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Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board via e-mail

RE: Baffinland Iron Ore Mine Limited – Mary River Bulk Sampling Project -NWB 2BE-MRY

The information submitted with the above-mentioned application has been reviewed on behalf of Environment Canada (EC) by EC staff members with expertise in air quality, waste management, water quality, and migratory birds. The following specialist advice has been provided pursuant to Environment Canada's mandated responsibilities for the enforcement of the *Canadian Environmental Protection Act*, Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act,* and the *Species at Risk Act*.

The bulk sampling program will involve the following work:

- Minor improvements to the airstrip include surface crowning, ditch or culverts to provide drainage, a stabilizing polymer binding agent called EK35 will be applied.
- The delivery of contractor mining and crushing equipment, camp materials and fuel in 2 ship voyages to Milne Inlet.
- Construction and operation of a 200-person camp, including water treatment facility.
- Establishment of temporary fuel storage facilities at Milne Inlet, the roadside camp and Mary River.
- The drilling, blasting and storing of 169,000 t weathered surface rock.
- The drilling, blasting and crushing of 250,000 t of iron ore bulk sample
- Hauling the 250,000 t bulk sample form Mary River to Milne Inlet
- Temporary stockpiling of the iron ore sample at Milne Inlet.

Environment Canada notes that the proponent is applying for an amendment to their current Type B water license to include the Bull sampling program. Schedule 4 of the Northwest Territories Waters Regulations, Licensing Criteria for Industrial Undertakings, applicable to the Nunavut Water and Surface Rights Tribunal Act, states that the use of 300 m^3 or more freshwater per day requires a Type A license. Under their current license, Baffinland is able to withdraw 475m^3/day. The bulk sampling project would add an additional 60m^3/day for camp usage alone. Given the scope of work, and as per the Northwest Territories Waters Regulations, EC is of the opinion that this project will require a Type A license.

EC recommends that the following monitoring and mitigation concerns be addressed by Baffinland prior to licensing:

Regulatory

- Environment Canada would like to remind the proponent that in addition to the mandatory regulations listed in subsection 1.2 Applicable Acts, Regulations and Guidelines of the Environmental Screening Document the Species at Risk Act, *The Migratory Bird Convention Act* and the *Migratory Bird Regulation* shall apply at all times during mining and camp operations.

Fuel Storage

- Environment Canada is proposing to repeal the existing "Registration of Storage Tank Systems for Petroleum Products and Allied Petroleum Products on Federal Lands and Aboriginal Lands Regulations" and replace it with a regulation that has a broader scope of application. The new regulation under the *Canadian Environmental Protection Act* (CEPA) 1999, Part 9 will incorporate mandatory technical requirements (secondary containment, leak detection, corrosion protection, overfill, spill containment) and be more in line with those regulations that already exist in most provincial and territorial jurisdictions. Compliance with the proposed regulations will be mandatory, and EC will conduct inspections to ensure compliance with the regulations. The proponent is encouraged to consult and implement the recommendations found in the 2003 CCME Guidance Document PN 1326 entitled "Environmental Code of Practice for Above Ground and Underground Storage Tank Systems containing Petroleum Product and Allied Petroleum Products". This document provides up to date information regarding best practices for the storage of petroleum products and allied petroleum products.

- All releases of harmful substances, regardless of quantity, are immediately reportable where the release:
    - is near or into a water body;
    - is near or into a designated sensitive environment or sensitive wildlife habitat;
    - poses an imminent threat to human health or safety; or
    - poses an imminent threat to a listed species at risk or its critical habitat.

- Decanting of snow or water from the berm area should proceed only if the appropriate chemical analysis has determined the contents meet the requirements of the *Fisheries Act*.

Landfill

- The proponent indicated in the *Geotechnical Drilling Program* that the bedding inside the liner of the fuel storage facilities would be tested for petroleum hydrocarbons before being removed and would be disposed of with bulky wastes in the landfill. EC's letter to the NIRB dated February 16, 2007 recommended that the liner be removed from site and disposed of in an approved disposal facility. On February 28, 2007 the proponent responded to EC that liner disposal in a landfill was in fact an artifact of an earlier draft and committed to removing all wastes from site. After reviewing the *Bulk Sampling Environmental Screening Document* EC notes in subsection 5.6 Abandonment and Recreation Plan this commitment has changed and the proponent plans to dispose of the geomembrance liner in the landfill. EC would like confirmation of which disposal method the proponent is intending on using as well as justification for its choice. **EC strongly recommends that the fuel storage facility liner be treated as a hazardous material and be removed from the project site upon closure as per the proponents original commitment.**

- Subsection 2.19.1 Landfill Design Considerations states that oil pans and fuel tanks will be drained and the oil or fuel incinerated and that empty crushed barrels will be landfilled. EC is concerned there are inadequate provisions made to ensure that equipment contaminated with hydrocarbons will be properly cleaned prior to being placed in the landfill. EC requests information regarding what parameters are being tested and what quality assurance is being applied to ensure all contaminants have been removed. EC would like confirmation that these procedures would apply to any equipment being disposed of in the landfill. Details of disposal should be provided.
- EC recommends that the proponent refer to the FSC (2003) guideline titled "Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT". The proponent should design the landfill to conform to the requirements of the Guideline and that those principals that are applicable be adopted in the design.
- Section 2.19.3 Hazardous Materials Management describes in brief the handling and storage of hazardous materials on site. This section should specify the final disposal of hazardous wastes.

