



2016-2017 Annual Monitoring Report for Baffinland Iron Mines Corp.'s Mary River Project



Nunavut Impact Review Board
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Project: Mary River Project

Project location: Qikiqtani (North Baffin) Region, Nunavut

Land Tenure: Inuit Owned and Crown Land

Project Owner: Baffinland Iron Mines Corporation
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Cover photo: Milne Port Area

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1 INTRODUCTION

The Nunavut Impact Review Board (NIRB or Board) Project Certificate No. 005 was issued for the Mary River Project on December 28, 2012 following an extensive public review of the ecosystemic and socio-economic effects of the proposed project, and pursuant to Section 12.5.12 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement).

On January 13, 2013 Baffinland Iron Mines Corporation (Baffinland or the Proponent) applied to the NIRB for the Early Revenue Phase (ERP) proposal, which included amendments to its project development activities and schedule. The Board determined that it was appropriate to assess the potential ecosystemic and socio-economic effects of the ERP and to reconsider, under Section 12.8.2 of Article 12 of the Nunavut Agreement, modifications to the terms and conditions of the original Project Certificate to reflect the potential effects of the ERP proposal.

Following a thorough reconsideration process, on March 17, 2014 the NIRB issued its Public Hearing Report to the Minister of Aboriginal Affairs and Northern Development for the ERP proposal. The report indicated that the proposed works and activities could be permitted to proceed subject to new and amended project-specific terms and conditions. Following the acceptance of the NIRB's report by the Minister, which included revised terms and conditions, on May 28, 2014, pursuant to Sections 12.5.5 and 12.8.2 of Article 12 of the Nunavut Agreement, the NIRB issued an *Amended* Project Certificate for the Mary River Project. The amendment allowed the Project to proceed in accordance with Terms and Conditions as contained therein.

The NIRB is required to monitor the Mary River Project in accordance with Section 12.7.1 and 12.7.2 of the Nunavut Agreement and as outlined within the Mary River Project Certificate. As a result, this report has been prepared to provide findings for the 2016-2017 monitoring period with respect to Baffinland's compliance with the terms and conditions of the Mary River Project Certificate, and the adequacy of the monitoring program to mitigate the potential ecosystemic and socio-economic impacts of the Project.

1.1 Project Description

The Mary River Project involves exploration, construction, operation, closure and reclamation of an open pit iron ore mine at what is known as Deposit No. 1, and includes mining at a rate of 18 million tonnes per year (Mt/a). There are three (3) main project locations – the Mine site, Milne Port located north of the Mine site, and Steensby Port located south of the Mine site. The Milne Port is connected to the Mine site by the Tote Road, approximately 100 kilometers (km) in length. The Project as originally proposed was to include the construction of a railway approximately 150 km in length to connect the Mine Site to Steensby Port. It was anticipated that facilities at Steensby Port and the railway would take up to four (4) years to construct.

As currently approved and in accordance with Baffinland's development plans, the extracted ore in the form of lump and fines would be transported by truck along the Milne Inlet Tote Road and shipped from Milne Port to European markets during the open water season using contracted vessels. There are no concentrators, tailings, or tailings ponds associated with the production

The approved Project also includes additional facilities at Milne Port, including the construction of a fixed ore dock, 4.2 Mt ore stockpile and reclaim area, 3,500 tonnes per hour ship loaders, a camp to accommodate workers, and the extension or relocation of the airstrip to the west of the proposed ore stockpile. The ERP operations are expected to continue for the duration of the mine life (i.e., 21 years), and would continue in conjunction with the Mary River Project as originally proposed, once developed.

1.2 Project Development Status

Baffinland reported within its annual reporting to the NIRB that mining and ore hauling activities from the Mine Site to Milne Port continued throughout 2016, and that approximately 3.2 million tonnes of iron ore was mined and hauled down the Tote Road during the year. As 2016 marked the second season of open water shipping of iron ore from the site, Baffinland reported that a total of 2.75 million tonnes of iron ore was shipped between July and October, which was noted to be significantly higher than the amount shipped in the first open water shipping in 2015 (0.9 million tonnes). While it indicated that no specific project activities were undertaken along the south railway alignment area or at the Steensby Port site in 2016, Baffinland reported to the NIRB that the scope of the construction and site activities it undertook in 2016 included:

- Installation of information technology infrastructure;
- Completion of the Waste Rock Sedimentation Pond and associated ditching;
- Ditching at the perimeter of the Mine Site Crusher Pad and the Ore Stockpile in Milne Inlet;
- Conversion of the Concrete Batch Plant to a Maintenance Building;
- Maintenance of the Tote Road;
- Management of hydrocarbon impacted soils within the existing landfarm;
- Removal of sea-can bridges along the Tote Road;
- Implementation of various environmental monitoring programs;
- Completion of various engineering and environmental baseline studies to support the Phase 2 Expansion Project;
- Removal of some components from the inactive Steensby Port camp;
- Initiation of a drill program to characterize the geology along the proposed rail line to Milne Port; and
- Operation of helicopter and fixed wing aircraft to service.

Operational Challenges

Baffinland also reported on the operational challenges it faced during the year, particularly with reference to the market condition for iron ore and the instances of non-compliance with authorizations for the Mary River Project. While it was reported that the market prices of iron ore continued to remain low in 2016 and generally affected the profitability of the Mary River Project, Baffinland further highlighted that it saw an upward improvement in the price iron ore price later in the year, from US \$41/t in January and peaking at US\$80/t in December 2016. Further, Baffinland reported that this favorable market condition for iron ore, in addition to the increased production of iron ore from the Mary River Project, led to its initiative to fully reinstate full salary to employees to reverse the salary cuts that were implemented in 2015 to maintain its operations. Baffinland also reported that during the reporting year, it received corrective directives from INAC and ECCC respectively due to non-compliances with some

aspect of the Fisheries Act as pertaining to sedimentation/runoff during freshet, as well as items under Part D of the Type “A” Water Licence 2AM-MRY1325.

Human Resources Reporting

Within its annual reporting to the NIRB, Baffinland highlighted that the Mary River Project transitioned from the construction phase in 2013 to the operational phase in late 2014 and 2015 and that its effort in 2016 continued to focus on ensuring that the site environment was prepared for increased mine production. Baffinland reported that a number of staffing changes occurred in 2016 that led to the re-establishment of a Sustainable Development Department, which included a division dedicated to Inuit, Government, and Stakeholder Relations. While it was reported that the retention of Inuit employees on the Project continued to be a challenge, with the Proponent being unable to meet its target goal of 25% Inuit employment in 2016; Baffinland reported that a revised Work Ready Program was currently under development to address the barriers to Inuit employment and retention at Baffinland. The initiative would allow representatives of its Human Resources Department and the Qikiqtani Inuit Association (QIA) to visit the five (5) North Baffin communities and Iqaluit in order to provide information to community members regarding employment opportunities, recruitment process, the availability of training programs and other employment-related information. It was also noted that Baffinland planned to implement an 8-week check-in program, which will work with new Inuit hires to resolve any work-related concerns identified during their probationary period at the Project, as well as to provide support to its new staff through the implementation of on-site apprenticeship program, including mentoring opportunities and enhanced cross-cultural awareness training as well as job interview process for Inuit.

Consultation

Within Baffinland’s 2016 Annual Report, Baffinland outlined its engagement efforts during 2016 which continued to focus on the five (5) North Baffin communities of Pond Inlet, Arctic Bay, Igloolik, Clyde River, and Hall Beach, which are considered to be the most impacted communities by the Mary River Project. In 2016, Baffinland implemented a Community Survey in each of the five (5) communities in order to gain a better understanding of the potential impacts of the Project on these communities, and its influence on the environment (biophysical and socio-economic) and the overall way of life in North Baffin Island, including the state of the relationship between Baffinland and the communities. A total of 205 surveys were completed and results showed that 57 % of the respondents indicated that the Project has had a positive impact on their community, while 35% of the respondents reported that the Project has made no difference on their community, 8% of the respondents further reported that the Project has had a negative impact on their community. While majority of the respondents did not express any concerns about the Project; approximately 18% of the respondents expressed concerns for the biophysical environment as pertaining to the effects of the mine upon terrestrial and marine wildlife and wildlife habitat due to dust emission; changes in water quality; shipping; and mine blasting noises. Baffinland also reported that 17% of the respondents expressed concerns regarding the effect of the Project on harvesting activities, the need for more Inuit employment, substance abuse in the communities, and family separation from employees. As such, Baffinland concluded that the local communities responded positively towards the Project and the associated business and employment opportunities that it brings to North Baffin residents.

In addition to the community surveys, Baffinland conducted a tour of the five (5) North Baffin Communities between November 21 and 25, 2016 to provide:

- An update on the current operations and plans for the Phase 2 Development proposal;
- Residents an opportunity to ask questions and voice any concerns they may have regarding the Project;
- Support ongoing engagement and relationship building between Baffinland and the North Baffin communities; and
- Information regarding what changes the communities have observed since the start of mine operations.

Baffinland reported that the most common questions coming from the communities regarding the Project were related to Inuit employment and issues associated with job stability and progression, improving Inuit recruitment and retention, ensuring a positive working environment at the mine, and training and capacity building.

Community Support Activities

Within its annual reporting to the NIRB, Baffinland indicated that in 2016 it donated 46 laptops to high school students, and awarded scholarships worth \$5,000 each to seven (7) post-secondary students in order to encourage consideration of careers in the mining industry, enhance Inuit participation in the Project workforce and improve access of Inuit businesses to contracting opportunities. In November 2016 Baffinland hired an Inuit Training and Education Specialist that will be responsible for the development of a revised Work Readiness Program and the on-site apprenticeship and training programs. During the holiday season in 2016, Baffinland reported that it assisted with country food exchange between Pond Inlet and Hall Beach; Pond Inlet sent five (5) boxes of maktaaq to Hall Beach, while Hall Beach sent 11 bundles of caribou meat and four (4) bundles of fermented walrus to Pond Inlet. Baffinland also reported that it assisted Sarvaq by delivering Christmas Hampers to Arctic Bay and Igloolik, as well as conducted a Search and Rescue operation in the Bylot Island area in September 2016 to help four (4) community members that were stranded as a result of losing control of their boat in rough seas.

1.3 Current Regulatory Instruments for the Approved Project

Baffinland reported that in addition to the NIRB amended Project Certificate No. 005, the following regulatory instruments and authorizations (Table 1) were applicable to various project activities undertaken in 2016 for the Mary River Project:

Table1: List of Authorizations for the Mary River Project

Approval/Authorization	Project Activity	Expiry
Qikiqtani Inuit Association (QIA) – Agreements issued under Articles 6, 20, and 26 of the Nunavut Agreement		
Inuit Impact Benefits Agreement (IIBA) – Nunavut Agreement, Article 26	Required under Article 26 of the Nunavut Agreement to proceed with Project. Concluded as of September 2013	No expiry

Wildlife Compensation Agreement – Nunavut Agreement, Article 6	Wildlife Compensation regime set out in IIBA	N/A
Water Compensation Agreement, Nunavut Agreement, Article 20	Compensation to be made if the Project substantially affect the quality, quantity, or flow of water on Inuit-owned land	June 10, 2025
Commercial Lease QI3C301	Mine development activities on Inuit Owned Land	December 31, 2043
Quarry Concession Agreement	Required to extract aggregate (quarried rock and borrow sand/gravel) on Inuit Owned Land	N/A
Nunavut Water Board Water Licences issued under the Nunavut Agreement (Article 13), the Nunavut Waters and Nunavut Surface Rights Tribunal Act, and the Northwest Territories Water Regulations		
Type “A” Water Licence 2AM-MRY1325	Water use and waste disposal associated with the mine	June 10, 2025
Type “B” Water Licence 2BE-MRY1421	Regional exploration activities, including exploration drilling	April 16, 2021
Indigenous and Northern Affairs Canada (INAC) Mineral leases and Land leases, Land Use Permits, and Quarry Permits on Crown Land, issued under the Territorial Lands Acts and associated Canadian Mining Regulations and Territorial Land Use Regulations		
Mineral Leases #2483, #2484 and #2485	Rights to extract minerals; Lease #2484 covers Deposit No. 1	August 27, 2034
Land Use Permit N2014C0013	Infrastructure and activities on Crown Land at Teensy Port	June 30, 2017
Land Use and Quarry Permit N2014Q0016	Extraction of sand and gravel from Borrow P1 at Km 63 along the Tote Road	June 30, 2017
Land Use Permit N2014J0011	Summer narwhal monitoring camp at Bruce Head, in Milne Inlet	June 30, 2017
Class A Land Use Permit N2014X0012	Port operation on Crown Land (ore dock operation)	June 30, 2017
Foreshore Lease 47H/16-1-2	Use of seabed by current ore dock at Milne Port	June 30, 2035
Transport Canada Approvals of in-water works under the Navigable Waters Protection Act (NWPA; now the Navigation Protection Act); and Marine Facility Approval under the Marine Transportation Security Act and Regulations		
Approvals: 8200-07-10273, 8200-07-10267,	Approvals to interfere with navigation within navigable	No Expiry

8200-07-10269, 8200-07-10268, 8200-07-10274, 8200-07-10272, 8200-07-10266, and 8200-07-10271	waters along the Tote Road at crossings: CV040, BG50, CV128, CV223, CV072, BG17, CV217, and CV099	
Statement of Compliance of a Marine Facility # 001743	Approval for the Milne Inlet Marine Facility to conduct iron ore operations	June 24, 2020
National Resources Canada Licensing of Explosives Manufacture and Storage Facilities under the Explosives Act		
Factory Licence #F76068	Issued to Baffinland's explosives contractor, Dyno Nobel Baffin Island, to manufacture explosives for the mine	June 30, 2017
Nunavut Research Institute Issues scientific licences for land and water research, or social and traditional knowledge research, under the Scientists Act		
Scientific Research Licence 02 031 16R-M	Environmental monitoring of the land and water environments	December 31, 2017

Engagement with the Qikiqtani Inuit Association

Baffinland reported that it remained committed to establishing and maintaining a positive relationship with the QIA through ongoing engagement at two (2) levels: engagement associated with the implementation of the Inuit Impact Benefit Agreement (IIBA), and engagement related to the commercial Lease (Q13C301). With respect to its engagement effort on the IIBA, Baffinland reported that the implementation of the IIBA continued to be managed by two (2) committees: a Joint Executive Committee (JEC) and a Joint Management Committee (JMC), each of which consists of an equal number of representatives from Baffinland and the QIA. While the JEC is responsible for the oversight of the implementation of the IIBA through the setting of annual goals, objectives and priorities, including the establishment of a supporting annual implementation budget; the JMC monitors the ongoing operations and management of the Project as it relates to the IIBA and shares information regarding the progress of training initiatives, employment targets and contract awards. Baffinland reported that both the JEC and the JMC met on a regular basis in 2016, by phone and face-to-face to discuss and resolve issues related to IIBA implementation. Baffinland reported that in 2016, the JMC focused on the development of the Inuit Human Resources Strategy, Inuit Procurement and Contracting Strategy, and Annual IIBA Implementation Plan. Baffinland further reported that the 2016 JEC meeting provided the JMC with additional direction and priority actions for the development of the Skills Partnership Fund Application; Inuit Human Resources Strategy; Inuit Procurement and Contracting Strategy, and the Annual IIBA Work Plan.

Engagement on the Commercial Lease and Associated Agreements

Baffinland reported that its engagement with the QIA on the Commercial Lease focused on discussions and soliciting feedback from the QIA regarding a range of management plans such as the Interim Closure and Reclamation Plan, the Roads Management Plan and the Snow Management Plan. It was also noted that monthly calls with the QIA were now being held, with additional engagement occurring on an as-needed basis as issues arise. Baffinland also reported that on July 19, 2016, the QIA issued a Notice of Arbitration which claimed that Baffinland was in default of its advance payment obligations under the IIBA, which was entered into in September 2013. Baffinland further clarified that the arbitration involved a disagreement as to the meaning of “commercial production” and the “intended capacity” of the Mary River Project. While it was reported that a Public Hearing to address the disagreement was originally scheduled for October 2016 and was deferred until early 2017, Baffinland indicated its commitment to maintaining a positive and constructive working relationship with the QIA in order to ensure the effective implementation of the provisions of the IIBA and the continued progress of the Mary River Project.

2 MONITORING ACTIVITIES

The NIRB’s monitoring program is focused on compliance and effects monitoring in order to determine the extent that the land or resource use in question is carried out within the predetermined terms and condition as stipulated pursuant to section 12.7 of the *Nunavut Agreement* and within the Mary River Project Certificate No. 005. The monitoring program may also contribute the information base necessary for agencies to enforce terms and conditions of land or resource use approvals.

2.1 Compliance with Reporting Requirements

During the 2016–2017 monitoring period, Baffinland demonstrated compliance with most of the reporting requirements in accordance with the Project Certificate. As part of Baffinland’s commitment towards mitigating the potential ecosystemic impact of the Mary River Project, the following materials were submitted to the NIRB for the current monitoring period:

- a. Air Quality and Noise Abatement Management Plan
- b. Status of Project Certificate Conditions in 2016 (Appendix A)
- c. 2016 Community Survey Results (Appendix B)
- d. 2016 Community Tour Meeting Records (Appendix C)
- e. Working Group Meeting Notes (Appendix D)
- f. 2016 Photo Essay (Appendix E)
- g. Updated Management Plans (Appendix F)
- h. Aquatic Effects Monitoring Plan (Appendix F2)
- i. 2016 Geotechnical Inspection Report (Appendix G)
- j. 2016 Socio-Economic Monitoring Report (Appendix H)
- Status of Proponent Commitments in 2016 (Appendix I)

2.2 Comment Requests on Baffinland’s 2016 Annual Report

On April 4, 2017 the NIRB received Baffinland’s 2016 Annual Monitoring Report for the Mary River Project. The NIRB circulated the report to and requested that interested parties provide

comments within their areas of expertise or jurisdiction as related to both effects and compliance monitoring. The NIRB received comments from the following parties regarding Baffinland's 2016 Annual Monitoring Report:

- **Qikiqtani Inuit Association (QIA)**
- **Government of Nunavut (GN)**
- **Environment and Climate Change Canada (ECCC)**
- **Fisheries and Oceans Canada (DFO)**
- **Indigenous and Northern Affairs Canada (INAC)**
- **Natural Resources Canada (NRCan)**
- **World Wildlife Fund Canada (WWF)**

The comments received identified specific areas that require further attention or discussions in addressing the environmental and socio-economic concerns resulting from the development of the Mary River Project. In addition, on June 23, 2017 the NIRB requested that Baffinland provide a response to a number of the comments received; the comments and Baffinland's responses were considered throughout the remainder of this report.

2.3 Compliance with the NIRB Project Certificate

A summary of the compliance status of each of the term and condition of the Project Certificate No. 005 is described and tabulated in [Appendix I](#) of this Report. The NIRB has also identified several outstanding information and key updates that have not been forwarded to the NIRB as part of the monitoring for the current reporting period:

2.3.1 Monitoring Sea Levels and Storm Surges at Steensby Port and Milne Inlet

Baffinland is required pursuant to Conditions 1 and 83 of the Project Certificate to undertake monitoring of sea levels and storm surges at Steensby Port and Milne Inlet area using Global Positioning System (GPS) and tidal gauges. Within its annual reporting to the NIRB, Baffinland reported that it utilized the tidal data collected in 2014 for informing oceanography and ballast water dispersion modelling for the Project, and that following the completion of the modeling exercise, the tidal gauge was removed and was not re-installed at Milne Port in 2016, and as such no tidal data were collected or available from Milne Port for the current reporting period. While Baffinland reported that it has engaged its consultant to re-install the tidal gauge, and commence GPS monitoring at Milne Port in the summer of 2017, the NIRB notes that trends related to sea levels and storm surges from the Milne Inlet area cannot be predicted or trends developed based only on the data available for 2014.

2.3.2 Validation and Update of Climate Change Predictions

Baffinland is required pursuant to Condition 2 of the Project Certificate to provide the results of any new or revised assessments and studies validating and updating climate change impact predictions for the Project. Baffinland reported within its 2016 Annual Monitoring Report that it has not undertaken such studies in 2016, but noted in its reporting to the NIRB that it was currently developing a climate change strategy in 2017 as a component of the proposed Phase 2 expansion.

2.3.3 Greenhouse Gas Emission Reporting

Baffinland is required pursuant to Condition 3 of the Project Certificate to provide interested parties with evidence of continued initiatives undertaken to reduce greenhouse gas (GHG) emissions. Within its 2016 Annual Monitoring Report, Baffinland reported that it calculated the annual GHG emissions from the Project site.

2.3.4 Air Quality Monitoring

Baffinland is required pursuant to Conditions 7 and 8 of the Project Certificate to update its Air Quality and Noise Abatement Management Plan to support the continuous monitoring of SO₂ and NO₂ emissions, and report on data collected, in order to ensure that emissions remain within predicted levels at Mine site, Milne Port, and at Steensby Port, and where applicable, within limits established by all applicable guidelines and regulations. In the 2016 Annual Report, Baffinland reported that as a result of equipment failure it did not collect or measure emissions parameters as part of its air quality monitoring program, as such it made no specific updates or changes to its Air Quality and Noise Abatement Management plan.

2.3.5 Dust Management

Baffinland referenced the submission of various documents (the Air Quality and Noise Management Plan and the Road Management Plan) in substantiating its compliance Condition 10 of the Project Certificate as pertaining to dust management; however, the web link provided by the Proponent in the 2016 Annual Monitoring Report and in its response to comments did not appear to function.

2.3.6 Noise and Vibration Monitoring

Condition 14 of the Project Certificate requires Baffinland to conduct noise and vibration monitoring at Project accommodations during all phases of the Project during the summer and winter seasons. In the 2016 Annual Monitoring Report, Baffinland stated that in July 2016, one (1) room at the Mine Site and two (2) rooms at the Port site were tested for noise and vibration. Baffinland further reported that due to equipment malfunction and availability issues that were not resolved before the end of 2016 it was unable to conduct the scheduled winter noise and vibration monitoring during the 2016 period.

2.3.7 Shipboard Observer Program

Baffinland reported to the NIRB that the ship-based surveillance monitoring was conducted in 2013, 2014, and 2015, but was discontinued in 2016 due to safety concerns about the on-boarding of the observers, and the general lack of success of observers on ships to observe marine mammals. Baffinland provided no information within its annual reporting to the NIRB on the alternatives it has adopted for monitoring vessel interactions with marine mammals, including seabirds during the reporting period nor when updated plan or solution could be expected. While Baffinland has indicated that it will continue discussions with the Marine Environment Working Group (MEWG) to identify an alternative program that would incorporate an accidental strikes reporting protocol, the NIRB expects the Proponent to remain committed to achieving compliance with this condition.

2.3.8 Marine Environment-Ship Noise

Baffinland is required pursuant to Conditions 110 and 111 to develop a monitoring protocol to prevent impacts to marine mammals from Project shipping activities and also expected to work with the Marine Environment Working Group to determine appropriate early warning indicator(s) that will ensure rapid identification of negative impacts along the southern and northern shipping routes. While Baffinland reported in the 2016 Annual Report to the NIRB that two (2) acoustic sites quantified vessel noise and detected the acoustic presence of marine mammal calls, Baffinland further noted that the effects on marine mammals and marine mammal populations were not assessed and that no early warning indicators of negative impacts of vessel noise have been developed.

2.3.9 Survey and Monitoring of Arctic Char

Condition 48(a) requires Baffinland to provide plans to conduct additional surveys for the presence of arctic char in freshwater bodies and implement ongoing monitoring of arctic char health in areas affected by the Project. Baffinland has not fully complied with this condition as it has not provided the NIRB with information on the health status of arctic char population in freshwater bodies around the Project site in its 2016 Annual Report.

