



Independent Environmental Monitoring Agency

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October 1, 2003

Melody J. McLeod
Chair
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
Yellowknife, NT
X1A 2P6

Dear Ms. McLeod:

Re: BHPB's 2003 Interim Abandonment and Reclamation Plan – Licences N7L2-1616 and MV2001L2-0008

The Independent Environmental Monitoring Agency has reviewed the above document submitted earlier to the Board for review and approval. For the reasons highlighted below, and those listed in the attachment, we find that the *2003 A&R Plan* is substantively inadequate, and should not be approved until the major deficiencies are remedied.

How the mine will be reclaimed and abandoned at the end of the day has been a key concern of the Aboriginal Peoples and the public from the beginning. Because it determines the long-term land use impacts of the mine's existence, the *Abandonment and Reclamation Plan* should be considered as perhaps the most important environmental management plan that BHPB will ever implement.

The *2003 Plan* is a long way from providing the specific and comprehensive reclamation measures called for in both the *Class A Water Licence* and the *Environmental Agreement*. As well, it is difficult to reconcile the general conceptual level plans set out here with the detailed calculations required to establish the reclamation liability estimates used previously for setting the security deposits required by the Board and the Minister.

It is worth highlighting several of the key deficiencies here.

First, the *Class A Water Licence* is very precise and exhaustive about the details of reclamation planning that it requires in this document. Part K items 1[a] to [m] call for specific and detailed descriptions of the reclamation activities, almost all of which, on our review, are not provided in the current draft, or are not described to any useful level of detail. The *A&R Plan* should be, by this stage of the mine's development, implementable if required, and should provide the level of detail and commitment so that managers could take appropriate action and that all parties can understand what is planned for closure. Maintaining flexibility has merits but should not be used to avoid commitments; flexibility can also be provided by the Board's requirement for the proponent to annually review and update as necessary its current *A&R Plan*.

Second, the original *EIS*, which was the basis of the mine being approved, stated that the pits would be filled naturally. The new *Plan* states that water *may* (italics added) be diverted from other sources to flood the pits, and that this will be decided based on economical and operational factors. Diversion of all upstream water sources in the Koala watershed would be a significant departure from the original plan, and would likely have serious environmental impacts downstream. No water balance has been presented to show the volumes and scheduling of the diversions. Nor have the impacts been evaluated, and they need to be. An environmental risk assessment of the available options for pit reclamation is required to support the eventual selection made. Environmental factors should be given considerable weight in the selection along with the economic and operational ones. This would be consistent with a "design for closure" philosophy, to which we subscribe. Closure of the Panda diversion channel is a new option, and the impacts of doing this, including the loss of newly created fish stream habitat, have not been described.

Third, in addition to not meeting the requirements of the *Water Licence*, firm commitments to specific actions are generally absent from the *Plan*. There are too many

conditional statements or inconsistencies in the *Plan* to know exactly what the company is planning. For example, while the company has done commendable research on revegetation methods, no concrete and viable plans (species, areas, costs, application methods, amendments required, etc.) for revegetating the major landscape components are presented. In most cases, further research activities and generalized approaches are offered.

Fourth, in spite of previous recommendations made by others, and ourselves no specific closure criteria have been presented. This is identified as work for the future.

Fifth, there are apparent options for pit infilling with significant environmental benefits that would better accord with the goals of our Aboriginal members that have not yet been contemplated by the company. These options, along with many of the other issues identified in the attachment to this letter, would benefit greatly from a workshop with all the interested parties prior to consolidating specific reclamation activities.

The lack of a detailed and operational plan for closure of the mine is serious at this stage of mining operations. Accordingly, we have the following recommendations to make:

1. The MVLWB should not approve the *2003 A&R Plan* until the major deficiencies have been rectified.
2. A workshop should be held (ideally by the company) in the very near future that brings together community, government and company representatives, and ourselves, to discuss reclamation issues and refine closure criteria.

