



CIRNAC Comments to NIRB Re: Baffinland Iron Mine Corporation's Mary River Project 2019 Annual Report



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Your file - Votre référence
08MN053
Our file - Notre référence
CIDMS # 1287061

July 27, 2020

Cory Barker, M.Sc.
Technical Advisor I,
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU, X0B 0C0
Via electronic mail to: info@nirb.ca

Dear Cory Barker,

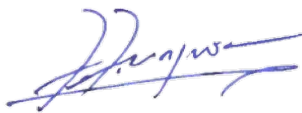
Re: Comment Request for Baffinland Iron Mines Corporation's Mary River Project 2019 Annual Report

On June 11, 2020, as per Section 12.7 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty The Queen in Right of Canada* (Nunavut Agreement), s. 135(4) of the *Nunavut Planning and Project Assessment Act*, S.C. 2013 c. 14 (NuPPAA), and the amended Mary River Project Certificate [No. 005], the Nunavut Impact Review Board (NIRB) requested parties to review Baffinland Iron Mines Corporation's (Baffinland's) 2019 Annual Report with respect to effects and compliance monitoring.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) has conducted a review of the 2019 Annual Report and related documents in areas under its mandate pertaining to effects and compliance monitoring. On this basis, CIRNAC would like to provide the comments attached for the NIRB's consideration.

CIRNAC appreciates the opportunity to review Baffinland's Mary River Project 2019 Annual Report and looks forward to working with the NIRB and Baffinland through future reviews for these projects. Should you have any questions, please do not hesitate to contact Alexandre Chaikine at 867-975-4587 or by email at alexandre.chaikine@canada.ca.

Sincerely,



Felexce Ngwa
Manager, Impact Assessment



1. Effects Monitoring

The 2019 Annual Report has been evaluated to assess the measurable changes to the valued components/indicators under CIRNAC areas of interest, compared to the potential effects that were predicted to result from a proposed development of the Mary River Iron Mine Project, taking into account the Final Environmental Impact Statement (FEIS), monitoring reports of previous years and the requirements included in the Projects Certificates. The assessment considered the following:

- a. Whether the conclusions reached by Baffinland in the 2019 Annual Report are valid; and,**
- b. Any areas of significance requiring further supporting information or any changes to the monitoring program which may be required**

Within the areas under its mandate, CIRNAC did not identify any information that would invalidate the conclusions reached by Baffinland in the 2019 Annual Report. However, the data interpretation would benefit from the comments included in this document.

Comment Number:	CIRNAC #1
Subject:	Dust Management and Monitoring
Reference:	<ul style="list-style-type: none">• Baffinland Iron Mines' 2019 Annual Report to the NIRB, May 15, 2020.<ul style="list-style-type: none">○ Section 4.6.2 Air Quality, Table 4.6 – Air Quality Impact Evaluation,○ Section 4.6.5 Groundwater & Surface Water,○ Section 4.6.6 Vegetation and Self-assessed Performance on Project Conditions 10, 21.
Issue/Rationale:	<p>The generation of dust by components of the Project and the potential effects of dustfall on land-based ecology along the project drainage ditches, marine shore-line ecology, soil quality, vegetation and forage for caribou are a concern. Dust fall on water courses affects water quality, potentially leading to environmental health issues. Baffinland has undertaken several initiatives such as using a new dust suppressant, 'Dust Stop', to reduce dust emissions particularly along the Tote Road. Monitoring results presented by Baffinland indicate that they have achieved a general decrease in total annual dust fall across the project area as presented in Trends of Project Condition No. 10.</p> <p>Ore dust, with chemical composition of 65% iron on average, as well as waste rock stockpiles are likely to be prone to leaching acidity, sulphate salinity and metals and metalloids. However, Table 4.15 states that ore dust runoff did not exceed the Final Environmental Impact Statement (FEIS) predictions.</p> <p>Additionally, nitrates are a potential contaminant found in ore dust that is associated with blasting activities. This presence can be</p>



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	<p>inferred by above baseline nitrates and/or ammonia concentrations observed in Camp Lake and Sheardown Lake as well as the Mary River system (as defined in the results of Baffinland's self-assessment of Project Condition No. 20). Although, in all cases concentrations at monitoring locations were below the Canadian Council of Ministers of the Environment (CCME) guidelines, the relevance of CCME guidelines for an arctic environment has not been established.</p> <p>CIRNAC acknowledges the efforts Baffinland has made to manage ore dust at the mine site, however, the Department notes that even slight increases in the parameters highlighted above can have long term impacts that the current monitoring programs may not be designed to identify, specifically:</p> <ul style="list-style-type: none"> • The current vegetation and soil base metals sites do not appear to be testing for acidity / alkalinity, sulphate, iron, manganese, nickel and nitrate concentrations. Slight changes in soil growth parameters (particularly increased nitrate levels in drainage lines) in an arctic environment and slight increases in sulphate salinity and bioavailable concentrations of iron, manganese, nickel may significantly stress vegetation and surface soil biota. • It is unclear whether the selected vegetation and soil base monitoring sites are static (i.e. the same location year by year) or incorporate targeting areas with readily visible dust deposition (via visual or aerial drone survey). These targeted areas should be captured in the monitoring program. • The depth of the profile of base soils represented by the soil sampling program is unclear. This will significantly affect the magnitude of metals concentrations and other parameters (e.g. the very shallow sampling depth which is no greater than the surface to immediately underlying dust deposition, versus a deeper sampling profile). • It is unclear whether correlations between nitrate increases in terrestrial vegetation and or suspended aquatic biota (e.g., algae) in the water column of water bodies is being monitored. <p>Overall it is unclear whether the monitoring programs associated with soil, vegetation, water way ecology, and marine ecology are specific enough to identify impacts to an arctic environment. Baffinland has committed to further assess impacts based upon a greater understanding of effects upon an arctic environment; however, the timeline associated with that commitment is unclear.</p>
Recommendation:	<p>CIRNAC recommends that Baffinland consider including the following testing measures to increase quality of monitoring activities:</p> <p>a) Inclusion of testing for acidity / alkalinity, sulphate, iron, manganese, nickel and nitrate concentrations in vegetation and soil base metal site tests.</p>



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	<ul style="list-style-type: none"> b) Identification and targeting for monitoring areas with readily visible dust deposition (via visual or aerial drone survey) in vegetation and soil base monitoring sites. c) Clarify the base soils depth of sampling undertaken for the soil sampling program.