Incineration

- The proponent should ensure that the installation of an incineration device is capable of meeting the emission limits established under the *Canada-wide Standards (CWS) for Dioxins and Furans* and the *CWS for Mercury Emissions* is required (both the Government of Canada and the Government of the Nunavut are signatories to these Standards and are required to implement them according to their respective jurisdictional responsibility).
- **Used absorbent materials, oily or greasy rags, and equipment servicing wastes** (such as used engine oil, antifreeze, hydraulic oil, lead acid batteries, brake fluid and other lubricants) should be safely stored and transported in sealed containers (odour free to prevent animal attraction) and safely transported to a facility that is authorized for the treatment and disposal of industrial hazardous wastes.
- Subsection 2.19 Waste Management of the Environmental Screening Document indicates that inert incineration ash will be disposed of at the landfill. Incineration ash can be contaminated with incineration byproducts (listed above) and therefore should be tested to ensure the ash is suitable for the landfill or encapsulated such that contaminants are permanently isolated.
- An incineration management plan should be developed in consultation with EC. The management plan should include annual reports to provide details on the following:
    - Recycling/segregation waste program
    - Incineration technology selected
    - The amount and types of waste incinerated
    - Operational and maintenance records
    - Operator training
    - Emission measurements
    - Incineration ash disposal
    - Initial stack test upon commission of the incinerator

- EC notes that some of the fuel bladders will be removed from the project site while others will be incinerated. EC requests justification as to why all fuel bladders potentially contaminated with hydrocarbons are not being removed from the site and disposed of at an approved facility.

Quarry

- The proponent shall not deposit, nor permit the deposit of sediment into any water body. It is recommended that an undisturbed buffer zone of at least 100 metres be maintained between the proposed quarry and burrow pit operation and the normal high water mark of any water body not 30 m as proposed by the proponent.
- The proponent shall apply erosion control measures are applied at all times to ensure that no deleterious substances are entering near by water bodies during quarry activities.
- It is recommended that the proponent not use any potentially problematic rock, which is subject to acid rock drainage (ARD) and metal leaching, in the construction of various structures that would be associated with this proposed development. If the proponent wishes to use such materials, EC recommends that the proponent develop a good quality control program for the separation of the rock so that the problematic rock types are not used.

Water Quality

- Based on EC's review of the *Bulk Sampling Program Environmental Screening Document* noted that water quality sampling results from the drilling activities exceeded various Canadian Council of Ministers for the Environment (CCME) guidelines for the protection of freshwater aquatic life (CCME-FWAL). Baffinland has stated that drilling and blasting is an activity required as part of any open pit operation and that Baffinland has clearly stated to Environment Canada that it is their opinion that the potential environmental effects of the project are mitigatable and the project proposal has outlined standard mitigation measures which can be effectively implemented. EC has concerns that if these issues are not resolved and proper mitigation measures are not put into place the environmental impacts resulting will be unacceptable.
    - Baffinland shall ensure that all drilling effluent is directed to a sump that is properly constructed and adequately sized to ensure there is no runoff and that water bodies downstream of drilling activities are not affected. All efforts shall be made to prevent drill mud, drill additives, return

water and cuttings from migrating from the drill site.

- Sump supernatant should be monitored, and, if necessary treated prior to discharge. EC recommends that the sump supernatant be sampled and analyzed for major ions and metals prior to discharge, and compared against the CCME-FWAL during the 2007 and 2008 drilling program. Results should be discussed with EC. Further, EC recommends that the proponent continue to sample the downstream water bodies to determine if impacts are still occurring. If elevated concentrations of contaminants are still being measured in the receiving environment despite the improvements to sump construction and maintenance identified, Baffinland shall implement alternative methods of containment.
- Water which is suitable for discharge should be discharged in such a manner as to prevent erosion from occurring.
- The addition of lime to the sumps to neutralize acids and precipitate metals should be considered where appropriate.

During the course of operations, the Proponent shall make determined efforts to resolve this issue and fully comply with requirements of their water license. All efforts should be demonstrated to the appropriate regulators. Environment Canada anticipates that any terms and conditions regarding water quality will be incorporated into the licenses.