Sincerely,

-ORIGINAL SIGNED BY-

Red Pedersen
Chairperson

Cc: Honourable Robert Nault, IACT members, Society members

Attachment: Deficiencies noted in the BHPB 2003 Abandonment and Restoration Plan

**Attachment to Letter to Melody McLeod, MVWLB from the Independent
Environmental Monitoring Agency, October 1, 2003**

Deficiencies Noted in the 2003 BHPB Abandonment and Restoration Plan

SUBSTANTIVE DEFICIENCIES

1. BHPB now plans to flood the pits, as opposed to letting them fill naturally as per the *EIS* and earlier versions of the *Interim A&R Plan*. This will require the total flows of the upper Koala watershed (including Panda diversion channel flows, Grizzly Lake outflow, and Long Lake watershed). The *Plan* notes (p.14) that the “primary impact expected in waterbodies downstream of the Panda, Koala Pits and the LLCF will be alteration of fish habitat due to reduced runoff input into the Koala watershed.” There is no assessment of the impacts of this new option, which could be substantial for downstream aquatic ecosystems. There is no discussion of the implications of closing the diversion channel for fish or fish habitat, or how compensation for lost habitat is to be made. There is no water balance provided to indicate the volumes of water to be diverted, and whether the anticipated rates of flooding are achievable. There is no explanation of why this alternative is being proposed, and no comparative risk assessment between the natural infilling and flooding alternatives.
2. The second main deficiency is that the *Plan* is too conceptual and ambiguous about what is being proposed. The *Plan* needs operational detail. It should be “ready to go”, as if the project were to shut down tomorrow, and should commit to what will actually be done during progressive reclamation and at closure—it does very little of these things. Reclamation details have been spelled out in the Komex reclamation costs model and can be readily identified for the current state of reclamation liability. This information has not been brought forward into this *Plan*. We are now 5 years into operation, and have progressed no further in developing a useable (i.e. implementable) *A&R Plan* than what was available in the 1995 *EIS*.
3. No measurable criteria or targets for determining the success of reclamation measures are provided. This has been relegated to future work.
4. Fully 1/6 of the document is a summary of results of revegetation research that have occurred since the project initiated, all of which have been reported in other places, and most of which is extraneous to the purpose at hand—i.e. what will be done in the way of revegetating the site. Very few clear details are provided about how the results of the research inform the reclamation plans. Sec.5.3.10 is the relevant section (3 short paragraphs), and even this section does not describe what will be done in the way of revegetation, or what further work is necessary to finalize revegetation plans. This section states that the results of the current revegetation research program have helped “better define reclamation goals”, but this not explained. What are the reclamation goals as pertains to revegetation? What options are available for achieving them? Do we know yet whether revegetation by any species on any natural medium at the site is possible for the long-term? The *Plan* seems to suggest that further work is required before we

- know. Yet, on this basis, the reclamation measures proposed for the Long Lake Containment Facility (LLCF) have been changed (see next item).
5. Reclamation of the LLCF has changed from previous plans. Instead of installing a waste rock cover, it is now proposed to revegetate the beached tailings. Native grasses and sedges are described as the primary vegetation cover, and fertilizer will be used for five years to enhance the growth of these. No evidence has been provided to show that this plan will result in permanent establishment of vegetation cover on the tailings. No cost figures are provided, so it is not clear how this fits with the reclamation liability estimate used in evaluating the security deposit. No mention is made of how erosion of fine tailings will be controlled once the dykes are breached and drainage patterns have been established in the post-closure situation.
 6. It is proposed to flood Sable pit with water from Mink Lake. This lake is not identified as to location or size. Volumes and rates are not specified, and the impacts of diverting this flow are not described.
 7. The *EIS* stated the following goals for reclamation: a] to re-establish stable landforms; b] to re-establish productive use of the land (wildlife and aboriginal use noted as important uses); c] to protect local water resources. The new *Plan* keeps the first and last of these, but substitutes “to facilitate natural recovery of areas affected by mining” for the second. This is a weakening of the formally approved commitment to restore the site for wildlife use. The *Plan* does subsequently state (p.3) that “targeted post-mine land use is wildlife habitat”, but then no further objectives, strategies, or prescriptions are provided to show how this might be achieved. (see note below on waste rock dump reclamation.)
 8. No objectives for reclamation are described. Reclamation “strategies” are provided in Table 2, but these are not related to any definable objectives. The *Plan* merely states, in broad terms, what the company is proposing to do for each of the landscape development units, without reference to objectives or specific criteria for reclamation. It is noted that some 2447 ha of terrain will be disturbed by the project over its lifetime. Table 1 indicates how much of each of 14 ecosystem units will be disturbed. There is little information relating these units to relative wildlife habitat quality, or what reclamation objectives have been defined for each unit. Will reclamation measures be applied to restore some of these, or none? The 1998 *Plan* identified surface disturbance areas by 8 ecosystem types. The 2000 *Plan* identified surface disturbance areas by 9 ecosystem types, all different than those in the 1998 *Plan*. This *Plan* refers to 14 ecosystem types - these identified apparently on the basis of more recent satellite data and a reinterpretation of the ecology. No correlation between the new and old ecosystem units is provided, so that early predictions of habitat impacts can no longer be verified or tracked.
 9. The *Plan* states (p.3) that “open pits will be flooded and returned to productive fish habitat”. No evidence is presented to show that creating productive fish habitat is possible or viable, especially given the recognition that water quality in the flooded pits may not be favourable to aquatic life. Three case studies of flooded pits are provided, but none mention fish or aquatic life restoration. As for the Ekati pit lakes, the *Plan* states that “a number of criteria, yet to be established,

