

Full Report Title: 2013 Site Visit Report for the Nunavut Impact Review Board's
Monitoring of Baffinland Iron Mine Corp.'s Mary River Project (NIRB
File No. 08MN053)

Project: Mary River Project
Project Location: Qikiqtani Region, Nunavut

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Cover photo: Aerial view of Milne Port

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1 INTRODUCTION

The Nunavut Impact Review Board (NIRB or Board) was established through Articles 10 and 12 of the Nunavut Land Claims Agreement (NLCA) and is responsible for post environmental assessment monitoring of a Project in accordance with Part 7 of Article 12 of the NLCA.

This report provides the findings that resulted from the site visit of the Mary River Project that took place on August 20 and 21, 2013 as part of the NIRB's monitoring program.

1.1 Objectives & Purpose of Site Visit

In December 2012, pursuant to Section 12.5.12 of the NLCA, the NIRB issued Project Certificate No. 005 for the Mary River Project (the Project), allowing the Project to proceed in accordance with the Terms and Conditions issued therein.

The Board is responsible for the monitoring of this Project as per Sections 12.7.1 and 12.7.2 of the NLCA. 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 the NIRB's Mary River Project Certificate [005] (Section 12.7.2(b) of the NLCA).

The observations resulting from this site visit shall, wherever possible, be incorporated into the measurement of the relevant effects of the project (Section 12.7.2[a], provide the information necessary for agencies to enforce terms and conditions of land or resource use approvals (Section 12.7.2[c]), and will further be used to assess the accuracy of the predictions contained in the project impact statements (Section 12.7.2[d]).

1.2 Introduction of the Mary River Project

The Project consists of mining iron ore from the reserve at Deposit No. 1 at a nominal production rate of 18 Million tons per year (Mt/a). The Project includes the extended exploration, construction, operation, closure and reclamation of an open-pit mine and associated infrastructure for extraction, transportation and shipment of iron ore. There are 3 main project locations – Mary River (the mine site), Milne Port north of Mary River, and Steensby Port south of Mary River. Milne Port is connected to Mary River by the Milne Inlet Tote Road, which is approximately 100 kilometers (km) in length. A railway of approximately 150 km has been approved for development to connect Mary River to Steensby Port. During the construction period, supplies and equipment required at Mary River and the northern portion of the railway will be received through Milne Port. Similarly, construction equipment and supplies for Steensby Port and the southern portion of the railway will be received at Steensby Port.

It is expected that Steensby Port facilities and the railway will take up to four years to construct and that during this time, supplies would be brought to both Milne Port and Steensby Port during the open water season. Once the railway is operational, 18 Mt/a of iron ore will be transported by rail and shipped to markets from Steensby Port. Shipping of iron ore will occur year round and will require vessels with icebreaking capabilities. When Steensby Port is operational, Milne Port will be used occasionally for the delivery of oversized equipment for Mary River.

In 2013, the Proponent applied for an Early Revenue Phase (ERP) development plan. The ERP as proposed would alter the development path outlined above, most notably to include a delay in the construction of the railway and Steensby Port facilities and includes the shipment of 3.5 Mt/a of iron ore by truck to Milne Port for shipping during the open water season via the Milne Inlet Tote Road. The transportation of ore via the Tote Road would continue for an initial 4 years or until railway infrastructure is in place, at which time it is proposed that total mine throughput would increase from the initially approved 18 Mt/a transported by rail to Steensby Port to include the 3.5 Mt/a proposed through the ERP which would be transported by truck to Milne Port for a total of 21.5 Mt/a for the life of the mine.

1.3 Preparations for the Site Visit

In preparation for the site visit, the Monitoring Officer reviewed the Mary River Project Certificate [No. 005], Baffinland's April 2013 informal update on the compliance of Project Certificate Terms and Conditions.

