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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File: 2AM-MRY1325

August 23, 2019

Christopher Murray
Environmental & Regulatory Compliance Manager
Baffinland Iron Mines Corporation
Suite 300 – 2275 Upper Middle Road East
Oakville, Ontario, Canada L6H 0C3

Email: christopher.murray@baffinland.com

RE: Licence No. 2AM-MRY1325 Type “A”; Mary River Project, Baffinland Iron Mines Corporation; 2018 Annual Report Review

Dear Mr. Murray:

The Nunavut Water Board (NWB or Board) has completed the technical review of the 2018 Annual Report (Report) for Type “A” Water Licence 2AM-MRY1325 (Licence). The Report was received on March 31, 2019 from Baffinland Iron Mines Corporation (Baffinland or Licensee), submitted as a requirement under Part B of the Licence.

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

[ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/1%20GENERAL%20\(B\)/2%20ANNUAL%20RPT/2018/](ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/1%20GENERAL%20(B)/2%20ANNUAL%20RPT/2018/)

On April 2, 2019, the NWB distributed the Report for public review. Submissions were received from Crown-Indigenous Relations and Northern Affairs (CIRNA), Fisheries and Oceans Canada (DFO), and the Qikiqtani Inuit Association (QIA) on August 6, 2019. The table below provides a brief summary of issues that NWB and the intervenors found outstanding during the Report review period. The table provides deadlines for the Licensee to respond to respective recommendations and concerns. For the intervenors’ discussion of these items, please refer to the comment submissions referenced above.

No.	Intervener Recommendation / Concern	Deadline to Respond by and Notes
Crown-Indigenous Relations and Northern Affairs (CIRNA)		
1-R1	Undertake supplementary test work to confirm the nature of the soluble sulphate fraction that is amorphous by use of a mineralogical technique that is able to confirm	March 31, 2020 (2019 Annual Report)

	amorphous minerals in waste rock.	
1-R2	Undertake further studies to investigate the potential effect of rapid release of acidity and metals from such materials on water quality upon seepage, and determine the appropriate water treatment requirements.	March 31, 2020 (2019 Annual Report)
1-R3	Review the 0.2% total sulphur cut-off and examine the necessity for an additional readily soluble sulphate cut-off to the identification of PAG materials.	March 31, 2020 (2019 Annual Report)
1-R4	Once addressed, the outcomes of recommendations in 1-R1, 1-R2, and 1-R3 need to be incorporated into the Waste Rock Management Plan.	March 31, 2020 (2019 Annual Report)
2-R5	Either adjust the neutralization potential ratio (NPR) to a value greater than 2 to account for a lack of Ca/Mg carbonate minerals, or undertake suitable supplementary test work to validate that there is effective neutralization capacity above pH 6.	March 31, 2020 (2019 Annual Report)
2-R6	Demonstrate: <ul style="list-style-type: none"> i. The level of uncertainty/variability between NPR values and associated total sulphur values; ii. The level of uncertainty/variability between total sulphur values and associated potential leachate water quality; and iii. A factor of safety in relation to the derivation of the total sulphur threshold. 	March 31, 2020 (2019 Annual Report)
3-R7	Continue to monitor the water quality discharge to ensure run-off from the WRF treatment plant remains compliant	As per Licence Part I, Item 5 and Schedule I
4-R8	Document and apply the lessons learned from the WRF pond liner leakage study to the assessment of the status of all current and planned lined pond facilities at the Mary River Project.	March 31, 2020 (2019 Annual Report)
5-R9	Follow the requirements to report all reportable spills within 24 hours to the 24-Hour Spill Reporting Line and to the CIRNAC Inspector, and that written reports are provided to the CIRNAC Inspector within thirty days of the initial event.	As per Licence Part H, Items 9 and 10
5-R10	Review all spills on the project site through an extended timeframe (annual or longer) to determine whether corrective and preventive actions need to be applied across the project at repeat failure locations. Changes should be tracked to determine if the improvements are effective	March 31, 2020 (2019 Annual Report) and subsequent annual reports
6-R11	Review the design of the ditch gradient profile at the crusher pad and ensure it is maintained.	Next geotechnical inspection
6-R12	Address all the noted design and layout challenges at the crusher drainage pad while maintaining the 3m buffer zone.	March 31, 2020 (2019 Annual Report)
7-R13	Use a more effective approach to collecting flow measurements during low flow conditions.	March 31, 2020 (2019 Annual Report)
8-R14	Provide justification for extrapolating beyond twice the highest measured flow against the recommendation of the Water Survey of Canada.	November 1, 2019
8-R15	Adjust the flow-monitoring program to capture additional flow measurements to further refine/verify the rating	March 31, 2020 (2019 Annual Report)