- will be met regarding these lakes at the time of closure.” The *Plan* then states that “it is assumed that they (lakes) can develop into healthy biological communities supporting fish and other organisms.” (*emphasis added*). The lack of good evidence, the absence of case study demonstrations, and reliance on assumptions and as yet un-established reclamation criteria are not reassuring, and do not meet the requirements of the *Class A Water Licence* for details on specific measures that will be taken.
10. Previously identified concerns about the potential toxicity of coagulants are lightly treated, and the *Plan* seems to conclude that these are not a concern for reclamation planning. Page 36 suggests that infilling the pits with kimberlite tailings is an option, although this “will depend on economics, timing of the mine plan, and periodic evaluation of the ore resources as mining progresses.” No evaluation is provided on the relative environmental merits of infilling with tailings or freshwater. Clearly, mine economics and scheduling will determine the choice of options, not sound environmental management.
 11. The *A&R Plan* is, according to the *Environmental Agreement*, to be prepared in “consultation and cooperation” with several players, including the Agency. This has not happened. The *Environmental Agreement* calls for “specific and comprehensive plans” to deal with reclamation, and the *Water Licence* calls for “specific abandonment and restoration objectives for each mine component” (*emphasis added*). There are no specific plans or objectives provided in this document.
 12. The *Class A Water Licence* calls for “a description of the measures required, or actions to be taken, to achieve the objectives stated...”. Since objectives are not stipulated, it is difficult to reconcile proposed measures with the objectives.
 13. The *Water Licence* also calls for “a detailed description, including maps and other visual representations, of the pre-disturbance conditions for each site, accompanied by a detailed description of the final desired landscape, with emphasis on the restoration of stream banks and surface drainage over the restored units.” This information is not provided. Visuals of mine footprint for each pit at end of production are provided, but there is little information (graphic or otherwise) about pre-disturbance conditions and final desired outcomes.
 14. The *Water Licence* also calls for a comprehensive assessment of materials suitability, including geochemical and physical characterization and availability for restoration needs, with attention to top-dressing materials, including maps where appropriate showing sources and stockpile locations of all borrow materials”. Little of this information is presented. At p.82 it is stated that “organic topsoil is the best topdressing but is in limited supply. Despite this, when such material is encountered, the “costs of salvaging” it will be “assessed”, and efforts will be made to salvage it “when technically feasible”. Criteria for cost and technical feasibility are not identified. It is further noted (p.26) that topsoil is being “salvaged and stored at various locations”, but these locations are not mapped and quantities not evaluated. It is also stated that selecting certain landscape units for active revegetation “allows limited resources available (in terms of plant materials, soil amendments and salvaged top soils) to be used where they are most likely to be effective.” While there is recognition here that