2 SITE VISIT

The 2013 site visit was conducted on August 20 and 21, 2013 by Jaswir Dhillon, NIRB Monitoring Officer and Sophia Granchinho, NIRB Senior Technical Advisor. On Tuesday, August 20, 2013, the Monitoring Officer and Senior Technical Advisor flew via aircraft chartered by Baffinland from the Iqaluit Airport to Mary River. The Monitoring Officer and Senior Technical Advisor were met by Oliver Curran, Director of Sustainable Development and Jennifer St. Paul-Butler, Environmental Analyst of Baffinland Iron Mines Corp. Once at the site, the Monitoring Officer and Senior Technical Advisor were provided with health and safety orientation before meeting with Trevor Myers, Baffinland's Environmental Superintendent for a tour of Mary River, which included the wastewater treatment facility, incinerator, impacted soil remediation site, fuel bladder location and various monitoring stations.

During the morning of August 21, 2013, the Monitoring Officer and Senior Technical Advisor visited the landfill, hazardous materials storage area, Quarry 2, water treatment facility and iron ore stockpile with Baffinland representatives, Mr. Curran, Mr. Myers and Ms. St Paul-Butler. During the afternoon, NIRB staff members were accompanied by Baffinland representatives on a tour of the Milne Inlet Tote Road (Tote Road) by truck. The new water intake locations and engineered fish ladders that form a part of Baffinland's compensation plan for the harmful alteration, disruption and destruction (HADD) of fish habitat for the Tote Road were visited. NIRB staff members were accompanied by Baffinland representatives for a tour of Milne Port. The visit culminated with staff being flown over the marine mammal monitoring station in Iluviliit, an aerial tour of Milne Port, Milne Inlet Tote Road and Mary River. NIRB staff members were also taken on an aerial tour of Deposit 1. Later in the evening and the following morning, August 22, 2013, the Monitoring Officer and Senior Technical Advisor met with Baffinland's Oliver Curran and Jennifer St. Paul-Butler to discuss several issues pertaining to the project and Project Certificate.

The site visit provided the Monitoring Officer with an opportunity to tour many of the major project component areas, as well as to make note of the construction work that has been

completed and that which was ongoing. The site visit also provided an opportunity for the Monitoring Officer and Baffinland staff to discuss relevant issues related to the Project.

2.1 General Observations

The following are general observations made during the site visit and do not pertain specifically to any particular terms or conditions of the Project Certificate:

- a. While at the camp site, a peregrine falcon was heard. A peregrine falcon was seen close to Deposit 1 at the Mary River site. Three (3) Arctic hares were seen around the camp site. Along the Milne Tote Road various bird species were observed; particularly loons, geese, ducks and Sandhill cranes.
- b. No mining work was being done at Mary River. Permanent hard-wall camps had arrived at the site and were awaiting assembly. Quarry 2 was in full operation mode and trucks were observed carrying quarried rock to the location of the camp pad which was under construction. Explosives had arrived on-site and were stored close to the quarry operation.
- c. Construction was underway at Milne Port, with Quarry 1 in full operation mode (refer to Photo 11). The Milne Port fuel tank farm was under construction, where two 12 million-litre (ML) fuel tanks were being constructed (refer to Photo 17) and a 750,000 L tank was scheduled for construction. The permanent hard-wall camps were currently being erected at Milne Port. The generator sets were ready for assembly and were being stored at the Milne Port laydown area.
- d. The main building at Mary River which houses the Environment Office, kitchen, lounge and staff training area, as well as several staff accommodation trailers was clean, and signs marking the function of specific areas were well-positioned and clearly marked (Photo 1 and Photo 2).



Photo 1. Hallway of main building at Mary River



Photo 2. Kitchen in the main building at Mary River

2.2 Meteorology and Climate

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.”

The Monitoring Officer noted that a telemetry station had been installed by Baffinland to obtain weather-related information for the mine site (Photo 3).