Comment Number:	CIRNAC #2
Subject:	Hydrology and Hydrogeology - Water Infrastructure Monitoring
Reference:	<ul style="list-style-type: none"> • Baffinland Iron Mines 2019 Annual Report to the NIRB, May 15, 2020. Section 4.6.4 (reference to Table 4.1 cited in Project Condition No. 19 – Results). • 2019 QIA and NWB Annual Report for Operations, April 30, 2020: <ul style="list-style-type: none"> ○ Performance on Project Certificate Conditions; ○ Project Certificate Condition No. 19.
Issue/Rationale:	<p>As stipulated by the Project's Type A and Type B Water Licenses, Baffinland is required to monitor, document and report the Project's water withdrawal rates from approved water sources. Page 92 of the 2019 Annual Report states:</p> <p><i>“There were twelve (12) reported incidents where the daily water volume withdrawn for domestic purposes exceeded Camp Lake's domestic daily water withdrawal limit (203.8 m3/day). As noted in the Annual Report, these (12) incidents, detailed in Table 4.1, are believed to be a result of the mis-categorization of water volumes withdrawn for industrial purposes and operator error due to raw water capacity constraints.”</i> (Baffinland Iron Mines 2019 Annual Report to the NIRB)</p> <p>There is a Table 4.1 in the 2019 Annual Report to NIRB; however it is not related to the daily water withdrawals incidences. Table 4.1 is titled “Status of Self-Assessment Compliance Terminology and Criteria”.</p> <p>The QIA and NWB Annual Report however, does highlight these exceedances in Table 4.1 – Daily, Monthly and, Annual Volumes of Water used for Domestic and Industrial Purposes on Inuit-Owned Land Crown Lands – 2019. This creates unnecessary confusion for the Reviewer.</p>
Recommendation:	<p>CIRNAC recommends that Baffinland include in subsequent Annual Reports to NIRB a summary table identifying all incidences when exceedances of the daily water withdrawal limits were reported. Specifically:</p> <ul style="list-style-type: none"> a) Clarify the categorization of water volumes withdrawn. b) Determine if reported exceedances are actual exceedances, or if these exceedances are mis-catagorized volume withdrawals, implement measures to avoid future mis-categorization of water



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	<p>volume withdrawals.</p> <p>c) Conduct a detailed investigation on daily water exceedances to determine the root and immediate causes of the incidence, lesson learned and measures to prevent future occurrence and capture it in the 2020 Annual Report to NIRB.</p>

Comment Number:	CIRNAC #3
Subject:	Groundwater Monitoring
Reference:	<ul style="list-style-type: none"> • Baffinland 2019 Annual Report to the NIRB Section 4.6.5 and – Appendix G.5 Groundwater 2019 Monitoring Program, May 2020. • Mary River Project 2019 QIA and NWB Annual Report for Operations, April 30, 2020 - Appendix E.12 2019 Groundwater Monitoring Report.
Issue/Rationale:	<p>Baffinland continued the groundwater monitoring program at the Mine Site Landfill Facility in 2019. Three (3) shallow groundwater wells (1.1 to 1.8 meter depths) down-gradient and two (2) groundwater wells up-gradient and drive-point piezometers were used to collect water near the active layer during September of 2019 (the time permafrost is at its maximum depth).</p> <p>Groundwater quality results during the 2019 program showed elevated values of conductivity, chloride and nitrate as well as some total metals. Due to the limited water quality data set, further groundwater monitoring and assessment of the stratigraphy are required to gain a better understanding of natural groundwater chemistry and hydrogeology at the Project site.</p> <p>Infiltration of runoff and leachate from the Waste Rock Stockpile area may be a source of contamination of groundwater quality; however the groundwater monitoring program does not include monitoring wells in the waste rock stockpiles areas. Additionally, potential nitrate impacts to groundwater at borrow pits / quarries along the transport route (i.e., as a result of blasting) need to be understood in terms of potential infiltration into groundwater and associated impacts.</p> <p>Baffinland recognized that challenges to implementing a groundwater monitoring program in shallow soils do exist; the results of the 2019 monitoring program demonstrate that groundwater monitoring may be feasible using drive-point piezometers at the Project site (or some equivalent method capable of collecting groundwater within the Waste Rock Stockpile). This is particularly important during periods when waste rock with significant acidic soluble sulphate content is being deposited (i.e. to evaluate the effectiveness of seepage containment during these periods).</p>



Comment Number:	CIRNAC #3
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Expand the groundwater monitoring program to include the Waste Rock stockpile area and other mine site areas (e.g., such as borrow pits and quarries) including shallow and deep wells in future years to gain a better understanding of the groundwater levels, stratigraphy characterization, permeability, groundwater quality and groundwater flow direction. Provide at a minimum a risk-based rationale for not implementing a groundwater monitoring program for the quarries. Complete a comparative analysis of existing groundwater quality and continue during future years the analysis of data that Baffinland is currently performing, to identify any trends and present a report in next year's annual report.

Comment Number:	CIRNAC #4
Subject:	Waste Rock Facility (WRF) – Identification and Management of ARD/ML waste rock materials and Permafrost
Reference:	<ul style="list-style-type: none"> Baffinland 2019 Annual Report to the NIRB <ul style="list-style-type: none"> Section 3 - CIRNAC Directive - Waste Rock Facility, May 15, 2020, Section 4 - 4.5.2 and 4.6.5 Self-assessed Performance on Project Conditions 16, 17, 24, 41, 46, Section 5, Section 6, Appendix D, Appendix E. Nunavut Water Board Water Licence No. 2AM-MRY1325, Part F, Section 3. Phase 1 Waste Rock Management Plan. Ref. No. BAF-PH1-830-P16-0029, Rev 2, December 31, 2019 and update Rev 3 June, 16, 2020. <ul style="list-style-type: none"> Section 7 Thermal Analysis. Golder Technical Memorandum 1790951. December 31, 2019. Life of Mine Waste Rock Management Plan, (BAF-PH1-830-P16-0031), 2014.
Issue/Rationale:	<p>Baffinland has undertaken several initiatives since the 2018 Annual Report to NIRB, including:</p> <ul style="list-style-type: none"> upgrade of the water treatment plant, increase of the drainage capture catchment, remediation of the WRF pond liner, and updating the Phase 1 Waste Rock Management Plan based upon further geochemical investigation and further review of both geochemical and thermal monitoring data sets. <p>Overall, these initiatives seem technically sound and will improve operational and post closure management of the WRF.</p> <p>Baffinland reported the following incidents:</p> <ul style="list-style-type: none"> there was a waste rock effluent spill September 28, 2019 (small