Subsection 5.1.12 Water Quality Immediately Downstream of Drilling Activities indicates that from observations at site E0-03, which is located in the Mary River, one can assume that the impacts resulting from effects of drill process water run-off are localized with little to no observable impacts in the near downstream environment. EC recommends that downstream water quality monitoring be rigorous and all results are reported to the NWB. Mitigation measures should be implemented to prevent environmental impacts to the downstream environment.

ARD/Metal leaching

The bulk sample pits are designed to be self draining to remove the potential for precipitation to accumulate, thereby further reducing the potential for acid generation and metal leaching by removing pit wall contact with standing water. This will minimize acid generation, but there is still the potential for ammonia to be washed from the rocks and be concentrated in the minewater. It is recommended that Baffinland consider including a drainage collection/minewater storage area with back-up plans for treatment in place in the event that the water is found to be of unacceptable quality.

- What ARD screening criteria are being used by Baffinland? An important note to material management is that classifying a material as non-PAG does not mean that it has a corresponding non-metal leaching potential. Metal leaching may occur under neutral pH conditions as seen on Mary River property.
- EC recommends that kinetic testing for ARD/ML potential on waste rock be part of the ongoing work. This would provide valuable information needed to estimate water quality from the development waste rock dump.

Waste management

Subsection 6.1.4.1. Discharge of Treated Sewage Effluent on Sheardown Lake states:" As Sheardown Lake exhibits a low turbidity, discharge of TSS in effluent may lead to localized issues associated with direct effects to biota and/or issues associated with sedimentation and effects to fish habitat. As the location(s) of arctic char spawning site(s) in the lake is currently unknown, risks to early life stages of fish can not be readily ascertained at this time".

And;

Subsection 6.1.4.1 Potential Issues and Impacts Associated with Discharge of treated Sewage Effluent on Milne Inlet states: "As there is no water quality and primary productivity information to characterize the existing environment of Milne Inlet and limited information on effluent quality, an assessment of potential impacts is limited".

In order to understand and properly assess all of the effects on the aquatic receiving environment, a better

appreciation of potential effects associated with the effluent discharge is needed. The information presented does not explicitly identify the potential ecological effects associated with the alteration of water quality in Sheardown Lake and Milne Inlet. The report acknowledges the lack of information, and states that mitigation and follow-up operations will be identified as additional information is compiled. This is not an acceptable approach, as options will be limited following system installation.

EC does not feel that the proposed effluent disposal configuration at Sheardown Lake is sufficiently protective of the receiving environment. Specifically:

- Treated effluent must comply with Section 36(3) of the *Fisheries Act*, i.e. be non-deleterious, if it is to be discharged to Sheardown Lake. Given the toxicity of ammonia to fish, it is unlikely that the effluent would pass bioassay tests (which are one of the measures of deleteriousness), **For this reason, as well as the following concerns, EC recommends against direct discharge to Sheardown Lake.**
- Sheardown Lake and downstream receiving waters can be classified as oligotrophic to mesotrophic based on the phosphorus concentrations. Addition of sewage effluent to Sheardown Lake is expected to result in increases in primary and secondary productivity. There has not been a throrough evaluation of eutrophication effects such as increases in productivity and the associated potential for winterkill, which is very likely.
- **EC recommends that alternative sewage collection and disposal methods be developed.**

Migratory Birds/Species at Risk

The Canadian Wildlife Service (CWS) of Environment Canada has reviewed the above-mentioned submission and makes the following comments and recommendations pursuant to the *Migratory Birds Convention Act* (the *Act*) and *Migratory Birds Regulations* (the *Regulations)*, and the *Species at Risk Act* (SARA).

- Section 6 (a) of the Migratory Birds Regulations states that no one shall disturb or destroy the nests or eggs of migratory birds. Therefore, Environment Canada recommends that all activities in which there is a risk of disturbing or destroying nests or eggs be conducted outside the migratory bird breeding season, which extends from approximately May 15 to July 31. These dates are approximate, and if active nests (i.e. nests containing eggs or young) are encountered outside of these dates the proponent should avoid the area until nesting is complete (i.e. the young have left the vicinity of the nest).
- If activities are permitted to occur during the breeding season, Environment Canada recommends that the proponent confirm there are no active nests (i.e. nests containing eggs or young) in the vicinity of their operations before activities commence. If active nests of migratory birds are discovered, the proponent should halt all activities in the area until nesting is completed (i.e. the young have left the vicinity of the nest).
- In order to reduce disturbance to nesting, moulting, and migrating birds, EC recommends that aircraft used in conducting project activities maintain a flight altitude of at least 610 m during horizontal (point to point) flight unless safety or cloud ceiling do not permit.
- In order to reduce disturbance to resting, feeding, or moulting birds, EC recommends that aircraft used in conducting project activities maintain a vertical distance of 1000 m and minimum horizontal distance of 1500 m from any observed concentrations (flocks / groups) of birds.
- EC recommends that camp waste be made inaccessible to wildlife at all times. Camp waste can attract predators of migratory birds (e.g., foxes and ravens) to an area if not disposed of properly.
- Section 35 of the *Migratory Birds Regulations* states that no person shall deposit or permit to be deposited, oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.
- The proponent has identified that ship traffic for the provision of materials and transport of the ore sample could have an impact on marine wildlife. The proponent notes that the ships must pass within close proximity of the seabird colony at Cape Graham Moore, on Bylot Island. Part of Bylot Island is a Migratory Bird Sanctuary and the southeastern tip and surrounding marine area has also been identified as a Key Migratory Bird Marine Area (Mallory, M. L. and A. J. Fontaine. 2004. Key marine