2.3.10 Marine Environment – Fouling Monitoring

Pursuant to Condition 91, Baffinland is required to develop a detailed monitoring plan for Steensby Inlet and Milne Inlet for fouling, and includes sampling areas on ships where antifouling treatment is not applied such as the areas where non-native species are most likely to occur. Baffinland reported within its 2016 Annual Monitoring Report to the NIRB that no fouling monitoring has taken place on vessel hulls, and that no trends in fouling in the marine environment of Milne Inlet have been reported to date based on the collected 2014 and 2015 data.

3 COMPLIANCE & EFFECTS MONITORING

On April 27, 2017 the NIRB requested that authorizing agencies with a mandate or jurisdictional responsibility for the Mary River project provide comments and information with respect to compliance and effects monitoring. Specifically, comments were requested regarding the following as it pertains to compliance monitoring, and assessment undertaken by regulators and other authorizing agencies to establish whether or not the Project is being carried out within defined regulations, commitments and agreements:

- 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;
 - ii. A summary of any inspections conducted during the 2016 reporting period, and the results of these inspections; and
 - iii. A summary of Baffinland's compliance status with regard to authorizations that have been issued for the Project.

The NIRB also requested comments with respect to effects monitoring, including:

- a) Whether the conclusions reached by Baffinland in the *Mary River Project 2016 Annual Monitoring Report* are valid; and
- b) Any areas of significance requiring further supporting information.

The following is a summary of the comments received from authorizing agencies regarding compliance and effects monitoring.

3.1 Qikiqtani Inuit Association (QIA)

▪ Compliance Monitoring

The QIA did not provide any information regarding any site inspection conducted or reported any observations from the Project site during the 2016 reporting period. With respect to the 2016 Annual Report, the QIA noted several information gaps (78 items) which have been summarized below:

Meteorology and Climate

- Requested whether the tabulated information (Tables 4.4 and 4.5) included the estimate of vessel-based emissions.
- Requested information on whether vessel emissions would be specifically monitored at Milne Port and that the Proponent should provide additional details on how this monitoring would be accomplished.

Noise and Vibration

- Recommended that the Proponent investigate whether the regular noise and vibration disturbance from the Tote Road traffic may be causing fish populations to avoid nearby watercourses.

Groundwater & Surface water

- Recommended that the Proponent ensure that char fry are not chronically exposed to nitrate concentrations greater than 6.25 mg/L.
- Recommended that the Proponent take aggressive steps in reducing fugitive dust to reduce sedimentation in fish bearing waters.

Vegetation

- Recommended that a minimum 30-metre (m) naturally-vegetated buffer area is maintained between the mining operation and adjacent water bodies, and that the Proponent make the effort to educate workers on the need to respect the 30 m buffer and continue to enforce the 30 m buffer zone.

Fresh water

- Recommended that all the hanging culverts and those that are at risk of becoming so in 2018 be remediated in 2017, to ensure uninterrupted fish passage.
- Recommended that the artificial habitat at the ore dock be monitored.
- Requested that the Proponent provide information regarding its survey for the presence and health of Arctic char in freshwater bodies along the Tote Road.

Marine Environment

- Reported that the 2016 draft technical reports were not made available to the Marine Environment Working Group (MEWG) prior to the Annual Report being submitted, and recommended that the Proponent make every effort to meet agreed-upon deadlines for draft report submission to the MEWG.
- Reported that the Proponent has not provided the relevant supporting documents or any reference report to substantiate that it completed hydrodynamic modelling in the Milne Inlet Port area to determine the potential impacts arising from disturbance to sediments, including re-suspension and subsequent transport and deposition of sediment.
- Recommended that the ballast water dispersion modelling be updated in 2017 to improve the understanding of potential impacts of ballast water release.
- Recommended that Baffinland engage with the QIA and the MEWG in the development of a modified marine invasive species monitoring program, and that a modified/updated program should be added to the Shipping and Marine Wildlife Management Plan (SMWMP) prior to the 2017 shipping season.
- Reported that the ballast water tanks of incoming vessels should be sampled to establish marine species' presence and abundance and recommended that this information be used in modelling to update the invasive species risk posed by ballast water discharges into Milne Inlet, and to inform any necessary mitigation.
- Reported concerns regarding the reliability of the testing results for ballast water exchange compliance, and recommended that ballast water and invasive marine species management becomes a standing agenda item for MEWG meetings until a functional monitoring program is in place.
- Recommended that a program for monitoring fouling on ship hulls be added to the SMWMP prior to the 2017 shipping season.
- Requested that the Proponent provide information on how the results from the spill model informed the development and update of the Spill at Sea Response Plan.
- Recommended that the Proponent provide a quantitative summary of ship speeds and exceedances.

Socio-economic Effects

- Recommended that the Proponent update the labour market analysis annually based on workforce projections for one (1) and three (3) years outlooks.
- Recommended that the Proponent demonstrate the measures it has undertaken to investigate measures and programs to assist Project employees with home ownership or access to affordable housing.
- Recommended that the Proponent provide information regarding when a mental health professional is available on site, with details as to whether they speak Inuktitut, and how many employees have accessed their services onsite.
- Commented on the Employee Information Survey administered by Baffinland and recommended that all surveys be conducted both in English and Inuktitut as well including information that all responses would be kept confidential.
- Noted that data regarding in-migration and out-migration of Inuit and non-Inuit residents on the North Baffin Local Study Area (LSA) as provided by Baffinland is insufficient, and recommended that data regarding employee residence, housing and migration status

be added to Baffinland's Employee Information Survey as required under Condition 133 of the Project Certificate.

- Requested that the Proponent include the Project Certificate conditions numbers in its Draft Socio-economic Monitoring Plan to improve transparency and accountability as well as include the following missing Project Certificate conditions in its Draft Socio-economic Monitoring Plan (135, 136, 137, 142, 155, and 156).
- Requested that the Proponent provide payroll data for both Inuit and non-Inuit Local Study Area (LSA) residents and contractors employees' who reside in the LSA.
- Recommended that Baffinland provide data on Contractors' employees (Employee Origin), in order to give a more accurate depiction of the makeup of the Project workforce.
- Recommended that the Proponent provide the current status of all its commitments for the Mary River Project and update the web portal address in its reporting.

Summary of Baffinland's Response to Comments Received from QIA:

- With respect to clarifying whether vessel emissions would be monitored at Milne Port, Baffinland indicated that it would monitor the emissions from the Milne Port operations as a whole, including vessels during the shipping season.
- Regarding monitoring the effects of explosive residues and related byproducts from project-related blasting activities on biota, Baffinland indicated that its Aquatic Effects Monitoring Program (AEMP) would continue to monitor the surface water runoff downstream of active quarries and mining areas.
- With respect to the concerns raised regarding fugitive dust generation from the Project site, Baffinland indicated that it has implemented measures within its Dust Mitigation Action Plan to manage and mitigate dust generation and dispersion at the Project.
- In response to monitoring the passage of fish at culverts, Baffinland indicated that an annual assessment of culverts bridging fisheries habitat was already conducted to identify any culverts that have become perched or at a risk of becoming perched and impeding fish passage.
- In response to the recommendation to provide pre-employment preparation, Baffinland noted that it was in the process and developing a new Work Ready Program, which it anticipated would be delivered beginning in 2017.

3.2 Indigenous and Northern Affairs Canada (INAC)

▪ Permitting and Regulatory Comments

INAC commented on Baffinland's 2016 Annual Report noting that as the Project was now in its third year and operating on a relatively small scale, it expected that the number and extent of non-compliances, exceedances, and accidents that occurred onsite could have been reduced. INAC also recommended that Baffinland should make the necessary efforts to learn from such experiences and mistakes, and where necessary incorporate appropriate corrective measures in its future management and operations plans and activities.

- **Compliance Monitoring**

Water Quality Inspections

INAC reported that from May 18 to 20, 2016, its Water Resource Officers (WRO) conducted site inspections at the Mary River Mine site, the Tote Road and related infrastructure, and Milne Port area sites to verify compliance with the Type “A” Water Licence No. 2AM-MRY1325 as issued by the Nunavut Water Board. INAC noted that at the time of the site visit, freshet was observed to have caused snowmelt to enter into nearby watercourses. Specifically, it was noted that the watercourses at Mary River site and along the Tote Road were significantly discolored due to the presence of sediment and ferric iron oxide in the water. WRO also reported that the water quality samples taken at the stream entering Camp Lake near the monitoring location MS-MRY-1 had a total solid suspension (TSS) result of 114 milligram per litre (mg/L), which exceeded the effluent quality limit of 30mg/L within the Type “A” Water Licence 2AM-MRY1325. As a result of this exceedance, the WRO issued a letter of non-compliance to Baffinland for failure to fulfil its commitments to mitigate the effects of sediment loading to water. It was also noted that following the issuance of the Inspector’s report, Baffinland committed to implement a plan to address concerns of sediments entering into watercourses around the site during subsequent freshet events.

From July 6 to 8, 2016, a second water licence inspection was conducted by WRO at the Mary River Mine, the Tote Road and related infrastructure, and the Milne Port area. During the site inspection, WRO noted that the previous commitments made by Baffinland to complete the ore stockpile pad diversion ditches, and the commitments to address areas prone to sedimentation along the Tote Road were not met. Due to this infraction, another letter of non-compliance was issued to Baffinland highlighting the deadlines to complete this work, and also issuing warning to the Proponent that further enforcement actions might be taken if reasonable diligence towards meeting the requirements of the Type A Water Licence (2AM-MRY1325, Part D) were not fully addressed. INAC specifically reported that since its May 2016 inspection, it noted that the Proponent has undertaken significant work to mitigate the sedimentation issues noted around the site and on the ore stockpile diversion ditches.

INAC reported that from July 27 to August 3, 2016, geotechnical site inspections were conducted by an external consultant and accompanied by the INAC manager for the Mary River Project and a WRO. During the geotechnical inspection, no major issues of non-compliance were reported onsite, although INAC staff recommended that Baffinland make improvement in housekeeping throughout the site. From September 28 to 29, 2016, a water licence inspection was conducted at the Mary River site, the Tote Road, and the Milne Port area. During the site visit, no major issues of non-compliance were identified on site, although the WRO reported that heavy snow cover and the frozen conditions around the site made the inspection difficult and prevented proper and thorough inspection of project areas or facilities.

- **Incorporation of Terms and Conditions into INAC Authorizations**

INAC also reported on how it had incorporated Conditions from the Project Certificate into its licensing for various aspects of the Mary River Project. The specific conditions and where it was incorporated in the INAC licence (N2014Q0016) are included in Table 2 below.

Table 2: Incorporation of Conditions into INAC Authorizations

<u>Condition</u>	<u>Subject</u>	<u>Implemented in NWB water licence 2AM- MRY1325 Amendment #1</u>	<u>Implemented in land use permit</u>
Condition 10	Dust Management and Monitoring Plan		Land Use Permit N2014Q0016 Part 31 (1) (m), 48
Condition 11	Incineration Management Plan	Part F, Item 7 (requirement to test and dispose bottom ash and record analysis results and volumes of ash)	
Condition 14	Noise and vibration		Part 31 (1) (m) 49 of Land Use Permit N2014Q0016
Condition 16	Water Infrastructure	Part D, which require that engineering drawings be provided upon request.	
Conditions 17	Effluents from project-related facilities	Parts F and I	
Conditions 18	Effluents from mine pit	Part F, Item 3	
Condition 19	Culverts	Parts B, D item 23, E item 23, and I	
Condition 20	Blasting Management Plan and Aquatic Effects Monitoring	Part E, item 24; Part I, item 23 as well as Part D, Item 18g of its authorization	
Condition 21, 22, 24	Aquatic Effects Monitoring; Sediment and Erosion Plan; and Effluent Monitoring	Parts I, D, E, and F	
Condition 23	Groundwater Monitoring and Management Plan	Part I, Item 14 (requirement to conduct opportunistic monitoring on any observed seepage).	
Condition 25	Geotechnical	Part D, Item 19 and Part	

<u>Condition</u>	<u>Subject</u>	<u>Implemented in NWB water licence 2AM-MRY1325 Amendment #1</u>	<u>Implemented in land use permit</u>
	Investigations	I, Item 12 (for water infrastructure).	
Condition 26	Erosion Management Plan	Parts D, E, F (requirement to prevent or minimize erosion)	N2014Q0016, part 31 (1) (m) 50
Condition 28	Effect of Project on Permafrost	Part D, Item 10 (requirement to minimize disturbance to permafrost around the site, including railway corridor)	
Condition 29	Engineering Drawings	Part D, Item 2 and Part E, Item 23	
Condition 30	Quarry Operations and Management Plans and Project Footprint	Part D, Item 5	N2014Q0016, 31 (1) (m) 51
Condition 33	Terrestrial Environment Management and Monitoring Plan	Part J, Item 2	
Conditions 39 and 40	Revegetation Program	Part J, Item 10 and 11 (requirement to implement progressive reclamation including revegetation)	
Conditions 41 and 42	Buffer Zone	Part D (Item 13 and 14 and as Part E, F and H)	
Condition 43	Silt Control	Part D. Item 2.	
Condition 44 and 48	Blasting Thresholds	Part E, Item 24 (requirement to submit Blasting Management Plans).	
Condition 46	Runoff	Part F	
Condition 47	Infrastructures in watercourses	Part E, Item 23	N2014Q0016: Part 31 (1)(f) 16.
Condition 53	Caribou Mortalities		N2014Q0016, Parts 31 (1) (h) 36-38, and 31 (1) (m) 52
Conditionon 64	Environmental Protection Plan	Part F, Item 7	N2014Q0016, Part 31 (1) (g) 27

<u>Condition</u>	<u>Subject</u>	<u>Implemented in NWB water licence 2AM- MRY1325 Amendment #1</u>	<u>Implemented in land use permit</u>
Condition 92	Oil Spill Response	Part H, Item 5	N2014Q0016, Part 31 (1) (g) 30 and 31

▪ **Effects Monitoring**

INAC provided its comments on effects monitoring and questioned the validity of Baffinland's conclusions regarding the following items as outlined below:

Effluent Discharge Criteria

INAC reported that Baffinland did not include within its 2016 annual reporting to the NIRB detailed analytical data regarding effluent discharges from the Crusher Pad Sedimentation Pond (MS-06) and Waste Rock Sedimentation Pond (MS-08). INAC outlined its concerns within its submission to the NIRB that without the detailed data, it was difficult to verify if Conditions of 17 and 24 of the Project Certificate have been met. INAC further recommended that Baffinland include such detailed data in future annual reports or point to where such data could be found and accessed.

Groundwater and Surface Water, including monitoring explosive residues

INAC noted that Baffinland's 2016 Annual Monitoring Report did not provide information regarding the number of instances or one-time exceedances of where water samples exceeded water quality parameters and thresholds. INAC specifically noted that several water samples collected downstream of some active quarries and the mining area showed elevated ammonia and nitrate levels in comparison to baseline levels, with Baffinland not including detailed data of the results in its annual reporting to the NIRB. INAC further indicated that this information gap has limited its ability to evaluate quantitatively the increases in concentration of ammonia and nitrate in the receiving environment, and recommended that Baffinland include detailed data in subsequent annual reports or identify where such data could be found and accessed.

Hydrodynamic Modelling

INAC reported that the results of physical and chemical parameters, such as conductivity, total suspended solids, turbidity, nutrients, metals and other chemical species in the water column and in the sediment collected from the Milne Inlet area were only presented in descriptive terms without quantitative data being provided within the report. Although Baffinland observed a well-defined vertical gradient in salinity, increasing from the surface to the bottom, and a consistent gradient in temperature, declining from the surface later to 65-85m in depth; however, INAC indicated that no detailed measurement data of these parameters were included in the annual report, and that it was unclear when or in which season the salinity profiles were taken, and whether or not it would be different in different seasons.

Ballast Water Management

INAC identified several erroneous data that brings into question the validity of Baffinland's conclusion regarding its compliance with Condition 89 of the Project Certificate. Some specific issues highlighted by INAC during its review of the 2016 Annual Report included the following:

The ballast water salinity test results in Table 4.8 on page 194 of the annual report appear to erroneous and unreasonably high, and does not reflect the known salinity levels of ballast water taken from the mid-Atlantic (i.e., seawater taken from the mid-Atlantic Ocean should have a salinity around 35 parts per thousand). INAC indicated its view that the numerous erroneous results tend to raise questions on Baffinland's quality assurance and quality control practices, and may further cast doubts on other reported results in the 2016 Annual Report to the NIRB. INAC recommended that Baffinland adopt measures to implement standard QA/QC procedures and practices to ensure that critical measurements results are valid.

Summary of Baffinland's Response to Comments Received from INAC

- With respect to improving ballast water testing, Baffinland indicated that it was currently reviewing procedures to reflect improvements to salinity sampling and testing methodologies in order to indicate the action to be taken in the event of a salinity reading that was lower or higher than the expected range.
- In response water quality parameters in surface water runoff downstream of active quarries and mining areas, Baffinland indicated that the reports and relevant data were provided and reported to ECCC and that the data were also available on Baffinland web document portal.

3.3 Government of Nunavut (GN)

▪ Compliance Monitoring

The GN did not provide any information regarding any site inspection conducted at the Mary River Project site or reported any concerns regarding compliance monitoring in its review of Baffinland's 2016 Annual Monitoring.

▪ Effects Monitoring

The GN provided general comments and recommendations regarding effects monitoring as summarized below:

Nunavut Annual Net Migration

- Recommended that further questions be developed and incorporated into the pre-existing voluntary employee survey to better define the effects of project-related influences on housing in the north Baffin LSA.

Community Survey Results and Well-being

- Recommended that the Proponent provide examples of negative changes reported in the community surveys in order to provide opportunities to further review impacts reported on behalf of communities, and to ensure the impact is valid.
- Recommended that Baffinland work with the GN to develop appropriate indicators for delivering reasonable interventions in matters that affect individual and community well-being.
- Recommended that the Proponent work with various stakeholders to develop a measurement tool/indicator for food security.

Childcare availability and Cost

- Commented on how the lack of child care in communities could increase employee turnover rate at the Project site and recommended that the Proponent investigate the feasibility of using the Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat (INPK) fund to provide additional supports to community daycares or child care services over and above what is available through the GN's Start-up Contribution program.

Polar Bear

- Recommended that the proponent take appropriate steps to limit resource wastage in the case of a necessary bear fatality on-site.

Dustfall Reporting

- Recommended that the proponent provide an updated figure for dustfall trends from 2014 to 2016 with all dustfall points clearly visible.

Flight Altitude Compliance

- Recommended that the proponent investigate additional mitigation measures to improve helicopter flights compliance with minimum altitudes.

Summary of Baffinland's Response to Comments Received from GN:

- Regarding providing examples of the negative changes reported in the community surveys, Baffinland responded that the surveys reported comments regarding the long separation between families and employees affecting family stability, substance abuse in communities, as well as the need for communication improvements between Baffinland and communities.
- In response to using the INPK fund to support community daycare services, Baffinland indicated that it currently supports two (2) funds established under the IIBA which could potentially be accessed by community daycares and/or child care services.
- Regarding developing a measurement tool/indicator for food security, Baffinland indicated that it continues to track the topic of food security through the Qikiqtani Socio-Economic Monitoring committee process and its community engagement program, and further clarified that statistical data collection in this respect was primarily a government activity and responsibility.

3.4 Environment and Climate Change Canada (ECCC)

- **Compliance Monitoring**

Site Visit and Inspections

ECCC reported that three (3) on-site inspections were completed in 2016. The first on-site inspection of the Mary River Project was completed by ECCC Environmental Enforcement on January 5 and 7, 2016 to verify Baffinland's compliance under the *Canadian Environmental Protection Act* (CEPA) and the *Fisheries Act* (FA). No compliance issues were identified during the course of the on-site inspection. On May 18 to 20, 2016, ECCC Environmental Enforcement conducted another on-site inspection of the Project to verify compliance under CEPA and FA and in response to two (2) spill reports (2016-158 and 2016-175). During the inspection, the

Enforcement Officer noted non-compliance issues regarding sediment runoff and discharge of rusty coloured water into several lakes, including Mary River and Philips Creek. The Inspector also indicated that the sediment runoff was caused by the activities at the mine site, and that the sediment runoff was not permitted to be deposited into water frequented by fish. As a result of the observed non-compliance, ECCC reported that it issued a verbal and written Fisheries Act Direction to Baffinland on May 31, 2016 to take measures to stop the discharge, provide updates to the inspector, provide a dust mitigation action plan and provide a follow-up report with an overview of how all the measures to be taken were completed.

On October 5 and 7, 2016, ECCC conducted another site inspection to verify compliance under CEPA and the FA, and to follow-up on the Fisheries Act Direction previously issued. ECCC noted that Baffinland has complied with the *Fisheries Act* and ECCC also reported that it conducted five (5) off-site inspections and reviewed the 2016 1st, 2nd, 3rd, and 4th quarterly reports, and one (1) annual report for two (2) Metal Mining Effluent Regulations Final Discharge Points, identified as MMER FDP # 1 MS08 (Waste Rock Sedimentation Pond) and MMER FDP # 2 MS-06 (Crusher/Stockpile Pad Sedimentation Pond). ECCC indicated that no compliance issues were identified during the review of the documents and offsite inspections.

▪ **Effects Monitoring**

ECCC provided its comments on effects monitoring as pertaining to Baffinland's 2016 Annual Monitoring Report, which included the following items:

Marine Environment and Marine Environmental Effects Monitoring Program

- Recommended that the results of the marine monitoring be included with the NIRB Annual Report.

Aquatic Effects Monitoring Plan

- Requested that Baffinland provide the current version of the AEMP with the Annual Report on the NIRB registry and recommended that the next update of the AEMP include maps and figures that are legible.

Lake Sedimentation Monitoring Program

- Recommended that the Sheardown Lake sedimentation monitoring study continue and that the management and mitigation of dust at the mine site and Milne Inlet facility be a priority for Baffinland.

Dustfall Monitoring Program

- Recommended that Baffinland provide the missing sections of the Dustfall Monitoring Program report.

Groundwater & Surface Water

- Recommended that Baffinland monitor groundwater drainage around the mine waste piles or clarify/justify why groundwater is not being monitored.

Air quality

- Requested that Baffinland provide clarification as to why air quality monitoring was not conducted for all of 2016, and recommended that the Proponent resume monitoring activities as soon as possible.
- Recommended that stack testing of incinerators be conducted at regular intervals (every three (3) years).

Summary of Baffinland's Response to Comments Received from ECCC:

- With respect to the Sheardown Lake Sedimentation Monitoring Study, Baffinland indicated that this study was continuing throughout 2017 to further monitor sediment quality and sediment deposition rates and confirm trends.
- In response to dust management, Baffinland indicated that it has taken several steps to manage and mitigate dust generation and dispersion at the Project and has followed the detailed in Baffinland's Dust Mitigation Action Plan developed and submitted to regulators during 2016.
- In response to air quality monitoring, Baffinland indicated that air quality monitoring did not take place in 2016 as a result of equipment malfunction and that it has re-commissioned the monitoring equipment at the mine site and Milne Port to ensure that air quality data would be available for 2017.
- Regarding incinerator stack testing, Baffinland indicated that the requirements for stack testing of incinerators would be addressed in the updated Incinerator Management Plan including establishing the required intervals for testing.

3.5 Department of Fisheries and Oceans (DFO)

▪ Compliance Monitoring

With respect to compliance monitoring, DFO indicated that Baffinland was issued a letter of advice for the Tote Road Crossing Upgrade on December 16, 2013, and that a *Fisheries Act* authorization was also issued to the Proponent on June 30, 2014 for the construction of the Ore Dock at Milne Inlet. While DFO reported that no additional *Fisheries Act* authorizations have been issued since 2014, it was noted that Baffinland requested to extend the removal of the remaining seacan crossings until March 28, 2017 and repair two (2) culverts (CV 186 and CV187) along the Mary River section of the Tote Road. DFO indicated that it has reviewed the Milne Ore Dock year 2 Offset Monitoring Report and that Baffinland was in compliance with its *Fisheries Act* authorization.