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	<p>but undisclosed volume greater than 100 metres from a water body),</p> <ul style="list-style-type: none"> • in June 2019 one exceedance of the MDMER maximum authorized monthly mean discharge concentration for TSS of 15 mg/L, and • one non-compliant discharge event of the MDMER grab sample criterion for TSS of 30 mg/L. <p>Baffinland has made a commitment to improve suspended solids removal via the installation of a second geo-tube settling pond in 2020. Overall, these reported spills and discharge exceedances appear to be relatively minor and manageable and the suggested method to improve suspended solids removal seems appropriate.</p> <p>The geochemical characterization and data review work undertaken by Golder in 2019 and used to inform the current Phase 1 Waste Rock Management Plan (Rev 3) has made significant progress:</p> <ul style="list-style-type: none"> • explaining the geological origin and spatial extent within Deposit 1 of the acidic soluble sulphate content within waste rock, that potentially led to unexpected acidic and elevated nickel drainage water in 2017, • updating the Potentially Acid Generating (PAG) identification criteria to include a paste pH threshold of 6 to differentiate between PAG and Non-Acid Generating (Non-AG) materials as it appears to be a reliable indicator of acidic soluble sulphate content, and • selecting blasthole samples of both PAG and Non-AG material for Acid Base Accounting (ABA) and Shake Flask Extraction (SFE) testing on an ongoing basis (1 hole per 40,000 tonnes) to further inform the geochemical database. <p>However there still remain the following fundamental issues for identification and management of Acid Rock Drainage and or Metal Leaching (ARD/ML) materials:</p> <ul style="list-style-type: none"> • Use of 0.2% total sulphur threshold (an analogue for a Neutralization Potential Ratio [NPR] of 2) to differentiate between PAG and Non-AG materials does not account for an absence of calcium or magnesium carbonate mineral content, which significantly reduces effective neutralization capacity; • The evidence for sufficient neutralization capacity provided in the Phase 1 Waste Rock Management Plan (Rev 3) are results from 4 Humidity Cell Test (HCT) cell kinetic results and a set of silicate neutralization literature papers. This evidence is not sufficient to base predictions of neutralization potential for the full range of waste rock that will be produced over life of mine from Deposit 1, particularly when field conditions are so different from conditions in the laboratory and those associated with the referenced papers;



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	<ul style="list-style-type: none"> • Even if an NPR threshold of 2 is assumed to be correct, the most recent presentation of the historical data set [Figure 10 from Golder Technical Memorandum 1790951,] suggests the total sulphur threshold would need to be significantly less than 0.2% to reliably achieve an NPR greater than 2; • There does not appear to be any sensitivity analysis around the effect of uncertainty in the 0.2% total sulphur threshold and expected tonnages of acidic soluble sulphate waste rock on projected volumes of PAG and Non-AG rock and implications in the design and operation of the Waste Rock Facility (WRF) for 2020 to 2021 (e.g. Section 10.2, Golder Waste Rock Management Plan 2020 to 2021). The current Life of Mine Waste Rock Management Plan developed in 2014 does not acknowledge any of these uncertainties and implications on WRF design and operation, particularly in relation to mine closure when it is assumed there will be sufficient Non-AG rock for a 50 m thick cover. Furthermore, there does not appear to be any specific contingencies in the current life of Life of Mine Waste Rock Management Plan for a significant and unexpected amount of acidic soluble sulphate waste rock approaching mine closure; • Neither the Life of Mine Waste Rock Management Plan or the Phase 1 Waste Rock Management Plan (Rev 3) qualify the total concentrations of Potential Contaminants Of Concern (PCOC) that may be associated with the Non-AG rock WRF cover at closure and whether concentrations of PCOC are likely to be suitable for final intended land use(s) (i.e. not pose either an ecological / human health risk); • Given the complexity of the WRF and the premise that the permafrost will set in and provide a hydraulic barrier for both water and airflow as an active ARD/ML preventive measure, an Engineer of Record (EOR) for this facility has an important role that has to be defined; and • A thermal assessment was undertaken by Baffinland to characterize the freezing patterns of deposited waste rock and assess its thermal performance. The instrumentation program implemented for the thermal assessment included thermistors, oxygen sensors, fluid (held within the waste deposit voids) pressure sensors - barometers and piezometers. Monitoring data from such sensors shall be used to establish the heat balance, and oxygen balance for WRF as Baffinland has done with the water balance. The heat balance should account for heat generation through ARD/ML chemical equations and barometric pump driven convection heat. The thermal assessment shall also help to establish the flow through characteristics of the frozen waste rock mass.
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> a) Review the 0.2% total sulphur threshold that is an analogue for an NPR of 2 based upon further geochemical test work and data



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	<p>review that can be relied upon to explain the implications of an absence of calcium or magnesium carbonate mineral content and associated neutralization potential in the waste rock;</p> <p>b) Perform a sensitivity analysis around the effect of uncertainty in the 0.2% total sulphur threshold and expected tonnages of acidic soluble sulphate waste rock on projected volumes of PAG and Non-AG rock and implications in the design and operation of the WRF;</p> <p>c) Develop specific contingencies in the current Life of Mine Plan to reflect the findings around waste rock management and to reflect any implications for unforeseen amounts of acidic soluble sulphate waste rock approaching mine closure;</p> <p>d) Confirm that the total concentrations of potential contaminants of concern (PCOC) associated with the Non-AG rock WRF cover at closure are likely to be suitable for final intended land use(s) (i.e. not pose either an ecological / human health risk);</p> <p>e) Define the role and responsibility of the Engineer of Record (EOR) for waste rock facility in the Waste Rock Management Plan. Consider including the role and responsibility of the EOR to conduct periodic review of thermal, hydraulic and geotechnical performance of this facility to ensure it meets the design intent;</p> <p>f) Provide an updated thermal analysis including the heat balance and oxygen balance across the WRF; and</p> <p>g) Provide flow characteristics of the frozen waste rock mass and determine if it meets the design requirements.</p>

Comment Number:	CIRNAC #5
Subject:	Borrow Pit / Quarry / Source Management
Reference:	<ul style="list-style-type: none"> • Baffinland 2019 Annual Report to the NIRB May 15, 2020 (Sections 3.1, 3.3, 4.6.5, Self-assessed Performance on Project Conditions 25, 26, 28, 30, 41 and 60. • Nunavut Water Board Water Licence No. 2AM-MRY1325, Part F, Section 3. • Borrow Pit and Quarry Management Plan (2014, BAF-PH1-830-P16-0004). • Borrow Source Management Plan-Kilometer 97 (2014, BAF - PH1 - 830 - P16 - 0032). • Baffinland's Memo to ECCC, May 14, 2019. • Baffinland Memo, July 3, 2019. • 2017 QMR2 Quarry Management Plan - BAF-PH1-830-P16-0040 (Section 4.5 – Site Management Measures). • 2018 QIA and NWB Annual Report for Operations, April 30, 2020 (Section 9.5 - Summary of Geochemical Analysis for Operated Quarries).
Issue/Rationale:	There are many proposed borrow and quarry pit sites over the Project area. Although each has a relatively small disturbance footprint, collectively they span a great area (particularly along the



