adaptive management framework that provides certainty in the operational response to deviations in WRF performance." In addition, the intervenor provided in its comment:

- Request for a comparison of the forthcoming calibrated water balance model output to the capacity of the pond under a 1:100 storm event scenario to ensure that the WRF pond is correctly sized despite the absence of calibrated water balance modelling;
- Recommendation to develop an adaptive management plan that includes contingency measures for contact water than is currently predicted in the water quantity model;
- Request for more detailed information on the assessment of input data for water balance for the next iteration of the WRMP;
- Request to outline in an adaptive management plan a contingent action plan should permafrost not aggrade into overlying WRF lifts as intended or a thawed layer be observed within the WRF; and
- Request to provide an updated water quality model that predicts water quality within the WRF pond throughout the life of the mine, including into closure, with a sensitivity analysis accounting for deviations from the proposed life placement strategy, the presence of ARD and seepage via the deep interflow pathway.

Once the Licensee responded to the comments, CIRNA provided its feedback:

- Once an in-pond sediment treatment is planned, Baffinland is to provide to the NWB:
 - an estimate of volume of sediment to be produced;
 - an assessment of the need for standby pond capacity;
 - details regarding the procedures for sediment handling, transport, and disposal; and
 - monitoring and sediment disposal record keeping practices.
- Noting Baffinland's commitment stating that "(a)ll models used in the development of the WRMP (water quality, water balance, thermal, geochemistry) will be updated prior to the next revision of the WRMP in 2021 following the collection of additional relevant data",

CIRNA recommended that “the relevant data include use of mass loading rates based on observed run-off flow, water quality and geochemistry of the WRF, and a continued collection of climate data at the Mary River station”.

ECCC, upon reviewing Baffinland’s response, submitted:

- Emphasizing that “...the 0.2 wt. % S cutoff may not be appropriate to segregate the waste rock into PAG and non-AG materials from the mining activity. Also, there seems to be a lack of neutralization potential within the rock that will mitigate ARD”, the intervener recommended ABA analysis and SFE tests be conducted on all representative samples in order to properly characterize the waste rock;
- Recommendation to provide adaptive management measures and evaluate potential effects of hot spots within the waste rock pile; and
- Request to clarify if potential treatment and mitigation options for sulphate and Appendix E predictions are pre- or post-treatment.

The NWB fully reviewed the Plan in the context of interveners’ comments and recommendations and the Licensee’s clarifications and commitments. While the Board notes the commitments made by Baffinland, the Board understands that there are many changes to the Plan that are required to ensure proper mitigation of risks for freshwater. Therefore, the NWB requests that the Licensee revise the Plan by addressing the interveners’ concerns on or before **June 16, 2020**. Any commitments should be reflected in the Plan with an indication of a timeline for execution.

Should you have any questions, please feel free to contact the undersigned at (867) 360-6338 (ext. 31) or assol.kubeisinova@nwb-oen.ca at your earliest convenience.

Regards,

Assol Kubeisinova
Technical Advisor
Nunavut Water Board

cc: Distribution List – Mary River