▪ Effects Monitoring

DFO indicated within its comment submission to the NIRB, that the conclusions reached by Baffinland in the 2016 Annual Report were valid.

3.6 Natural Resources Canada (NRCan)

NRCan commented on Baffinland's 2016 Annual Report noting that the Explosive Factory Licence F76068 issued to Baffinland's contractor, Dyno Noble had satisfied the requirements of

the Explosive Act and Regulations as outlined for the amended Mary River Project Certificate No. 005.

3.7 World Wildlife Fund (WWF)

WWF provided general comments regarding the 2016 Annual Report and noted that its comments focused on several carry-over items from WWF comments on Baffinland's 2015 Annual Report, and the review of the 2016 Annual Report. Firstly, WWF noted that in 2015 a number of its comments on Baffinland's Annual Report were specifically directed to the NIRB, either for its consideration in developing a Mary River Monitoring framework, for it respond directly, or for it to forward on to Baffinland for a response. With regards to those comments WWF requested that the NIRB either provide a response or require a response from Baffinland. WWF noted that a number of those items remained relevant to its review of the 2016 Annual Report and were submitted for the NIRB's consideration again this year. Some of these relevant items included the following:

- Outstanding Appendix A items for which WWF requested a NIRB response pursuant to terms and conditions (3, 5, 9, 16, 19, 20a, 21, and 25) of the Project Certificate.
- Outstanding Appendix A items to which WWF requested Baffinland response pursuant to terms and conditions (4, 8, 11, 12b, 14b, 15, 18, 20b, 22, 23, 24, and 29) of the Project Certificate.

However, with respect to the 2016 Annual Report, WWF provided comments on issues as related to 14 terms and conditions of the Project Certificate (6, 9, 48a, 53, 54, 55, 91, 99, 101, 105, 109, 110, 111, and 112) as summarized below:

Emissions

- Requested clarification on whether greenhouse gases (GHG) including NO_x and SO₂ emissions from fuel consumption at the Project site are within the original or ERP predicted values.
- Recommended that Baffinland clarify whether the emissions numbers are inclusive of work undertaken by contractors and subcontractors.

Arctic Char

- Requested that the Proponent confirm whether or not it is undertaking monitoring of Arctic char health within watersheds proximal to the mine, Tote Road, and Milne Inlet Port project development areas.

Caribou calving areas

- Requested that the Proponent provide information of the locations of general project transportation routes with respect to current calving areas, and clarification on how these areas have been considered for mitigation and monitoring.

Collection of Marine baseline data

- Recommended that the Proponent strengthen its marine monitoring program by including acoustic monitoring and by continuing aerial surveying of marine mammals and include the results from DFO-led surveys, prior to interpreting results and providing conclusive statements in the annual report.

- Recommended that the Proponent comment on its ability to undertake more direct studies on disturbance, including for instance, acoustic monitoring before, during, and after ship transects, drone monitoring before, during, and after ship transects and possibly photo surveys before, during and after transects.
- Requested that the Proponent confirm how many Project and non-Project vessels moved through Milne Inlet in total, during the 2016 shipping season.
- Requested that the Proponent confirm what specific measures it has in place to reduce the potential for shipping interactions with marine mammals.

Summary of Baffinland's Response to Comments Received from WWF:

- With respect to providing calculations of GHG emissions, Baffinland responded that GHG emissions in 2016 were calculated to be 116,400 tonnes (t) to produce 2.7 million tonnes (Mt) of iron ore, which is approximately 43,000 t CO₂/Mt.
- Regarding monitoring of Arctic char health, Baffinland responded that studies of arctic char health occur annually under the Aquatic Effects Monitoring Program (AEMP) and the Marine Environmental Effects Monitoring Program.
- Regarding monitoring for active wolf dens within a 10 km radius from the mine site, Baffinland responded that carnivore den surveys would be reinitiated when wolves and/or caribou are observed near site or on observations of local harvesters and as reported to Baffinland or the Terrestrial Environment Working Group (TEWG).
- With respect to strengthening the marine monitoring program, Baffinland indicated that it was developing an acoustic tagging program for narwhal in collaboration with DFO and the Mittimatilik Hunters and Trappers Association in order to provide an improved approach to assess the interaction of narwhal and marine vessels.
- Regarding the status of the shipboard observer program, Baffinland reported that the shipboard observer program was discontinued due to safety concerns and the poor visibility from the deck of the ship that made observations of marine mammals and the ship interactions very limited.

3.8 NIRB Site Visits- March and August 2017

As an integrated part of the NIRB's continuous monitoring program of the Project, the NIRB visited the Mary River site between March 22 to 24, 2017 (Winter Site Visit) and August 24 to 28, 2017 (Summer Site Visit). For a comprehensive review of the NIRB's 2017 site visits and observations, please refer to the NIRB's 2017 Mary River Site Visit Reports, included as [Appendix II](#) of this report.

During the winter/ summer site visits, a tour around the Mine site was undertaken, which included observational visits to the following locations:

- Crusher Plant,
- Deposit No. 1,
- Waste rock storage area,
- Incinerator,
- Sewage outfall area, and
- Landfill.

After the tour to the Mine site visit, NIRB staff further undertook observational visits to the following locations around Milne Inlet: ore stockpile area, incinerator, landfarm, conveyor system, docking area, accommodations facility, and the Tote Road all of which were assessed by truck. NIRB staff did not undertake any observational trip to the Steensby Inlet area. Upon completion of the tour, the Monitoring Officer discussed several outstanding items and observations noted during the site visit with Baffinland staff, especially as they pertained to the implementation of specific terms and conditions of the Project Certificate. The following outline the major findings from the 2017 winter site visit and the summer site visit:

3.8.1 Excavator at Km 80

During the March site visit, NIRB staff followed-up on Baffinland's progress with regards to the removal of a CAT excavator that broke through the river ice on December 3, 2016, and was partially submerged at a location downstream of the former seacan bridge crossing (CV217) near km 80 bridge. Although Baffinland indicated during its initial reporting of the accident that an extraction plan was in place to safely remove the excavator from the ice and minimize the potential for a spill; however, based on the observation from the March site visit, it was evident that no such extraction plan has been implemented. There were also concerns at the time of the March site visit that the excavator may continue to constitute a physical barrier to the movement of water and fish especially during ice melt and spring thaw, as such Baffinland was requested to safely remove the excavator from the frozen lake, without any damages to fish and fish habitat. During 2017 summer site visit, NIRB staff observed that the excavator was removed from the lake at Km 80.

3.8.2 Dust Suppression Measures and Crusher Area

Condition 10 requires the implementation of a dust management and monitoring plan at site to prevent impacts to air quality from dust dispersion. During the March site visit, it was noted that the increased dust emissions generated from the crusher plant facility continue to be an ongoing issue onsite. At the time of the winter site visit, NIRB staff noted that specific parts of the crusher and screening plant lacked appropriate hoods or shrouds for dust containment, which resulted in the release and dispersion of significant amounts of fugitive dust to the surrounding environment. NIRB staff informed Baffinland that proper engineering designs and controls may be required to address the increased dust emissions from the crusher plant. During the summer site visit, NIRB staff observed that dust emissions from the crusher and screening plant was reduced due to the installation of shrouds around the feeders and jaws of the crusher plant. Along the Tote Road, widespread discolouration of snowbank was commonly observed during the winter site visit. During the summer site visit, NIRB staff viewed the water trucks that were used for applying dust suppression along the road leading to Deposit No. 1 and the Milne Inlet Tote Road. Further details regarding the status of dust emissions from different Project areas are available in the appended Site Visit Reports ([Appendix II](#)).

3.8.3 Tire management

Used tires has continued to be a significant waste stream generated across the Project sites and consistently noted during both site visits, particularly around the Mine site and Mile Port. During the winter site visit, NIRB staff noticed tire piles around the vicinity of the incinerator and around the ore stock pile area at Milne Inlet, including near the landfarm area. As the

amended Project Certificate does not have any specific terms and conditions to address this particular waste stream, the Monitoring Officer has previously recommended that Baffinland staff develop a consistent approach for managing unused tires onsite, including options for proper tire disposal, reuse strategy and repurposing options especially for historical tire piles. On April 26, 2017, Baffinland submitted an Onsite Current Tire Disposal Procedure to the NIRB, which outlined the various procedures to dispose newly generated scrap tires, and options for managing historical tire piles around the PDA. During the summer site visit, NIRB staff noticed that many tire piles around the vicinity of the incinerator have been removed into seacans with the intent of either shipping them offsite for final disposal or repurposing them site use. Baffinland is requested to implement the procedures outlined within its Tire Management Plan, and adhere to industry best practices for tire management in mining operations.

3.8.4 Waste Landfill

During the NIRB's March and August 2017 site visits, it was observed that solid waste materials were properly contained within the landfill, although deterioration of the protective mesh and incomplete fencing around landfill footprint continue to be a recurring issue. NIRB staff noted that the condition of the landfill fencing has not improved significantly compared to previous site observations in 2014, and 2016 respectively, as Baffinland has not fully installed a more durable fencing material to prevent offsite dispersal of waste materials to the adjacent tundra. Baffinland was requested to develop a long-term solution for addressing the recurring fencing issue noted at the landfill.

3.8.5 Milne Inlet Landfarm

As noted in during the winter and summer site visits, the landfarm continue to have an issue with the entrenchment of synthetic material such as liners including barrels, batteries and other solid materials being deposited in it along with contaminated soil and snow. NIRB staff have consistently issued directive to Baffinland that the development of action plan would be necessary to have the landfarm reach acceptable standards.

3.8.6 Sedimentation Ponds at Mary River and Milne Inlet

During the 2016 site visit, NIRB staff observed that the waste rock storage area lacked appropriate water management structures to properly divert or intercept overland runoff from the waste rock dump to the nearby sediment pond. . At the time of the winter site visit, NIRB staff did not observe any signs of runoff or flow of uncontrolled seepage of potentially contaminated contact water from the piles of the waste rocks into the adjacent tundra as the area was difficult to observe due to snow cover. However, during the summer visit, NIRB staff observed that Baffinland had constructed a sedimentation pond (MS-08) near the vicinity of the waste rock area, and noted that the collected water within the pond overflowed into the adjacent tundra. NIRB staff observed that the waste rock pile water management system, that include the construction of ditches and sedimentation pond following the NIRB's 2016 site visit have failed to contain runoff from the waste rock pile, thus making the second interception ditch constructed prior to the August 2017 site visit necessary to prevent untreated runoff from reaching the environment.

3.9 Follow Up to NIRB's 2015-2016 Recommendations

As a result of the NIRB's 2015-2016 monitoring program, the Board made twenty-two (22) recommendations to Baffinland in order to provide guidance on compliance to the Mary River Project Certificate. The recommendations are outlined below, including updates from the Proponent and the Board's follow up on the items:

Recommendation 1 (Monitoring Sea Levels and Storm Surges): *The Board requests that Baffinland provide its rationale for not submitting tidal gauge monitoring results to NIRB, and where applicable, identify or clarify any site-specific conditions that may have limited the Proponent's efforts to retrieve data from the tidal gauge located at Milne Port since 2014. The Board also requests that Baffinland provide information on how it intends to address these limitations in subsequent monitoring periods to ensure that sea levels and storm surges are adequately monitored. It is requested that this rationale, information and available monitoring data be submitted to the NIRB within 30 days' receipt of the Board's recommendations, with an accompanying discussion regarding any observed changes in sea levels, storm surges, and other climate related effects across key project locations.*

Baffinland submitted the tidal gauge data collected in 2014 at Milne Port and by the Canadian Hydrographic Service at Koluktoo and further indicated to the NIRB that it was in the process of evaluating options for collecting long-term data related to monitoring of sea levels and storm surges at Milne Port to meet Project Certificate Conditions 1 and 83. Baffinland committed to ensuring that the required instrumentation would be installed during the 2017 open water season.

Recommendation 2 (Submission of Quarry Management Plans): *The Board requests that Baffinland address this information gap by submitting the blasting management plans for quarry sites Q18 and P1 within 30 days' receipt of the Board's recommendations.*

Baffinland submitted the Quarry Management Plan for Q18 and the Borrow Source Management Plan for P1 for the NIRB's review.

Recommendation 3 (Potential Suspension of Sulphur Dioxide Monitoring): *The Board requires that the details of any contemplated changes to the ongoing air quality monitoring program, including rationale for the potential suspension of any monitoring parameters (e.g., SO₂ and NO₂), be provided to the NIRB and other authorizing agencies prior to terminating such monitoring activities. The NIRB requests that Baffinland provide an update on this matter within its 2016 Annual Report. Baffinland responded to the Board that it was re-assessing the SO₂ and NO₂ monitoring program due to challenges with air quality equipment maintenance and that an update on the status of SO₂ and NO₂ monitoring will be provided in the next (2016-2017) annual report.*

Baffinland noted that it was re-assessing the SO₂ and NO₂ monitoring program due to challenges with air quality equipment maintenance and that it intends to resume monitoring of these parameters in 2017.

Recommendation 4 (Fish Health Monitoring): *The Board requests that Baffinland consider improvements to its Core Receiving Environment Monitoring Program (CREMP) to further substantiate its conclusion of no mine-related effects on fish population. For example, one way*

this could be addressed is by monitoring biochemical changes and sub-lethal effects in fish populations, using markers of oxidative stress, status of antioxidant enzyme activities and conducting histopathology of gills, livers and gonads, to monitor mine-related effects in the aquatic environment. The NIRB requests that the Proponent support its conclusions regarding mine-related effects on fish health beyond reliance on morphometric parameters (length, size, weight, and age) and metal bioaccumulation trends in assessing effects; further consultation with experts from Fisheries and Oceans Canada and/or Environment and Climate Change Canada may assist in this regard. While the Board recognizes that the 2015 CREMP report indicated that iron concentrations were elevated at the Camp Lake system (CLT1), the NIRB notes that excessive iron uptake can induce cellular injuries, oxidative stress, lipid peroxidation and alteration in antioxidant enzyme activities, which can subsequently threaten fish health at the population level. It is requested that Baffinland highlight updates to its CREMP and include an expanded discussion of any conclusions made regarding mine-related effects on fish populations in the next Annual Monitoring Report.

Baffinland disagreed with the NIRB's comment and recommendation to make modifications to the Core Receiving Environment Monitoring Program, but has committed to provide an expanded discussion regarding mine-related effects on fish populations in the next annual monitoring report to the NIRB.

Recommendation 5 (Terrain Stability): *The Board requests that Baffinland provide information on the terrain stability status of the locations along the Tote road and the borrow pits previously identified for stabilization in 2014. Where applicable, Baffinland should provide descriptions of the specific mitigation measures undertaken to address permafrost degradation and terrain stability within the Project area. It is requested that this information be incorporated into Baffinland's next annual report to the NIRB.*

Baffinland indicated that an update would be provided in the 2016 Annual Report.

Recommendation 6 (Terrestrial Environmental Monitoring Program): *The Board requests that Baffinland provide sufficient justification for the suspension of the selected terrestrial monitoring programs listed on page 73 of its 2015 Terrestrial Environment Annual Monitoring Report, with an accompanying discussion of what implications these changes may have on providing data for long-term monitoring of valued ecosystem components. The Board further requests that Baffinland clarify whether it liaised with the local hunters and trappers organizations, community members and authorizing agencies prior to suspending the selected terrestrial monitoring programs in 2015, and further describe how any such engagement was carried out. Evidence of any support received from parties regarding changes to monitoring programs must also be substantiated. Finally, Baffinland must demonstrate how it has continued to meet the requirements of Project Certificate terms and conditions 34-39, 55a, and 65-74 and how it intends to ensure continued compliance going forward. It is requested that this information be provided within 30 days' receipt of these recommendations.*

Baffinland clarified that it has not discontinued any of the monitoring program and that for some programs, where changes are expected to occur slowly and annual monitoring has been deemed not to provide additional evidence, the frequency of the program has been reduced. Baffinland also noted that it will continue to complete monitoring programs based on the agreed upon time

frames with the working groups and will consider all input from the working groups on the design and frequency of the monitoring programs.

Recommendation 7 (Hydrodynamic Modelling): *The Board requests that Baffinland provide the referenced publication (CORI, 2015) titled “Preliminary estimates of seasonal ballast water dispersal at Milne Inlet, Baffin Island” and supporting information regarding the status of the hydrodynamic modelling results. The Board also requests that Baffinland provide details as to how and when it utilized additional bathymetry from Milne Inlet to model the anticipated ballast water discharges from ore carriers prior to commercial shipment in 2015, including discussion of how results of the model were used to update impact predictions regarding ballast water discharge. It is requested that this publication, the update and any pertinent reports or results be provided to the NIRB within 30 days’ receipt of these recommendations.*

Baffinland submitted the requested report within its response to the NIRB.

Recommendation 8 (Accidents and Malfunctions): *The Board requests that Baffinland provide the NIRB with an update regarding how it has complied with Project Certificate term and condition 174 to date, further highlighting its future plans to provide spill response equipment and annual training to Nunavut communities along the shipping route. In addition, a discussion should be provided as to how the training and equipment are expected to help improve upon response times in the event of a marine spill. It is requested that this update be provided within 30 days’ receipt of these recommendations, and that additional information pertaining to any training sessions held to date including materials provided to affected communities be included within the Proponent’s next annual reporting to the NIRB.*

Baffinland indicated that additional training and spill response capabilities for the community have been discussed with the Coast Guard in the past and that the Coast Guard was currently reviewing efforts to have additional spill response to deal with non-Baffinland related spill response activity. Baffinland also reported that it will follow-up with the Coast Guard on this commitment and will provide an update in the next NIRB Annual report.

Recommendation 9 (Adaptive Strategies for Dust Deposition): *The Board requests that Baffinland provide the NIRB with the identified documentation as absent within the 2015 Annual Report, and further clarify why the 2015 Air Quality and Noise Abatement Management Plan was not updated as required by the Board’s 2015 recommendation regarding which specific adaptive management measures that would be implemented in the event of high threshold level of dust deposition, exceeding levels predicted in the FEIS or FEIS Addendum. It is requested that these missing documentation be provided within 30 days’ receipt of these recommendations, and that the required update to Section 8 of Air Quality and Noise Abatement Management Plan be included within the Proponent’s next annual report to the NIRB.*

Baffinland noted that the Dust Management Protocol was attached to the Air Quality and Noise Abatement Management Plan submitted to the NIRB within the 2015 Annual Report in March 2016 and further indicated that updates would be made on the Dust Management Plan to reflect changes in measures and practices that will be adopted during 2017.

Recommendation 10 (Construction Noise on Marine Mammal Presence): *The Board requests Baffinland provide a copy of its construction noise monitoring report, which is to include information regarding compliance with the requirement of the Fisheries Act authorization including effects of construction noise on marine mammal presence. It is requested that this information be provided within 30 days' receipt of these recommendations.*

Baffinland submitted the Milne Ore Dock Construction Noise Verification Program Report which was noted to be Appendix G to the Milne Dock Construction Monitoring Report.

Recommendation 11 and 12 (Shipping and Marine Wildlife Management Plan): *The Board requests that Baffinland revise its Shipping and Marine Wildlife Management Plan (SMWMP) through engagement with the Marine Environment Working Group (MEWG), and provide updated information within the SMWMP regarding the timelines for the implementation of an anti-fouling system, including an action plan to integrate Inuit from potentially-impacted communities in the interpretation of results from the ongoing monitoring program. It is requested that this be included within the Proponent's next annual report to the NIRB.*

Baffinland responded that the SMWMP will be updated based on the feedback received from the MEWG meeting and reports on 2016 monitoring programs, and that a status update on the revision to the SMWMP would be discussed in the 2016 Annual Monitoring Report.

Recommendation 13 (Migration and Inuit Turnover Rate): *The Board requests that Baffinland, in consultation with the Qikiqtaaluk Socio-Economic Monitoring Committee, develop robust indicators to measure and survey the in-migration and out-migration of Inuit and non-Inuit residents in the North Baffin Local Study Area. The Board requests that this survey be conducted, and an assessment of the Project's Inuit employee turnover rate undertaken on an annual basis. Results of the survey should be provided and incorporated in the Proponent's next annual report to the NIRB.*

Baffinland indicated that it will discuss opportunities for a collaborative approach to the survey of in-migration and out-migration of Inuit and non-Inuit residents with the Qikiqtaaluk Socio-Economic Monitoring Committee, and will provide an update on the progress towards meeting this commitment in the 2016 Annual Monitoring Report.

Recommendation 14 (Non-Inuit LSA residents and Contractor Employees): *The Board requests that Baffinland, in consultation with the Qikiqtaaluk Socio-Economic Monitoring Committee, develop robust indicators to measure and survey the in-migration and out-migration of Inuit and non-Inuit residents in the North Baffin Local Study Area. The Board requests that this survey be conducted, and an assessment of the Project's Inuit employee turnover rate undertaken on an annual basis. Results of the survey should be provided and incorporated in the Proponent's next annual report to the NIRB.*

Baffinland indicated that it has continued to work with the Qikiqtani Inuit Association through the Inuit Impact and Benefits Agreement (IIBA) Joint Management and Joint Executive Committees to improve the availability of information on employment, payroll and the local economy. Baffinland also clarified that contractor payroll information is typically not available to Baffinland by contractors due to concerns related to commercial confidentiality and employee

privacy. Baffinland has committed to providing information related to aggregated Inuit/non-Inuit payroll data in its next IIBA annual report.

Recommendation 15 (Project Infrastructure in Watercourses): *The Board requests that Baffinland develop an action plan for the identified fish-bearing crossings, and that it prioritize those crossings with potential to become impassable in the future (e.g., BG-01). It is requested that updated information regarding the status of the affected fish-bearing crossings, including BG-01 be provided and incorporated into Baffinland's next annual report to the NIRB.*

Baffinland indicated that an action plan for fish bearing streams would be submitted as part of the Sediment Mitigation Action Plan, and that details regarding the status of fish bearing crossings would be provided in the 2016 NIRB Annual Report.

Recommendation 16 (Terrestrial Environment and Marine Working Groups): *The Board requests that Baffinland ensure that the Terms of Reference for both the Terrestrial Environment Working Group (TEWG) and Marine Environment Working Group (MEWG) appropriately reflect the organizations that are involved in the working groups, and if necessary provides additional clarity to expected level of participation for the various groups participating. Baffinland should also detail in its meeting notes how meetings are structured to allow for meaningful engagement. Consideration should be given to adoption of a consensus-based or quorum decision-making process to ensure that the record properly reflects parties' full contributions and inclusion of expertise, prior to implementing any changes to ongoing terrestrial and marine monitoring programs. It is requested that any specific changes to ongoing terrestrial and marine monitoring programs be reported directly to the NIRB on an ongoing basis.*

Baffinland indicated that it has discussed the need to revise both the MEWG and TEWG Terms of Reference (ToRs) at meetings on November 29 and 30, 2016 respectively, and that both groups were in agreement on the need for revisions to the Terms of References (ToRs). Baffinland also indicated that it will provide the MEWG and TEWG with a draft revised ToR including an updated membership list.

Recommendation 17 (Used Tires): *The Board requests that Baffinland provide an explanation as to why the used tire management measures committed to in the Final Environmental Impact Statement (FEIS) and FEIS Addendum for the Mary River Project and Early Revenue Phase, which stated that used tires would be stockpiled for shipment offsite (e.g., re-treading, reuse, or disposal), are not in place onsite. In addition, the Board requests that Baffinland clarify why used tires are not properly segregated in an on-site landfill facility as committed to within the Mine site Landfill/Landfarm site layout plan submitted to the Nunavut Water Board in 2011. It is requested that this information be provided within 30 days' receipt of these recommendations.*

Baffinland acknowledged that tire disposal continues to be an area for improvement and noting that it was reviewing disposal/reuse options for used tires at the site for 2017. Baffinland also indicated that the Waste Management Plan was currently being revised to improve used tire management following industry guidelines, and would also include strategies for clean-up of current storage areas, and plans for shipment of tires off site during summer sealift or disposal on site in a segregated area of the landfill.