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	<p>Tote road and what may be required for the construction of any future rail link) and overall present significant risks to land use, aesthetics, human health and ecology (both terrestrial and aquatic). Baffinland has undertaken extensive and regular geotechnical surveys of existing borrow and quarry pit sites and there appears to be an appropriate set of management measures in the associated Borrow Pit and Quarry Management Plan and Borrow Source Management Plan-Kilometre 97. However, the following issues have yet to be addressed:</p> <ul style="list-style-type: none"> • In the Memo dated July 3, 2019, Baffinland committed to avoid mitigate and monitor ARD/ML materials at all rail corridor quarries. The detailed and specific mitigation measures were presented in Baffinland's Memo to ECCC dated May 14, 2019. This includes water monitoring for ARD/ML parameters, water diversion, covering potential acid generating (PAG) materials with crushed carbonate rock and / or engineered covers and contingency for passive / active water treatment prior to discharge. Baffinland has also provided both the Phase 1 and Phase 2 ARD/ML test work program results, which are representative of the majority of potential quarry locations along the rail route. In light of completion of the Phase 2 ARD/ML test work program, sampling locations appear to be significantly more representative of rock types. Quarry and borrow pits for road / rail construction represent a low risk in terms of ARD. However Shake Flask Extraction (SFE) results suggested that some rock materials may leach certain metals at concentrations greater than the adopted Canadian Water Quality Guidelines for Aquatic Life, specifically aluminum, mercury and copper. The origin of these exceedances (dissolved phase vs suspended solids) and implications for drainage water quality and water treatment requirements are yet to be determined. • Both the Borrow Pit and Quarry Management Plan Borrow Source Management Plan-Kilometer 97 make reference to restoration of the disturbed areas to achieve a site which is physically, chemically, and biologically stable upon closure but there does not appear to be any survey / information regarding the pre-disturbed condition of these areas, particularly in relation to baseline contamination (including baseline nitrate levels in down-stream water ways), vegetation and general aesthetics and most of these aspects are not included in the criteria in terms of successful reclamation and rehabilitation. • QMR2 Quarry is a main construction materials quarry at the mine site. 2017 geochemical test work suggested rock materials had low potential for ARD/ML. 2018 aggregate extraction results indicated elevated sulphur concentrations, described as localized PAG areas. A total of 2430 m³ of PAG rock material was shifted to Waste Rock Facility. This development results in a new issue of concern as there is the potential for the creation of



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	exposed PAG wall areas that can generate long term sources of ARD/ML into the watershed that will require monitoring and mitigation both during operations and after mine closure.
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Confirm the origin of elevated concentrations of aluminum, mercury and copper in Shake Flask Extraction test for rock materials sourced from quarry and borrow pits for road / railway construction, and develop and implement an appropriate water quality monitoring and management strategy for railway corridor rock quarries as required by the project water licence. Compare the monitoring results with the FEIS Addendum predictions and identify and implement any appropriate mitigation measures. Report Results in the 2020 Annual Report Integrate reclamation / restoration criteria into their Closure and Reclamation Plan with specific reference to desired post disturbance condition of borrow / quarry areas in terms of contamination (including nitrate levels in down-stream water ways), vegetation and general aesthetics. Update the 2017 QMR2 Quarry Management Plan to identify PAG sources on quarry walls as well as monitoring and mitigation for operation and closure. Monitoring and mitigation results should then be included in future Annual reports.

Comment Number:	CIRNAC #6
Subject:	Reclamation and Closure
Reference:	<ul style="list-style-type: none"> Baffinland, 2019 Annual Report to the NIRB May 15, 2020, including: <ul style="list-style-type: none"> Appendix G.15: 2019 Milne Inlet Tote Road and Borrow Sources (File No. ENG.EARC03171-01); Appendix G.16: Borrow Source Action Plan. Borrow Pit and Quarry Management Plan (2014, BAF-PH1-830-P16-0004). Borrow Source Management Plan-Kilometre 97 (2014, BAF - PH1 - 830 - P16 - 0032). Interim Closure and Reclamation Plan (2018, BAF-PH1-830-P16-0012), October 2018. 2019 QIA and NWB Annual Report for Operations, April 30, 2020: <ul style="list-style-type: none"> Section 8.0 – Reclamation, Closure and Financial Security.
Issue/Rationale:	In the 2019 QIA and NWB Annual Report, Baffinland mentions the continued implementation of a long-term multi-year plan to address localized areas of permafrost degradation associated with some borrow areas. The Borrow Source Management Plan implemented during 2018 was continued in 2019. As stated in the report, "Borrowing in the Km 97 areas has led to thawing of the underlying



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	<p>permafrost soils, which has caused a considerable increase in ponded water, and as a result there is settlement from thaw of both the ground ice in the soil matrix". During 2019, Baffinland notes the reclamation efforts included significant dewatering of the Km 97 borrow areas to reduce permafrost degradation.</p> <p>Baffinland further indicates that the Tote Road conditions were evaluated and an action plan has been implemented in 2019 / 2020, including to address historic borrow sources. Section 2.2 of the 2019 Milne Inlet Tote Road and Borrow Sources notes that "2019 work was carried out to guide possible progressive reclamation activities for the numerous borrow pits. Minor reclamation has been conducted to date, but many remain untouched." This has resulted in deteriorating conditions over time, as demonstrated by a number of sites being given higher priority rankings than before.</p> <p>Section 4.6.4 of the 2019 Annual Report to t indicates as path forward that Baffinland plans to continue with implementation of its Tote Road Earthworks Execution Plan which proposed reclamation in 2019-20 of all 17 Priority A to A++++ sites. Priority B and Priority C sites are not addressed therein. CIRNAC is concerned that over time these lower priority sites have tended to become destabilized and conditions worsened.</p> <p>Section 6 of the Interim Closure and Reclamation Plan describes proposed progressive rehabilitation measures to be implemented. It would be beneficial if the main body of the Annual Report provided a high level summary of progressive reclamation and closure activities for all areas and facilities that were carried out in the previous year as well as future planned activities. For borrow pits/areas, information should be presented in a table format which can specifically identify the priority rating, recommended reclamation measure and status, and results of follow-up inspections/monitoring.</p> <p>Section 8.2 of the 2019 QIA and NWB Annual Report states that additional closure activities are outlined in the 2019 Work Plan (Rev.1). This document is not part of the 2019 Annual Report to NIRB. A summary of the closure activities included in the Work Plan and a concordance table relating the activities performed during 2019 (listed in Table 8.0), would be useful to complete the Annual Report.</p> <p>Furthermore, the Borrow Pit and Quarry Management Plan, and the Borrow Source Management Plan-Kilometre 97 make reference to restoration of the disturbed areas to achieve a site which is physically, chemically, and biologically stable upon closure. However, there does not appear to be any survey / information regarding the pre-disturbed condition of these areas, particularly in relation to baseline contamination (including baseline nitrate levels</p>



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	<p>in downstream water ways), vegetation and general aesthetics and most of these aspects are not included in the criteria in terms of successful reclamation and rehabilitation. This is also the case for dust fall impacts across the project area.</p> <p>Finally, there appears to be a lack of third party review of whether methods of impact assessment and rehabilitation criteria and strategies related to disturbed areas and terrestrial environment are relevant to an arctic environment (BIMC Methods for PC No. 39, 40 and 56).</p>
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Include in the 2020 Annual Report, an overview of the long-term multiyear plan to address the permafrost degradation in the borrow pits/areas, including a table summary that includes all borrow sites. Include in the 2020 Annual Report, a summary description of other closure and reclamation activities, including those outlined in the 2019 Work Plan (Rev.1). Revisits Reclamation / restoration criteria with specific reference to target conditions of borrow / quarry areas in terms of contamination (including nitrate levels in down-stream water ways), vegetation and general aesthetics. As part of that process, validate that these criteria are relevant to the arctic environment.