	curves.	
9-R16	Provide an explanation outlining why a single flow measurement was used and to demonstrate that changes to the watercourse/rating curve are not occurring.	November 1, 2019
9-R17	Provide an explanation or discussion to explain why an updated rating curve was developed for stations H02, H04, and H11.	November 1, 2019
10-R18	Incorporate information about effluent concentrations in receiving water bodies, or a reference to where this information can be found, into the Annual Reports.	Subsequent annual reports
10-R19	Incorporate the findings and data from the Hydrometric Monitoring Program into other monitoring and mitigation programs to develop a holistic view of on-going environmental conditions, trends, and impact predictions.	Subsequent annual reports
11-R20	Update on the proposed method for collecting high flow measurements in the future.	November 1, 2019
12-R21	Quality Assurance and Quality Control of the Groundwater Monitoring Report notes that total aluminum, iron and titanium were above 3 times their respective maximum daily allowance. Provide clarification on the rationale for the elevated parameters and/or lessons learned.	November 1, 2019
13-R22	Conduct chemical and mineralogical quality analyses on future sediment samples.	As per the Aquatic Effects Monitoring Plan
14-R23	Develop a holistic view of on-going environmental conditions and trends that can tie back into the monitoring and mitigation programs by incorporating findings and data from other monitoring programs.	Subsequent annual reports
15-R24	Provide a summary description of the activities performed to address the permafrost degradation in the borrowing areas in subsequent Annual Reports.	Subsequent annual reports
16-R25	Provide a detailed explanation of the method of determining monthly generated soil volumes, and why there is no 2018 monthly petroleum contaminated soil volume data for the Land farm at Milne Port.	November 1, 2019
17-R26	Demonstrate compliance to the regulatory criteria in subsequent Annual Reports by providing a table that compares results to the allowable limits.	Subsequent annual reports
18-R27	Acquire confirmation in writing from the NWB, stating that the selected landfill facility in Southern Canada has been approved, prior to any backhauling activity.	The Board notes that it does not exercise authority over waste disposal facilities outside of the Nunavut Settlement Area.
18-R28	Along with the volume, provide the details associated with any disposal in Southern Canada in the Annual Reports, including details on the alternative disposal facility, written approval from the NWB, and sewage volume.	The Board notes that it does not exercise authority over waste disposal facilities outside of the Nunavut Settlement Area.
19-R29	If/when the Run of Mine Stockpile is built, update the Fresh Water Supply, Sewage, and Wastewater Management Plan with the correct location.	As per Licence Part B, Item 17
20-R30	Either include all of the regulatory instruments that inform the <i>Surface Water and Aquatic Ecosystem Management Plan</i> , or remove the “and;” from the end of	March 31, 2020 (2019 Annual Report)

	the list to demonstrate a complete list, or include a phrase to indicate that the regulatory instrument list is not exhaustive.	
21-R31	Clarify why rutting by vehicles, environmental and wildlife concerns, and all soil stockpile parameters have been removed from the list of routine inspections.	November 1, 2019
22-R32	Clarify why the section describing dust control measures has been removed from the <i>Surface Water and Aquatic Ecosystem Management Plan</i> .	November 1, 2019
23-R33	Include all sample sites at quarries including Q1 and QMR2 in tables 9-2 and 9-3 of the <i>Surface Water and Aquatic Ecosystem Management Plan</i> .	Next revision of the plan
Fisheries and Oceans Canada (DFO)		
1	The Proponent is operating under several Fisheries Act Authorizations for the Mary River Project and Baffinland is required to report on their compliance with their issued Fisheries Act Authorizations through annual reporting directly to DFO.	No feedback to the NWB is required.
Qikiqtani Inuit Association (QIA)		
1	Baffinland provide all outstanding as-built drawings and Construction Summary Reports.	As per Licence Part D, Item 17
2	Going forward, Baffinland include work plan items and modification requests, which were not completed in Table 2.0.	The NWB recognizes the issue as subject to the agreement between the Licensee and the QIA only.
3-1	Baffinland provide supporting documentation to substantiate the reclamation of KM 57.	As per Licence Schedule B, Item f(i)
3-2	What are Baffinland's plans for reclamation of the historical tote road for 2019? Specifically, how many kilometers of the tote road will be reclaimed?	As per Licence Part J, Item 3 and Schedule J
4	Given the WRF Waste Treatment Plant is the main item in this modification request and has been operational for a year, it would be reasonable to request the as-built for this facility be submitted.	The NWB understands that the Piping (or Process) and Instrumentation Diagrams (P&IDs) of the water treatment plant at the Waste Rock Facility are provided in BAF-PHI-340-PRO-048 <i>Waste Pond Water Treatment Plant Operations</i> ; however, the P&IDs lack a stamp and signature of an Engineer (please see NWB comment 3).
5	Baffinland provide a revised as-built for works completed under Modification No. 9 as per the requirements of the Lease Operations Guide.	While the NWB recognizes that any requirements under the Lease Operations Guide as subject to the agreement between the Licensee and the QIA only, the Board reminds ¹ the Licensee to submit post-