Recommendation 18 (Waste Landfill): *The Board requests that Baffinland adhere to industry best practices for landfill operations, including maintenance of landfill litter fences to ensure waste materials are not dispersed offsite. It is further requested that Baffinland continue to evaluate its need for an upgraded litter fence around the active areas of the landfill in the light of changing environmental conditions at site. It is requested that an update regarding implementation of this recommendation be provided within the next annual report to the NIRB.*

Baffinland indicated that the old fence was removed during landfill berm extension activities and a new perimeter fence of approximately two (2) metres in height was installed around the open face of the landfill during September 2016. Baffinland also indicated that wind-blown waste captured by the fence is routinely removed and re-deposited back in the landfill.

Recommendation 19 (Uncontrolled Seepages from Waste Rocks): *The Board requests that Baffinland provide an explanation for the uncontrolled seepage of site contact water from the piles of potentially acid generating waste rock into the adjacent tundra, with an indication why mitigation measures and structures which Baffinland committed within the Final Environmental Impact Statement (FEIS) and FEIS Addendum to installing for the Mary River Project and Early Revenue Phase were not in place at the time of the NIRB 2016 site visit. Additionally, the Proponent is to provide a discussion of how it will ensure that site contact water is managed around the waste rock piles, and how discharge from the waste rock dump will be properly contained and channeled, and not allowed to flow into the adjacent tundra. It is requested that this information be provided within 30 days' receipt of these recommendations.*

Baffinland responded that construction of the waste rock settling pond and ditching system was completed over the spring and summer of 2016 and that by the end of July 2016, these modifications were already effective in directing most runoff originating from the waste rock stockpile to the sedimentation pond.

Recommendation 20 (Landfarm): *The Board requests that Baffinland continue to adhere to industry best practices for landfarm operations, including for management of contaminated snow and waste synthetic liners. It is further requested that Baffinland address the improper storage of used tires near the landfarm area. It is requested that an update regarding steps taken to address this recommendation be provided within the next annual report to the NIRB.*

Baffinland indicated that additional information would be provided in the 2016 NIRB Annual Monitoring Report with respect to the operations of its landfarm and management of contaminated snow and waste synthetic liners.

Recommendation 21 (Aesthetic Quality): *The Board requests that Baffinland take immediate steps to address the general clean-up required on site across all project areas, and plan for near-term removal of unused scrap materials, tires and synthetic materials currently stored temporarily at various project locations in order to improve the visual quality of the site as well as prevent potential impacts to the surrounding ecosystem from improper storage and uncontrolled dispersal of wastes. It is requested that an update on steps taken to better manage wastes and general site condition, including a plan for removal of miscellaneous scrap materials, be provided within 30 days' receipt of these recommendations.*

Baffinland responded that improvements in general housekeeping practices were implemented in 2016 and that good waste management and housekeeping practices would continue to be implemented throughout 2017. Baffinland also indicated that a more rigorous inspection program was also under development to track waste management items and housekeeping issues.

Recommendations 22 (Terrain Stability at Sewage Outfall Area): *The Board requests that Baffinland provide a response regarding how it plans to address the terrain stability issues noted at the sewage outfall area in relation to impacts resulting from freshet events or spring thaw. It is requested that this information be provided within 30 days' receipt of these recommendations.*

Baffinland responded that this identified location will be included as part of the bi-annual geotechnical inspection of the Mary River Project infrastructure as required under the Type "A" Water Licence in order to ensure that the area is monitored for stability and erosion. Baffinland also indicated that any recommendations from this inspection would be submitted to the Nunavut Water Board and will be acted upon appropriately.

4 FINDINGS AND CONCLUSIONS

During the 2016–2017 monitoring period, Baffinland demonstrated compliance with most of the reporting requirements as contained in the Project Certificate, and as applicable to the current phase of the Mary River project; however, the Board notes several deficiencies with respect to some monitoring items in the terrestrial and marine environment including mitigation measures across the site. Pursuant to the NIRB's 2016 Recommendation to the Proponent, the Board has identified several outstanding items requiring follow-up action by Baffinland in order to ensure that Baffinland achieves full compliance with the Mary River Project Certificate. Where the NIRB recommended to the Proponent that it include additional reporting information within its 2016 Annual Report, Baffinland either submitted the required additional information, or provided its rationale for not reporting on the items, but in some instances additional reporting information were not provided by the Proponent.

During the site visits in March and August 2017 respectively, the NIRB staff did not observe issues of significant environmental concerns, with the exception of several recurring issues related to used tire storage, waste landfill, uncontrolled seepages from waste rocks, dust emission from the crusher facility, liner entrenchment in the landfarm, terrain stability along the Tote Road and sewage outfall area, including dust suppression measures which has been discussed in more detail in the site visit reports ([Appendix I](#)). While certain Terms and Conditions of the Project Certificate pertain to later phases in the Mary River project's development and are not applicable at this stage in the NIRB's monitoring program, Baffinland is required to address all the information gaps and deficiencies noted in [Section 2.3](#) of this report by submitting the required information as pertaining to the following items:

- a. Results of ongoing monitoring of relative sea levels and storm surges at Milne Port (Conditions 1 and 83).
- b. Results of ongoing monitoring of ambient air quality monitoring (Conditions 7 and 8).
- c. Evidence of implementation of any specific initiative aimed to reduce greenhouse gas emissions (Condition 3).
- d. Updates to Mitigation Plan (Condition 10).

- e. Information regarding how protocols for monitoring for the potential introduction of invasive vegetation species has been incorporated into its Terrestrial Environment and Monitoring Plan.
- f. Details of how it has developed clear thresholds for determining if negative impacts as a result of vessel noise are occurring (Conditions 111 and 112).
- g. Evidence of conducting hydrodynamic modelling in the Milne Inlet Port area to determine the potential impacts arising from disturbance to sediments including re-suspension and subsequent transport and deposition of sediment (Condition 83a).
- h. Evidence of conducting a Ship Board Observer Program or an alternative program that incorporate an accidental strikes reporting protocol (Conditions 105 and 121).
- i. Development of early warning indicators of negative impacts of vessel noise on marine mammals (Conditions 110 and 111).
- j. Evidence of monitoring of Arctic char health in areas affected by the Project (Condition 48a).
- k. Evidence of implementing fouling monitoring on vessel hull (Condition 91).

5 SUMMARY

Baffinland commenced construction of the Mary River Project in May 2013, and to date the project is being conducted as committed to in the Final Environmental Impact Statement and Early Revenue Phase Addendum submitted by Baffinland. Since issuance of the original NIRB Project Certificate in December 2012 and the amended certificate on May 28, 2014, Baffinland has continued to work towards compliance with the Terms and Conditions of the Project Certificate that apply to the current phase of the development of the Mary River project. However, several issues noted during the NIRB's site visits, and as discussed throughout this report remain outstanding, which require Baffinland's attention as well as corrective actions. These issues are further addressed in the Board's 2017 Recommendations issued to the Proponent. Pursuant to Nunavut Agreement Sections 12.7.2 and 12.7.3, the NIRB will continue to work with Baffinland and other authorizing agencies in order to undertake the required evaluation of Project information, conduct and coordinate monitoring efforts, and to review results and Project compliance in accordance with the requirements set out in the Mary River Project Certificate No. 005.

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 Title: Technical Advisor II
 Date: November 27, 2017



Signature:

Reviewed by: Kelli Gillard P.Ag.
 Title: A/Director, Technical Services
 Date: November 27, 2017



Signature:

Appendix I: NIRB's Assessment of Baffinland's Compliance

Concordance Table for Amended EIS Guidelines for the Mary River Phase 2 Project Proposal - NIRB File 08MN053

PC Condition No.		Summary of Condition Requirement	NIRB Evaluation
Climate			
1	In progress	GPS/tidal gauge monitoring of sea levels and storm surges	Baffinland reported that the tidal gauge installed at Milne Port was removed during initial data collection/modelling in 2014, but the gauge was not re-installed at Milne Port in 2016, as such no data regarding sea levels and storm surges was available from Milne Port for the 2016 year. Further, Baffinland indicated that it does not see the need to install a tidal gauge(s) at Steensby Port as that phase of the project is currently inactive. As a result of the Proponent not installing a tidal gauge and undertaking GPS monitoring, the NIRB notes that Baffinland has not fully complied with the requirement of this term and condition for the reporting period.
2	Not applicable	Validation and update of climate change impacts of the project on the LSA and RSA.	Baffinland indicated that this term and condition was not applicable in 2016 and also noted to the NIRB that it is currently developing a climate change strategy in 2017 as a component of the Phase 2 Expansion Project. The NIRB reminds the Proponent that the assessment to validate and update climate change impact predictions should be viewed as a priority for the approved Mary River project and not limited to the scope of the proposed Phase 2 expansion project.
3	In progress	Exploring and implementing steps to reduce GHGs.	Baffinland only reported that it calculated the annual GHG emissions from the Project, but provided no evidence of the implementation of any specific initiatives within the context of its Climate Strategy aimed to reduce GHG in 2016. The NIRB notes that Baffinland has not fully complied with the term and condition of this Project Certificate.

4	Not applicable	Engage Inuit in climate change related research and studies.	No climate change related studies or research was conducted in 2016.
5	In compliance	Reasonable measures to ensure that Project-site weather related information is publically available.	Baffinland indicated that weather related information for Mine site and Milne Port are posted on Baffinland's website. The NIRB noted that this information was available on Baffinland corporate website.
6	In compliance	Provide results of SO2, NOX, and GHG emissions calculations using fuel consumption or other relevant criteria.	Baffinland has met the requirement of this term and condition.
Air Quality			
7	In progress	Update AQ and noise abatement plan to include continuous SO2 and NO2 monitoring at port sites to capture operations phase ship-generated emissions	Baffinland did not complete the required ambient air quality monitoring data during 2016.
8	In progress	Demonstrate through SO2 and NO2 monitoring at the mine site and ports that emissions remain within	Air quality monitoring was not completed in 2016.
9	In compliance	Provide calculations of GHG emissions at the port sites and other Project sources including Project	Baffinland has reported this information under PC #6.
10	Partial compliance	Update to dust management plan to include monitoring and management plans	Baffinland reported that Dust Management and Monitoring was incorporated into the Air Quality and Noise Management Plan and the Road Management Plan prior to the start of construction. In addition, a Dust Mitigation Plan was developed in 2016 in response to excessive dust, to identify specific adaptive management measures to be implemented to reduce dust emissions. The NIRB noted that it was unable to access the reference documents from the weblink in order to validate the updates/changes made to the plans, as such is unable to confirm whether the Proponent is in full compliance with this term and condition.
11	In compliance	Develop and implement Incineration Management Plan.	Not applicable in 2016.
12	In compliance	Conduct at least one stack test immediately following commissioning new incinerators.	Baffinland noted that no new temporary nor permanent incinerators were commissioned in 2016. Baffinland indicated that stack testing was conducted on the incinerators when commissioned in 2013.

Noise and Vibration

13	In compliance	Work with Fisheries and Oceans Canada to select overpressure threshold applied to explosives for the protection of fish and aquatic life.	Not applicable as no blasting occurred in 2016 within setback distances.
14	In progress	Conduct noise and vibration monitoring at Project accommodations in summer and winter during all phases of the project.	Baffinland indicated that it only conducted noise and vibration monitoring during the summer, and that due to equipment failure and availability of replacements winter testing was not done. Vibration levels barely to non-detectible. Noise levels appear acceptable.
14a	Not applicable	Demonstrate appropriate adaptive management practices during construction for activities with the potential to disrupt marine mammals.	Not applicable in 2016 as there was no active construction in the marine environment.
14b	In compliance	Demonstrate appropriate adaptive management practices for project activities with the potential to disrupt terrestrial wildlife and Project site users.	Baffinland indicated that noise levels are monitored in relation to worker health and safety, therefore mitigation measures to reduce noise and sensory disturbance are implemented with respect to human safety. Wildlife effects considered irrelevant by Terrestrial Environment Working Group.
15	In compliance	Collaborate with the QIA and local Hamlets when undertaking consultation with communities regarding railway, tote road and marine shipping operations. Provide visuals and discuss safety considerations.	Mary River Community Group formed and conducted tour of five North Baffin communities in November 2016. No details on presentations regarding safety.

Hydrology or Hydrogeology

16	Complete	Ensure that water related infrastructure is consistent with FEIS and FEIS addendum.	Regulatory approval received before construction of infrastructure. Water related infrastructure and facilities constructed to date are consistent with those proposed in the FEIS and FEIS Addendum for the ERP in terms of type, location, and scope.
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17	In compliance	Develop and implement measures to ensure that all effluent satisfies discharge criteria established by relevant regulatory authorities.	Water sampling reported 3 minor incidents of exceeding effluent limits, and 2 incidents of MMER-mandated sampling not carried out due to samples being held for too long because of weather-related delays.
18	Not applicable	Confirm and update, as needed, the approximate fill time of the mine lake pit identified in the FEIS.	Not applicable in 2016.
19	In compliance	Develop and implement adequate water infrastructure monitoring to ensure that natural water flow is not significantly hindered. Monitor and report water withdrawal rates and water use for domestic and industrial purposes.	Reports submitted to INAC, NWB, and QIA. Withdrawal rate did not exceed licences.
Groundwater and surface waters			
20	In compliance	Monitor the effects of explosive residue and by-products from Project related blasting. Implement measures to ensure explosives do not negatively effect the surrounding area.	Elevated ammonia and nitrate levels observed downstream of active areas, almost all below CCME guidelines, all acutely non-lethal.
21	Partial compliance	Ensure that the scope of the Aquatic Effects Monitoring Program (AEMP) is consistent with the requirements in the condition.	AEMP revision 2 submitted to stakeholders in April 2016, not yet approved or in use.
22	Complete	Develop a Sediment and Erosion Management Plan.	Incorporated into Surface Water and Aquatic Ecosystems Management Plan (SWAEMP), which was completed prior to construction. Any future revisions of the aforementioned plan would be expected to be submitted to the NIRB.
23	In progress	Develop and implement Groundwater Monitoring and Management Plan.	Incorporated into Surface Water and Aquatic Ecosystems Management Plan (SWAEMP), which was completed prior to construction. Any future revisions of the aforementioned plan would be expected to be submitted to the NIRB.
24	In compliance	Ensure that effluent discharge conditions are met all times	See results of #17

25	In compliance	Identify sensitive landforms and develop and implement measures to minimize Project impacts on identified landforms.	Geotech survey carried out in 2016 to inspect dykes and berms, review new structures for conformity to design, and inspect proposed north railway to Milne Port for Phase II Development proposal. Little to no erosion identified. Settlement identified in settling ponds, appears to be in active layer. Localized permafrost degradation along Tote Road and Mine Haul Road. Major ice lenses identified along rail alignment, requiring moving alignment.
26	In compliance	Develop and Implement Erosion Management Plan.	Incorporated into Surface Water and Aquatic Ecosystems Management Plan (SWAEMP), which was completed prior to construction. Any future revisions of the aforementioned plan would be expected to be submitted to the NIRB.
27	In compliance	Record notes on impacts to the aesthetic value of the Project area heard in public consultations.	Implemented StakeTracker information management software. Community meetings did not indicate significant concern about changes to topography and landscape. Single comment about desire to protect landscape, most comments on landscape concerned use for traditional activities rather than appearance.
28	In compliance	Monitor Project effects on permafrost and ensure its integrity.	See results of #25. Third party consultants hired to deal with permafrost degradation along roads, preventative and mitigation measures planned to be carried out 2017.
29	In compliance	Provide construction design and drawings for review and acceptance by relevant authorities. Provide as-built drawings to authorities following construction.	Reported as required to regulatory agencies and stakeholders.
30	In compliance	Develop site-specific quarry operation and management plans before the development of any potential quarry site or borrow pit.	Not applicable as no additional quarries were developed in the reporting period.
Vegetation			

31	In compliance	Ensure that Project activities are planned and conducted to minimize the Project footprint.	All work carried out within the Potential Development Area, current footprint below FEIS.
32	In compliance	Ensure that all supplies brought to site are clean of soil that could contain plant seeds not naturally occurring in the area. Inspect vehicle tires prior to initial use in Project area.	Inspections of vehicles carried out prior to offload. No exotic plants identified in prior surveys, no survey in 2016.
33	Complete	Include relevant monitoring and management plans within the TEMMP.	TEMMP included required plans. Any revisions to the plan would be expected to be submitted to the NIRB
34	In compliance	Conduct soil sampling to determine levels of metals in soils where berry producing plants are, near any potential development area prior to commencing operations.	Samples from 50 sites taken. One soil and one lichen sample exceeded threshold. Insufficient data to indicate any trend.
35	Not applicable	Monitor baseline metal levels in organ tissue of caribou harvested within the local study area, prior to commencing operations.	Not applicable in the reporting period as no caribou were being harvested within the local study area.
36	In compliance	Establish an on-going monitoring program of vegetation used as caribou forage near project development areas, prior to commencing operations.	Surveys carried out, no evidence of significant change due to operations.
37	Not applicable	Incorporate methods to evaluate the potential introduction of invasive plant species into the Terrestrial Environment and Monitoring Plan. Report non-indigenous plant species to the Government of Nunavut.	No surveys conducted were conducted in 2016.
38	In compliance	Review and adjust all monitoring information and management plans annually and adjust as needed to prevent/reduce adverse project effects on vegetation.	Additional transects for monitoring established, increase of sample size to 50 sites, 100 samples (50 soil, 50 lichen).

39	In compliance	Develop a progressive revegetation program for disturbed areas no longer in use.	Proposed Reclamation Research Program under QIA review to identify best practices for re-vegetation. Survey of previously disturbed sites carried out to observe natural rates of re-vegetation.
40	In compliance	Include revegetation plans in the Site Reclamation Plan that promotes progressive reclamation compatible with the surrounding environment.	Proposed Reclamation Research Program under QIA review to identify best practices for re-vegetation.
41	In compliance	Maintain a 100-m naturally vegetated buffer between the high water mark of any fish-bearing water bodies and permanent quarries with the potential for acid rock drainage, unless otherwise approved.	No new quarries within buffers, existing quarries maintain buffer.
42	In compliance	Maintain a 30-m naturally vegetated buffer between the mining operation and adjacent water bodies.	Bi-weekly inspections conducted to ensure buffers are maintained.
43	In compliance	Submission of a Site Drainage and Silt Control Plan to the relevant authorities prior to the start of construction.	Incorporated into Surface Water and Aquatic Ecosystems Management Plan (SWAEMP), which was completed prior to construction. Any future revisions of the aforementioned plan would be expected to be submitted to the NIRB.
44	Not applicable	Meet or exceed guidelines for blasting thresholds set by Fisheries and Oceans Canada for the protection of fish and fish habitat.	No blasting near water in 2016.
45	In compliance	Adherence to the No-Net-Loss principle at all phases of the Project.	Obsolete seacan crossing at BG-50 removed 2016. Assessment in 2016 indicates previous compensation work still successful. More rapid colonization of fish offset than expected observed.
46	In compliance	Ensure runoff from fuel storage and maintenance facility areas, sewage and wastewater other facilities generating liquid effluent and runoff meet discharge requirements.	See #17. Several sedimentation events exceeded criteria for total suspended solids due to freshet. Reported to relevant authorities, DFO issued a Fisheries Act Direction, INAC a letter of non-compliance. Completion report produced by Baffinland described measures to address issue, accepted by DFO.

47	Partial compliance	Design and construct all Project infrastructure so as they do not prevent or limit the movement of water in fish bearing streams.	Perching or hanging culverts noted in several locations potentially impacting fish movement. BG-50 perching preventing upstream fish movement in south channel, seacan bridge removed in November 2016. Culverts at BG-01 becoming increasingly perched and may soon be impassable. Tote Road Earthworks Execution Plan being developed to improve fish passage and erosion and sedimentation issues noted at several crossings.
48	In compliance	Engage with Fisheries and Oceans Canada and the QIA to explore Project specific thresholds for blasting that would exceed guidelines.	No blasting in or near water in 2016.
48(a)	In compliance	Conduct additional surveys for the presence of arctic char in freshwater bodies and ongoing monitoring of arctic char health where applicable, within watersheds proximal to the mine, tote road and Milne Inlet Port project development areas, including but not limited to, Phillips Creek, Tugaat and Qurluktuk. Consult with MHTO re: the design, timing, and location of proposed surveys and ongoing monitoring.	2016 Marine Environmental Effects Monitoring Program (MEEMP) studies carried out
Terrestrial Environment			
49	Complete	Establish a Terrestrial Environment Working group to serve as an advisory body.	TEWG established 2013. Terms of reference revised in 2016 to include Mittimatalik HTO to membership, organizational structure revisions, and increase in meetings (via teleconference).
50	Complete	Develop and implement a Project specific terrestrial monitoring plan.	Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) in place.

51	In compliance	Consider and, where appropriate, cooperate with relevant regional and/or community-based monitoring initiatives that raise issues or produce information pertinent to mitigating project-induced impacts. Give special consideration for supporting regional studies of population health and harvest programs for North Baffin caribou.	Baffinland supported GN's North Baffin 2016 fall caribou survey, discussing supporting 2017 spring survey. No harvest programs known by Baffinland.
52	Not applicable	Initiate and develop a timeline to test and implement deterrence mechanisms for caribou near hazardous areas, within 3 months of issuances of the project certificate. Report information back to the Terrestrial working group.	No caribou seen near any of the project area in 2016
53	In compliance	Proponent shall demonstrate all measures outlined in the condition to mitigate impacts to caribou.	Measures in place and carried out, but no caribou detected in 2016.
54	In compliance	Provide an updated Terrestrial Environment Monitoring Plan which includes all aspects included in the condition.	Terrestrial Environment Monitoring Plan in place, reviewed and updated annually.
55	Not applicable	Develop an adaptive management plan applicable to wolves and wolf habitats in collaboration with the Government of Nunavut.	No significant wolf population in project area. Current management plan is to avoid wolf dens, if and when identified.
56	In progress	Develop a progressive strategy for the recovery of terrestrial wildlife habitat that is consistent with the Nunavut Wildlife Act. To ensure progressive reclamation of disturbed wildlife habitat.	No results provided, although Baffinland indicated that an Interim Mine Closure and Reclamation Plan was in place to support the rehabilitation of affected areas to viable and self-sustaining ecosystems/habitat that are functional.
57	In compliance	Report annually on terrestrial environment monitoring efforts including information included in the condition.	Reported. No trends reported except in increase in vehicle traffic due to production increase. No monitoring of timing of snowmelt and green-up; Baffinland is not clear as why this information is necessary or how to qualify the timing.

