Aboriginal Affairs and Northern Development Canada
Affaires autochtones et Développement du Nord Canada

Water Resources Division
Nunavut Regional Office
PO Box 100
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December 11, 2012

Erik Madsen
Vice President Sustainable Development,
Health, Safety & Environment
Baffinland Iron Mines Corporation
120 Adelaide Street West, Suite 1016
Toronto, ON M5H 1T1

Dear Mr. Madsen:

The Nunavut Regional Office of Aboriginal Affairs and Northern Development Canada (AANDC) would like to clarify some aspects of the Baffinland Iron Mines Corporation (BIMC) type "A" water licence application ahead of the technical meeting and pre-hearing conference. AANDC thanks BIMC for providing responses regarding previous completeness and technical review comments from AANDC in your letter to NWB dated October 12, 2012, and for providing additional responses in your letter to NWB on October 31, 2012. Observations and recommendations in this letter pertain mainly to issues raised in previous information requests as well as to some terms and conditions in the Nunavut Impact Review Board's Final Hearing Report. A number of recommendations regarding the proposed post-licensing updates of water licence management plans are also included.

BIMC has proposed that the majority of management plans in the water licence will be revised and updated when additional information becomes available subsequent to the issuance of the water licence and prior to the construction phase of the project (in most cases 60 days prior to construction). AANDC recognizes that it will not be necessary for BIMC to submit final versions of all plans before the water licence is issued, but AANDC nonetheless recommends that some particular information, described below, should be incorporated into certain plans before the issuance of the water licence. In the view of AANDC, the information is required to ensure confidence in proposed mitigation measures. Please see the following list of observations and recommendations for further detail.

1. The proposed mitigation measures for pit lake water quality may require an unreasonable length of time for implementation. Water quality modeling submitted by BIMC predicted that pit lake discharges may not meet Metal Mines Effluent Regulations (MMER) criteria

for pH after 21 years and AANDC observes that further degradation over time may impact the downstream receiving water. In Section 8.2 of the Preliminary Mine Closure and Reclamation Plan, BIMC has proposed a mitigation strategy of treating pit lake water over several decades in the post-closure period, presumably either while or after pit lake is passively filled through seepage, surface run-off and direct precipitation. The prospect of decades of treatment during the projected 85-150 year passive fill period presents a risk that environmental liabilities would be deferred and that the potential use of reclamation security would be required far into the future. Considering the risk, and considering that further modeling of pit lake water quality will inform the adaptation of potential mitigation measures, AANDC recommends the following:

a. BIMC should commit to a maximum 25 year timeframe to complete mitigation and remediation measures for pit lake water quality following cessation of mining in the pit. BIMC may need to pump water to fill pit lake within the 25 year period should modeling not demonstrate that other mitigations will address long term risks to water quality. This commitment should be provided by BIMC prior to issuance of the water licence.
b. AANDC notes that the Preliminary Mine Closure and Reclamation Plan cost estimate includes only three years of post-closure monitoring. Considering the mitigation options for pit lake water quality, longer term monitoring and treatment options for pit lake must be incorporated into the reclamation security estimate. Cost estimates for post-closure monitoring and remediation of pit lake water should be updated with each iteration of the plan, beginning with the Interim Mine Closure and Reclamation Plan.

2. For water licence management plans that will not be updated until after issuance of the water licence, AANDC recommends the following:
    a. Each plan should be revised and submitted to the NWB as outlined in Appendix A and each of these plans should be circulated for comments by interested parties **prior to approval;**
    b. Approval of the revised plans by the Nunavut Water Board should be required **prior to commencement** of any proposed activity contemplated therein;
    c. The updated management plans should accommodate the revision recommendations listed in Appendix B.

3. According to the Surface Water and Aquatic Ecosystems Management Plan, BIMC contracted the Water Survey of Canada (WSC) to run four hydrometric stations and also funded an additional 14 hydrology stations (Table 4.1). BIMC suspended operation of the four hydrometric stations in 2012, but may resume their operations in 2013. AANDC recommends that BIMC continue to monitor water quantity parameters (water level and discharge) through contract with the WSC throughout the life of the project to provide

quality hydrometric data in support of project water management, such as planning water withdrawals for the potential filling of pit lake, and in support of regional water resource management.

