Recommendations

Tailings and Wastewater Management
1. BHPB’s new Wastewater and Processed Kimberlite Management Plan (WPKMP) should:
   a. Contain a commitment to complete deposition into the north end of cell B by 2009 to allow pilot scale reclamation to begin.
   b. Omit use of cell D for deposition.

Reclamation and Closure
2. BHPB should develop closure objectives, options and criteria and assess risk collaboratively with all interested parties in accordance with the advice offered by the Agency and the Interim Closure and Reclamation Plan (ICRP) working group members.

Aquatic Effects Monitoring
3. BHPB should, through monitoring and additional analyses of data already collected, obtain the necessary information to explain changes in zooplankton community structure in relation to water chemistry changes.

Communications and Consultation
4. BHPB consultation and communications activities should adopt the principles suggested by the Agency and our Aboriginal Society Members.

Assessment of BHPB
5. BHPB should provide adequate resources to its Environment Department to ensure it can meet the obligations of its Environmental Agreement, water licences and other authorizations.

Dedicated to the memory of Joe Migwi.
It is with pleasure that I present the technical version of the 2005-06 annual report of the Independent Environmental Monitoring Agency (the Agency). The report summarizes the Agency’s activities and offers recommendations for BHP Billiton (BHPB) and for the regulators so that the good environmental performance observed at the mine can continue.

Changes in the last year involved the departure of François Messier, one of our original directors who has served us very well for almost a decade. His many helpful contributions have been well received. Indeed, this year, he received the Outreach and Public Service Award from his university in part for his contributions to the Agency. Dave Osmond was replaced by Sheryl Grieve as the appointee to our board from the North Slave Métis Alliance. We thank Dave for his contributions and welcome Sheryl as his replacement. We also look forward, hopefully in the near future, to replacement directors for François Messier and Peter McCart.

Environmental performance at the Ekati™ Diamond Mine continues to be good based largely on effective application of adaptive environmental management and the collaborative review of monitoring results. The Agency is pleased with the sound approach BHPB has taken to the 2006 Environmental Impact Report; this approach has been very inclusive, involving the many interested parties.

The Agency and BHPB were involved in a dispute resolution process in accordance with the Environmental Agreement, which was triggered by disagreement over the Agency’s proposed workplan and budget. The mediation results (report and agreement are on our web site) were seen as successful by all participants. The Agency will have maintained its independence in determining its work priorities; BHPB will have certainty for future budgets and the stronger involvement in implementation of the Environmental Agreement by Canada and the Northwest Territories. The major focus of the Agency for this past year has been on reclamation and closure of the mine. The Agency has developed both substantial and procedural recommendations for BHPB’s Interim Closure and Reclamation Plan. These recommendations and the process through which we have arrived at them has involved input from the Aboriginal communities.

We have also been involved in discussions regarding the contents of the 2006 Environmental Impact Report (being prepared by BHPB), in the examination of results of water chemistry studies for the Long Lake Containment Facility, the new Ekati water licence and in the review of the proposed changes to the Wastewater and Processed Kimberlite Management Plan.

Our efforts to increase community input have again been valuable this past year. We held a board meeting in Dettah at the invitation of the Yellowknives Dene. Several meetings in communities, especially Lutsel K’e, have resulted in beneficial exchanges, something we greatly appreciate and look forward to for the coming year.

William A. Ross, Chairperson
March 31st, 2006
2005 was a challenging year for the Agency. As in previous years BHPB produced a considerable amount of material requiring a concentrated technical review. The Agency was faced with the ongoing task of not only reviewing the increasing amount of technical material but to develop coherent recommendations and advice for consideration by the regulators or BHPB, usually within tight regulatory timelines. Directors were also involved in attending various working group meetings or information sessions in Yellowknife or at Ekati. We endeavoured to assist our Aboriginal members in retaining a level of comfort that the Agency is functioning effectively and the environment at Ekati is being protected. This is a key Agency priority at a time when northern capacity is stressed due to increasing development activity.