Photo 3. Telemetry station at Mary River

2.3 Air Quality

Condition 8

“The Proponent shall demonstrate through monitoring of air quality at the mine site and at the Steensby Inlet Port site that SO₂ and NO₂ emissions remain within predicted levels...”

The Monitoring Officer did not observe any air quality monitoring stations installed at Mary River, nor was it evident that any air quality monitoring work was being undertaken. Dustfall monitoring stations were observed at various locations throughout Mary River and along the Tote Road (Photo 4).



Photo 4. Dustfall monitoring station

2.4 Noise and Vibration

Condition 14

“The Proponent shall conduct noise and vibration monitoring at Project accommodations sites located at the Mary River mine site, Steensby Inlet Port site, and Milne Inlet Port site. Sampling shall be undertaken during the summer and winter months during all phases of Project development.”

It was indicated by Mr. Curran that noise monitoring would commence at the Mary River mine site and at Milne Port once the generators have been commissioned. At the time of the site visit, Baffinland staff confirmed that no noise and vibration monitoring had been undertaken.

2.5 Hydrology and Hydrogeology, Groundwater/Surface Water

Condition 17

“Develop and implement effective measures to ensure that effluent from project-related facilities and/or activities....satisfies all discharge criteria requirement established by the relevant regulatory agencies prior to being discharged into the receiving environment.”

Condition 24

“The Proponent shall monitor as required the relevant parameters of the effluent generated from Project activities and facilities and shall carry out treatment if necessary to ensure that discharge conditions are met at all times.”

It was communicated by Mr. Myers that at the time of the site visit, a polishing waste stabilisation pond (PWSP) was being used to ensure that the treated sewage discharge criteria was met. The sewage treatment system in place at the time was a rotating biological contactor (RBC) which, according to Mr. Myers, does not adapt well to fluctuating loads and was not very effective in fluctuating load conditions. Baffinland indicated that it would be replacing the RBC with a membrane bioreactor (MBR), which its staff noted would be more adaptable in fluctuating load conditions. Until the new treatment system is operational, Baffinland staff noted that the PWSP would continue to be operated prior to the discharge of treated effluent to Sheardown Lake. The wastewater treatment facilities were observed to be in good general condition (Photo 5).



Photo 5. Polishing waste stabilisation pond (PWSP)

Leachate monitoring points were observed to be located around the landfill (Photo 6). There were also monitoring points and well test pits observed around the ore stockpile (Photo 7 and Photo 8). Baffinland staff noted that the monitoring points and test pits were sampled once a month to ensure that the contact water meets discharge criteria. Mr. Myers further noted that if contact water does not meet criteria, it is treated prior to discharge.



Photo 6. Landfill



Photo 7. Ore stockpile



Photo 8. Monitoring Station and well test pit at iron ore stockpile

Condition 19

“The Proponent shall ensure that it develops and implement adequate monitoring and maintenance procedures to ensure that the culverts and other conduits that may be prone to blockage do not significantly hinder or alter the natural flow of water from areas associated with the proposed mine. In addition, the Proponent shall monitor, document and report the withdrawal rates for water removed and utilized for all domestic and industrial purposes.”

Mr. Myers explained that the culverts and conduits used for the Mary River project had been sized appropriately to allow water to flow naturally and that monitoring was being done on the flow of water out of culverts to determine whether the sizing is appropriate. Several drains were scheduled for replacement due to the discovery that the size of the culvert or drain was too small to allow the natural flow of water (e.g. culvert at KM 80 of the Tote Road).

Mr. Myers also noted that preventative maintenance measures were in place to prevent blockage of the culverts and conduits and that this maintenance was designed based on past experience of having had the Tote Road washed away due to blocked culverts and conduits. Baffinland’s staff indicated that it times the de-icing of the culverts and conduits slightly before break-up so that the culverts and conduits are cleared by snowmelt (Photo 9).



Photo 9. Culvert under the Tote Road

Condition 20

“Monitor the effects of explosives residue and related by-products from project-related blasting activities as well as develop and implement effective preventative and/or mitigation measures.”