¹ Assol Kubeisinova (NWB) to Christopher Murray (Baffinland), RE: Licence No. 2AM-MRY1325 Type "A"; Mary River Project, Baffinland Iron Mines Corporation; NWB Follow-up on Modification No. 9 - Milne Port Ore Stockpile Water Management Upgrades; dated April 15, 2019.

		construction information in accordance with Licence Part G, Item 4 and Part D, Item 17.
6	Baffinland please provide insight on the high occurrence of sewage spills at Mine Site Complex. Additionally, list any steps currently being taken to reduce the risk/occurrence of spills of treated and untreated sewage from the Mine Site Complex Lift Stations.	March 31, 2020 (2019 Annual Report) and subsequent annual reports (echoing CIRNA's 5-R10 above)
7	Can Baffinland confirm the volume of water exceeding Water Licence criteria, which was discharged into the receiving environment?	November 1, 2019
8	Baffinland provide a revised listing separating out "Equipment", "Mobile Equipment", and "Other Materials". Moreover, Baffinland specify whether these items are owned by Baffinland or third-party companies.	The NWB recognizes the issue as subject to the agreement between the Licensee and the QIA only.
Nunavut Water Board (NWB)		
1	The NWB notes that allowable water use for dust suppression was exceeded in 2018. While the Board appreciates the inclusion of mitigation measures into BAF-PH1-830-P16-0010 <i>Fresh Water Supply, Sewage, and Wastewater Management Plan</i> , the Board reminds the Licensee to restrict its water use to prescribed limits.	Subsequent annual reports
2	The NWB would like to correct the statement in section 7.3.3 of the 2018 QIA and NWB Annual Report for Operations, "Within 24 hours of discovering and stopping the release, Baffinland reported the release to the NT-NU Spill Line, NWB, CIRNAC, QIA and ECCC (NT-NU Spill Report No. 18-244)." The NWB was not in receipt of the spill report from Baffinland. This is a minor correction, as the Licensee does not have an obligation to provide a spill report to the NWB within 24 hours.	No follow-up required.
3	Some P&IDs and drawings for engineered facilities, especially those provided in management plans, do not have an Engineer's stamp and signature.	Next revisions of management plans
4	During its June 2018 inspection, the QIA observed that "Sample WRF_018_20180626 obtained from a Non-PAG (base layer of Non- PAG placed on existing ground) location tested and classified as PAG. Sample WRF_004_20180626 obtained from a slope that appears to be located outside the identified PAG boundaries". In response ² , Baffinland committed to "compare results to provided QIA data and communicate these results to QIA. Field evaluations of the identified non-conformance zones will be actioned to evaluate the extent of the non-conformance and a plan developed prior to August 30th." The NWB requests that the Licensee provide an explanation to the occurrence.	November 1, 2019

The NWB notes that Baffinland submitted the following updated management plans with the 2018 Annual Report:

² Christopher Murray (Baffinland) to Fai Ndofof (QIA), RE: Response to QIA June 2018 Site Inspection, Findings and Recommendations, dated August 2, 2018.

- BAF-PH1-830-P16-0010 *Fresh Water Supply, Sewage, and Wastewater Management Plan* dated March 31, 2019;
- *Interim Waste Rock Management Plan* dated March 2019;
- BAF-PH1-830-P16-0026 *Surface Water and Aquatic Ecosystem Management Plan* dated March 31, 2019; and
- BAF-PH1-830-P16-0023 *Roads Management Plan* dated March 31, 2019.

The Licensee is advised that the updated plans address the requirements of the Licence.

The Board notes that Baffinland requested changes to the Monitoring Program. The Board advises the Licensee that a separate correspondence on the subject will follow.

If you have any questions, please contact the undersigned at assol.kubeisinova@nwb-oen.ca or (867) 360 6338 (ext. 31).

Best regards,

Assol Kubeisinova
Nunavut Water Board
Technical Advisor

Enclosure: Comments – CIRNA, DFO, QIA

Cc: Distribution List – Mary River