Throughout the year the responsibilities of the Agency were met while operating with a shortage of directors and being distracted by an ongoing mediation process with BHPB. Two director positions remain unfilled due to the inability of the Environmental Agreement signatories to agree on replacements. In our view, operating with five directors instead of seven considerably reduces the technical expertise available to us, and imposes an additional burden on the remaining directors. This situation needs immediate action by the signatories.

A lengthy disagreement with the company (since resolved) related to the Agency mandate, budget and workplan effectively made the feasibility of new Agency initiatives uncertain. Involvement of a small group of directors and our manager in negotiating a settlement with the company was a considerable diversion of our energies away from the real issues. However, the agreement reached is beneficial to all parties and should provide a framework to resolve future differences of opinion on interpretation of the Environmental Agreement! After mediation, we renewed our focus on environmental effects of the project with great vigour.

Our core activities for the year included regular board meetings, an annual general meeting with our Aboriginal members, BHPB and governments, review of Ekati environmental reports and plans, participation in regulatory processes, meetings with our society members in Yellowknife and in the communities and production of our annual report.
The following are some highlights in meeting our mandate as a public watchdog for environmental management of Ekati:

- **The Agency’s Reclamation and Closure Workshop**
  We hosted a focused workshop to explore reclamation objectives and options specific to the Ekati site. The workshop involved specialists in the fields of mine reclamation and wildlife monitoring and was followed by a half-day session including representatives of our Aboriginal members. Based on the workshop results, we produced a document for BHPB conveying our thoughts and advice on reclamation of major mine components at Ekati.

- **Participation in technical sessions hosted by BHPB**
  BHPB’s forthcoming 2006 Environmental Impact Report (a ‘state of the environment’ report produced every three years by the company).

- **A community meeting at Dettah (Yellowknives Dene First Nation community)**
  Each year the Agency attempts to hold a board meeting in a member community.

- **Annual report brochure mail out**
  We distributed a plain-language flyer describing highlights of the Agency annual report to each residence in our member communities in the NWT and Nunavut.

- **Assisting the MVLWB and DIAND in developing policy**
  The Agency participated in initiatives such as mine reclamation guidelines and improving regulatory processes related to water licensing. We also worked with MVLWB consultants tasked with reviewing the performance of the MVLWB with regard to the new BHPB water licence process.

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### Highlights of the Resolution Agreement (January 17, 2005):

- Agency independence regarding allocation of funds and development of work plan retained;
- Fixed annual core budget for Agency (Agency funding supplied entirely by BHPB) with linkage to consumer price index for future year budget adjustments;
- Enhanced process by which Agency can request additional funds from BHPB for mandate-driven activities;
- Biannual meetings between Agency and Environmental Agreement signatories addressing a need for greater involvement of governments in implementation and interpretation of the BHPB Environmental Agreement; and
- Distinct portion of Agency annual budget allocated to involvement in interventions and the regulatory process as defined in the Environmental Agreement

[For a copy of the agreement please visit our website]

### Agency Mandate

- Review, report and make recommendations on BHPB and government reports and plans.
- Make recommendations on the integration of Traditional Knowledge and experience of Aboriginal Peoples into environmental plans and programs.
- Participate as an intervener in regulatory processes.
- Provide an accessible public repository of all environmental information relevant to the project.
- Provide ways of distributing information to Aboriginal Peoples and the public.
- Provide an effective means to bring to BHPB and governments the concerns of Aboriginal Peoples and the general public.