habitat sites for migratory birds in Nunavut and the Northwest Territories. CWS Occasional Paper No. 109). Marine birds in the area are vulnerable to oil spills and to pollution of their feeding areas. The proponent should plan its shipping route to avoid the key bird areas, as much as possible. Also, the proponent should ensure that wildlife protection measures are identified as part of its Spill Contingency Plan for marine areas. This should include specific mitigation measures to keep birds out of any contaminated area and what measures would be taken if birds do come in contact with the spill.

- The proponent has started to collect baseline data on birds within the project area. It is suggested that the proponent contact Canadian Wildlife Service of Environment Canada for advice on migratory bird survey techniques to ensure that the methodologies used are comparable to surveys done elsewhere in the region. For further information, contact Myra Robertson (Environmental Assessment Coordinator, Canadian Wildlife Service, Environment Canada, Suite 301, 5204-50th Avenue, Yellowknife, NT X1A 1E2, Ph: (867) 669.4763 or myra.robertson@ec.gc.ca).
- All mitigation measures identified by the proponent, and the additional measures suggested herein, should be strictly adhered to in conducting project activities. This will require awareness on the part of the proponents' representatives (including contractors) conducting operations in the field. Environment Canada recommends that all field operations staff be made aware of the proponents' commitments to these mitigation measures and provided with appropriate advice / training on how to implement these measures.
- Implementation of these measures may help to reduce or eliminate some effects of the project on migratory birds, but will not necessarily ensure that the proponent remains in compliance with the *Migratory Birds Convention Act* (the *Act*) and *Migratory Birds Regulations (*the *Regulations)*. The proponent must ensure they remain in compliance with the *Act* and *Regulations* during all phases and in all undertakings related to the project.

The following comments are pursuant to the Species at Risk Act (SARA), which came into full effect on June 1, 2004. Section 79 (2) of SARA, states that during an assessment of effects of a project, the adverse effects of the project on listed wildlife species and its critical habitat must be identified, that measures are taken to avoid or lessen those effects, and that the effects need to be monitored. This section applies to all species listed on Schedule 1 of SARA. However, as a matter of best practice, Environment Canada suggests that species on other Schedules of SARA and under consideration for listing on SARA, including those designated as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), be considered during an environmental assessment in a similar manner.

- The proponent has identified Species at Risk within and near the project area, identified adverse effects, and some potential mitigation measures.
- The proponent identified both Ivory and Ross's gulls as Species at Risk near their project area. Note that there are no known breeding sites of either of these species within the project area. Both species, however, would be susceptible to pollution and disturbance at marine feeding areas.

Environment Canada recommends:

- If Species at Risk are encountered, the primary mitigation measure should be avoidance. The proponent should avoid contact with or disturbance to each species.
- The proponent should record the locations and frequency of any observations of Species at Risk and note any actions taken to avoid contact or disturbance to the species.
- The proponent should consult with the Department of Fisheries and Oceans (for aquatic species) and the Government of Nunavut (for species under Territorial jurisdiction such as polar bear, wolverine, peregrine falcon) to identify other appropriate mitigation and/or monitoring measures to minimize effects to these species from the project.
- Mitigation and monitoring measures must be taken in a way that is consistent with applicable status reports, recovery strategies, action plans, and management plans.
- The proponent has noted Ivory Gull as a species seen during the 2006 project surveys. Observations of Ivory Gulls should be forwarded to Mark Mallory (Seabird Biologist, Canadian Wildlife Service, Environment Canada, Box 1714, Qimugjuk Bldg. 969, Iqaluit, NU, X0A 0H0, Ph: (867) 975.4637 or mark.mallory@ec.gc.ca).

If there are any changes in the proposed project, EC should be notified, as further review may be necessary. Please do not hesitate to contact me with any questions or comments with regards to the foregoing at (867) 975-4631 or by email at cindy.parker@ec.gc.ca.

Yours truly,

Original signed by

Cindy Parker
Environmental Assessment Specialist

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