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Department of Environment

Ministère de l'Environnement

June 4, 2007

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board

via Email to: licensing@nunavutwaterboard.org

RE: NWB FILE # 2BE-MRY – BAFFINLAND IRON MINES CORP. – MARY RIVER EXPLORATION & BULK SAMPLING PROJECT

Dear Ms. Beaulieu:

The Government of Nunavut, Department of Environment (DOE) has reviewed the amendment water license application from the Baffinland Iron Mines Corp. (Baffinland) for the Mary River project for conducting exploration and bulk sampling of iron ore near Pond Inlet. Based on the *Environmental Protection Act*, the DOE has the following comments to make regarding water quality, waste management and abandonment & restoration.

The following DOE comments will reference the materials below submitted by Baffinland:

- The Environmental Screening Document (ESD);
- The April 20, 2007 response document by Baffinland to the NIRB regarding parties' comments during the NIRB screening process;
- Preliminary results of phase I geochemical characterization program, dated March 16, 2007;
- Memorandum dated April 17, 2007 entitled *Calculation of Estimated Ammonia Runoff from Bulk Sample Pits*.

A. WATER QUALITY

1. Acid Rock Drainage (ARD) & Metal Leaching (ML)

To predict ARD and ML, it is recommended that both static tests such as acid base accounting tests, and kinetic tests are performed. The geochemical result submitted is incomplete regarding static tests, and kinetic tests have not been initiated. The DOE therefore recommends comprehensive tests are conducted, and complete test results are submitted.

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If ARD is presented as an issue, mitigation measures proposed using nearby calcareous sandstone to neutralize the acid, should be submitted in details to demonstrate this approach would work in perpetuity. The mitigation and management plan should include information such as the amount of rock to be neutralized, rock locations of concerns, engineered drainage plans for the pits and waste storage areas, the amount and ability of calcareous rock to buffer the run-off, and effluent monitoring plans. Furthermore, the proponent should also outline adaptive management measures and triggers that would be used if mitigation measures prove ineffective. The same approach should also apply to ML if this is of concern.

2. Drill Site Run-off

The sampling locations downstream of drill sties have shown non-compliance with CCME standards. Page 53 of the ESD submitted indicated that two sampling locations namely E3-01 and E4-01 near the drill sites have water quality of "Marginal" (CCME WQI Value 45-64) in 2005, which means water quality is frequently threatened or impaired; conditions often depart from natural or desirable levels.

The DOE therefore recommends that proper mitigation measures are implemented to ensure water quality is protected within the standards at all times. The measures should include but not limited to the following:

- Improve drilling practices to minimize drilling run-off.

- Drill cuttings be diverted to sumps located at least 30 meters from the high water mark of any water bodies. When using hydrocarbon based drill additives such as EZMud and Darina drill grease as proposed by Baffinland, the DOE recommends the use of a filtration system aimed towards reduction in discharges of harmful substances to the environment.

3. Ammonia Run-off

Baffinland indicated in the memorandum dated April 17, 2007 entitled *Calculation of Estimated Ammonia Runoff from Bulk Sample Pits*, that ammonia run-off from blasting activities will not affect local water resources and ammonia in the receiving water will comply with the Canadian Council of Ministers of the Environment (CCME) guidelines for receiving water. The DOE requests that Baffinland continues to monitor water quality to ensure compliance and that appropriate triggers be implemented to detect exceedances of ammonia. If ammonia run-off is a concern in the future, approved management and mitigation measures shall be implemented to ensure local water quality is not compromised.

4.Methodology used to Monitor Surface Water Quality

The methodology used to monitor surface water quality is inadequate. The Method Detection Limit of some parameters exceeds the approved guideline. Page 51 of the ESD states that "…*the method detection limit (MDL) for cadmium continually exceeded the CCME guideline*." Similar comments on this subject were provided to Baffinland during the NIRB review of this project, and Page 29 of their April 20, 2007 response document to NIRB confirmed their agreement on this issue, stating that "*future metals analyses will be forwarded to ALS Laboratories in Vancouver, as this laboratory can achieve the necessary detection limit*." The DOE asks that the water license reflects this commitment.

B. WASTE MANAGEMENT

1. Sewage Management

Baffinland plans to discharge treated sewage into a nearby lake (Sheardown Lake) at the Mary River camp, and into the ocean at the Milne Inlet camp,.Page 105 of the ESD states that "*once additional information on effluent quality and water quality and primary production in the lake is made available, a more thorough assessment of potential impacts to Sheardown Lake can be undertaken*." Page 105-6 also indicates the lack of impact assessment for the Milne Inlet camp. The lack of information on effluent quality and volume, baseline information on the receiving environment, along with an assessment of impacts, hinders our ability to determine if this impact is likely to be significant. Page 28 of the April 20, 2007 response document stated that "Baffinland will upgrade the proposed sewage treatment plant at the Mary River camp to meet tertiary treatment levels by including nutrient removal in its design." The DOE thanks Baffinland for upgrading their facility in attempt to meet the standards; however, baseline data collection and impacts assessment should still be undertaken prior to sewage discharge.

Additionally Baffinland plans to use Rotating Biological Contactor (RBC) to treat sewage at the 100-people Mary River camp; however, has not provided any management details (i.e., operation and maintenance protocols), and detailed mitigation measures in the case of RBC malfunction. Page 28 of the April 20, 2007 response document indicated that a polishing pond be available to receive sewage from the RBC system as a contingency measure in the event of RBC malfunction. However, details of this contingency measure such as the size of the pond, has not been provided for review. The DOE therefore recommends Baffinland submits a sewage management plan that includes operation and maintenance procedures, waste management options for sewage sludge and detailed contingency measures in case of RBC failure. Additionally, spill response measures should be incorporated into their spill contingency plan.