Comment Number:	CIRNAC #7
Subject:	Unauthorized Discharges and Spills
Reference:	<ul style="list-style-type: none"> Baffinland, 2019 Annual Report to the NIRB, May 15, 2020, including Appendix G.4 – Freshet 2019 Monitoring Report. Stakeholder Engagement Plan, Doc. No. BAF-PH1-830-P16-0025, Rev 1, March 14, 2016. Baffinland's Spills Contingency Plan, Doc. No. BAF-H1-830-P16-003, April 29, 2020. 2018 QIA and NWB Annual Report for Operations, March 31, 2019. 2019 QIA and NWB Annual Report for Operations, April 30, 2020, including Appendix E.8.4 - Initial and Follow-Up Reports and Appendix E.11 - Freshet 2019 Monitoring Report.
Issue/Rationale:	<p>Table 4-1 of the Stakeholder Engagement Plan identifies 5 key community concerns, including “environmental degradation due to spills.” However, spills continue to be a concern, as discussed below.</p> <p>Table 4.3 of the 2019 Annual Report summarizes unauthorized discharges and spills for 2019. This table is a beneficial addition to the report; however, the location of the spill was not provided.</p> <p>To compare 2019 with 2018 spills, CIRNAC reviewed “Table 6.1 -</p>



Comment Number:	CIRNAC #7
	<p>List of Reported Spills and Unauthorized Discharges - 2018" from the 2018 QIA and NWB Annual Report. There were 25 reportable spills in 2019. Baffinland notes that this is a 28% decrease from the 36 spills reported in 2018. Baffinland indicates adherence to its Spill Contingency Plan, including notification within 24 hours and follow-up spill reports. Immediate causes, corrective and preventative actions are reported.</p> <p><i>Sewage and Grey Water</i> The majority of spills continue to be sewage and grey water, which dropped frequency from 23 spills in 2018 to 15 spills in 2019. However, the total volume of the spills increased by approximately 20% (16 m³ in 2018 to 21 m³ in 2019). The primary recommendation for these types of spills in the follow-up reports (Appendix E.8.4 of the 2019 QIA and NWB Annual Report) continues to be routine or continued checks and inspections.</p> <p>Section 6.1 of the 2018 QIA and NWB Annual Report provided a more detailed analysis for 2018 spills. The most common causes were attributed to equipment failure, improper equipment use and procedural issues. Although there is no such analysis in the -2019 Annual Report, a review of the 2019 follow-up reports indicates that the root causes for most of the 2019 reportable sewage and greywater spills are similar. This suggests improved preventative maintenance, training and inspections could reduce the number and quantity of sewage and greywater spills.</p> <p>Finally, the follow-up reports contain some specific recommendations, such as snow and ice removal from the lines (Spill No. 18-492) and reference to piping schematics prior to snow removal in high risk areas (Spill No. 19-007). These types of recommendations should be incorporated into environmental management plan updates to avoid future reoccurrences.</p> <p><i>Hydrocarbon</i> The number of reportable hydrocarbon releases dropped from seven in 2018 to four in 2019, including a reduced quantity spilled. Recommendations from follow-up reports in Appendix E.8.4 of the 2019 QIA and NWB Annual Report include: regular and/or increased inspections; operator review of Standard Operating Procedures and, daily toolbox reinforcement. Updates to future environmental management plans should include these types of recommendations, as appropriate, to avoid future reoccurrences.</p> <p><i>Sediment</i> The number of reportable sediment releases decreased from four in 2018 to two in 2019. The 2019 Freshet Monitoring Report documents the sediment releases and the corrective actions taken to avoid future sediment releases during the freshet.</p>



Comment Number:	CIRNAC #7
	Recommendations from spill follow-up reports should be incorporated, as appropriate, into updates of the environmental management plans.
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Include in the 2020 Annual Report a more detailed analysis of unauthorized discharges and spills, including quantity spilled and an overview of root causes and corrective/preventative measures. Include in the 2020 Annual Report an update on the measures taken to ensure that the necessary equipment has been maintained and the necessary training provided to personnel to respond to all sizes of spills at the various Project locations. Incorporate recommended corrective/preventative measures from follow-up reports as outlined in Appendix E.8.4 of the 2019 QIA and NWB Annual Report into future environmental management plan updates. Implement recommended corrective/preventative measures, as outlined in Appendix E.8.4 of the 2019 QIA and NWB Annual Report, in the execution of the work.

Comment Number:	CIRNAC #8
Subject:	Waste Management
Reference:	<ul style="list-style-type: none"> Baffinland, 2019 Annual Report to the NIRB, May 15, 2020, including Appendix G.4 – Freshet 2019 Monitoring Report. Waste Management Plan - Document No. BAF-PH1-830-P16-0028, Revision 8, March 31, 2020. Polar Bear Safety Plan - Document No. BAF-PH1-830-P16-0041, Revision 1, March 7, 2016.
Issue/Rationale:	<p>T&C No. 64 requires Baffinland to implement systems and procedures to prevent the attraction of carnivores to the Project site. The Waste Management Plan in part focusses on preventing carnivore attractants from being disposed at the landfill, including food wastes and materials such as cardboard, wrappers or other paper products which may carry food odours. The Polar Bear Safety Plan further stresses, as a priority, preventing polar bears from developing bad habits by keeping food inaccessible.</p> <p>Baffinland considers the installation of the fencing at the Mary River Landfill, containing landfill litter from reaching the tundra, as one of its key 2019 environmental initiatives. The fence with a single locked gate can restrict unauthorized access to the landfill and possibly the dumping of prohibited wastes, including food wastes. The fence, however, does not prevent the ingress and egress of carnivores, including smaller animals which could attract larger carnivores. The Waste Management Plan identified measures to deter or otherwise not attract animal, including: animal-proof containers; incineration of food/food contaminated wrappers and cardboard; and installation of metal skirting on the accommodation</p>



Comment Number:	CIRNAC #8
	<p>and kitchen complexes to prevent denning near humans. All of these are ongoing measures, requiring: staff training; continued vigilance to ensure all food wastes are properly stored and the food waste containers are intact; and, inspections of the landfills for banned wastes. The success of these measures can be undermined however, for example, by a single event of unauthorized dumping of food wastes at the landfill.</p> <p>The mitigation measures are not specific in quantified evidence, such as frequency of landfill inspections and outcomes of the prevention measures. Evidence of the presence of an Arctic fox indicates that the current measures are either underperforming or are not sufficient. Additional measures may be warranted.</p>
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Provide in its future annual reports more quantified information on the frequency of landfill inspections and the results of such inspections. This includes any indication of unauthorized food waste disposal or the presence of animals, including smaller animals (pets) at the landfill that could attract larger carnivores. Indicate in its annual report the number of times food waste containers have been found damaged by animals or food wastes not properly contained therein. Document animal denning or otherwise frequenting the Project sites.