4. Given that the NIRB Final Hearing Report identified significant uncertainty with regards to potential impacts to water quality and that the precautionary approach was recommended, there is an expectation that clear and effective monitoring and adaptive management plans will be identified in the water licensing process. A number of inconsistencies and inadequacies in planned monitoring activities were identified in previously submitted information requests. Recognizing that even though monitoring plans will continue to change as MMER monitoring is adjusted and finalized, as the Aquatic Effects Monitoring Plan is further developed, and as other plans are updated in the future, it remains important to consolidate and clarify all currently-committed water-related monitoring before the water licence is issued. AANDC recommends that BIMC compile information on all monitoring station locations, monitoring frequencies, monitoring parameters, and assessment criteria related to water quality monitoring activities identified in the water licence application and project certificate into a singular tabular format. This will provide confidence that the monitoring program will be ready for implementation before licence-approved activities begin.

We look forward to receiving BIMC responses to our information requests and recommendations. Should you have any questions or comments, please do not hesitate to contact me via telephone at (867) 975-4550 or via email at Murray.Ball@aandc.gc.ca.
Sincerely,

Murray Ball
Manager of Water Resources

cc. Phyllis Beaulieu, Manager of Licensing, Nunavut Water Board
Karen Costello, A/Director, Resource Management, AANDC

APPENDIX A

Table 1: AANDC Recommendations Regarding the Schedule for Updating Management Plans

Management Plan	**BIMC Proposed Timeframe**	**AANDC Recommendation**
Environmental Protection Plan	60 days prior to start of construction	This seems appropriate.
Emergency Response and Spill Contingency Plan	60 days prior to start of construction	AANDC recommends the plan be submitted **90 days prior to construction** to ensure that BIMC is prepared for all spills on site well in advance of construction. The plan should be updated to provide contingencies for additional hazardous chemicals before they are brought on site (including MSDS).
Blasting Management Plan	60 days prior to the start of blasting operations	This seems appropriate.
Hazardous Material and Hazardous Waste Management Plan	60 days prior to start of construction	AANDC recommends the plan be submitted **90 days prior to construction**. The plan should be updated to include management of additional hazardous materials before they are brought on site (including MSDS).
Surface Water and Aquatic Ecosystems Management Plan	60 days prior to start of construction	Assuming that a comprehensive table of monitoring locations, frequencies and parameters will be submitted before issuance of the water licence, this timeline seems appropriate.
Fresh Water Supply, Sewage, and Wastewater Management Plan	60 days prior to start of construction	This timeline seems appropriate.
Waste Management Plan	60 days prior to start of construction	AANDC recommends the plan, including embedded landfarm plans, be submitted **90 days**

		prior to construction.
Borrow Pits and Quarry Management Plan	60 days prior to star of construction	This seems appropriate as long as only quarries with approved management plans are developed.
Environmental Monitoring Plan	60 days prior to start of construction	This timeline will be appropriate only if inconsistencies in sampling frequencies and parameters will be resolved and that a consolidated monitoring table will be developed before the water licence is issued.
Aquatic Effects Monitoring Program (AEMP) Framework	Phase 1 – 60 days prior to start of construction Phase 2 – 60 days prior to start of mine pre-stripping operations	AANDC defers to recommendations of Environment Canada with respect to this plan.
Waste Rock Management Plan	60 days prior to start of mine pre-stripping operation	AANDC recommends this plan be submitted **90 days prior to start of pre-stripping operations** to provide an adequate review period.
Preliminary Closure and Reclamation Plan	Preliminary Plan - Implemented upon issuance of the water licence. Interim Plan – 60 days prior to start of mine pre-stripping operation	AANDC recommends that the Preliminary Plan be amended before issuance of the water licence to include a maximum 25 year timeline for pit lake water quality mitigation. AANDC recommends that the **Preliminary Plan be amended 60 days before construction** to address training of security personnel conducting monitoring during potential Care and Maintenance as described in Appendix B, below. AANDC recommends that the **Interim Plan should be**

		submitted 90 days prior to start of mine pre-stripping operation.