The Monitoring Officer observed that monitoring stations were located around the perimeter of Quarry 2 at Mary River.

Condition 21

“The Proponent shall ensure that the scope of the Aquatic Effects Monitoring Plan (AEMP) includes, at a minimum, monitoring of non-point sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data and the mechanisms proposed to monitor and treat runoff, and sample sediments.”

Mr. Curran noted during the visit that Baffinland had consulted with Environment Canada to identify reference sites (including those for non-point sources of discharge) and further confirmed that a map of the chosen sites would be submitted to the NIRB for information.

Condition 23

“The Proponent shall develop and implement a Groundwater Monitoring and Management Plan to monitor, prevent and mitigate the potential effects of the Project on groundwater within the Project area.”

The Monitoring Officer observed that groundwater monitoring was implemented at the ore stockpile and this was confirmed by Mr. Myers (Photo 8).

2.6 Landforms, Geology and Geomorphology, Soils and Permafrost

Condition 28

“The Proponent shall monitor the effects of the Project on the permafrost along the railway and all other Project affected areas and must implement effective preventative measures to ensure that the integrity of the permafrost is maintained.”

It was communicated to the Monitoring Officer by Baffinland staff that Project infrastructure would be designed in a manner to ensure that permafrost integrity is not compromised. Further, staff indicated that insulation would be put down in the foundation to limit heat effects on the permafrost and that thermal monitoring would be conducted by the infrastructure design consultant in order to determine whether or not the design is successful in its ability to limit the effects to permafrost.

2.7 Vegetation

Condition 32

“The Proponent shall ensure that equipment and supplies brought to the Project sites are clean and free of soils that could contain plant seeds not naturally occurring in the area. Vehicle tires and treads in particular must be inspected prior to initial use in Project areas.”

Mr. Curran commented that all equipment/vehicles are washed down at the originating port prior to loading into seacans.

2.8 Freshwater Aquatic Environment

Condition 41

“The Proponent shall maintain a minimum 100-metre naturally-vegetated buffer between the high-water mark of any fish-bearing water bodies and any permanent quarries with potential for acid rock drainage or metal leaching.”

Condition 42

“The Proponent shall maintain minimum a 30-metre naturally-vegetated buffer between the mining operation and adjacent water bodies.”

Quarry 2 located at Mary River and Quarry 1 located at Milne Port were in operation at the time of the site visit. It was observed by the Monitoring Officer that the distance between the quarries and the nearest waterbodies was more than 100 metres (Photo 10 and Photo 11). The Monitoring Officer observed no evidence of a waterbody close to Deposit 1, although Deposit 1 was not in operation at the time of the site visit.



Photo 10. Quarry 2



Photo 11. Quarry 1

2.9 Terrestrial Wildlife and Habitat

Condition 53

"The Proponent shall demonstrate consideration for the following:

- 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....”*

Condition 61

“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.”

No caribou were observed during the drive from the Mary River mine site to Milne Port along the Tote Road. Both Mr. Myers and Mr. Curran commented that in the event that caribou are encountered, a policy is in place which requires that vehicles stop to let caribou pass. Mr. Myers added that the operational procedure in place is for vehicular traffic to stop at any time wildlife is encountered to allow safe passage for wildlife. Mr. Myers reported that wildlife logs, located in the main camp building, are kept up to date with a running log of wildlife encountered or seen in and around Mary River and along the Tote Road.

Condition 62

“The Proponent shall prohibit project employees from transporting firearms to site and from operating firearms in project areas for the purpose of wildlife harvesting.”

Mr. Myers reported that employees are prohibited from having firearms in their possession onsite. All firearms are stored in a secure location. Baffinland staff noted that two employees have possession of the keys to the firearms storage area, the Site Supervisor and the Occupational Health and Safety (OSH) Superintendent and that any staff that may be required to use firearms onsite would be provided with training.