### To Meet its Mandate in 2005 the Agency

- Reviewed and provided comments on reclamation and closure, waste rock see, wastewater and processed kimberlite management and environmental reporting.
- Sent letter to DIAND on provision of intervener funding for Aboriginal member participation in regulatory affairs such as public hearings.
- Supported the Aboriginal parties in their request for BHPB to collaboratively review the 2006 Environmental Impact Report.
- Participated in the WLWB working group for developing a terms of reference for the Ekati Interim Closure and Reclamation Plan.
- Maintained a website which contains copies of reference documents, Agency technical review documents, board meeting summaries, records of incoming and outgoing correspondence, slide presentations and digital photographs.
- Maintained and updated a resource centre of relevant correspondence and reports.
- Hosted a board meeting and open house in Dettah, NWT in September 2005.
- Responded positively to invitations to Agency directors to consult directly with communities.
- Hosted our annual general meeting and distributed a plain-language flyer, produced a plain language and a technical annual report.
- Invited Aboriginal member representatives to Agency hosted reclamation workshop.
- Provided a forum for Aboriginal member concerns to be shared with BHPB at the Agency annual general meeting and at other events.
Agencies Recommendations from 2004-2005:

BHPB and Regulator Responses
The information below summarizes the responses of those to whom we made formal recommendations.

Reclamation and Closure

1. **Last year’s Recommendation**: BHPB should develop a workable closure plan, within one year, with closure objectives and preferred options for the mine components leading to specific closure criteria.
   
   **Response from BHPB**: BHP Billiton has been working on revisions to this plan since 2003. The target delivery date is January 15, 2007 to the Wek’ëezhíi Land and Water Board.

2. **Last year’s Recommendation**: Decisions should be made about closure of mine components based on information from the corresponding studies in the forthcoming Abandonment and Reclamation research plan.
   
   **Response from BHPB**: Several studies have already informed the closure planning process. Additional studies will likely be identified during the closure option evaluation review and will be included in the closure plan as a research chapter. There will not be a stand-alone Research Plan.

3. **Last year’s Recommendation**: BHPB should use a collaborative consultation process to assist in developing its next closure plan, similar to the process used for improving the operation of the Long Lake Containment Facility (LLCF).
   
   **Response from BHPB**: BHPB has incorporated the best features of the LLCF and other reclamation planning processes to create an effective process for the Interim Closure Options Evaluation Workshop in July 2006. It will refine and improve this style of consultation for other projects.

Traditional Knowledge

4. **Last year’s Recommendation**: BHPB should enable greater participation of Aboriginal Peoples in the design and delivery of monitoring programs at Ekati.
   
   **Response from BHPB**: BHPB has sought to involve the communities in Traditional Knowledge and environmental monitoring programs. The Environmental Agreement is clear that each Aboriginal group shall determine the extent of its participation.

Communications and Consultation

5. **Last year’s Recommendation**: BHPB should adopt a more collaborative approach to the review and design of reports, programs, projects and risk assessments.
   
   **Response from BHPB**: BHPB already uses a collaborative approach for the design of reports, programs and risk assessments. A good example of this is the series of meetings held with parties to discuss the 2006 Environmental Impact Report.
Regional Monitoring and Cumulative Effects

6. Last year’s Recommendation: DIAND, GNWT, GNU and BHPB should be involved in regional caribou monitoring of the Bathurst Caribou herd.

Response from BHPB: BHPB has conducted aerial caribou monitoring surveys of the wildlife study area since 1993. This data is provided to GNWT and GNU for inclusion in their regional monitoring programs.

Response from DIAND: DIAND is not the lead on Wildlife or in Monitoring of the Bathurst Caribou Herd. The Government of the Northwest Territories, has a mandate to manage and monitor wildlife in the Territories. DIAND participates in and attends workshops and support monitoring programs developed by ENR. The long-term objective is to support management and sustainability of wildlife in the Northwest Territories.