Comment Number:	CIRNAC #9
Subject:	Hazardous Materials and Hazardous Waste Management
Reference:	<ul style="list-style-type: none"> Baffinland, 2019 Annual Report to the NIRB, May 15, 2020. Hazardous Materials and Hazardous Waste Management Plan - Document No. BAF-PH1-830-P16-0011.
Issue/Rationale:	<p>Under the Mary River Annual Report section for PC No. 25, it was indicated that the minor repairs and actions recommended by reviewers of previous annual report had not been completed, including;</p> <ul style="list-style-type: none"> remove timbers and other miscellaneous items from the Hazardous Waste Berm 6 at the Mine Site to ensure liner integrity, and correct minor disturbance by foot traffic at the generator fuel berm as well as the Milne Port Hazardous Waste Storage facility. <p>They are scheduled to be addressed prior to July 2020.</p> <p>Section 6.4 of the Hazardous Materials and Hazardous Waste Management Plan, Document No. BAF-PH1-830-P16-0011, requires, as part of reporting, that:</p> <p><i>“Project hazardous materials and hazardous materials activities including quantities of contaminated soils, water or waste that is generated at Project sites are included in</i></p>



Comment Number:	CIRNAC #9
	<p><i>Baffinland's submission of the NWB, QIA and NIRB annual reports."</i></p> <p>The 2019 Annual Report to NIRB should include a high level summary table identifying the types and quantities of contaminated soil and hazardous wastes generated by the different activities performed in the preceding year and outcomes of inspections and management of temporary hazardous waste storage locations.</p>
Recommendation:	<p>CIRNAC recommends that Baffinland:</p> <ol style="list-style-type: none"> Ensure a timely implementation of repairs and actions recommended by reviewers of previous annual report, regarding the hazardous waste storage facilities. Include in 2020 Annual Report to the NIRB, a summary table for hazardous wastes and contaminated soils, including type and quantity and a supporting narrative of wastes generated by the different activities performed and outcomes of inspections and management action.

Comment Number:	CIRNAC #10
Subject:	Employee origin
Reference:	<ul style="list-style-type: none"> NIRB Project Certificate No. 5, Term and Condition #134 Baffinland, 2019 Annual Report to the NIRB, May 15, 2020 <ul style="list-style-type: none"> Section 4.7.7 Culture, Resources & Land Use (PC Conditions 162 through 166).
Issue/Rationale:	<p>Term and Condition #134 requires Baffinland to report project-specific information on employee origin for labour analysis purposes. Pursuant to this T&C, Baffinland must provide the following information within their annual report submission:</p> <ol style="list-style-type: none"> <i>The number of Inuit and non-Inuit employees hired from each of the North Baffin communities, specifying the number from each;</i> <i>The number of Inuit and non-Inuit employees hired from each of the Kitikmeot and Kivalliq regions, specifying the number from each;</i> <i>The number of Inuit and non-Inuit employees hired from a southern location or other province/territory outside of Nunavut, specifying the locations and the number from each; and</i> <i>The number of non-Canadian foreign employees hired, specifying the locations and number from each foreign point of hire.</i> <p>Baffinland has not provided information for items b), c), and d) in their 2019 Annual Report. This issue was raised during the June 24, 2020 Mary River Socio-economic Monitoring Working Group meeting and Baffinland subsequently provided the required information to working group members on June 26, 2020.</p>
Recommendation:	CIRNAC recommends that Baffinland include employee origin data for all of the parameters identified in T&C #134 in future annual report submissions.



2. Compliance Monitoring

a. Provide a summary of any compliance monitoring and/or site inspections undertaken in association with the project, including specifically:

i. Identify the terms and conditions from the Project Certificate which have been incorporated into any permits, certificates, licenses or other approvals issued for the Project, where applicable

CIRNAC has a broad mandate for the co-management of water resources and the management of Crown land in Nunavut under the following applicable acts and regulations:

- The *Department of Crown-Indigenous Relations and Northern Affairs Act*;
- The *Nunavut Agreement*;
- The *Arctic Waters Pollution Prevention Act and Regulations*;
- The *Nunavut Waters and Nunavut Surface Rights Tribunal Act and Regulations*; and
- The *Territorial Lands Act and Regulations*.

In terms of water management in Nunavut, CIRNAC has a number of different responsibilities. The Minister of Northern Affairs has a decision-making role with regards to the Nunavut Water Board's (NWB) issuance of any Water Licences associated with a project. Furthermore, CIRNAC participates as an intervenor in the water licensing process, providing advice and expertise.

When a proposed project is approved to proceed, CIRNAC is responsible for inspecting and enforcing any Terms and Conditions contained within any Water Licence associated with the project. The NWB ensures that Project Certificate Terms and Conditions are incorporated in Water Licences.

CIRNAC issued the following lease for BIMC Mary River Project:

- Land use permit N2014Q0016

CIRNAC has reviewed the Type 'A' Water Licence associated with the Mary River Project with respect to Project Certificate [No. 005] and have included a concordance table (Appendix A) that outline how these T&Cs have been incorporated in the Water Licence.

In 2019, the projects activities and monitoring were conducted under the following Water Licence:

- Type A Water Licence 2AM-MRY1325

ii. A summary of any inspections conducted during the 2019 reporting period, and the results of these inspections;

CIRNAC's Field Officers conducted three inspections of the projects in 2019, once in January, May, and September.

Summaries of the concerns identified in the inspection reports are presented below for NIRB's consideration.



January 23-24, 2019

The following facilities and their associated water management structures were inspected:

- Ore Crushing,
- Waste Rock Stockpile,
- Hazardous Waste Berms,
- Polishing Waste Stabilization Ponds,
- Non-Hazardous Landfill,
- Ore Stockpile Pad at Milne Inlet, and
- Laydown in Milne Inlet (W10A and W10B).

At the Ore Crushing Area and Associated Water Management Structures, Baffinland has committed to completing the work of clearing iron ore away from the ditches and re-installing the required buffer zone between the ditches and stockpile to allow single lane traffic prior to May 15, 2019.

Further, Baffinland is reviewing upgrades at the Waste Rock Stockpile's ditches and water management pond, which a Baffinland representative indicated would be done within one month of the date of the inspection. The Inspector noted a potential concern for continued Acid Rock Drainage related to encapsulation of PAG rock, and requested a timeline or plan for the east side of the facility within 30 days of receiving the report.

The CIRNAC Inspector noted the Non-Hazardous Materials Landfill was not locked and the gate was snowed in. The inspector noted this could be due to the facility not being locked when not in use. Lastly, the Inspector noted the importance of ensuring unauthorised waste is not deposited into the non-hazardous materials landfill, and issued a warning.