Condition 64

“The Proponent shall ensure that its Environment Protection Plan incorporates waste management provisions to prevent carnivores from being attracted to the Project site(s)...”

During the site visit, it was observed that the landfill was equipped with a bear fence to keep wildlife (including predators) out (Photo 6). Waste is segregated adjacent to the existing incinerator, and all food waste is incinerated, untreated wood is burned at a designated burn area in the landfill and hazardous waste is stored in labelled drums on top of pallets (Photo 12). All other waste is landfilled. Mr. Curran informed the Monitoring Officer that the new incinerator was scheduled for commissioning in mid-September and that stack testing would be performed following commissioning of the new incinerator (Photo 13 depicts the existing incinerator).



Photo 12. Hazardous waste storage area



Photo 13. Existing incinerator

2.10 Birds

Condition 65

“The Proponent shall ensure all employees working at project sites receive awareness training regarding the importance of avoiding known nests and nesting areas and large concentrations of foraging and moulting birds.”

Mr. Curran explained that a 2.5 hour long orientation session is provided to new employees, where wildlife is addressed and specific instructions are provided in the event wildlife is encountered. A consultant hired by EDI also provided bird nest awareness training where employees were provided direction on what to do if nests were found in their work area.

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.”

Mr. Myers commented that the strategy to date has been to start work before nesting begins so birds do not nest in the work areas. For any nests that are found, zones of avoidance have been established around them.

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.”

The Monitoring Officer observed that there were no lights installed during the time of the site visit.

Condition 69

“Prior to bird migrations and commencement of nesting, the Proponent shall identify and install nesting deterrents (e.g. flagging) to discourage birds from nesting in areas likely to be disturbed by construction/clearing activities taking place during the nesting season.”

Mr. Myers informed the Monitoring Officer that flagging deterrents are currently being used to discourage birds from nesting in areas where work is taking place.

2.11 Marine Environment

Condition 92

“The Proponent shall ensure that it maintains the necessary equipment and trained personnel to respond to all sizes of potential spills associated with the Project in a self-sufficient manner (marine shipping).”

Mr. Curran informed the Monitoring Officer that spill response training was conducted in early August.

During the site visit, the Monitoring Officer observed that fuel storage bladders were used to store fuel at Mary River (Photo 14). Some fuel leakage was observed around the fuel bladders (Photo 15). There also appeared to be a significant amount of contact water pooled around the fuel bladders (Photo 16). Mr. Myers explained that all contact water is pumped and treated prior to discharge.



Photo 14. Fuel bladders



Photo 15. Evidence of fuel leakage



Photo 16. Pooled contact water at the fuel storage area

During the site visit, the fuel storage facility at Milne Port was undergoing construction (Photo 17). Two 12 million-litre (ML) tanks were under construction and a 750,000 L tank was scheduled for construction shortly. An observation of the fuel storage facility revealed that there was some standing water inside the bermed area (Photo 18).



Photo 17. Milne Port fuel storage facility



Photo 18. Pooled water in fuel storage facility

2.12 Marine Wildlife and Habitat

Condition 124

“The Proponent shall prohibit project employees from recreational boating, fishing, and harvesting of marine wildlife in project areas, including Steensby Inlet and Milne Inlet. The Proponent is not directed to interfere with harvesting by the public in or near project areas, however, enforcement of a general prohibition on harvesting in project areas by project employees during periods of active employment (i.e. while on site and between work shifts) is required.”

Mr. Myers commented that Baffinland has check-in procedures in place for hunters in the area or those who are passing through. Hunters would be welcome to stop and rest en route to hunting grounds should they travel through the project area.

2.13 Human Health and Wellbeing

Condition 153

“The Proponent is encouraged to employ a mental health professional to provide counseling to Inuit and non-Inuit employees in order to positively contribute toward employee health and well-being.”