58	In compliance	Incorporate a review section in the NIRB annual report including the information outlined in the condition.	Done. Baffinland notes no known reports of VEC regional trends required for 58(a), or caribou in area for 58(b).
59	In progress	Ensure that aircraft maintain, whenever possible altitudes outlined in the condition. Develop measures to ensure all employees and subcontractors providing aircraft services are respectful of wildlife and Inuit harvesting that may occur in the Project development area.	Helicopter flights have generally not been compliant with condition.
60	Complete	Develop a blasting program to minimize the effects of blasting on terrestrial wildlife, prior to construction.	No known harm to wildlife by blasting during construction.
61	Complete	Implement a stop work policy when wildlife in the area may be endangered by Project work, whenever practical and not causing human safety concerns.	Policy is within the Environmental Protection Plan (EPP). No report of it being required in 2016.
62	Complete	Prohibit Project employees from transporting firearms to site and from operating firearms in the Project area for the purpose of wildlife harvest.	No hunting or fishing on Baffinland leases in 2016, no firearms transported to site by employees.
63	In compliance	Liaise with local Hunters and Trappers Organizations in advance of carrying out terrestrial wildlife surveys. Meet with the organizations annually to discuss wildlife monitoring.	Mittimatalik Inlet HTO added to Terrestrial Working Group (TEWG).
64	Complete	Ensure the environment protection plan incorporates waste management provisions to ensure carnivores are not attracted to Project site(s).	Some carnivore interactions due to non-conformance of waste sorting guidelines. Arctic fox habituation occurs even with proper attractant mitigation. One rabid fox documented.
Birds			

65	In compliance	Ensure all employees at site receive bird awareness training (avoidance of nests and large concentrations of foraging and moulting birds).	All employees receive training semi-annually. No reported disturbance of nests.
66	In compliance	Avoid bird Species at Risk and their nests; establish avoidance zones as per TEMMP.	Completed, no nests or eggs of SARA listed species encountered.
67	In compliance	Ensure mitigation and monitoring strategies for bird Species at Risk are updated for consistency with applicable status reports, recovery strategies, action plans and management plans.	ECCC provides Baffinland with updates through participation in TEWG.
68	Complete	Install flashing red, red strobe or white strobe lights and guy-wire deterrents on communications towers. Consider reducing lighting when possible in areas where it may serve as an attractant to birds or other wildlife.	Strobe lighting deemed irrelevant by the Proponent as the majority of birds are in the area during the period of 24 hour daylight. Reflectors placed on guy wires of communication towers.
69	In compliance	Prior to bird migrations and nesting, identify and install nesting deterrents (e.g. flagging) to discourage birds from nesting that will be disturbed by construction/clearing activities.	No deterrents used. No apparent nesting attempts by birds in cleared areas.
70	In compliance	Protect any nests found (or indicated nests) with a buffer zone as per setback distances outlined in the TEMMP.	No bird nests located in 2016.
71	In progress	<p>Subject to safety requirements, the Proponent shall require all project related aircraft to maintain a cruising altitude of at least:</p> <p>a. 650 m during point to point travel when in areas likely to have migratory birds</p> <p>b. 1100 m vertical and 1500 m horizontal distance from observed concentrations of migratory birds</p>	<p>Generally not compliant</p> <p>No concentrations observed</p>

		c. 1100 m over the area identified as a key site for moulting snow geese during the moulting period (July-August), and if maintaining this altitude is not possible, maintain a lateral distance of at least at least 1500 m from the boundary of this site	Generally not compliant
72	In progress	Ensure that pilots are informed of minimum cruising altitude guidelines and that a daily log or record of flight paths is maintained and available for regulatory authorities.	Pilots informed, but generally non-compliant. Some are due to weather, movement of personnel and equipment, or pilot safety concerns. Beginning in 2017 pilots will be required to submit logs with the reason for the non-compliance.
73	Complete	Develop detailed and robust mitigation and monitoring plans for migratory birds taking into consideration input from relevant organizations.	Complete, existing monitoring programs continued in 2016.
74	Complete	Develop and update relevant monitoring plans for migratory birds prior to construction including the key indicators included in the condition.	Complete, existing monitoring programs continued in 2016.
75	In compliance	Report annually on terrestrial habitat loss due to the Project to verify impact predictions and project footprint.	All construction completed with PDA, project footprint below FEIS assessment. Monitoring is ongoing.
Marine Environment			
76	Complete	Develop a comprehensive environmental effect monitoring program to address concerns and identify potential impacts on the marine environment.	Marine Environmental Effects Monitoring Plan (MEEMP) in place.
77	Complete	Establish a Marine Environment Working Group.	MEWG established, revisions to terms of reference begun 2016, similar changes as to TEWG.
78	In compliance	Update baseline information for landfast ice using a long term data-set and with inter-annual variation.	Updated as new information is available, last update 2015.

79	In compliance	Provide the Canadian Hydrographic Services with bathymetric data and other information in support of Project shipping where possible.	CHS collected bathymetry around the ore dock in 2016.
80	Deferred	Prior to commercial shipping of iron ore, a detailed risk assessment is to be conducted for Project related shipping accidents.	To be conducted prior to ice breaking from Steensby Port. Not applicable in 2016.
81	Not applicable	Reassess the potential for ship wake impacts to cause coastal change following changes to the proposed shipping route.	No changes in shipping routes.
82	Not applicable	Encouraged to have ore carriers to subjected to sea trials to measure wake characteristics at various speeds.	Baffinland believes this concerns the southern shipping route, which is not being used.
83	In progress	Install tidal gauges at Steensby and Milne Ports to monitor sea levels and storm surges.	Baffinland indicated that gauge was not re-installed in Milne Inlet. Not compliant.
83 (a)	Partial compliance	Identify potential for and conduct monitoring to identify effects of sediment redistribution associated with construction and operation at Milne Port	Monitoring conducted, but insufficient data to indicate trends.
84	Not applicable	Update sediment redistribution modelling once ship design has been completed and sampling should be undertaken to validate the model and inform sampling sites and the monitoring plan.	Baffinland believes this concerns the southern shipping route, which is not being used, and ore carriers which have not yet been commissioned.

85	Not applicable	Develop a monitoring plan to verify Project impact predictions associated with sediment redistribution resulting from propeller wash in shallow water locations along the shipping route. Additional mitigation measures are required if monitoring detects negative impacts.	Baffinland believes this concerns the southern shipping route, which is not being used, and ore carriers which have not yet been commissioned.
86	Partial compliance	Prior to commercial shipping of iron ore, use more detailed bathymetry collected from Steensby and Milne Inlets to model anticipated ballast water discharges from ore carriers. This information should be used to update ballast water discharge impact predictions and sampling should be conducted to validate the model.	Canadian Hydrographic Service collected bathymetry around the ore dock in 2016. Updated ballast water model to be generated in 2017 for Cape-size vessels associated with Phase 2 Development proposal.
87	Partial compliance	Develop a detailed monitoring program at a number of sites over the long term to evaluate changes to marine habitat and organisms and to monitor for non-native introductions resulting from Project-related shipping. Initiate program several years prior to any ballast water discharge at Steensby or Milne Inlets.	Marine Environmental Monitoring Program carried out in 2016. Insufficient data collected as yet to identify trends.
88	Complete	Prior to commercial shipping of iron ore, provide update risk analysis regarding ballast water discharge to assess the adequacy of treatment and implications on the receiving environment.	Risk assessment complete 2013, additional baseline data collected 2014-2016 to update the model for Phase 2 Development proposal.

89	In progress	Develop and implement a ballast water management program that may include the treatment and monitoring of ballast water discharges in a manner consistent with or exceeds applicable regulations. The management program should reflect all inclusions outlined in the condition.	Ship logs inspected to confirm mid-ocean ballast water exchange as per Canadian regulations. Ballast water measured in random tanks to confirm salinity consistent with mid-ocean exchange. Several unusually high readings indicate a potential problem with the measuring technique or equipment that has to be assessed.
90	Complete	Incorporate into the Project Shipping and Marine Wildlife Management Plan provisions to achieve compliance with the requirements under the International Convention for the Control and Management of Ships Ballast Water and Sediment (2004) or its replacement regulation as amended.	Incorporated into Shipping and Marine Wildlife Management Plan (SMWMP)
91	In progress	Develop a detailed monitoring plan for Steensby and Milne Inlets for fouling that complies with all applicable regulatory requirements and guidelines issued by Transport Canada.	No trends identified based on 2014-2015 data. No sampling to monitor hull fouling. No TC regulations or guidelines issued. SCUBA monitoring of hulls at Milne proposed for 2017.
92	In compliance	Ensure that the Proponent maintains the necessary equipment and trained personnel to respond to all sizes of potential spills in a self sufficient manner.	In place. Spill response exercises carried out annually during fuel transfer at Milne Port.
93	Not applicable	Prior to construction, based on vessel selection, reassess the risk analysis of using vessel -based fuel storage with the inclusions outlined in the condition.	Not applicable as the the use of vessel-based fuel storage is not currently proposed.
94	Deferred	Consult directly with affected communities regarding its plans for over-wintering of fuel in Steensby Inlet.	Baffinland indicated that it would re-visit this condition if overwintering of fuel at Steensby Inlet is proposed.
95	Deferred	Meet or exceed all regulatory regulations and requirements to the practice of overwintering of a fuel vessel at Steensby Inlet with reporting to NIRB and Transport Canada.	Baffinland indicated that it would re-visit this condition if overwintering of fuel at Steensby Inlet is proposed.

96	Deferred	Update the NIRB on the results of all compliance monitoring and site inspections undertaken by government agencies for the overwintering of a fuel vessel at Steensby Inlet.	Overwintering of fuel in Steensby Inlet is not currently proposed.
97	Complete	Prior to commercial shipping of iron ore, conduct fuel spill dispersion modelling that minimally includes those items outlined in the condition.	Baffinland indicated that there have been no changes to the shipping practices since the revised oil spill modelling was conducted, therefore no updates are required.
98	Complete	Incorporate the results of revised fuel dispersion modelling into its impact predictions for the marine environment and the spill response and emergency preparedness plans.	The revised fuel spill modelling completed in 2015 was used to revise Baffinland's spill response and emergency preparedness plans, including the development of a Spill at Sea Response Plan.
Marine Wildlife			
99	Not applicable	With the Marine Environment Working Group, consider and identify priorities for conducting supplemental baseline assessments for the items outlined in the condition.	In compliance. Monitoring activities in Steensby Inlet are inactive
100	Not applicable	Update the Project Shipping and Marine Wildlife Management plan to include avoidance of polynyas and mitigation measures designed for potential fuel spills along the shipping lane during the winter months.	Baffinland indicated that there is currently no winter shipping or ice breaking occurring as part of the Mary River Project so there is no need to address fuel spills during winter months in the SMWMP.
101	Applicable items are complete for 2016. Some items are Not applicable in 2016.	Incorporate all items outlined in the condition into the appropriate monitoring plans.	Several items were not applicable in 2016 (a, f and h) but in general Baffinland achieved compliance with the expectations of the terms and conditions of the Project Certificate.

102	In compliance	Ensure that routing of project vessels is tracked and recorded for both the southern and northern shipping routes, with data made real-time available to communities in Nunavut and Nunavik.	Baffinland has contracted exactAIS, a global vessel monitoring and tracking service based on AIS (Automatic Identification System) data from polar orbiting satellites to track and report on vessel movements. Baffinland has made vessel routing accessible to the public.
103	In compliance	Report annually to the NIRB regarding project related ship track and sea-ice information including all items outlined in the condition.	No significant deviations from the nominal shipping route have occurred in the first two years of iron ore shipping (2015 and 2016), and Baffinland will continue to monitor ship tracks with the use of the exactAIS service.
104	Not applicable	Plan shipping routes to Steensby Port in accordance with the items outlined in the condition. Summarize all incidences of significant deviations from the nominal shipping route presented in the FEIS to/from Milne and Steensby Ports.	Shipping to/from the Steensby Port is not a currently active part of the project, therefore 104a is not currently applicable. No significant deviations from nominal shipping routes to/from Milne Port were made in 2016.
105	In progress	Ensure that measures to reduce the potential for interaction with marine mammals particularly in Hudson Strait and Milne Inlet area identified and implemented prior to commencement of shipping operations.	No activity took place at Steensby Port in 2016. In Milne Inlet, ship-mammal interactions are monitored by the shore-based marine mammal monitoring program at Bruce Head. Baffinland's SMWMP identifies that "Project vessels will travel at a speed of 7-10 knots when transiting through Eclipse Sound and Milne Inlet".
106	In progress	Ensure that shipboard observers are employed during seasons where shipping occurs and provided with the means to effectively carry out the duties. The role of shipboard observers should be taken into consideration in the design of any Project purpose built ships.	The Ship-based Observer program was put on hold in 2016 due to safety concerns about the on-boarding of the observers. No vessel collisions with marine mammals were recorded over the 3 years of monitoring. Very few sightings of marine mammals were observed over the 3-year period (65 marine mammals in 2013, 12 in 2014, and 16 in 2015).
107	In progress	Revise the proposed 'surveillance monitoring' to improve the likelihood of detecting strong marine mammal, seabird or seaduck responses occurring too far ahead of the ship to be detectable by observers aboard the ore carriers.	Ship-based surveillance monitoring was conducted in 2013, 2014, and 2015, but was discontinued in 2016. It was found that very few marine mammals were visible to observers on board the vessels, and there were safety concerns about having observers board the vessels at sea, which was accomplished by transferring the observers onto the ship from a smaller vessel based in Pond Inlet.

108	Not applicable	Ensure that data produced by the surveillance monitoring program is analysed by experienced analysts (in addition to being discussed as proposed in the FEIS) to maximize effectiveness in providing baseline information and/or detecting potential effects. Data from the long term monitoring should be treated with the same rigor.	The ship-based surveillance monitoring program was discontinued after three years because neither observers nor UAV technology were demonstrated to be effective in detecting marine mammal, seabird or seaducks ahead of the ship, and there were safety issues for transfer of observers to the ship.
109	Partial compliance	Conduct a monitoring program to confirm the predictions in the FEIS with respect to disturbance effects from ships noise on the distribution and occurrence of marine mammals.	Baffinland indicated that in 2016, a Marine Mammal Integration Report was prepared to compile the existing information regarding the disturbance effects from ships noise on the distribution and occurrence of marine mammals. The NIRB could not verify the information as presented by Baffinland as the weblink to the referenced document was not functional
110	In progress	Immediately develop a monitoring protocol that includes acoustical monitoring to assess short, long term and cumulative effects of vessel noise on marine mammals. Work with the MEWG to identify appropriate early warning indicators that will ensure rapid identification of negative impacts along southern and northern shipping routes.	No early warning indicators of negative impacts of vessel noise have been developed.
111	In progress	Develop clear thresholds for determining if negative impacts as a result of vessel noise is occurring.	Baffinland indicated it did not comply with this condition.

112	In progress	Prior to commercial shipping of iron ore, in conjunction with the MEWG, develop a monitoring protocol that includes acoustical monitoring that provides an assessment of the negative effects of vessel noise on marine mammals. Consideration of early warning indicators and thresholds of impacts should be included.	No early warning indicators of negative impacts of vessel noise have been developed. Passive underwater acoustic monitoring was conducted by Greeneridge on behalf of Baffinland at sites adjacent to Bruce Head and the mouth of Koluktoo Bay during ice-free periods of 2014 and 2015 (Early Revenue Phase of the project). The two acoustic sites quantified vessel noise and detected the acoustic presence of marine mammal calls.
113	Partial compliance	Conduct monitoring of marine fish and fish habitat including monitoring for Arctic Char stock size and health condition in Steensby and Milne Inlets, as recommended by the MEWG.	Arctic char has been monitored each year from 2013 to 2016 by gill netting and Fukui trapping in Milne Inlet. In 2016, 149 Arctic char were captured. Fork length ranged from 300 to 890 mm (mean 560 mm). Weights of 300-7,300 g were recorded (mean 2,445 g). Body burden analysis, gut content analysis, and age determination are ongoing
114	Not applicable	In the event of the development of a commercial fishery in Steensby Inlet or Milne Inlet areas, in conjunction with the MEWG, shall update the monitoring program for fish and fish habitat to ensure that the ability to identify Arctic Char stock(s) and any changes in stock size and structure of affected stocks	No commercial fishery was developed in the vicinity of the two port areas in 2016.
115	In compliance	Continue to explore off-setting options in both the freshwater and marine environment to offset serious hard to fish which will result from the construction and infrastructure associated with the project.	The ore dock was constructed in 2014, and the offsetting plan was implemented. The 2016 Milne Ore Dock Fish Offset Monitoring Annual Report was submitted to the DFO in January 2017. The annual report demonstrates that the off-setting plan has been supporting biological activity at all trophic levels as expected.
116	Not applicable	Prior to construction, develop mitigation measures to minimize the effects of blasting on marine fish and fish habitat, marine water quality and wildlife that includes compliance with the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.	Blasting in the marine environment has not occurred on site to date.

117	Not applicable	Ensure that blasting in, and near, marine water shall only occur during periods of open water. Blasting in, and near, fish-bearing freshwater should occur to the greatest degree possible in open water. Blasting during ice-covered periods must meet requirements established by Fisheries and Oceans Canada.	Not applicable as blasting in the marine environment has not occurred on site to date.
118	Complete	Prior to construction, incorporate into the appropriate mitigation plan, thresholds for the use of specific mitigation measures meant to prevent or limit marine wildlife disturbance.	A detailed mitigation plan was developed for dredging and vibratory pile driving that was undertaken during construction of the ore dock (Ruskin Construction, 2014). Monitoring was undertaken during dock construction to confirm the effectiveness of the mitigation measures (ERM, 2015).
119	Not applicable	In conjunction with the MEWG, monitor ringed seal birth lair abundance and distribution for at least two years prior to the start of ice-breaking to develop a baseline, with continue monitoring over the life-time of the project.	Not applicable. Ice breaking has not been required in the Early Revenue Phase of the project; however, Baffinland indicated that a monitoring study of ringed seal lairs in Eclipse Sound is being considered for winter 2017-2018 to support the potential for winter sealifts associated with the Phase 2 Development proposal.
120	Complete	Ensure, subject to vessel and human safety, that all Project shipping adhere to mitigation measures outlined in the condition for the protection of marine wildlife.	The SMWMP provide guidance on ship speeds and ship tracks that should be followed. Baffinland indicated that ore vessels travelled at a maximum speed of 8.9 knots which is within the required 7-10 knots. However, cargo vessel speeds were measured in the 12-13 knot range.
121	In progress	Immediately report any accidental contact by Project vessels with marine mammals or seabird colonies to Fisheries and Oceans Canada and Environment Canada, respectively.	There were no observations of accidental contact between project vessels and marine mammals or seabird colonies during the three years that the ship board observer program was run. No notifications of accidental contact were reported by Baffinland in 2016 from vessel operators, observers at the Bruce Head Shore Based Observer station or local hunters.
122	In compliance	Summarize and report annually to the NIRB regarding accidental contact by Project vessels with marine mammals or seabird colonies through the applicable monitoring report.	No contacts reported.

123	Not applicable in 2016 (discontinued)	Provide sufficient marine mammal observer coverage on Project vessels to ensure that collisions with marine mammals and seabird colonies are observed and reported throughout the lifecycle of the Project. The marine wildlife observer protocol should include those items outlined in the condition.	Ship-based surveillance monitoring was conducted in 2013, 2014, and 2015, but was discontinued in 2016. It was found that very few marine mammals were visible to observers on board the vessels, and there were safety concerns about having observers board the vessels at sea, which was accomplished by transferring the observers onto the ship from a smaller vessel based in Pond Inlet.
124	In compliance	Prohibit all Project employees from recreational boating, fishing and harvesting of marine wildlife in Project areas, including Steensby and Milne Inlets.	No incidences of project personnel hunting or fishing within lands leased to Baffinland occurred in 2016.
125	Not applicable	Prior to the use of acoustic deterrent devices, carry out consultations with communities along the shipping routes and nearest to Steensby and Milne Inlet Ports to assess acceptability of the devices. Feedback from consultation should be incorporated into the mitigation plan.	No acoustic deterrents have been considered for use on the Project to date.
125(a)	Complete	Consult with potentially affected communities and groups, particularly the Hunters and Trappers Organizations regarding the identification of Project vessel anchor sites and potential areas of temporary refuge for Project vessels along the shipping routes within the Nunavut Settlement Area. Feedback from the consultation should be incorporated.	The Mittimatalik Hunters and Trappers Organization (MHTO) sits on the MEWG with two members of the MHTO participating in the November 2016 MEWG meeting.
126	In compliance	Design monitoring programs to ensure that local users of the marine area in communities along the shipping route have opportunity to be engaged throughout the life of the Project in assisting with monitoring and evaluating potential Project-induced impacts and changes in marine mammal distributions.	The Mittimatalik Hunters and Trappers Organization (MHTO) sits on the MEWG with two members of the MHTO participating in the November 2016 MEWG meeting.

127	In compliance	Ensure that communities and groups in Nunavik are kept informed of Project shipping activities and are provided with opportunity to participate in the continued development and refinement of shipping related monitoring and mitigation plans.	Baffinland has made vessel routing accessible to the public.
128	Complete	Consult with local communities as fish habitat off-setting options are being considered and demonstrate incorporation of this input in the design of the Fish Habitat Off-Setting Plan.	Baffinland and the Department of Fisheries and Oceans Canada (DFO) consulted the community of Pond Inlet in 2013 and 2014 regarding the development of off-setting measures for the ore dock.
Population Demographics			
129	In compliance	Encouraged to engage in the work of the Qikiqtaaluk Socio-Economic Monitoring Committee along with other agencies and affected communities, endeavoring to identify areas of mutual interest into a collaborative monitoring framework that includes socio-economic priorities related to the Project, communities and the North Baffin region as a whole.	Socio-economic performance of the Project in 2016 was assessed using socio-economic indicators for a number of Valued Socio-Economic Components (VSECs) included in the Final Environmental Impact Statement (FEIS; Baffinland, 2012). The information presented in the 2016 Socio-Economic Monitoring Report supports many of the FEIS predictions for these VSECs and identifies a number of positive effects the Project has had.
130	In compliance	Consider establishing and coordinating with smaller socio-economic working groups to meet Project specific monitoring requirements throughout the life of the Project.	Baffinland continues to engage with the QSEMC and participates in the Mary River SEMWG, a sub-set of the QSEMC whose members include Baffinland, the Government of Nunavut, the Government of Canada, and the QIA. A Terms of Reference for the SEMWG (which identifies socio-economic monitoring priorities and objectives for the Project) has been finalized.

131	In compliance	The Qikiqtaaluk Socio-Economic Monitoring committee is encouraged to engage in monitoring of demographic changes including the movement of people into and out of the North Baffin communities and the territory as a whole.	Baffinland has provided demographic change information in the 2016 Socio-Economic Monitoring Report.
132	In compliance	Encouraged to partner with other agencies in the North Baffin region, the Municipal Training Organization and the Government of Nunavut in developing/implementing programs which encourage Inuit to remain living in their home communities while seeking ongoing and progressive training and development.	Between 2014 and 2016, the Work Ready Program was delivered to new hires only. In 2015, Baffinland offered a Light Vehicle Training Program to 25 North Baffin Inuit (approximately 5 per community); participants received certification for a Class 5 driver's licence. In 2016, Baffinland once again contracted the Ilisaqsivik Society (the group that developed and delivered the initial program) to update the Work Ready Program.
133	In compliance	Encouraged to work with the Qikiqtaaluk Socio-Economic Monitoring committee and with the Government of Nunavut and other relevant stakeholders to design and implement a voluntary survey to be completed by its employees on an annual basis in order to track housing status and migration intentions. Non-confidential findings are to be reported to the Government of Nunavut and the NIRB.	In early 2017, Baffinland implemented a revised voluntary Employee Information Survey, which collected information related to employee changes of address, housing status, and migration intentions (amongst other topics). This survey was offered to all Inuit employees residing in Nunavut, Inuit employees residing outside of Nunavut, and non-Inuit employees residing in Nunavut. It was not offered to contractors.
134	In compliance	Provide in the annual report to the NIRB a summary of employee origin information including information outlined in the condition.	Data on the origin, number, and ethnicity of Project employees and contractors in 2016 are presented in the 2016 Socio- Economic Monitoring Report. This information was obtained from internal Baffinland Human Resources records.
Training and Education			
135	Partial compliance	Encouraged to consider offering additional options for work/study programs available to Project employees.	Plans were made in early 2016 to have adult educators on site to institute a GED program as well as develop programs on site to officially license operators. Progress on these initiatives was limited due to employee turnover at the executive level and a lack of resources.