Response from GNWT: Actions taken by GNWT include the collaborative development of the Bathurst Caribou Management Plan, the first of an annual stakeholder meeting and development of the Barren-ground Caribou Management Strategy. Other initiatives include monitoring actions to assess the status of the Bathurst caribou herd such as:
- The Health and Condition Project (involves hunter participation)
- The North Slave Caribou Monitoring Program
- Calving ground survey
- Development of a hunting reporting template
- Ahiak herd survey

Assessment of Regulators

7. Last year’s Recommendation: There is a need for greater clarity on the issue of water quality and the definition of receiving environment that could take the form of guidelines from the MVLWB. Building of internal technical capacity may assist with this initiative.

Response from DIAND: DIAND continues to work toward providing resource management tools, such as guidelines, to assist and inform Land and Water Boards (among others) as they develop resource management plans, formulate regulatory terms and conditions, prepare interventions and review reports and/or documents related to mining activities in Northern Canada. Specifically, DIAND is currently in the process of developing guidelines for Aquatic Effects Monitoring Programs. These guidelines will provide greater clarity on the issue of water quality and the receiving environments.

The Water Resources Division also has a number of other guidelines, reports, and internal expertise to draw upon for information and technical assistance on water quality concerns. The Mackenzie Valley Land and Water Board conducted its own independant review of the process for the new Ekati water licence (see page 34).
Activities in 2005

Last year we wrote about the analysis BHPB was conducting to re-examine the management of kimberlite tailings deposition into the Long Lake Containment Facility (LLCF). For several reasons, kimberlite being discharged into the impoundment was not behaving in the way that the company had predicted, resulting in a loss of storage capacity and a need to modify the operation to achieve more efficient use of the tailings storage area.

The company’s analysis relied on the outcome of a performance evaluation it conducted of the past five years’ of operating experience (based on monitoring programs), plus consultation with regulators and affected parties during final selection of management options for the tailings impoundment. We commended the company on this work, particularly with respect to the collaborative process it utilized.

BHPB’s re-assessment of its tailings operations resulted in the submission (in February 2006) of a new tailings operating plan to the Wek’eezhii Land and Water Board for approval. As we go to press, the new Wastewater and Processed Kimberlite Management Plan (WPKMP) is under review by regulators and other parties.

It is important to note that BHPB’s preferred option for the management of the tailings impoundment was selected for improving the operational aspects of the LLCF. Closure aspects were examined only in a relative way among the three operating scenarios being considered, but the evaluation did not specifically address closure issues associated with the facility once operations are shut down.

The new WPKMP includes a small diamond recovery plant, chloride addition, change in tailings deposition pattern, and construction of new access roads along the west side of cell A. There are also plans to construct a channel along the east side to collect runoff and to move the water toward the lower portion of the LLCF. We would like BHPB to avoid deposition into cell D as long as possible in order to keep open the option of putting tailings into a pit if possible. We also strongly prefer conditions under operation that would allow for the completion of deposition into the north end of cell B to allow it to become available for reclamation sooner than BHPB currently plans.

Agency’s Assessment

Our primary concern with BHPB’s proposed WPKMP is the lack of an adequate description of closure issues and concepts provided for the LLCF.

As part of our review of BHPB’s work in the Agency’s 2004 annual report, we noted that major information uncertainties about tailings composition, geochemical behaviour, and long-term stability had not yet been addressed. These, we wrote, would need to be answered in the formulation of the company’s revised operating plan for the tailings facility, especially so that closure issues could be properly considered and described. We also noted our expectation that the closure measures for each component of the facility should be described at a reasonable level of detail when BHPB submits its new WPKMP for approval. Unfortunately, closure details in the submitted document are lacking, and a number of issues remain outstanding.