The Monitoring Officer was informed by Mr. Curran that a contract was being negotiated for a mental health call line and that this was expected to be in place by October 2013. The mental health call line would be equipped with two dedicated services, one for Inuit employees and the other for non-Inuit employees.

2.14 Culture, Resources and Land Use

Condition 165

“The Proponent is strongly encouraged to provide buildings along the rail line and Milne Inlet Tote Road for emergency shelter purposes, and shall make these available for all employees and any land users travelling through the Project area. In the event that these buildings cannot, for safety or other reasons be open to the public, the Proponent is encouraged to set up another form of emergency shelters (e.g. seacans outfitted for survival purposes) every 1 kilometre along the rail line and Milne Inlet Tote Road....”

The Monitoring Officer was informed that there are two emergency shelters along the Milne Inlet Tote Road, at Kilometres 33 and 69. At the time of the site visit, the Monitoring Officer was informed that these emergency shelters were for use by project personnel only.

Baffinland indicated to the Monitoring Officer the impracticality of the installation of one emergency shelter every kilometre, noting that the indicated frequency would amount to nearly 100 shelters.

2.15 Accidents and Malfunctions

Condition 173

“The Proponent shall employ full containment booms during all ship-to-shore and other marine-based fuel transfer events.”

Mr. Curran and Mr. Myers communicated to the Monitoring Officer that the ships had been located too far from the shore for the use of containment booms.

Condition 174

“The Proponent and the Canadian Coast Guard are required to provide spill response equipment and annual training to Nunavut communities along the shipping route to potentially improve response times in the event of a spill.”

Mr. Curran informed the Monitoring Officer that Baffinland provided spill response training to one representative of the community of Pond Inlet, but that the Canadian Coast Guard was not in attendance for this training.

3 FINDINGS AND SUMMARY

Based on observations made during the site visit, facilities in operation and those that were under construction appear to be reasonably well-maintained with some items noted for improvement to ensure that the potential adverse impacts to the environment are adequately mitigated.

Baffinland is at the early stages of the construction phase of the Mary River Project, as such there are many terms and conditions contained within the Mary River Project Certificate which are not applicable or have not been completely adopted at this time.

The Monitoring Officer has, however, noted several items and areas where Baffinland has not fully met the requirements of the Project Certificate terms and conditions as expected.

Condition 8 requires that air quality monitoring be performed at Mary River and Steensby Inlet Port site to demonstrate that pollutant emissions are within predicted levels. The Monitoring Officer noted that no air quality monitoring stations had been set up at the time of the site visit.

Condition 68 requires that the Proponent install flashing red, red strobe or white strobe lights and guy-wire deterrents on communication towers. The Monitoring Officer noted that no lights or guy-wire deterrents had been installed on communication towers at site.

Condition 173 requires the usage of full containment booms during all ship-to-shore and other marine-based fuel transfer events. The Monitoring Officer noted during the site visit that no containment booms were in place during marine-based fuel transfer that was occurring at the time.

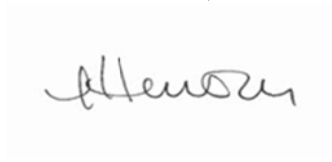
Although there are no specific term and conditions pertaining to the operation of fuel storage facilities, the Monitoring Officer noted significant contact water and in some areas, evidence of fuel leakage at the fuel storage facilities.

Where Baffinland indicated during the site visit that it is unable to meet specific requirements of the terms and conditions contained within the Mary River Project Certificate, the Monitoring Officer advised Baffinland that the submission of formal correspondence to the NIRB requesting clarification and/or discussion would be an appropriate course of action.

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Date: November 1, 2013

Signature: _____

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A handwritten signature in black ink, appearing to read 'A. Hanson', is centered within a light gray rectangular box.

Signature: _____

4 REFERENCES

Baffinland Iron Mines Corporation, “*Project Certificate No. 005 Progress Update*”, April 2, 2013.

Nunavut Impact Review Board, “*NIRB Project Certificate No.005*”, December 2012.