136	In compliance	Encouraged to work with training organizations and/or government departments offering mine-related or other training in order to provide additional training opportunities for employees which are transferable and meaningful.	In late 2016, Baffinland hired an IIBA Training and Education Specialist with the mandate to assess current training programs and to develop new educational and training initiatives. Since his appointment, the IIBA Education and Training Specialist has been engaged in outreach to other mining companies, local and territorial governments and educational institutions to compile an inventory of training and educational resources.
137	In compliance	Prior to construction, develop an easy referenced listing of formal certificates and licences that may be acquired via on-site training or training during employment at Mary River. Listing to be updated on an annual basis, provided to the NIRB upon completion and whenever it is revised.	A total of 27,966 hours of training were delivered in 2016, including 2,434 hours to Inuit workers.
138	In compliance	Encouraged to work with the Qikiqtani Inuit Association to ensure timely development of effective Inuit training and work-ready programs.	Baffinland and the QIA work closely through the IIBA Joint Management Committee and Joint Executive Committee to address Inuit training needs, including programs directed at work readiness.
139	Complete	Prior to construction, undertake and provide results of a detailed labour market analysis which provides quantitative predictions on the number of employees to be sourced from southern Canada and foreign markets. Within 90 days of receipt of the Project Certificate, submission of an updated labour market analysis must be submitted.	A revised labour market analysis was presented in the 2014 Annual Report to the NIRB (Baffinland, 2015b). Nothing was submitted, but no updates was provided in 2016.
140	In compliance 2017	Encouraged to survey Nunavummiut employees as they are hired and specifically note the level of education obtained and whether the incoming employee resigned or left an educational institute to take up employment with the Project.	2017 was the first year this revised survey was administered; as such, no long-term trends are yet apparent. However, Baffinland will continue to administer this survey on an annual basis and report on any observed future trends.

141	Complete	Prior to construction, encouraged to work with the Qikiqtani Inuit Association in order to prioritize the provision of training of Inuit to serve as employees in monitoring or other such capacities.	Ongoing. In late 2016, Baffinland hired an IIBA Education and Training Specialist with responsibilities for the identification and design of Inuit-specific training programs at both the pre-employment and employment stages. The Specialist has developed a revamped work readiness program which will be implemented in each of the 5 North Baffin communities in 2017.
Livelihood and Employment			
142	In compliance	Encouraged to address the potential direct and indirect effects that may result from Project employees on-site use of various Inuktitut dialects as well as other spoken languages.	Ongoing. Baffinland's Inuktitut in the Workplace Policy outlines the corporate position respecting support for the use of Inuktitut at all sites in Nunavut and ensures that, while the working language of the mine and port sites is English, a lack of proficiency in English will not be a barrier to Inuit employment, subject to considerations of health and safety. The Inuktitut in the Workplace Policy has been shared with the QIA at both the Executive and Management Committees and is scheduled to be reviewed and updated in 2017.
143	In compliance	Encouraged to consider the use of both existing and innovative technologies as a way to ensure Project employees are able to contact their family and friends.	Internet and telephone access is available free of charge to employees in the bunkhouse rooms at site, and in some common areas. Bandwidth and utilization levels may limit the use of some applications.
144	In compliance	Encouraged to make requirements for employment clear in its work-readiness and other programs and documentation.	Ongoing. In November 2016, Baffinland held open-houses and public presentations in each of the 5 North Baffin Communities. Information was included on employment requirements and the process required for employment at Baffinland.
145	In compliance	Encouraged to work with the Government of Nunavut and the Qikiqtaaluk Socio-Economic Monitoring committee to monitor the barriers to employment for women.	Ongoing. Baffinland has provided information on potential barriers to employment for women in the 2016 Socio-Economic Monitoring Report. This includes indicator data on hours worked by female employees and contractors, and information on childcare availability and costs.

146	Complete	The Government of Nunavut and the Qikiqtani Inuit Association are encouraged to investigate the possibility for Project revenue streams to support initiatives or programs which offset or subsidize child care for Project employees.	Not directly applicable to Baffinland
147	In compliance	Encouraged to work with the Government of Nunavut and the Nunavut Housing Corporation to investigate options and incentives which might enable and provide incentive for employees living in social housing to maintain employment as well as to negotiate for an obtain manageable rental rates.	Baffinland indicated that it discusses housing related issues with the Mary River Socio-economic Monitoring Working Group, of which the Government of Nunavut (including Nunavut Housing Corporation) are active participants.
Economic Development			
148	In compliance	Encouraged to undertake collaborative monitoring in conjunction with the Qikiqtaaluk Socio-economic Monitoring committee's monitoring program which addresses Project harvesting interactions and food security and broad indicators of dietary habits.	Baffinland has provided information on potential Project harvesting interactions and food security in the 2016 Socio-Economic Monitoring Report.
149	Complete	Prior to operations, required to undertake an analysis of the risk of temporary mine closure giving consideration to the affects of such to the North Baffin region.	The Potential Effects of a Mine Closure study was completed in 2014.
150	Partial compliance	Ensure that specific conditions are met in regard to Sirmilik National Park, as outlined in the condition.	In 2016, there was one instance of non-compliance for flight height. The non-compliance occurred when Baffinland assisted in a search and rescue in the Bylot Island area in September 2016. Four people were stranded on Bylot Island near Pond Inlet. Baffinland used their chartered helicopter to extract the four individuals.

151	Partial compliance	Encouraged to investigate measures and programs designed to assist Project employees with home ownership or access to affordable housing options.	Baffinland indicated that currently, there is not a clear and direct relationship between Project employment and any measures or programs undertaken by Baffinland or others, and home ownership.
152	Not a Baffinland condition	The Qikiqtani Inuit Association is encouraged to provide the Board and the Qikiqtaaluk Socio-Economic Monitoring committee with information regarding the effectiveness of any provisions within the Inuit Impact Benefit Agreement which may require that larger contracts are broken into smaller contracts.	This PC Condition is primarily directed at the QIA. However, Baffinland indicated that in 2016, the company and the QIA agreed to develop an Inuit Procurement and Contracting Strategy. Work on this strategy is ongoing in early 2017.
Human Health and Wellbeing			
153	Complete	Encouraged to employ a mental health professional to provide counselling to Inuit and non-Inuit employees in order to positively contribute toward employee health and well-being.	Baffinland's benefit plan includes an Employee and Family Assistance Program (EFAP), which offers all permanent employees and their dependents professional short-term counselling on an as-needed basis.
154	In compliance	Work with the Government of Nunavut and the Qikiqtaaluk Socio-Economic committee to monitor potential indirect effects of the projects.	Baffinland has provided information on potential indirect effects of the Project in the 2016 Socio-Economic Monitoring Report. This includes indicator data on the prevalence of substance abuse, gambling issues, family violence, marital problems, rates of sexually transmitted infections and other communicable diseases, rates of teenage pregnancy, high school completion rates, and other topics (e.g., crime rates).
155	In compliance	Encouraged to provide the NIRB with an updated report on its development of mitigation measures and plans to deal with potential cultural conflicts which may occur at site.	Baffinland is committed to promoting employee cohesion through cultural awareness and social programs. In 2016, Baffinland continued to provide cultural recognition programs such as cultural awareness, promotion of Inuktitut in the workplace and Elder support for Inuit employees. However, as a result of the economic downturn and cutbacks, Baffinland was unable to deliver on additional cultural events and cross cultural recognition initiatives.

156	In compliance	Encouraged to assist with the provision and/or support of recreation programs and opportunities within the potentially affected communities in order to mitigate potential impacts of employees' absence from home and community life.	An Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat fund has been established under Article 12 of the IIBA. To date, Baffinland's contributions have totalled \$750,000 plus administrative funds.
157	Complete	Consider providing counselling and access to treatment programs for addictions, domestic parenting, and marital issues that affect employees and/or their families.	Baffinland's employee benefit plan includes an Employee and Family Assistance Program (EFAP), which offers all permanent employees and their dependents access to professional short-term counselling on an as-needed basis.
Community Infrastructure			
158	In compliance	Encouraged to work with the Government of Nunavut and other relevant parties to develop a Human Health Working Group.	Baffinland continues to work with the QSEMC and the Mary River SEMWG on socio-economic monitoring initiatives; the Government of Nunavut (GN) actively participates in both these groups. A Memorandum of Understanding was also signed with the GN Department of Health in November 2013 regarding site health services.
159	In compliance	Encouraged to work with the Government of Nunavut to develop an effects monitoring program that captures increases to community based and airport infrastructure in the local study area and Iqaluit.	Baffinland continues to work with the QSEMC and the Mary River SEMWG on socio-economic monitoring initiatives; the GN actively participates in both these groups.
160	Not a Baffinland condition	The Government of Nunavut and the Qikiqtani Inuit Association are encouraged to cooperate to ensure that benefits are in a broad sense distributed across impacted communities and demographic groups that best offsets Project related impacts to infrastructure or services.	Baffinland produces an annual socio-economic monitoring report and regularly engages the Qikiqtaaluk Socio-Economic Monitoring Committee (QSEMC) and Mary River Socio Economic Monitoring Working Group (SEMWG) to discuss socioeconomic impacts and benefits of the Project. GN and QIA representatives are active members of both the QSEMC and Mary River SEMWG.

161	Not a Baffinland condition	The Government of Nunavut should be prepared for the potential need for increased policing to handle on-going Project related demographic changes in subsequent crime prevention.	While Baffinland cannot influence how the Government of Nunavut (GN) and Royal Canadian Mounted Police (RCMP) interact with one another, the Company regularly cooperates with the GN with regards to Project-related socio-economic monitoring.
Cultural Resources and Land Use			
162	In compliance	Make all reasonable efforts to engage Elders and community members of the North Baffin communities for input into monitoring programs and mitigative measures to ensure that they are informed by traditional activities, cultural resources and land-use.	Baffinland consulted on its proposed Phase 2 Development project.
163	Partial compliance	Continue to engage and consult with the communities of the North Baffin region to ensure that Nunavummiut are kept informed about Project activities.	In 2016, Baffinland held public meetings whose purpose were to share project related information and gather feedback. In addition, Baffinland carried out a community survey within the five North Baffin communities that are the most likely to be affected by the Mary River Project.
164	In compliance	Provide notification to communities regarding scheduled ship transits throughout the Regional Study Area including Eclipse Sound and Milne Inlet. Real-time data should be made available. Changes to proposed shipping routes should be provided to the MEWG, the community of Pond Inlet and communities in the region.	Baffinland has enlisted exactAIS [®] , a global vessel monitoring and tracking service based on AIS (Automatic Identification System) data from polar orbiting satellites to track and report on vessel movements. Baffinland has made vessel routing accessible to the public. There were no changes to the shipping route in 2016.
165	In compliance	Encouraged to provide buildings along the rail line and Tote Road for emergency shelter purposes to be made available for employees and land users of the area.	Baffinland has constructed 3 refuge stations at Km 33, 40, and 69 along the Tote Road. Each station is heated with beds and bedding, water, an automatic external defibrillator (AED), food and a digital radio that will contact security or dispatch and that is always monitored.

166	In compliance	Ensure through consultation efforts and public awareness campaigns that the public has access to shipping operations personnel for transits into and out of Steensby and Milne ports via telephone or internet contact to ensure information regarding ice conditions and ship movements can be shared.	Vessel transit information is publicly available on the Baffinland website. The webpage displaying ship transit information also posts an email address (contact@baffinland.com) to contact regarding any shipping updates or information. The public have access to shipping operations personnel via telephone and internet contact.
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Benefits, Royalties and Taxation

167	Not applicable	Encouraged to enter into negotiations for a Development Partnership Agreement with the Government of Nunavut.	Baffinland issued an invitation letter to the Government of Nunavut in September 2013 regarding the negotiation of a Development Partnership Agreement (DPA). It has come to Baffinland's attention that the DPA program for new mines is currently on hold, while the GN's Department of Economic Development and Transportation and Department of Finance work to develop a replacement. Baffinland will consider re-engaging with the GN on this topic once a replacement policy has been developed by the GN.
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Governance and Leadership

168	In compliance	Include the aspects outlined in the condition into the monitoring program adopted by the Qikiqtani Socio-Economic Monitoring committee.	Data collection and analysis methods are presented in the annual report.
169	In compliance	Provide an annual monitoring summary to the NIRB on the monitoring data collected related to the regional and cumulative economic effects associated with the Project and any proposed mitigation measures.	Baffinland has provided a summary of monitoring data related to regional and cumulative economic effects (positive and negative) associated with the Project in its annual socio-economic monitoring report.

Incidents and Malfunctions

170	Deferred	Include an updated Terrestrial Wildlife Management and Monitoring Plan plans for increased caribou monitoring efforts including weekly winter track surveys and bi-monthly surveys in the summer and fall.	The railway has not been built, and these monitoring activities have not been triggered.
171	In compliance	Include within the updated Terrestrial Wildlife Management and Monitoring Plan, a commitment to establish deterrents along the railway and Tote road embankments at any areas where the movement of caribou presents a likelihood of mortality to occur.	To date, no areas have been identified along the road where there is a likelihood of caribou mortality to occur. Because of these observations, no deterrents have been necessary along the Tote Road.
172	Not applicable	Encouraged to provide the Government of Nunavut with evidence that the vessel intended for use for the overwintering of fuel has been designed and certified for use under the operational conditions. Proof of vessel owners insurance policies are required.	Baffinland did not require the overwintering of fuel in 2016.
173	In compliance	Employ best practices and meet all regulatory requirements during ship to shore and other marine based fuel transfer events.	Baffinland maintains a Transport Canada approved OPEP for ship to shore fuel transfers at Milne Port. No updates to the Plan were made in 2016. Training of Baffinland staff on the Milne Inlet OPEP was conducted by a qualified marine spill response contractor between July 29-31, 2016.
174	In compliance	Provide, as well as the Canadian Coast Guard, spill response equipment and annual training to Nunavut communities along the shipping route.	Spill training exercises took place at Milne Port from July 29 to 31, 2016.

175	Deferred	In coordination with the Qikiqtani Inuit Association and the Hunters and Trappers Organizations of the North Baffin communities and Coral Harbour, provide updates to the Shipping and Marine Wildlife Management Plan to include adaptive management measures to take should the placement of route markers along the ships track during ice breaking not prove to feasible for marking the route.	Baffinland is conducting all of its shipping during open water and there is currently no winter shipping or ice-breaking being conducted. Action on this PC Condition is deferred until the Steensby Port is developed and transits through ice are scheduled.
176	Deferred	Required to revise its spill planning to include additional trajectory modelling for Hudson Strait, where walrus concentrate, as well as Milne Inlet, Eclipse Sound and Pond Inlet during winter conditions.	Baffinland indicated that there have been no changes to the shipping practices since the spill modelling was conducted; therefore, no updates are required.
177	Complete	Enroll any foreign flagged vessels commissioned for Project-related shipping within Canadian waters into the relevant foreign program, equivalent to Transport Canada's Marine Safety Delegated Statutory Inspection Program.	Shipowners / operators are responsible for enrolling their foreign flagged vessel with the appropriate program. Baffinland incorporates this requirement into contract terms and conditions with all vessels contracted directly by Baffinland.

Alternative Analysis

178	Deferred	Subject to safety requirements, require all Project vessels to maintain a route to the south of Mill Island to prevent disturbances to walrus and walrus habitat.	The condition is not currently applicable to project operations, which do not involve shipping through Steensby Inlet. Baffinland will consider this condition when shipping through Steensby Inlet becomes active.
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Operational Variability

179	Deferred	Not to exceed 20 ore carrier transits to Steensby Port per month during the open water season (242 transits per year).	The condition is not currently applicable to project operations, which does not involve shipping through Steensby Inlet. Baffinland will consider this condition when shipping through Steensby Inlet becomes active.
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179a	In compliance	The total volume of ore shipped via Milne Inlet shall not exceed 4.2 million tonnes.	The total volume of ore shipped via Milne Inlet is tracked annually by Baffinland. Baffinland has not exceeded the approved 4.2 million tonnes total volume of ore shipped via Milne Inlet during the first two years of ore shipments (2015 and 2016).
179b	In compliance	The total volume of ore transported by truck on the Tote road shall not exceed 4.2 million tonnes per year.	The total volume of ore transported by truck on the Milne Inlet Tote Road in 2016 was approximately 3.4 million tonnes.
Transboundary Effects			
180	Complete	The Marine Environment Working Group shall invite a representative from Makivik Corporation to be a member of the group.	Makivik is a member of the MEWG established in 2013. Meeting minutes of working group meetings are distributed to all parties. Makivik has received MEWG meeting minutes and other technical information in 2016.
181	Complete	Regardless of whether Makivik Corporation participates as a member of the Marine Environment Working Group, the group will provide Makivik with regular updates throughout the life cycle of the project.	Makivik is a member of the MEWG established in 2013. Meeting minutes of working group meetings are distributed to all parties. Makivik has received MEWG meeting minutes and other technical information in 2016.
182	Complete	Make available any ship route deviation routes provided to the NIRB to Makivik Corporation.	Vessel transit information is publicly available on the Baffinland website. Baffinland will provide ship route deviation reports to Makivik when required. There were no changes to the ship route in 2016.

Appendix II: March and August 2017 Site Visit Report

Report title: 2017 Winter Site Visit Report for the Nunavut Impact Review Board's Monitoring of Baffinland Iron Mines Corp.'s Mary River Project (NIRB File No. 08MN053)

Project: Mary River Project

Project Location: Qikiqtani (North Baffin) Region, Nunavut

Land Tenure: Inuit Owned and Crown Land

Project Owner: Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, ON
L6H 0C3

Proponent Contact: Todd Burlingame, V.P, Sustainable Development
Telephone: (416) 553-0062

Visit conducted by: Solomon Amuno, Technical Advisor II
Davin St. Pierre, Technical Advisor II

Telephone: (867) 983-4603; email samuno@nirb.ca

Site visit dates: March 22-24, 2017

Last Site Visit: July 13-14, 2016

Report prepared by: Solomon Amuno, Technical Advisor II

Pictures by: Solomon Amuno and Davin St. Pierre

Cover picture: View of iron ore conveyor system at Milne Inlet

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1 INTRODUCTION

The Nunavut Impact Review Board (NIRB or Board) was established through Articles 10 and 12 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement) and is responsible for post environmental assessment monitoring of a Project in accordance with Part 7 of Article 12 of the Nunavut Agreement.

This report provides the findings that resulted from the NIRB's winter site visit to the Mary River Project site on March 22 to 24, 2017 as part of the NIRB's ongoing monitoring program.

1.1 Objectives & Purpose of Site Visit

The objective of the NIRB's site visit was to determine whether, and to what extent, the land or resource use in question is being carried out within the predetermined Terms and Conditions of NIRB Project Certificate No. 005 issued for the Mary River Project (the Project), in accordance with Section 12.7.2(b) of the Nunavut Agreement.

The observations resulting from this site visit shall, wherever possible, be incorporated into the measurement of the relevant effects of the Project according to Section 12.7.2(a), as well provide the information necessary for agencies to enforce terms and conditions of land or resource use approvals as required under Section 12.7.2(c). Site-specific observations will also be used to assess the accuracy of the predictions contained in the Project impact statements according to Section 12.7.2(d) of the Nunavut Agreement.

1.2 Introduction of the Mary River Project

The Mary River Project involves the exploration, construction, operation, as well as the closure and reclamation of an open pit iron ore mine at what is known as Deposit No. 1, and includes mining at a rate of 18 Million tons per year (Mt/a). There are three (3) main project locations – the Mary River Mine (the Mine) site, Milne Port located north of the Mine site, and Steensby Port located south of the Mine site. Milne Port is connected to the Mine site by the Milne Inlet Tote Road, which is approximately 100 kilometers (km) in length. The Project as originally proposed was to include construction of a railway approximately 150 km in length to connect the Mine site to Steensby Port. It was anticipated that facilities at Steensby Port and the railway would take up to four (4) years to construct. The NIRB Project Certificate No. 005 was issued for the Mary River Project on December 28, 2012 following a thorough environmental review process, which included community consultations and a public hearing.

On January 13, 2013 Baffinland Iron Mines Corporation (Baffinland or the Proponent) informed the NIRB that it was proposing an Early Revenue Phase (ERP) that would change the schedule and specific activities associated with the Project as initially approved. The ERP involved an amendment to the Mary River Project, which included the extraction of up to an additional 4.2 Mt/a of iron ore from the Mary River Mine site, with ore to be transported via the Milne Inlet Tote Road and Port at Milne Inlet during the open water season only. As the ERP outlined significant modifications to the activities previously approved under NIRB Project Certificate No. 005 for the Mary River Project, the Board determined that it was appropriate to assess the potential ecosystemic and socio-economic effects of the ERP and to consider modifications to the terms and conditions of the original Project Certificate under Article 12, Section 12.8.2 of the

Nunavut Agreement. On May 28, 2014 pursuant to Article 12, Sections 12.5.5 and 12.8.2 of the Nunavut Agreement, the NIRB issued an *Amended* Project Certificate No. 005, allowing the Project to proceed in accordance with the Terms and Conditions issued therein. The Board is responsible for monitoring this Project as stipulated in Sections 12.7.1 and 12.7.2 of the Nunavut Agreement.

As currently approved and in accordance with Baffinland's development plans, extracted ore is transported by truck along the Milne Inlet Tote Road and shipped by contracted vessels from Milne Port to European markets during the open water season. The approved Project also involves additional facilities at Milne Port, including the construction of a fixed ore dock, 4.2 Mt ore stockpile and reclaim area, 3,500 tonnes per hour ship loaders, a camp to accommodate workers, and the extension or relocation of the airstrip west of the proposed ore stockpile. The ERP operations are expected to continue for the duration of the mine life (i.e., 21 years), and continue in conjunction with the Mary River Project as originally proposed, once developed.

1.3 Preparations for the Site Visit

In preparation for the site visit, the Monitoring Officer reviewed the following items: Mary River Project Certificate; previous NIRB site visit reports, including the NIRB's 2016 Recommendation to Baffinland, as well as additional follow-up correspondence regarding review of Annual Reports and monitoring of the Mary River Project.

2 SITE VISIT

The site visit was conducted on March 22 to 24, 2017 by Solomon Amuno, the NIRB's Monitoring Officer for Project Certificate No. 005 (Monitoring Officer) and Davin St. Pierre, (Technical Advisor II). On Tuesday, March 22, 2017, NIRB Staff flew from Pond Inlet to the Mary River site via Baffinland's regularly scheduled aircraft charter, and were accompanied by Baffinland's Sustainability Manager, Ms. Megan Lord-Hoyle and Environmental Staff, Mr. Allan Knight.

Once at the Mary River site, the NIRB Staff were transported by truck via the Tote Road to the Milne Inlet accommodation facility and received a brief health and safety orientation before undertaking a tour to the Mine site ([Picture 1](#)), which included observational visits to the following locations: crusher plant, deposit No. 1, waste rock storage area, incinerator, sewage outfall area and landfill. After the tour to the Mine site visit, Baffinland and NIRB Staff further undertook observational visits to the following locations around Milne Inlet ([Picture 2](#)): ore stockpile area, incinerator, landfarm, conveyor system, docking area, and accommodations facility. There was no observational trip to the Steensby Inlet area conducted during this site visit.

Upon completion of the tour, the Monitoring Officer discussed several outstanding items and observations noted during the site visit, especially as they pertained to the implementation of specific terms and conditions of the Project Certificate. The site visit provided the Monitoring Officer with an opportunity to comparatively assess the changes taking place in the surrounding environment of Project development areas (PDA), as well as to identify specific areas needing improvement with regards to environmental impacts and mitigation measures.



Picture 1: Aerial view of the Mary River Mine site



Picture 2: Aerial view of the Milne Inlet site

2.1 General Observations based on Progress from Previous Site Visit

The following sections briefly describe the major facilities visited during the tour around the Project Development Area (PDA), as well as observations of the overall progress of the site compared to the previous site visit(s). Where applicable, the Monitoring Officer also noted compliance with specific terms and conditions of the Project Certificate, and followed up on items where Baffinland has made commitment to mitigate the potential ecosystemic impacts of the Mary River Project.