APPENDIX B

Emergency Response and Spill Contingency Plan

- Locations of all spill kits within the project area should be included in the plan, as should the contents of each type. Section 2.1 refers to Annex 2 for a list of spill kits and contents of different types of spill kits available on site. Annex 2 refers to Annex 4 of the Milne Port OPEP which only lists spill response equipment for the Milne Inlet Bulk Handling Facility. Annex 8 lists four types of spill kits, yet only the contents of one type are listed. AANDC recommends that the locations and contents of spill response equipment be consolidated in one document when the plan is updated prior to construction.
- The proposal to switch to latrine toilets during sewage system failures (Section 3.2.1.6) should be included in the next update of the waste management plan and should clarify how latrine waste will be managed.
- Section 4.0: The plan should be updated periodically to provide contacts for third party responders contracted to assist in spill response.
- Section 4.1.2 and Table 7.1: The next plan update should indicate that AANDC contacts are the Manager of Field Operations (867 975-4295) and Manager of Water Resources (867 975-4550).
- The training exercises in this plan should be specific to spills on the land. AANDC recommends that the next update to the plan remove references in Section 4.4 to the Oil Pollution Emergency Plan (OPEP) regarding appropriateness of the response, activation of the OPEP, and exercise coordination with ships and Canadian Coast Guard and include exercises that are more specific to procedures within the spill contingency plan.
- The spill plan is scoped to address the containment and clean up of all spills, but lacks a response procedure for a sewage spill at Milne Port or Steensby Port. AANDC recommends that the next update to the plan include a response for sewage spills in Section 6.3.1.1.

Hazardous Materials and Hazardous Waste Management Plan

- AANDC recommends that the next update to this plan be prepared as a stand-alone document. In particular, references in Sections 4.3, 4.6, and 4.7 to parts of the Environmental Protection Plan (EPP) should be replaced with respective content so that all relevant procedures are included directly in the plan.
- AANDC recommends that the next update to the plan include a requirement in Section 4.4.2 to remove all contaminated waste from the mine on a periodic basis.
- Section 4.4.2 indicates that storage sites will have emergency response equipment appropriate for the hazardous material on site. AANDC recommends that a list of the required emergency response equipment should be provided at each site.

- Section 8.1: BIMC will monitor the quantities of hazardous materials transported off-site for disposal. It is recommended that the next update to the plan commit to annual reporting of quantities of hazardous materials maintained on site as well.

Surface Water and Aquatic Ecosystems Management Plan (SWAEMP)

- Section 6.1.1: Treated soils that meet appropriate criteria will be used as landfill cover material or other acceptable purposes. AANDC recommends that the soil quality criteria be specified in the next update to the plan.
- AANDC recommends that the next plan update Table 6.2 to indicate whether heavy equipment maintenance facilities will be lined.
- Section 6.4.3 of the application identifies the use of access roads to facilitate construction of the railway but the NIRB Final Report states that it is unsure whether access roads will be used. AANDC recommends that the plan clarify whether access roads will be used
- AANDC recommends that the next plan update include floating camps in the overview of facilities at Steensby Port (Table 6.4).

Fresh Water Supply, Sewage, and Wastewater Management Plan

- Section 6.2.2 indicates that run-off water from the tank fuel storage areas will be treated by a local oily water separator system and periodically tested. It is recommended that the next update to the plan include an inspection and sampling schedule for management of the oily water separator.
- An evaporation system is proposed for treated wastewater at the emulsion plant. It is recommended that the next update to the plan provide a description of the evaporation system and a management protocol for its operation.

