INDEPENDENT ENVIRONMENTAL MONITORING AGENCY
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February 15th, 2006

Sarah Baines, Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
Yellowknife, NT XlA 2P6

Dear Ms. Baines

IEMA Comments Pit Lake Studies Task 1 & 2

We appreciate the opportunity to comment on the first two reports submitted by BHPB on the pit lake studies underway.

In our view, the Task 1 literature survey appears to competently survey the field, but lacks in summarizing the lessons learned in the various case studies and discussing the implications of these for Ekati closure research needs. This is particularly true for the biological community issues raised by pit lake reclamation, a priority issue for IEMA which we have previously emphasized to the company.

The Task 2 report falls short of meeting some of the terms of reference and the commitments made by the company in its 8 April, 2005, letter to the MVLWB respecting work to be undertaken in accordance with the *Terms of Reference* for the studies, as explained below.

We provide more specific responses for each report below.

Task 1 Report – Literature Survey

1. In our 22 February, 2005, letter to the MVLWB commenting on the TOR for this work, we recommended that the topic of 'fish habitat' ought to be expanded to include case studies on the 'success of re-establishing viable aquatic ecosystems' in pit lakes. The literature survey uncovered a few case studies where aquatic biology information is available, but noted generally that such information for pit lakes is scarce. Some information for the 'most comprehensive biological survey of a pit lake' (Gunnar uranium mine) was summarized in the Task 1 report. This case study, and some of the others summarized indicates that re-establishment of aquatic communities is possible. Garrow Lake in Nunavut is presented as an example of a meromictic Arctic lake. However, its biotic communities, if any, are not discussed.

It would have been helpful in this section of the Task 1 report to attempt to distill out of the available case studies the important common factors (if any) that contribute to the re-establishment of aquatic communities. What are the lessons learned from the case studies that can identify the knowledge needs for the Ekati pit and, hence, contribute to the identification of information gaps in Task 2? The Task 1 report notes that these studies 'should prove to be useful in planning for Ekati', but more evaluation of these studies should have been done at this stage so that future research needs could be identified now. We noted the desirability of identifying further research requirements in our 22 February letter.

2. It is noteworthy that Koala and Panda Lakes contained Round Whitefish originally. The Task 1 report states that the kimberlite pit lakes, being steep sided and deep, won't support Round Whitefish due to lack of a littoral zone and, possibly, the creation of an anoxic benthic zone. The report suggests that it will be impossible to re-establish this species in the pit lakes. The Agency understands that the re-introduction of Round Whitefish is not necessarily an objective of pit reclamation thus more could be discussed here about the kinds of research needed to narrow the uncertainty about this issue. Hopefully, there will be an evaluation of this in the Task 7 report.

3. The Task 1 report notes that potential groundwater inflows to the pit lakes will likely be greater than 8,000 mg/L total dissolved solids. Is there additional information which needs to be collected in order to understand the implications of this for pit water quality and the re-establishment of aquatic life? If the pits are flooded quickly at end of mine life with non-saline fresh water, what will this mean for resulting pit water quality? Since it is not addressed here, or in Task 2 report, we would expect that this potential salination of the pit lakes will be incorporated into the discussion of viability of fish habitat in Task #7 Report.

4. From the Colomac site, the Task 1 report identifies two physical phenomena affecting meromixis about which little is known: salt exclusion from freezing surface water; and, compressibility of water in deep lakes. Again, this suggests further research is required in order to predict whether meromictic conditions will occur in the Ekati pits, yet the implications of these two phenomena are not presented, nor identified as data gaps in the Task 2 report.

Task 2 Report – Gap Analysis

1. In its 8 April 2005 submission to the MVLWB, responding to reviewers' comments on the Terms of Reference for the pit lake studies, BHPB stated that,

   > "The Task 2 report will identify not only the available data, but data gaps and work plans for the collection of additional data. The report will also describe the purpose and use of this data for determining the design of pit lakes for infilling and closure."

   The Task 2 report provides little of the above information regarding the purpose of the date for use in mine closure. It simply lists five data gaps (see next item).

2. Five items have been identified in the Task 2 report as requiring further information:
    - 1 year of hydrology data for Upper Exeter Lake;
    - lake level monitoring and survey for Sable Lake;
    - sampling Lac de Gras for surface water quality;
    - sample groundwater in pits as pits deepen;, and
    - assess littoral habitat in Ursula and U. Exeter Lakes (for drawdown impacts).

    None of the above deal with biological research needs in the pit lakes. Does this mean that the biological questions have been answered? Some discussion about this topic should be provided. The case studies dealing with biological restoration in pit lakes identified in Task 1 are not referenced here.

3. The option of pit infilling with processed kimberlite and/or with waste rock may be available as a closure measure. This measure would change a pit lake into, presumably, a shallow lake having much different physical, chemical and biological characteristics than the deep meromictic lakes being investigated. In such a case, one of the issues for research lies in the potential toxicological impacts of contaminants or heavy metals being mobilized and/or taken up from the kimberlite by benthic life. The 2004 benthic invertebrate study in Long Lake demonstrated that benthic invertebrate colonization of a kimberlite substrate took place. What is not known is whether there was contaminant uptake by the organisms. More work may be required to narrow the uncertainty about whether aquatic organisms can survive in the long-term. As well, bioavailablity of any contaminants produced by kimberlite or waste rock in the pit lakes should be evaluated. It is possible that the early kimberlite toxicity studies carried out by BHPB address some of the points, if so, that should be specifically mentioned.

Pit Lake study in general is a very important part of the reclamation research program. Its results will be very helpful in the stakeholder review to be carried out by BHPB. We encourage the timely completion of the Pit Lake study and its components into that process.

Sincerely,

-ORIGINAL SIGNED BY-

William A. Ross,
Chairperson

cc. Society Members