2.1.1 Mary River Mine Site

Crusher and Screening Plant Area

Baffinland led NIRB Staff a tour around the crusher plant adjacent to the main accommodation facility at Mary River site ([Picture 5](#)). While at the facility, the Monitoring Officer observed significant dust emissions including visible dust plumes from the crusher and screening plant due to ongoing ore crushing activities ([Picture 6](#)). Significant dust accumulation was noted in the surface soils and snow cover adjacent to the facility, and with the crusher plant lacking efficient dust containment controls or appropriate sealing designs at the transfer point, base of chute/feeder and conveyor belt for preventing dust dispersion ([Picture 4](#)).

The original Final Environmental Impact Statement (FEIS) of the Mary River Project, including the Addendum to the FEIS for the ERP specifically identified the crusher and screening plant as a potential source of dust emissions, and predicted that dust emissions would intermittently be higher during the construction and operational phase of the Mary River Project, and outlined several mitigation measures to reduce dust emissions onsite. However, at the time of the current site visit, the Monitoring Officer noted that the specific dust suppression measures committed to within Baffinland's Air Quality and Noise Abatement Management Plan were not fully implemented at the crusher and screening plant.¹ The Monitoring Officer noted that the Workers' Safety and Compensation Commission (WSCC) had previously expressed concern in 2015 regarding the increased dust generation from the crusher plant. In addition, the NIRB's 2015 Recommendation 16 specifically indicated that Baffinland implement appropriate dust control measures at the crusher and screening plant in order to prevent occupational health hazards to workers onsite. The dust emission observed from the crusher plant during the current site visit appear not to have significantly improved compared to previous site observations in 2015 and 2016 respectively. Further during the site visit, Baffinland's staff indicated that improved engineering system to control fugitive dust dispersion from the crusher plant facility would be implemented later in the year. The Monitoring Officer also observed the disposal and pile up of solid waste materials at various locations near the crusher plant ([Picture 3](#)).



Picture 3: Rubber wastes near crusher area



Picture 4: Dust accumulation on soil near crusher

¹ Section 3.2.1 of Appendix J1-Air Quality and Noise Abatement Management Plan



Picture 5: Crusher Plant area

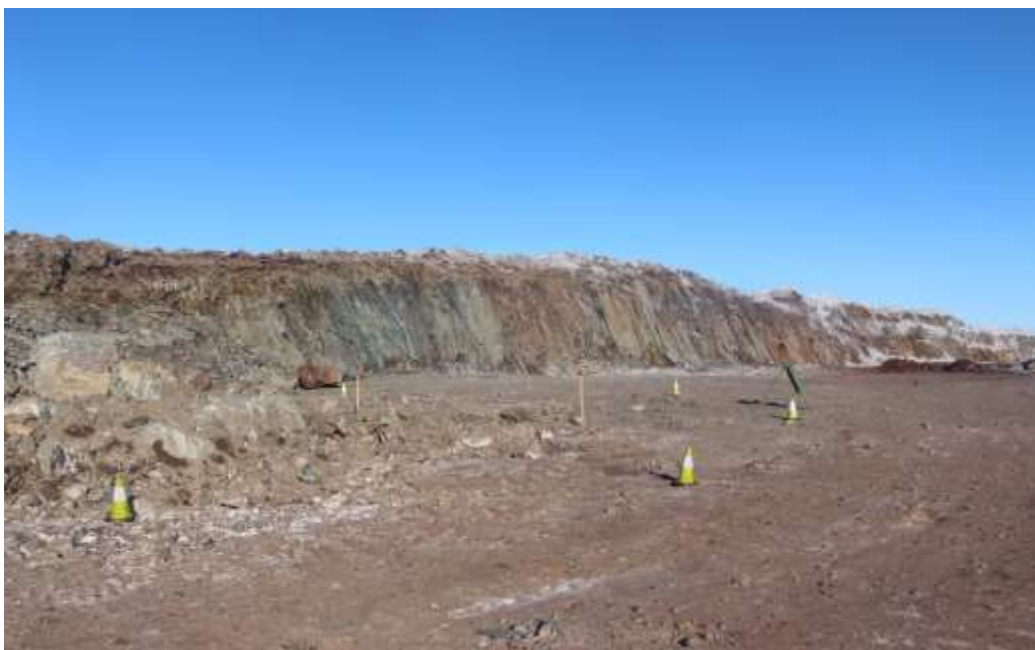


Picture 6: Dust emissions from crusher plant

Deposit No. 1 Reserve and Waste Rock Dump

During the drive to Deposit No. 1, the Monitoring Officer noted significant dust emission from vehicular traffic, as well as discoloration of snow surface due to heavy dust deposition. During previous site visits in 2015 and 2016 respectively, the Monitoring Officer noted the emplacement of several check dams along the access road to the Mine site for controlling the flow of site contact water into the adjacent tundra. At the time of this site visit, no check dams were visibly observed due to extensive snow deposition along the access road. While at the deposit reserve, the Monitoring Officer observed the location of the pit, and noted that iron ore was extracted from the mine pit in successive layers or “benches” ([Picture 7](#)). One (1) heavy truck and blasting cones were observed to be located within the pit area ([Pictures 8](#) and [9](#)). After leaving the Mine pit area Baffinland and NIRB Staff further visited the adjacent waste rock site, an area designated for the disposal of potentially acid generating (PAG) rocks ([Picture 10](#)). The Monitoring Officer did not observe any signs of runoff or flow of uncontrolled seepage of potentially contaminated contact water from the piles of PAG waste rocks into the adjacent tundra ([Picture 11](#)) as the area was difficult to observe due to snow cover and further observations would be made during the summer site visit to Mary River.

During the 2016 site visit, the Monitoring Officer observed that the waste rock storage area lacked appropriate water management structures to properly divert or intercept overland runoff from the waste rock dump to the nearby sediment pond, and as a result the NIRB’s 2016 Recommendation 16 specifically requested that Baffinland clarify why the mitigation measures for managing site contact water, as committed to within the FEIS of the Mary River Project and Addendum to the FEIS for the ERP, were not in place at the time of the NIRB’s site visit. In responding to the Board’s recommendation, Baffinland reported that it subsequently completed the construction of a waste rock settling pond and a ditching system adjacent to the waste rock storage area immediately after the 2016 site visit, and that new structures were onsite to direct most of the runoff from the waste rock stockpile to the sedimentation pond.



Picture 7: Mine pit at Deposit No. 1



Picture 8: Heavy truck at Mine Pit



Picture 9: Cone set-up for blasting operation



Picture 10: Waste rock dump area



Picture 11: Vicinity of waste rock dump area

Landfill Area

NIRB staff also viewed the landfill site in order to follow-up on the recurring issues noted during previous site observations pertaining to the deterioration of the landfill litter fences. The Monitoring Officer also followed-up on Baffinland's progress towards implementing best management practices regarding proper landfill operations, and the NIRB's Recommendation 18 regarding maintenance of the fencing system to ensure that waste materials are not dispersed offsite. During the March site visit, it was noted that most of the protective mesh around the landfill footprint was completely removed from the supporting poles similar to previous site observations ([Pictures 12, 14, and 15](#)). The Monitoring Officer further noted that the wooden fences utilized at the site did not fully enclose the landfill footprint, thereby increasing the risk for offsite waste dispersion ([Picture 13](#)).



Picture 12: No litter fencing in some areas of landfill



Picture 13: Wooden fencing in landfill



Picture 14: Litter fence (2016 observation)



Picture 15: Damaged poles (2016 observation)

Incinerator Area

Based on the 2016 site observations and the 2017 March site visit, the Monitoring Officer noted that the incinerator in use at the Mine site continue to remain well maintained except for the minor pooling of drainage water within the incinerator facility ([Pictures 16 and 17](#)). The NIRB's 2016 Recommendation 21 specifically requested that Baffinland take immediate steps to remove unused scrap materials, tires and synthetic materials currently stored temporarily at various Project locations, including around the immediate vicinity of the incinerator facility in order to improve the visual quality of the site. During this site visit, the Monitoring Officer observed the ongoing effort of Baffinland staff in relocating most of the historical tires into seacans for offsite disposal ([Picture 18](#)).



Picture 16: Incinerator



Picture 17: Waste storage within incinerator facility



Picture 18: Historical tire removal into a seacan

2.1.2 Tote Road

During 2017 winter site visit, the Monitoring Officer did not observe any major environmental issues along the Tote Road, although increased generation of dust plumes was commonly noted during vehicular traffic. The Monitoring Officer also followed-up on Baffinland's progress with regards to the removal of a CAT excavator, which broke through the river ice on December 3, 2016, and was partially submerged at a location downstream of the former seacan bridge crossing (CV217) near km 80 bridge. Although Baffinland indicated in the aftermath of the accident, and following the NIRB's enquiry on the incident, that an extraction plan was in place to safely remove the excavator from the ice. At the time of the March site visit, the NIRB Staff observed that the excavator had yet to be removed and relocated from the frozen lake ([Picture](#)

[19](#)). Other items noted along the Tote Road included several dust fall monitoring stations, communication towers and bird deterrents (Km 33, 34, and 69), including emergency shelters (Km 40). Piles of scrap materials were also observed in several locations along the road (km 62, 73, and 97).



Picture 19: Excavator on frozen lake at Km 80 bridge

2.1.3 Milne Inlet

Ore Dock and Stockpile Area

Mr. Knight led the tour of Milne Inlet, via a truck, and with visits focused around the ore dock area and stockpile loading area ([Pictures 20](#) and [21](#)). During the 2017 site visit, the Monitoring Officer did not observe any major activities at the ore dock area, with the exception of ore stockpiling. Piles of historical tires were noted to be neatly located and repurposed for use at the ore dock area.



Picture 20: Conveyor system at Milne Inlet



Picture 21: Ore stockpiles at Milne Inlet

Landfarm Area

Since 2014, the Monitoring Officer consistently reported on the deteriorating condition of the landfarm facility, and has raised concerns that the disposal synthetic liners, contaminated snow and soils have not been properly managed in accordance with industry best practices. Even though snow covered the area, NIRB Staff observed similar conditions to those noted in 2015 and 2016 where synthetic liners were mixed in with contaminated snow, and disposal of waste batteries including disposal of unused tires was occurring near the landfarm. The NIRB's 2016 Recommendation 20 specifically requested that Baffinland implement best practices for landfarm operations, including for management of contaminated snow, waste synthetic liners, including used tires ([Pictures 22, 23, 24, and 25](#)). Further observations would be made by the Monitoring Officer during the summer site visit to confirm items and make any suggestions if required.



Picture 22: Landfarm area with synthetic liners



Picture 23: Landfarm area with waste materials



Picture 24: Waste batteries within landfarm footprint



Picture 25: Waste tires near landfarm area

Visual Environment and Aesthetic Quality of Mine Site, Tote Road, and Milne Port

The Monitoring Officer observed that many areas within and surrounding the PDA, including the Mine site and Milne Inlet, would require additional waste management actions due to the increasing accumulation of scrap materials and unused items such as tires, steel pipes, wooden materials, and drums without proper waste management strategy ([Pictures 26, 27, and 28](#)).



Picture 26: scrap materials near Km 80 bridge



Picture 27: waste tires and seacans in Milne Inlet



Picture 28: Piles of waste tires around ore stockpiles in Milne Inlet

2.2 Observations Based on NIRB Project Certificate No. 005

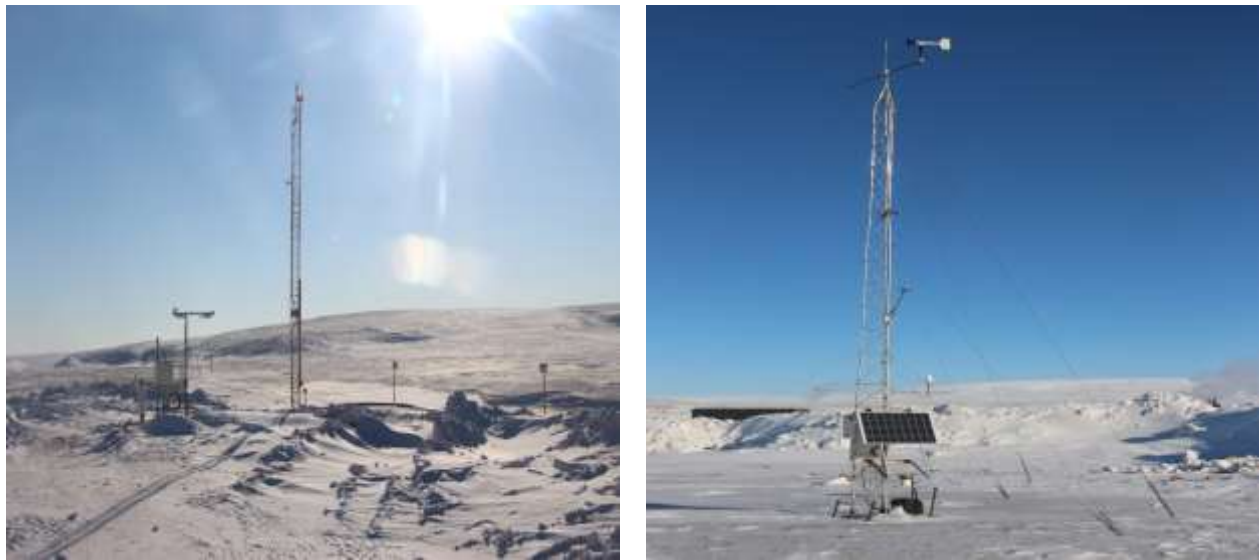
The following are the observations made during the site visit that pertain specifically to terms and conditions of Project Certificate No. 005:

2.2.1 Meteorology and Climate – Weather Monitoring Data

Condition 5

The Proponent shall endeavour to explore and implement reasonable measures to ensure that weather-related information for the various Project sites is readily accessible to the public on a continual basis throughout the life of the Project

During the tour of the Mine area, the Monitoring Officer was directed to observe a fully operational weather system. The Monitoring Officer also observed that current weather-related information is displayed on the monitors located within the main accommodation building ([Picture 29](#)).



Picture 29: Weather monitoring systems in Mary River site

2.2.2 Air Quality –Dust Management and Monitoring Plan

Condition 10

The Proponent shall update its Dust Management and Monitoring Plan to address and/or include the following additional items:

- 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.*

Condition 58c

Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes:

- c) A description of the extent of dust fall based on measured levels of dust fall (fugitive and finer particles such as TSP) on lichens and blueberries, and ash content of caribou fecal pellets;*

During the drive along the Tote Road, the Monitoring Officer observed the increased generation of dust plumes and widespread discolouration of snow areas, which was apparent in high traffic locations. As it is difficult to manage dust in the winter, NIRB Staff inquired about snow and ice management practices associated with winter dust control. While at Milne Inlet, the Monitoring Officer followed up on the previous 2015 observation of dust accumulation on sea ice; but at the time of the current site visit, no evidence of dust deposition or accumulation was noted on sea ice ([Pictures 31](#) and [32](#)). Dust fall stations were observed along the Milne Inlet Tote Road, which can be noted as being in compliance to part c of Condition 10 ([Picture 30](#)).



Picture 30: Dust fall monitoring station in and Mary River site



Picture 31: No dust deposition on sea ice (2017)



Picture 32: Dust deposition on sea ice (2015)

Condition 53

- a. *Steps taken to prevent caribou mortality and 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....*

Whenever practical and not causing a human safety issue, a stop work policy shall be implemented when wildlife in the area may be endangered by the work being carried out. An operational definition of 'endangered' shall be provided by the Terrestrial Environment Working Group.

[illegible]

A small, fluffy, light brown fox cub is walking on a sandy beach. The cub is facing right and has a thick, bushy tail. A shadow is cast on the sand to its right.

Mary River Project

2.2.4 Birds

Condition 66

If Species at Risk or their nests and eggs are encountered during Project activities or monitoring programs, the primary mitigation measure must be avoidance. The Proponent shall establish clear zones of avoidance on the basis of the species-specific nest setback distances outlined in the Terrestrial Environment Management and Monitoring Plan.

Condition 68

The Proponent shall ensure flashing red, red strobe or white strobe lights and guy-wire deterrents are used on communications towers established for the Project. Consideration should also be given to reducing lighting when possible in areas where it may serve as an attractant to birds or other wildlife.

Condition 70

The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its Terrestrial Environment Mitigation and Monitoring Plan, until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird's nests and their young are protected.

Ravens were observed along the Tote Road as well as around the landfill area ([Picture 35](#)) which would be expected during this site visit due to its timing. Past issues raised by Baffinland regarding the installation of communication towers onsite were concerns that lights were shown to be an attractant to birds, and that in the study area birds are active during the 24-hour daylight season. At the time of the site visit, no bird deterrent strobe or flashing lights was observed on the communicator tower ([Picture 36](#)); but the Monitoring Officer would be verifying the status of the lights during the summer Mary River site visit.



Picture 35: A raven was spotted along the Tote Road



Picture 36: Communication tower along Tote Road

3 FINDINGS AND SUMMARY

Due to the ongoing development of the Mary River Project, and the timing of the current site visit, it was noted that many biophysical component of the Project site could not be fully monitored due to ice conditions and extensive snow cover across Project locations. In addition, several terms and conditions as contained within the NIRB Project Certificate [No. 005] may not be applicable for this monitoring period and/or have not yet been thoroughly implemented at this time by Baffinland. Based on the observations made during this current site visit, all Mary River Project facilities in operation appear to be well managed, and generally are maintained with adequate environmental protection measures and procedures in place.

In order to fully meet the requirements of the Project Certificate terms and conditions, and to ensure that potential adverse impacts to the environment are adequately mitigated, the NIRB Monitoring Officer has identified several issues that require follow-up and corrective action:

3.1 *Excavator at Km 80*

As noted in sections [2.1.2](#), the excavator which broke through river ice has yet to be removed from the freshwater lake adjacent to the bridge crossing at Km 80. Although Baffinland indicated during its initial reporting of the accident that an extraction plan was in place to safely remove the excavator from the ice and minimize the potential for a spill; however, based on the observation from the site visit, it is evident that the extraction plan has yet to be implemented. There is also concern that the excavator may continue to constitute a physical barrier to the movement of water and fish especially during ice melt and spring thaw, as such Baffinland is requested to safely remove the excavator from the lake, without any damages to fish and fish habitat.

3.2 *Dust Suppression Measures and Crusher Area*

Condition 10 requires the implementation of a dust management and monitoring plan at site to prevent impacts to air quality from dust dispersion. At the time of the current site visit, it was noted that increased dust emissions, including visible dust plumes generated from the crusher plant continue to be an ongoing issue. Specific parts of the crusher and screening plant were also noted to lack appropriate sealing or dust containment system, resulting in the release and dispersion of fugitive dust to the surrounding environment. Proper engineering designs and controls may be required to address the increased dust emissions from the crusher plant. In addition along the Tote Road, widespread discolouration of the snowbank was commonly observed. In Milne Inlet, dust deposition on sea ice appears to have significantly reduced compared to the 2015 site observation.

3.3 *Tire management*

Used tires continue to be a significant waste stream generated across the Project sites, particularly around the Mine site and Mile Port. As the amended Project Certificate does not have any specific terms and conditions to address this particular waste stream, the Monitoring Officer recommended that Baffinland staff develop a consistent approach for managing unused tires onsite, including options for proper tire disposal, reuse strategy and repurposing options especially for historical tire piles. Following the Monitoring Officer's recommendation, on April

26, 2017, Baffinland submitted an Onsite Current Tire Disposal Procedure to the NIRB, which specifically outlined the various procedures to dispose newly generated scrap tires, and options for managing historical tire piles around the PDA. Baffinland is requested to implement the procedures outlined within its tire management plan, and adhere to industry best practices for tire management in mining operations.

3.4 Waste Landfill

During the NIRB's current site visit, the Monitoring Officer observed that solid waste materials were properly contained within the landfill, although deterioration of the protective mesh and incomplete fencing of the landfill footprint continue to be a recurring issue. The Monitoring Officer noted that the condition of the landfill fencing has not improved significantly compared to previous year's observations, as Baffinland has yet to fully install a more durable fencing material to prevent offsite dispersal of waste materials to the adjacent tundra. Baffinland is requested to develop a long-term solution for addressing the recurring fencing issue of the landfill.

Prepared by: Solomon Amuno, PhD
Title: Technical Advisor II
Date: July, 2017

Signature:



Reviewed by: Kelli Gillard P.Ag.
Title: A/Director, Technical Services
Date: November 27, 2017

Signature:





2017 Summer Site Visit Report

for the NIRB's Monitoring of
Baffinland Iron Mines Corp.'s Mary River Project



Nunavut Impact Review Board

August 2017

Report title: 2017 Summer Site Visit Report for the Nunavut Impact Review Board's Monitoring of Baffinland Iron Mines Corp.'s Mary River Project (NIRB File No. 08MN053)

Project: Mary River Project
Project Location: Qikiqtani (North Baffin) Region, Nunavut
Land Tenure: IOL and Crown Land

Project Owner: Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
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Visit conducted by: Solomon Amuno, Monitoring Officer
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Site visit dates: August 25-27, 2017

Last Site Visit: March 22-24, 2017

Report prepared by: Solomon Amuno and Keith Morrison

Pictures by: Solomon Amuno, Keith Morrison, and Baffinland Iron Mines Corporation

Figures: Baffinland Iron Mines Corporation

Cover picture: Drilling in preparation for blasting at Deposit #1

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1 INTRODUCTION

The Nunavut Impact Review Board (NIRB or Board) was established through Articles 10 and 12 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (Nunavut Agreement) and is responsible for post environmental assessment monitoring of a Project in accordance with Part 7 of Article 12 of the Nunavut Agreement.

This report provides the findings that resulted from the NIRB's summer site visit to the Mary River Project site on August 25 to 27, 2017 as part of the NIRB's ongoing monitoring program.

1.1 Objectives & Purpose of Site Visit

The objective of the NIRB's site visit was to determine whether, and to what extent, the land or resource use in question is being carried out within the predetermined Terms and Conditions of NIRB Project Certificate No. 005 issued for the Mary River Project (the Project), in accordance with Section 12.7.2(b) of the Nunavut Agreement.

The observations resulting from this site visit shall, wherever possible, be incorporated into the measurement of the relevant effects of the Project according to Section 12.7.2(a), as well provide the information necessary for agencies to enforce terms and conditions of land or resource use approvals as required under Section 12.7.2(c). Site-specific observations will also be used to assess the accuracy of the predictions contained in the Project impact statements according to Section 12.7.2(d) of the Nunavut Agreement.

1.2 Introduction of the Mary River Project



Figure 1: Location Map¹



Figure 2: Tote Road²

¹ Figures 1, 2, and 3 are extracted from maps prepared by Baffinland for their 2016 report to the Qikiqtani Inuit Association and the Nunavut Water Board (March, 2017)

The Mary River Project involves the exploration, construction, operation, as well as the closure and reclamation of an open pit iron ore mine at what is known as Deposit No. 1, and includes mining at a rate of 18 Million tons per year (Mt/a). There are three (3) main project locations – the Mary River Mine (the Mine) site, Milne Port located north of the Mine site, and Steensby Port located south of the Mine site ([Figure 1](#)). Milne Port is connected to the Mine site by the Milne Inlet Tote Road, which is approximately 100 kilometers (km) in length ([Figure 2](#)). The Project as originally proposed was to include construction of a railway approximately 150 km in length to connect the Mine site to Steensby Port. It was anticipated that facilities at Steensby Port and the railway would take up to four (4) years to construct. The NIRB Project Certificate No. 005 was issued for the Mary River Project on December 28, 2012 following a thorough environmental review process, which included community consultations and a public hearing.