Waste Management Plan (WMP)

- Section 4.6.4.3 indicates that ground warming at mine landfills will be monitored by watching for evidence of soil creep. Noting that thermistors are often used as best management practice for monitoring ground warming, AANDC recommends that the next update to the plan provide a rationale for choosing soil creep as an indicator and also provide a description of the methods to be used to measure soil creep.
- The Preliminary Landfarm Plan, submitted as Annex 5 to the Waste Management Plan, is specific to Milne Inlet, a facility built to treat soils impacted by a fuel bladder rupture in 2008. AANDC recommends that the next update to the Waste Management Plan include an update to the Preliminary Landfarm Plan to clarify that soil other than from the ruptured bladder will be treated at the Milne Inlet landfarm, and to provide design criteria and management plans for all landfarms (including Steensby and Mine Site landfarms) taking consideration of site topography, borrow site material properties and landfarm sizing requirements (Section 3.1).

- It is recommended that wastewater treatment (evaporation system) and sewage disposal (septic system) at ammonium nitrate emulsion (ANE) sites be included in the next update to the waste management plan.
- Section 5.1.1 of the Preliminary Mine Closure and Reclamation Plan notes that facilities not in use during the operations phase of the mine will be demolished, removed, and disposed of in approved landfills, the mine pit, quarries, or off-site disposal facilities. Disposal of facilities in the mine pit and in quarries was not addressed in the waste management plan. AANDC recommends that the plan should be updated prior to operation phase to indicate how quarry and pit designs have been developed to accept waste and how risks to water will be mitigated.

Environmental Monitoring Plan (EMP)

- AANDC recommends that Sections 4.2.1 and 4.3.1 should include the sampling frequencies and proposed parameters listed in Section 9.1.2 of the Fresh Water Supply, Sewage, and Wastewater Management Plan.
- Section 3.1 indicates that vegetation monitoring will focus on invasive species and vegetation health. It is recommended that vegetation type and percent cover also be included in the next update of the plan.
- AANDC recommends that section 4.2, monitoring and reporting requirements, should also include monitoring at landfills, landfarms, cement ponds, and ANE waste water.
- AANDC recommends that the next update to the plan should include monitoring frequency for water quality testing in Table 4-5.

Preliminary Mine Closure and Reclamation Plan

- AANDC recommends that reclamation plans for concrete ponds (WMP, p20) and contaminated snow ponds (SWAEMP, Section 6.3.2) should be included in the Interim Closure and Reclamation Plan.
- Section 6.7 indicates that reclamation work will be completed within approximately 2 months following initiation of temporary closure status. AANDC recommends that this timeline should be clarified in the Interim Closure and Reclamation Plan to account for limitations of conducting activities in the winter months.
- AANDC recommends that the Interim Closure and Reclamation Plan include a commitment to report waste rock physical and chemical stability assessment results (Section 7.7) to the NWB.
- Section 7.8 indicates that during Care and Maintenance seepage and drainage identified through visual inspections will be sampled by site security personnel. Security personnel will inspect physical stability and conduct chemical analysis of surface water monthly. AANDC recommends that the Preliminary Closure and Reclamation Plan clarify that

training will be provided to security personnel in monitoring techniques and QA/QC procedures.

- Section 8.0 mentions transfer of ownership of structures that may be utilized by the surrounding communities during harvests, camping, and other recreational uses. Whether or not the structures are transferred, it is recommended that the Interim Closure and Reclamation Plan require all structures be removed from site prior to final inspection for closure of the site.
- Section 8.2: If ARD/ML drainage were to develop, batch treatments of contaminated water will be carried out over several decades to ensure it meets discharge requirements before overflow to the environment. Considering that this could occur in the post-closure period, AANDC recommends that the Interim Closure and Reclamation Plan should include treatment of ARD/ML contaminated water in the post-closure section .
- Section 8.9 indicates that liners will be removed from polishing ponds and sewage management ponds. The Interim Closure and Reclamation Plan should indicate where the liners may be disposed.
- Plans for the reclamation of dams and areas associated with dams were not provided. At the Technical Meeting, BIMC committed that all dams will be removed at final closure and later confirmed in their response to technical review comments (October 12, 2012) that they would rehabilitate areas associated with dams at final closure. AANDC recommends that this commitment should be incorporated into the Interim Closure and Reclamation Plan.