2. Spill Contingency Plan

Based on the DOE *Spill Contingency Planning and Reporting Regulations*, and *A Guide to the Spill Contingency Planning and Reporting Regulations*, we have the following comments to make:

- All fuel tanks, connectors and associated plumbing should be installed in a manner that meets current acceptable codes for the installation of such appliances. Fuel tanks should be situated on solid platforms, on a stable base, and should be inspected on a regular basis for leaks and movement (shifting). Flex connectors, if used, should be installed as per manufacturer's instructions and should be inspected regularly.

- A contact number is provided in page 4 of the spill plan. Is this a 24 hour emergency contact number? If so, it should be specified as such. Further to the aforementioned, the 24 hour contact number should be provided front and centre of the document.

- For transportation of fuel over the all-weathered road, the following DOE standards should be implemented:

    - Trucks should carry at least 10 square metres of polyethylene material (for lining a trench or depression), a spark-proof shovel and oil absorbent blankets or squares.

    - Trucks should carry reliable radio and/or satellite phone communications.

    - Trucks should carry sufficient response equipment for the safe removal of fuel from an overturned tanker (such as hatch cone covers, hoses etc).

    - In general, the proponent should be fully prepared to manage spills, in a timely and efficient manner, resulting from vehicle accidents along the road.

- While snow can be useful to stop the spread of spills and is also an effective absorbent, disposing of fuel contaminated snow can be problematic; especially if large volumes are involved. The single most difficult problem associated with disposing of large amounts of fuel contaminated snow is finding a place to store and treat the snow before the spring melt. Baffinland is strongly advised to consider how they would manage large amounts of fuel-contaminated snow in the event of a major spill. While empty 45 gallon drums make excellent containers, more often than not, there are not enough of them on site to handle the volume of contaminated snow.

- DOE refers Baffinland to a GNWT document entitled: *Generic Plans and Operating Procedures of a Remediation Facility for Hydrocarbon-*

Contaminated Materials in the NWT. Baffinland might find this to be of use in developing a plan for managing fuel-contaminated materials such as snow and soil. An electronic copy of this document is available from DOE, upon request.

- Baffinland describes the technique of deploying containment booms and a skimmer to capture free product on the water. The reviewer could not find either of these items on the spill equipment inventory list in Section 7 of the spill plan. Baffinland should clarify whether or not they have these items on hand. If so, the inventory of spill response equipment should be updated to reflect this.

- All fuel storage drums should be situated in a manner that allows easy access and inspection as well as removal of drums in the event of leaks or spills. Large fuel caches in excess of 20 drums should be inspected daily. Additionally, the proponent is strongly advised to keep a written log of the inspections. For long term storage (> 6 months), it is strongly recommended that drummed fuel be stored on pallets to prevent the bottoms from rusting out.

- Caches of drummed fuel and chemicals are particularly prone to spills because they often become buried in snowdrifts and are thus vulnerable to damage from heavy equipment; most commonly, front end loaders. Furthermore, once buried, leaking containers cannot be detected until after the snow melts, by which time, most, if not all, of the spilled material has escaped off site with the spring melt. Drum cache locations should be clearly defined and marked so that they are visible even during the winter season.

- Baffinland is advised to keep a stock of 55 gallon “overpack” or “salvage” drums. These afford a safe, effective and rapid means for containing leaking drums.

- The spill plan indicates that some fuel will be stored in drums, however, it is not clear to the reviewer if all of the fuel is to be stored in drums or if some of this fuel, particularly the large caches in the million litre range, will be stored in bulk storage tanks. This should be specified within the bulleted list in section 6.1 of the spill plan.

- A detailed description of the spill response training that will be delivered to Baffinland’s emergency responders should be included with the plan. The qualifications and background of the instructor(s) as well as well as a course outline should also be provided. This information is useful to regulatory agencies in that it allows them to determine how well-prepared the proponent is to deal with hazardous materials spills.

- The NWT-Nunavut spill report form has been updated, and can be obtained from the Spill Line.

3. Waste Incineration

The Government of Nunavut is signatory to *Canada-Wide Standards (CWS) for Dioxins and Furans*, and Canada-*Wide Standards for Mercury Emissions*, and it is important that incineration of camp wastes complies with the CWSs. The DOE thanks Baffinland for complying with the standards by committing to the following as indicated on Page 30 of their April 20, 2007 response document:

> "The incinerator will be of dual-chambered design intended to meet the Canada-wide Standards for Dioxins and Furans. The efficacy of this equipment will also limit the potential for the release of particulate matter. Confirmatory stack testing will be completed during the bulk sampling program."

C. ABANDONMENT & RESTORATION

Baffinland provided preliminary rock characterization results on May 16, 2007, but detailed results have not been submitted for review. Without knowing acid generating and metal leaching potential of the ore and waste rock in the field and in the future, it is difficult to design an appropriate abandonment & restoration plan as acid rock drainage and metal leaching if confirmed may significantly affect the site plan and/or the overall plan of the proposal.

The DOE thanks the NWB for giving us the opportunity to review and provide comments on the Mary River project. Please contact us if you have any further questions or comments.

Yours sincerely,

Original signed by

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