May 22-23, 2019

The following facilities and their associated water management structures were inspected:

- Ore Crushing Area,
- Waste Rock Pile,
- Landfill,
- Laydown #2 at mine site,
- Raw water intakes,
- Hazardous waste berms at Milne Inlet and mine site,
- Polishing Waste Stabilization ponds at Milne inlet and mine site,
- Air Terminal Jet A storage,
- Ore Stockpile Pad at Milne Inlet,
- Milne Inlet Land Farm, and
- Bridges along the tote road.

The CIRNAC Inspector noted several items which needed to be addressed. Required actions included;

1. Installing and maintaining the required 8 meter gap between the Crusher Pad Stockpile and Water Management structures, related to Baffinland's commitment made during the January 23-24, 2019 inspection, along with notes of inconsistencies with approved designs, material sizes and the lack of observed shrouds at the conveyer belt post crushing;
2. Provide a report ensuring that the Water Management structures surrounding Ore Crusher Pad are constructed with the approved materials in the approved design;
3. Remove all hazardous material from any damaged containers to place the hazardous materials in sound containers at the mine site's Hazardous Waste Berms;



4. Repair and, or Key-in the liners at the water management structures denoted MP-05 and MP-06 to ensure all runoff is proper captured;
5. Ensure a Professional Engineer is consulted to inspect the Bridges along the Tote road as stated by CIRNAC's Civil Engineer and during the last Geotechnical inspection;
6. Repair the liner at the Jet "A" storage;
7. Install the appropriate water management structures or apply the appropriate snow management practices to limit machinery from driving through this surface water at Lay Down #2;
8. Install the appropriate water management structures at areas along the Mary River Effluent discharge road where it disrupts the natural surface drainage; and,
9. Submit the required documents in Part G of the licence 2AM-MRY1325 and seek approval for the water management structures constructed leading into Camp Lake.

September 17-19, 2019

The following facilities were inspected:

- Tote Road, Bridges,
- Ore Stockpile,
- Waste Rock Stockpile,
- Mine Haul Road,
- Ore Crushing Area, and
- Jet A fuel berm near the Runway.

The CIRNAC Inspector noted several action items as a result of this inspection, including;

1. Install the appropriate erosion control measures to prevent further sediment from entering the surrounding waterways at the Km 63 bridge;
2. Remove the Ore from all unauthorized areas around the site including ditches and the areas identified in Inspector comment, inclusive of ore used as construction material, ore being stored outside of containment areas;
3. Install the appropriate ditches on the Ore Stockpile within 30 days of the inspection and to provide a plan to install the required ditches/diversion berms around the Ore Stockpile.
4. Ensure that all ditches on site are constructed, as described, in the engineered drawings and are operating as intended;
5. Provide the findings of the internal investigation on why the waste rock stockpile pond was leaking;
6. Install the appropriate erosion control measures to prevent further erosion on the side of the Mine Haul road;
7. Discontinue the usage of sea cans as a secondary containment and to develop a plan for the storage of waste water treatment sludge prior to the disposal; and,
8. Develop a plan, prior to December 15th, 2019, to prevent future acts of non-compliance at Camp Lake and Shear Down Lake (unapproved levels of TSS), with respect to a noted annual failure to comply with PART F, Item 27, Table 11 which states; "All Contact Water and surface runoff from the site Drainage and Surface Water Management Systems where flow may directly or indirectly enter a water body, shall be sampled weekly during the Operations Phase of the Project and must not exceed the following Effluent quality limits: Total Suspended solids-Maximum Average concentration 15 mg/L- Maximum Concentration of any grab sample 30mg/L".

As of February 18 2020, Most of the identified concerns during the 2019 inspections were addressed by Baffinland; others have actions for verification or commitments to rectify the items identified by the Inspector. The main action item remaining is to provide verification that the ore



stockpile water management structures installation is being supervised and field checked by a certified engineer.

Detailed inspection reports can be accessed through the NWB Public Registry:

[ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/0%20SCOPE%20ENFORCE%20\(A\)/1%20INSPECTION/2019/](ftp://ftp.nwb-oen.ca/registry/2%20MINING%20MILLING/2A/2AM%20-%20Mining/2AM-MRY1325%20BIMC/3%20TECH/0%20SCOPE%20ENFORCE%20(A)/1%20INSPECTION/2019/)

iii. A summary of Baffinland's compliance status with regard to authorizations that have been issued for the project.

Although some issues have been identified in 2019, CIRNAC is generally satisfied with Baffinland's response to the concerns raised by the inspectors in 2019, and CIRNAC will continue to work with Baffinland to ensure compliance with all water licence requirements associated with Mary River project.



Appendix A: Mary River Project Certificate Terms and Conditions (T&C) incorporated into any permits, certificates, licenses or other approvals issued for the Project

Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
10	<p>The Proponent shall update its Dust Management and Monitoring Plan to address and/or include the following additional items:</p> <ul style="list-style-type: none"> a. Outline the specific plans for monitoring dust along the first few kilometres of the rail corridor leaving the Mary River mine site. b. Identify the specific adaptive management measures to be considered should monitoring indicate that dust deposition from trains transporting along the rail route is greater than initially predicted. c. Outline specific plans for monitoring dustfall at intervals along and in the vicinity of the Milne Inlet Tote Road to determine the amount and extent of dustfall. d. Identify the specific adaptive management measures to be considered if monitoring indicates that dust deposition from traffic on the Milne Inlet Tote Road is greater than initially predicted. 		N2014Q0016 , Part 31 (1) (m), 48
11	The Proponent shall develop and implement an Incineration Management Plan that takes into consideration the recommendations provided in Environment Canada's Technical Document for Batch Waste Incineration	Part F, Item 7 (requirement to test and dispose bottom ash and record analysis results and volumes of ash)	



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
14	<p>The Proponent shall conduct noise and vibration monitoring at Project accommodations sites located at the Mary River mine site, Steensby Inlet Port site, and Milne Inlet Port site. Sampling shall be undertaken during the summer and winter months during all phases of Project development.</p> <p>(b) The Proponent, through coordination with the TEWG as may be appropriate, shall demonstrate appropriate adaptive management for project activities during operations which have the potential to produce noise and sensory disturbance to</p>		N2014Q0016 , Part 31 (1) (m) 49)
16	The Proponent shall ensure that the water related infrastructure or facilities that are designed and constructed, including the modification of culverts, diversion of watercourses, and diversion of runoff into watercourses along the railway, access roads, the Milne Tote Road, and other areas of the Project site, are consistent with those proposed in the FEIS in terms of type, location, and scope and that the requirements of all relevant regulatory	Part D	
17	The Proponent shall develop and implement effective measures to ensure that effluent from project-related facilities and/or activities, including sewage treatment plants, ore stockpiles, and mine pit, satisfies all discharge criteria requirement established by the relevant regulatory agencies prior to being discharged into	Parts F and I	
18	The Proponent shall carry out continued analyses over time to confirm and update, accordingly, the approximate fill time for the mine pit	Part F, Item 3	