On January 13, 2013 Baffinland Iron Mines Corporation (Baffinland or the Proponent) informed the NIRB that it was proposing an Early Revenue Phase (ERP) that would change the schedule and specific activities associated with the Project as initially approved. The ERP involved an amendment to the Mary River Project, which included the extraction of up to an additional 4.2 Mt/a of iron ore from the Mary River Mine site, with ore to be transported via the Milne Inlet Tote Road and Port at Milne Inlet during the open water season only. As the ERP outlined significant modifications to the activities previously approved under NIRB Project Certificate No. 005 for the Mary River Project, the Board determined that it was appropriate to assess the potential ecosystemic and socio-economic effects of the ERP and to consider modifications to the terms and conditions of the original Project Certificate under Article 12, Section 12.8.2 of the Nunavut Agreement. On May 28, 2014 pursuant to Article 12, Sections 12.5.5 and 12.8.2 of the Nunavut Agreement, the NIRB issued an *Amended* Project Certificate No. 005, allowing the Project to proceed in accordance with the Terms and Conditions issued therein. The Board is responsible for monitoring this Project as stipulated in Sections 12.7.1 and 12.7.2 of the Nunavut Agreement.



Picture 1: Mary River Mine Site



Picture 2: Milne Port

As currently approved and in accordance with Baffinland's development plans, extracted ore is transported by truck along the Milne Inlet Tote Road and shipped by contracted vessels from Milne Port to European markets during the open water season. The approved Project also involves additional facilities at Milne Port, including the construction of a fixed ore dock, 4.2 Mt ore stockpile and reclaim area, 3,500 tonnes per hour ship loaders, a camp to accommodate workers, and the extension or relocation of the airstrip west of the proposed ore stockpile. The ERP operations are expected to continue for the duration of the mine life (i.e., 21 years), and continue in conjunction with the Mary River Project as originally proposed, once developed.

1.3 Preparations for the Site Visit

In preparation for the site visit, the Monitoring Officer reviewed the following items: Mary River Project Certificate; previous NIRB site visit reports, including the NIRB's 2016 and 2017 Recommendation to Baffinland, as well as additional follow-up correspondence regarding review of Annual Reports and monitoring of the Mary River Project.

2 SITE VISIT

The site visit was conducted on August 25 to 27, 2017 by Solomon Amuno, the NIRB's Monitoring Officer for Project Certificate No. 005 (Monitoring Officer) and Keith Morrison (Technical Advisor II). On Thursday, August 24, 2017, the Monitoring Officer and Technical Advisor flew from Iqaluit to the Mary River site via Baffinland's regularly scheduled aircraft charter, and were met by Baffinland's Sustainability Manager, Ms. Megan Lord-Hoyle and Environmental Staff, Mr. Allan Knight.



Picture 3: Mary River Airstrip

Once at the Mary River site, the Monitoring Officer and Technical Advisor were accommodated at the Mine Site Complex. On Friday, August 25, 2017 the Technical Advisor was provided with a brief health and safety orientation before undertaking a tour to the Mine site, which included observational visits to the following locations: explosives magazine, deposit No. 1, waste rock storage area, 110 Laydown area, crusher sedimentation pond, crusher pad, sewage outfall area, landfill, incinerator, and water intake. On August 26, 2017, Milne Inlet was visited by truck along the Tote Road, and observational visits made to the following locations around Milne Inlet incinerator, tank farm, ore pad settling ponds, and the landfarm. The Tote Road was assessed by truck while in transit, and the km 80 bridge inspected while *en route* to Milne Inlet.

Upon completion of the tour, the Monitoring Officer discussed several outstanding items and observations noted during the site visit. The site visit provided the Monitoring Officer with an opportunity to comparatively assess the changes taking place in the surrounding environment of project development areas (PDA), as well as to identify specific areas needing improvement with regards to environmental impacts and mitigation measures.

2.1 General Observations based on Progress from Previous Site Visit

The following sections briefly describe the major facilities visited during the tour around the PDA, as well as observations of the overall progress of the site compared to the previous site visit(s). Where applicable, the Monitoring Officer also noted compliance with specific terms and conditions of the Project Certificate, and followed up on items where Baffinland has made commitment to mitigate the potential ecosystemic impacts of the Mary River Project and the 2017 winter site visit.

2.1.1 Mary River Mine Site

Deposit No. 1 Reserve and Waste Rock Dump

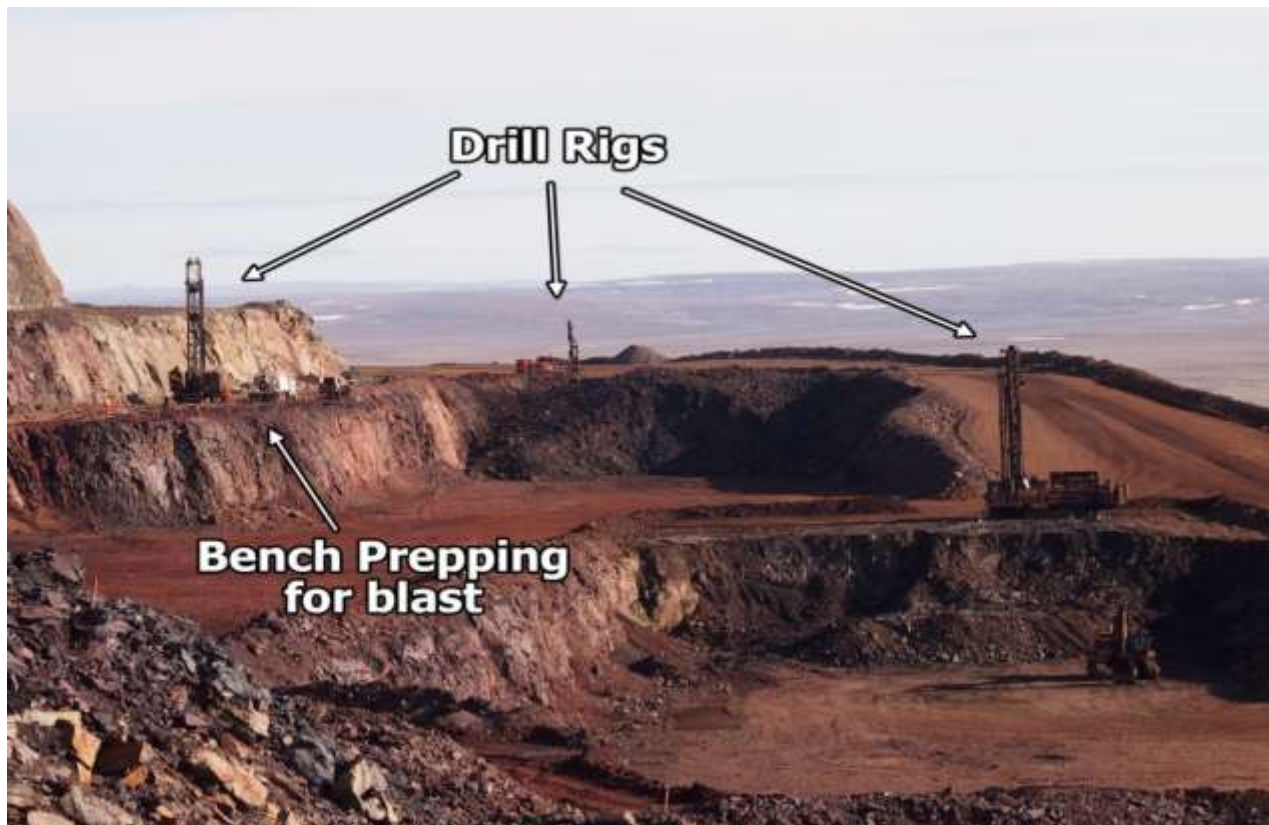
During previous site visits in 2015 and 2016 respectively, the Monitoring Officer noted the emplacement of several check dams along the Haul Road for controlling the flow of site contact water into the adjacent tundra, and were noted again during this current visit after being hidden by snow in March 2017 ([Picture 4](#)). At the Mine pit area, the Monitoring Officer noted three (3) drilling rigs (not in operation during the visit) and a mining bench with holes preparing for blasting ([Picture 6](#)).



Picture 4: Check dam and silt fences beside Haul Road



Picture 5: Explosives Magazine



Picture 6: Pit #1 Drill Rigs and blast preparation

Baffinland staff indicated that blasting and ore extraction activities were ongoing and steadily progressing in the summer. They also indicated that the environmental monitoring department on site monitors the open pit area after a blast to ensure that operations are in compliance with Baffinland's Environmental Management Plan.



Picture 7: Pit and 110 Laydown Area



Picture 8: Waste Rock Pile

After leaving the Mine pit area ([Picture 7](#)), the NIRB staff observed the adjacent waste rock site, an area designated for the disposal of potentially acid generating (PAG) rocks ([Picture 8](#)). During the 2016 site visit, the Monitoring Officer observed that the waste rock storage area lacked appropriate water management structures to properly divert or intercept overland runoff from the waste rock dump, and as a result the NIRB's 2016 Recommendation 16 specifically requested that Baffinland clarify why the mitigation measures for managing site contact water, as committed to within the FEIS of the Mary River Project and Addendum to the FEIS for the ERP, were not in place. In responding to the Board's recommendation, Baffinland reported that it subsequently completed the construction of a waste rock sedimentation pond ([Picture 9](#)) and a ditching system ([Picture 10](#)) adjacent to the waste rock storage area immediately after the 2016 site visit, and that new structures were onsite to direct most of the runoff from the waste rock stockpile to the sedimentation pond.



Picture 9: MS-08 Sedimentation Pond



Picture 10: MS-08 Ditching

In the March 2017 site visit, the area of the ditch and sedimentation pond (MS-08) was covered in snow preventing close examination. Prior to the August 2017 site visit, MS-08 had been the subject of concern as per the Qikiqtani Inuit Association and Environment and Climate Change Canada inspections as not being adequate to contain contact water. Therefore, Baffinland had constructed emergency ditches to contain the seepage/overflow and intercept water not being diverted into MS-08 ([Picture 11](#)). In the August 2017 site visit it was noted that there were structural deficiencies in the pond design which would cause the pond to overflow, and that two (2) pumps were in place (but not operational) to pump excess water out of the pond. ([Picture 12](#)).



Picture 11: MS-08 Emergency Ditch

Baffinland staff indicated that it was making effort to redevelop the ditches in the western portion of the facility in order to more efficiently intercept seepage and prevent further flow of untreated contact water onto the tundra. Also observed at MS-08 were scarecrows ([Picture 13](#)) intended to discourage birds from using the sedimentation pond. Baffinland staff reported that they had proven successful in keeping birds away from the pond.



Picture 12: MS-08 Pumps



Picture 13: MS-08 Pond inflow and scarecrow

Crusher and Screening Plant Area

The dust emission observed from the crusher plant ([Picture 14](#)) during the August site visit appear to have improved compared to previous site observations in 2015, 2016, and March 2017 ([Picture 15](#)). As discussed in the March 2017 site visit, between NIRB site visits Baffinland installed the shrouds at the crusher plant's transfer points ([Picture 16](#)), hoods over the crusher jaws, and lowered the height of drop for trucks dumping ore to reduce the generation of dust plumes (see Pictures 5 and 6 of the Winter 2017 Site Visit Report). Baffinland staff indicated a dustfall measuring station had been installed to monitor dust generated at the crusher pad. During the August 2017 visit, trucks were observed delivering ore, and ore being processed through the facility. A water truck used for dust control was also observed.



Picture 14: Crusher Plant Area



Picture 15: Crusher Plant



Picture 16: Transfer point shroud

Crusher Pad Sedimentation Pond (MS-06)

During the tour of the crusher pad sedimentation pond (MS-06), it was observed that tires and wooden stakes were embedded in the material of the crusher pad ([Picture 17](#) and [18](#)). From discussion with Baffinland staff on the issue, the source of the embedded debris were from the tires and stakes previously used to mark the edges of the pad and road that were not removed before earthmoving operations to expand the pad were conducted which resulted in their entrenchment.



Picture 17: Tires embedded in overburden



Picture 18: Tires embedded in overburden

Observation of the MS-06 sedimentation pond indicated the pond had been filled to capacity, as had been reported by Baffinland, and was of insufficient size to contain the amount of runoff required ([Picture 19](#)). Further, it was observed that the ditch used to intercept runoff and direct it to the MS-06 sedimentation pond had no lining or other erosion control measures to maintain it, and that sections of the pad were eroding into the ditch ([Picture 20](#)). Some portions of the ditches were becoming blocked due to the expansion of the pad having pushed material into the ditch as well as the deposition of material carried off the pad due to erosion ([Picture 21](#)).



Picture 19: MS-06 Sedimentation Pond



Picture 20: Erosion of Crusher Pad



Picture 21: Ore pad expansion blocking drainage

Landfill Area

NIRB staff also took a tour around the landfill site ([Picture 22](#)) in order to follow-up on the recurring issues noted during previous site observations pertaining to the deterioration of the landfill litter fences. In the 2016 and March 2017 site visits, it was noted that fencing mesh had been removed from the supporting poles, and that Baffinland had not implemented the recommendations of the NIRB made in 2014, 2015, and 2016 regarding the maintenance of fencing surrounding the landfill to retain wind-blown debris. As had been noted during the March 2017 visit, the landfill was lacking fencing with only a small section of wooden fencing providing any means of containing wind-blown debris ([Picture 24](#) and [26](#)). No improvement in the fencing in comparison to the March 2017 site visit was observed.



Picture 22: Landfill and Effluent Discharge Locations



Picture 23: 360 degree panorama from within landfill



Picture 24: Landfill wooden fence

Baffinland indicated that the landfill had begun a second lift and noted its intent to request an expansion of the landfill site. As in previous site visits, the Monitoring Officer noted to Baffinland staff the continuing concern of the NIRB regarding the lack of appropriate fencing.



Picture 25: New garbage in landfill



Picture 26: Refuse outside landfill

Incinerator Area

Based on the previous 2016 site observations and the most recent 2017 site visit, the Monitoring Officer noted that the incinerator in use at the Mine site ([Picture 27](#)) continues to remain well maintained. The NIRB's 2016 Recommendation 21 specifically requested that Baffinland take immediate steps to remove unused scrap materials, tires and synthetic materials currently stored temporarily at various Project locations, including around the immediate vicinity of the incinerator facility, in order to improve the visual quality of the site. During the August 2017 visit, it was noted that while the area around the incinerator showed improvement in the cleanup of scrap and synthetic materials, the large pile of scrap tires remained adjacent to the incinerator. ([Picture 29](#)). It was noted that aside from the visual issue, a single large mass of tires represented the potential for causing serious and difficult to control fire should the tires to ignite. Baffinland staff stated the same concern had been raised by the Mine Rescue Team who would be responsible to responding to such an incident.



Picture 27: Location of Mary River Incinerator



Picture 28: Mary River incinerator Interior



Picture 29: Scrap tire pile at Mary River Incinerator (composite image)

Effluent Discharge

While the measures in place to reduce erosion at the effluent discharge appeared to be functioning as intended ([Picture 30](#)), it was noted in the 2016 site visit that the ground to the side of one (1) of the sewage lines was in the process of slumping due to erosion and lack of riprapping. ([Picture 31](#)). This issue remained apparent in the August 2017 site visit and had not been addressed. Visual investigation indicated that the slumping appeared to be natural and not associated with Baffinland's operations. It was suggested that Baffinland monitor the progress of the slump, if it was not already doing so, in able to monitor the progression and respond appropriately if issues should arise.



Picture 30: Effluent Discharge



Picture 31: Slumping adjacent to discharge

2.1.2 Tote Road

During 2017 summer site visit, the Monitoring Officer did not observe any major environmental issues along the Tote Road. Due to wet conditions at the time of the visit, dust plumes due to vehicle traffic were minimal. The Monitoring Officer also followed-up with Baffinland in regards to the removal of a CAT excavator, which had broken through the river ice in December 2016 near the km 80 bridge ([Picture 32](#)) and had not yet been removed at the time of the March 2017 visit. Baffinland confirmed the excavator had been successfully recovered. NIRB staff noted at the km 80 bridge that the seacans which had formerly made up the bridge had yet to be removed. ([Picture 33](#)) It was also observed that scrap metal from culverts that had been replaced at various locations along the Tote Road had not yet been removed and Baffinland indicated the intent to do so.



Picture 32: KM 80 Bridge



Picture 33: KM 80 Bridge seacans

Road maintenance and construction was ongoing during the visit, with Baffinland slightly adjusting the road in specific locations to reduce the number of blind curves and adjusting slope cuts to provide better sight lines for traffic for safety reasons.



Picture 34: Dust Measuring Station, Tote Road



Picture 35: Repairs to B-Train on the Tote Road

It was noted that terrain beside the road north of the mine site was showing signs of erosion and possible natural permafrost degradation. Mr. Alan Knight indicated that Baffinland has consulted with permafrost experts in order to determine if there is an engineering solution to stabilize the permafrost to prevent erosion from affecting the road.

The unusually high levels of moisture due at the time of the visit limited the amount of dust generated by vehicles, therefore the amount of dust which would normally be generated by traffic could not be judged visually during this visit.

2.1.3 Milne Port



Picture 36: Milne Port

Ore Dock and Stockpile Area

Mr. Knight led the tour of Milne Inlet ([Picture 36](#)). During the August 2017 site visit, the loading of an ore ship was in progress ([Picture 37](#)).



Picture 37: Ship Loading at Milne Port Ore Dock

The sedimentation ponds located on the east ([Picture 38](#)) and west sides ([Picture 39](#)) of the ore stockpile pads were noted as having deposited sediment below the level of the surroundings berms indicating that they were of sufficient size to deal with the amount of runoff water currently present; however, the east pond was near capacity indicating it would be insufficient to deal with the quantities of water present during freshet. The ditch feeding the western pond showed a lack of protection against erosion ([Picture 40](#)) and observation of the ditch seemed to indicate that study of the grade of the ditch should be assessed in order to allow for water flow into the pond ([Picture 41](#)). It was suggested that Baffinland confirm that the ditch had a proper grade and consider some form of protection be applied to the sides of the ditch to prevent erosion which could dam water flow.



Picture 38: Stockpile East Pond



Picture 39: Stockpile West Pond



Picture 40: Ditch with no erosion protection



Picture 41: Looking up ditch

Landfarm Area

Since 2014, the Monitoring Officer consistently reported on the deteriorating condition of the landfarm facility, and has raised concerns that the disposal synthetic liners, contaminated snow and soils have not been properly managed in accordance with industry best practices. The NIRB's 2016 Recommendation 20 specifically requested that Baffinland implement best practices for landfarm operations, including for management of contaminated snow, waste synthetic liners, including used tires. At the time of this visit the landfarm showed some minor improvement compared to the March 2017 visit and significant improvement to that of the 2016 site visit; however, liner material continued to be observed to remain in the landfarm, as well as refuse such as plastic buckets and barrels ([Pictures 42, 43, and 44](#)). The waste water holding pond within the landfarm similarly had garbage and debris in it such as used petroleum containment booms and a portable spill berm ([Picture 45](#)).



Picture 42: Landfarm



Picture 43: Landfarm debris



Picture 44: Barrels in landfarm



Picture 45: Debris in landfarm pond



Picture 46: Salt laydown location

Salt Laydown

The laydown area at Milne Inlet used for storage of salt used as a dust suppressant ([Picture 46](#)) showed poor organization and a generally untidy appearance, with individual bags of salt falling out of the shipping packaging and the shipping packaging scattered at random over the pad. ([Picture 47](#) and [48](#))



Picture 47: Bags of salt in laydown area

Visual Environment and Aesthetic Quality of Mine Site, Tote Road, and Milne Port

The Monitoring Officer observed that areas within and surrounding the PDA, including the Mine site and Milne Inlet, require additional waste management actions due to the accumulation of scrap materials and unused items such as tires, steel pipes, wooden materials, and drums without proper waste management strategy.

2.2 Observations Based on NIRB Project Certificate No. 005

The following are the observations made during the site visit that pertain specifically to terms and conditions of Project Certificate No. 005:

2.2.1 Air Quality –Dust Management and Monitoring Plan

Condition 10

The Proponent shall update its Dust Management and Monitoring Plan to address and/or include the following additional items:

- 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.*

Condition 58c

Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes:

- c. A description of the extent of dust fall based on measured levels of dust fall (fugitive and finer particles such as TSP) on lichens and blueberries, and ash content of caribou fecal pellets;*

3 FINDINGS AND SUMMARY

Based on the observations made during this current site visit, the Mary River Project facilities in operation appear to be well managed, and generally are maintained with adequate environmental protection measures and procedures in place.

In order to fully meet the requirements of the Project Certificate terms and conditions, and to ensure that potential adverse impacts to the environment are adequately mitigated, the NIRB Monitoring Officer has identified several issues that require follow-up and corrective action:

3.1 Milne Inlet Landfarm:

As noted in sections [2.1.3](#), the landfarm while improved over the March 2017 site visit by the removal of synthetic liners entrenched within the landfarm previously noted in the 2015, 2016, and March 2017 site visits, continues to have an issue with material such as embedded liners, pails, barrels, and other garbage being deposited in it along with contaminated soil. The NIRB recognizes the efforts to date; however, actions will continue to be necessary to have the landfarm reach acceptable standards.

3.2 Milne Inlet Salt Laydown

The disorganized and uncontrolled salt laydown area at Milne port represents a potential issue as the haphazard storage and uncontrolled nature of the area increases the probability of content spillage and uncontrolled release into the environment, as well as the negative visual impact due to the untidiness. It was recommended to Baffinland that measures would be necessary to improve the storage area and implement plans to store and access the salt in an organized manner.

3.3 Tire management

Used tires continue to be a significant waste stream generated across the Project sites, particularly around the Mine site and Mile Port. Following the Monitoring Officer's recommendation, on April 26, 2017, Baffinland submitted an Onsite Current Tire Disposal Procedure to the NIRB, which specifically outlined the various procedures to dispose newly generated scrap tires, and options for managing historical tire piles around the PDA. During the August 2017 visit, Baffinland staff discussed that the shipping out of used tires is keeping up with the current stream, but the historical scrap tires inventory remain largely on site. It was recommended that at a minimum Baffinland organize the tire piles to improve the aesthetics of the project area and to reduce the risk of an uncontrolled tire fire until such time as a permanent solution to the tire issue can be implemented.

It was also recommended that prior to earthmoving operations in areas where tires are used to delineate pads or roads that the tires be either moved or removed in order to avoid burying the tires as was seen at the crusher pad.

3.4 Waste Landfill

During the NIRB's current site visit, the Monitoring Officer observed that solid waste materials were generally properly contained within the landfill, although the incomplete fencing of the landfill footprint continue to be a recurring issue. The Monitoring Officer noted that the condition of the landfill fencing has not improved significantly compared to previous observations, as Baffinland has yet to fully install a durable fencing material to prevent offsite dispersal of waste materials to the adjacent tundra. Baffinland was requested, again, to develop a long-term solution for addressing the recurring fencing issue of the landfill as well as adopt best management practices for landfill operations.

3.5 Sedimentation Ponds and Ditches at Mary River and Milne Port

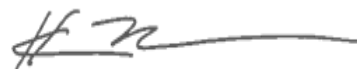
The sedimentation ponds and associated feeder ditches at the Mary River crusher pad (MS-06) and Milne Inlet ore stockpile pad demonstrated similar issues in the lack of protection against erosion in the ditches, allowing for increased sediment deposit restricting or potentially blocking water flow. It was recommended to Baffinland that some form of protection for the ditches be implemented to prevent excessive erosion and ditch blockage.

The MS-06 facility is of insufficient size to contain the runoff water from the ore pad. Subsequent to the site visit, Baffinland has applied for and received permission from the Nunavut Water Board to expand the sedimentation pond in order to increase its capacity, with construction to be completed prior to the 2018 freshet.

The MS-08 facility (ditches and sedimentation pond) implemented following the 2016 site visit is failing to contain runoff from the waste rock pile. The construction of an emergency ditch to prevent untreated runoff from reaching the tundra was required in 2017. Baffinland staff noted that the engineering of the pond was to be modified to address the issue of untreated water bypassing the pond. The existing ditches are insufficient to direct runoff water to the sedimentation pond, and the sedimentation pond is of insufficient size to contain the runoff from the waste rock pile. It is recommended that Baffinland implement and execute a plan to deal with this situation.

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