- such materials are limited, no quantities are identified. Priority units for active revegetation are also not identified.
15. The *Water Licence* also calls for “a description of the process to be employed for progressive restoration, plus details of restoration scheduling and procedures for coordinating restoration activities with the overall mining sequence and materials balance.” With the exception of the reclamation schedules summarized in Tables 2 & 6, none of this information is provided.
 16. The *Water Licence* also calls for “a description of any post-closure treatment potentially required for drainage water that is not acceptable for discharge from any of the reclaimed mine components.” Post-closure water treatment is not discussed.
 17. The *Water Licence* also calls for “a description of how the potential for post-closure groundwater contamination will be assessed and monitored during the term of the Licence.” This information is not provided.
 18. The *Water Licence* also calls for “a detailed description of proposed revegetation plans, incorporating a description of how initial vegetation cover will promote successional development on reclaimed landscape units, what the expected progression and time-frame will be, and how it will be compatible with local ecosystem characteristics.” No detailed description of any of this is provided.
 19. The *Water Licence* also calls for “a description of the monitoring program to be employed in recording the progress of mining activities as they relate to on-going restoration needs.” There is no acknowledgement that such a program has been contemplated, let alone a description of its operational details.
 20. The *Water Licence* also calls for “the qualifications, status and authority of those individuals who will be responsible for, and who will conduct, restoration activities during the term of the Licence.” This information is not provided.
 21. The scarification of roads to assist in natural revegetation, as proposed in earlier plans, has now been abandoned. Page 26 states that road surfaces will not be scarified because this would negatively impact vegetation that would have colonized during reclamation work. Page 25 states that roads will remain open until reclamation and monitoring are completed in 2042 to 2044, which indicates that vegetation colonization will be unlikely during reclamation activities. The plan indicates that the roads will remain to serve as travel corridors and insect relief for caribou. This may be unwise given early evidence that wolves are learning to use the roads to prey on caribou. This is an issue that needs to be more fully explored with the Aboriginal Peoples and regulatory agencies before deciding what option to pursue.

MINOR DEFICIENCIES AND INCONSISTENCIES

22. Page 31 notes that sections of the diversion channel will be “infilled” to “reduce long-term management concerns”. It is unclear what sections will be infilled, how the remaining sections will be reclaimed and what the long-term management concerns are.
23. Using tailings to fill the pits is now discretionary and dependent upon the mine plan—there is no longer a commitment to do this. Earlier documents (e.g. *Sable*

- Pigeon Beartooth EAR*) stipulated that Beartooth pit would be filled with tailings provided that kimberlite would not pose toxicity problems. At this date in the project it is not acceptable that the mine schedule is not established sufficiently to allow for pit closure scheduling.
24. On p.14 it is noted that the flooding of Panda and Koala pits “will occur simultaneously”. Conversely, on p.31 it is noted that “Koala Pit will fill after Panda Pit. Once Panda Pit fills with water, it will overflow into Koala Pit; a channel will be re-established between the two pits to allow this overflow.” The latter alternative is nonsensical. Since the pits are connected at depth by underground workings, any water going into Panda will also go into Koala, and the surfaces in each pit will rise in tandem. The final surface elevation of water will be at the surface outlet of the lowest pit rim, in this case, Koala at 453 m, 7 m below lowest point on Panda rim. Page 14 also erroneously states that “Koala Lake will become the headwater of the Koala watershed.”
 25. Inconsistencies abound regarding the potential use of lakebed sediments. On page 58, in relation to Beartooth lake sediments, it is stated that “Lakebed sediments are stored separately because they need to be accessible for potential future reclamation purposes.” In the next paragraph it is stated that “Lake sediments are not suitable for reclamation uses and will be co-dispersed with the granite waste rock...”. On p.105 it is noted that “the use of lake sediments as potential cover material will continue to be evaluated...” On p.80 it is stated that sediments from Panda and Koala pits are being stored for future reclamation needs, but sediment from other pits is not. No explanation of this is provided. Are the quantities being stored at Panda waste storage area sufficient for all anticipated reclamation measures? The disposal of lakebed sediments at Sable pipe is not mentioned. No standing inventory of stored lake sediments, or estimates of final tallies, are provided. We simply do not know at this point whether lake sediments will be used or not.
 26. The *1995 EIS* proposed that some areas on the slopes and flats of waste rock dumps would, if feasible, be actively reseeded or revegetated for wildlife habitat enhancement. This is consistent with one of the stated reclamation goals. However, the new *Plan* backs away from proposing any active revegetation of the waste rock dumps, leaving the effort to natural processes which, it is noted at p.57, “will likely take several hundred years before any measurable plant cover is present.” The only proposed deliberate measure for wildlife at the waste rock dumps is to establish access ramps for caribou.
 27. Detailed descriptions of existing conditions for the exploration camps (site disturbance, number and type of buildings, equipment, materials, volumes and types of wastes, etc.) are not provided. Generic approaches to closure are offered, but no specific details of the reclamation work required at each site.