For some years now, the Agency has been stressing the importance of ‘designing for closure’ when changes are being made to operations at Ekati. This means that when a mining operation or procedure is being developed or revised by BHPB, closure considerations should be central to the design, not tacked on as an afterthought or postponed for a later exercise.
Tailings and Wastewater Management

Issues related to BHPB’s 2006 Wastewater and Processed Kimberlite Management Plan:

- no description of the outstanding information needs and their implications for operation and closure of the tailings facility;
- no descriptions of studies, monitoring, or other analyses being undertaken to resolve the information deficiencies, along with completion dates;
- no identification and description of conceptually viable proposals for closing the Long Lake containment facility, particularly the interface shorelines;
- no evidence that the extra fine processed kimberlite can be held secure by a thin layer of clean water over time;
- no cross-sections of the facility illustrating pond levels in each cell for several intervals between now and closure;
- lacking an annual schedule of tailings deposition in each cell including, importantly, a schedule for progressive reclamation of the beaches; and,
- lacking geochemical and mineralogical characterization of tailings solids and porewater, including predictions of water quality at closure.

Recommendation

1. BHPB’s new Wastewater and Processed Kimberlite Management Plan (WPKMP) should:
   a. Contain a commitment to complete deposition into the north end of cell B by 2009 to allow pilot scale reclamation to begin.
   b. Omit use of cell D for deposition.

Given the uncertainties identified about the long-term behaviour of the tailings, particularly the clay slurries (or ‘extra fine processed kimberlite’) which are highly mobile and do not settle like the rest of the kimberlite tailings, it is far from demonstrated that effective closure measures exist for stabilizing and reclaiming the tailings cells. In our view this is a serious problem. Conceptually viable closure options for all mine components, such as the tailings impoundment, ought to be demonstrated at the time of regulatory approval, not later. For that reason, the Agency will be recommending that the Wek’eezhii Land and Water Board not approve the new WPKMP until BHPB revises it to provide the necessary information (see sidebar).

In light of the fact that some research currently being undertaken by BHPB in respect of tailings behaviour might continue for some time, we believe an update of the WPKMP is warranted within two years.

One of these investigations involves the addition of a small diamond recovery plant to the processing facility at Ekati. This plant will generate higher quantities of the extra fine processed kimberlite, posing additional challenges for operations and closure of the tailings facility. The company is currently experimenting with adding calcium chloride to the process as a way of enhancing settlement of the kimberlite clay minerals. This may pose problems for future water quality in the containment area, as there are early indications that chloride levels may significantly exceed guidelines for the protection of aquatic life. This is an issue we will be tracking closely over the next few months as BHPB continues to experiment with calcium chloride addition and monitor the results.

One of BHPB’s objectives in redesigning the operation of tailings discharge was to delay placing tailings directly into cell D, and possibly avoid it altogether if the Beartooth Pit became available for tailings deposition in the latter stages of mine life. We agree with BHPB that avoiding, and even minimizing, use of cell D is a prudent objective for operation of the tailings facility, since it would provide an additional settling and clarification stage for tailings effluent prior to discharge to Leslie Lake. We also believe that BHPB should move as expeditiously as possible to complete tailings deposition into the north end of cell B (uppermost cell) so that pilot scale reclamation research can be done to enable full scale closure and reclamation of the LLCF to be completed as early as possible. Some essential research, such as revegetation potential, has yet to be completed for the tailings area, and BHPB needs to now act quickly with answering some of the key questions needed for effective closure, and to proceed with progressive reclamation in a timely way.
Activities in 2005

Mining activities at Ekati over the past year continued with the development of underground mining at Panda, Koala and Koala North pipes, open pit mining at Fox and Beartooth, and the temporary closure of Misery pipe operation in April of 2005.

The depositing of massive volumes of waste rock on the tundra poses potentially serious environmental concerns if the rock has the capacity to produce drainage that would be harmful to aquatic life. For this reason, BHPB annually conducts several surveys that investigate the geochemical and thermal properties of the excavated rock, and the quality and amount of drainage that is produced by the waste rock dumps. The results of these surveys are reported to the Wek’èezhii Land and Water Board.

The current situation is that there are no significant environmental issues at Ekati related to waste rock management. There are, however, some potentially serious issues related to post-closure conditions that are discussed further below.