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
19	The Proponent shall ensure that it develops and implement adequate monitoring and maintenance procedures to ensure that the culverts and other conduits that may be prone to blockage do not significantly hinder or alter the natural flow of water from areas associated with the proposed mine. In addition, the Proponent shall monitor, document and report the withdrawal rates for water removed and	Parts B, D, Item 23, E Item 23, and I	
20	The Proponent shall monitor the effects of explosives residue and related by-products from project-related blasting activities as well as develop and implement effective preventative and mitigation measures, including treatment, if necessary, to ensure that the effects associated with the manufacturing, storage, transportation and use of explosives do not negatively	Part E, Item 24, Part I, Item 23, and Part D, Item 18, g	
21	The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum, monitoring of nonpoint sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data and the mechanisms proposed to monitor and treat runoff, and sample	Part I	
22	The Proponent shall develop a detailed Sediment and Erosion Management Plan to prevent and/or mitigate sediment loading into surface water	Part D	
23	The Proponent shall develop and implement a Groundwater Monitoring and Management Plan to monitor, prevent and mitigate the potential effects of the Project on groundwater within the Project area.	Part I, Item 14 (requirement to conduct opportunistic monitoring on any observed	



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
24	The Proponent shall monitor as required the relevant parameters of the effluent generated from Project activities and facilities and shall carryout treatment if necessary to ensure that discharge conditions are met at all	Part E and F.	
25	The Proponent shall undertake the additional geotechnical investigations to identify sensitive landforms, modify engineering design for Project infrastructure and develop mitigation and monitoring measures to minimize the impacts of the Project's activities and infrastructure on sensitive	Part D, Item 19 and Part I, Item 12 (for water infrastructure)	
26	The Proponent shall develop and implement a comprehensive erosion management plan to prevent or minimize the effects of destabilization and erosion that may occur due to the Project's construction and operation.	Parts D, E, and F (requirement to prevent or minimize erosion)	N2014Q0016, part 31 (1) (m) 50
28	The Proponent shall monitor the effects of the Project on the permafrost along the railway and all other Project affected areas and must implement effective preventative measures to ensure that the integrity of the permafrost is maintained.	Part D, Item 10 (requirement to minimize disturbance to permafrost around the site, including railway corridor)	
29	The Proponent shall provide to the respective regulatory authorities, for review and acceptance, for-construction engineering design and drawings, specifications and engineering analysis to support design in advance for constructing those facilities. Once project facilities are constructed, the Proponent shall provide copies of the as-built drawings and design to the	Part D, Item 2 and Part E, Item 23	
30	The Proponent shall develop site-specific quarry operation and management plans in advance of the development of any potential quarry site or borrow pit.	Part D, Item 5	N2014Q0016 ,Part 31 (1) (m) 51



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
31	The Proponent shall ensure that Project activities are planned and conducted in such a way as to minimize the Project footprint.	A general requirement	
33	The Proponent shall include relevant Monitoring and Management Plans within its Environmental Management System, Terrestrial Environment Management and Monitoring Plan	Part J, Item 2	
39	The Proponent shall develop a progressive revegetation program for disturbed areas that are no longer required for operations, such program to incorporate measures for the use of test plots, reseeding and replanting of native plants as necessary. It is further recommended that this program be directly associated with the management plans for erosion control	Part J, Item 11 (requirement to implement progressive reclamation including revegetation)	
40	The Proponent shall include revegetation strategies in its Site Reclamation Plan that support progressive reclamation and that promote natural revegetation and recovery of disturbed areas compatible	Part J, Items 10 and 11	
41	Unless otherwise approved by regulatory authorities, the Proponent shall maintain a minimum 100-metre naturally-vegetated buffer between the high-water mark of any fishbearing water bodies and any permanent quarries with potential for acid rock	Part D, Items 13 and 14	
42	The Proponent shall maintain minimum a 30- metre naturally-vegetated buffer between the mining operation and adjacent water bodies.	Parts D, E, F, and H	
43	Prior to the start of construction, the Proponent must submit a Site Drainage and Silt Control Plan to the appropriate regulatory authorities for approval.	Part D, Item 2	



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
44	The Proponent shall meet or exceed the guidelines set by Fisheries and Oceans Canada for blasting thresholds and implement practical and effective measures to ensure that residue and by-products of blasting do not negatively affect fish and fish habitat.	Part E, Item 24	
46	The Proponent shall ensure that runoff from fuel storage and maintenance facility areas, sewage and wastewater other facilities responsible for generating liquid effluent and runoff meet discharge requirements	Part F	
47	The Proponent shall ensure that all Project infrastructures in watercourses are designed and constructed in such a manner that they do not unduly prevent and limit the movement of water in fish bearing streams and rivers	Part E, Item 23	N2014Q0016 , Part 31 (1)(f) 16.
48	The Proponent shall engage with Fisheries and Oceans Canada and Qikiqtani Inuit Association in exploring possible Project specific thresholds for blasting that would exceed the requirements of Fisheries and Oceans Canada's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (D.G. Wright and G.E. Hopky. 1998).	Part E, Item 24 (requirement to submit Blasting Management Plans)	



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
53	<p>The Proponent shall demonstrate consideration for the following:</p> <ul style="list-style-type: none"> a. Steps taken to prevent caribou mortality an injury as a result of train and vehicular traffic, including operational measures meant to maximize the potential for safe traffic relative to operations on the railway, Milne Inlet tote road and associated access roads. b. Monitoring and mitigation measures at points where the railway, roads, trails and flight paths pass through caribou calving areas, particularly during caribou calving times. c. Evaluation of the effectiveness of proposed caribou crossings over the railway, Milne Inlet tote road and access roads as well as the appropriate number. d. d. Development of a surveillance system along the railway corridor to identify the presence of caribou in proximity to the train tracks and operational protocols for the train to avoid collisions and enable caribou to cross the train tracks unimpeded. e. Protocols for documentation and reporting of all caribou collisions and 		<p>N2014Q0016, Parts 31 (1) (h) 36-38, and 31 (1) (m) 52</p>



Project Certificate 005 term & condition		Implemented in NWB water licence 2AMMRY1325 Amendment #1	Implemented in CIRNAC's land use permit
64	<p>The Proponent shall ensure that its Environment Protection Plan incorporates waste management provisions to prevent carnivores from being attracted to the Project site(s). Consideration must be given to the following measures:</p> <ul style="list-style-type: none"> a. installation of an incinerator beside the kitchen that will help to keep the food waste management process simple and will minimize the opportunity for human error (i.e. storage of garbage outside, hauling in a truck (odours remain in truck), hauling some distance to a landfill site, incomplete combustion at landfill, fencing of landfill, etc.). b. installation of solid carnivore-proof skirting on all kitchen and accommodation buildings (i.e., heavy-duty steel mesh that would drop down from the edge of the 	Part F, Item 7	N2014Q0016 , Part 31 (1) (g) 27
92	The Proponent shall ensure that it maintains the necessary equipment and trained personnel to respond to all sizes of potential spills associated with the Project in a self-sufficient manner.	Part H, Item 5	N2014Q0016 , Part 31 (1) (g) 30, 31