Rock geochemistry analyses for the Beartooth waste rock continue to demonstrate that the bulk of the waste rock types (granite) has low sulphur concentrations and low potential for acid generation. Similar conditions prevail for the Misery waste rock, although biotite schist present there in substantial quantities has higher sulphur levels and a potential for acid generation. This rock has been deposited in layers on the waste rock dumps and it is planned to be permanently encapsulated with inert granite and frozen.

Overall, it was a relatively dry year at Ekati. The volumes of drainage originating in the waste rock dumps remain low, and the water quality produced remains at environmentally acceptable levels. Most of the Koala/ Panda waste rock seeps drain toward the Long Lake tailings containment area, with only one seep in the north Panda area draining to Bearclaw Lake. This seep showed increased concentrations of ammonia, nitrate, and nitrite in 2005. BHPB attributed these increases to the placement of recently-blasted waste rock on the margins of the dump upslope from the seep.

The 2005 seep surveys at Misery showed increases in concentrations of cobalt, copper, nickel and zinc in one seep, attributed by BHPB to disturbance related to relocating waste rock upslope as part of operations.

Monitoring temperatures within the Koala/Panda waste rock dumps reveals that permafrost conditions are being established.
throughout the piles, so that any infiltrated water from precipitation is being frozen. The company expects that freezing of the internal portions of the waste rock piles will be permanent, and this will naturally prevent the formation and flow of any harmful mine drainage from the dumps.

Agency's Assessment

In our last annual report we reported on the results of an independent expert review we commissioned of BHPB’s 2003 waste rock monitoring program, and identified a number of important issues that BHPB ought to address in future surveys and reports. Some of the more significant comments include:

- the waste rock monitoring report would be improved if it included a discussion of the management implications of the findings;
- uncertainty remains in the long-term future performance of some of the mitigation measures (e.g., toe berms and permafrost aggradation) that the company has adopted for waste rock management;
- coarse kimberlite waste rock, in some locations at least, is not freezing and may present drainage problems at mine closure;
- the cause of acidity of some seeps has not been definitively explained;
- leaching of nickel from kimberlites and black clay may be a long-term concern;
- sulphide oxidation in some dumps may generate sufficient heat to thwart permafrost aggradation;
- geochemical characterization of processed kimberlite fines should be done;
- geochemical characterization of post-blast fines should be done to corroborate drill-chip sampling;
- characterization of till and lake sediments should be conducted;
- mineralogy of potential neutralizing and metal leaching sources should be conducted; and,
- mineralogical characterization of kimberlite minerals, particularly the carbonates, should include x-ray diffraction.

Most of the above issues pose potentially serious problems for closure planning, and need to be meaningfully addressed by the company in its Waste Rock Monitoring Program.

As we went to press this year, BHPB’s 2005 Waste Rock Seepage report was distributed. We were again disappointed to see that our independent expert’s comments from the past years were not acknowledged, and the same problems carried over from previous years’ reports. It is our view that the sampling and monitoring of waste rock at Ekati represents a comprehensive and serious effort at collecting the data to understand what problems the waste rock might pose in the future. However, we are dismayed that BHPB continues to simply report the results without addressing the outstanding questions posed by the data, or discussing the implications the data have for closure planning.

We note that during the Environmental Impact Report 2006 technical session on aquatic effects, that BHPB’s consultants made a presentation on seepage monitoring and results. This presentation indicated that BHPB had considered some of the suggestions from the Agency’s independent review but these were not incorporated into the 2005 report.

Importantly, during the 2005 relicensing process for the Ekati Mine, the Mackenzie Valley Land and Water Board (MVWB) recognized that this was an important objective and included a requirement in the new licence for BHPB to discuss the management implications of its waste rock monitoring program. Not to have provided this in the 2005 report means that the company is out of compliance with its water licence. Accordingly, we will be writing to the Wek’eezhii Land and Water Board (WLWB) and recommending that the report not be accepted until the issues raised by the reviewers have been addressed including management implications.