



Technical Annual Report 2008-09

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™



Independent
Environmental
Monitoring Agency

Message from the Chair 2009

The main activities of the Agency in the last year have been our contributions to the Interim Closure and Reclamation Plan (ICRP) working group, as well as our participation in the Sable, Pigeon and Beartooth Licence renewal process that ultimately led to an amalgamation with the main water licence. As noted elsewhere, we are very proud of improvements we and others contributed to the ICRP and the ICRP process. The first major contribution the Agency made was the development of how best to develop and present the objectives for *reclamation* of each mine component, the options for achieving these objectives and the criteria for determining when these objectives have been achieved (and the corresponding portion of the security deposit returned to the company). The second major contribution was the effective integration of the *reclamation* research plan into the ICRP. When there is a knowledge gap that prevents the ICRP from being completed, it is necessary to fill the knowledge gap in a timely manner

through a *reclamation* research plan. We believe these improvements will not only make for a better ICRP for EKATI™ Diamond Mine but will help regulators with other ICRPs as well.

With funding from the two governments and BHP Billiton (BHPB), we had an external review of the Agency done by Specialists in Energy, Nuclear and Environmental Sciences (SENES) Consultants in an effort to improve our future performance. This review is also reported on elsewhere in this report, as well as our initial response to the recommendations made by SENES. We have invited SENES to come to our next annual general meeting to report on its findings. At that time, we will invite our Society Members to provide further comments on our past performance and any additional advice for our future performance.

There have been several developments in wildlife monitoring in the past year. Major efforts were initiated to bring together the monitoring programs of different mines. This would enable more useful results and better coverage of regional *cumulative effects* on caribou and other species. As noted elsewhere, these efforts were, in our view, partly successful and partly not.

Sheryl Grieve was replaced as a director on the Agency by Brad

Enge and subsequently by Audrey Enge. We thank them for their contributions and look forward to working with Audrey.

BHPB has continued to do a good job of environmental protection at Ekati. While we do not always agree on everything, the working relationship between the Agency and the company is, we are pleased to report, very good.

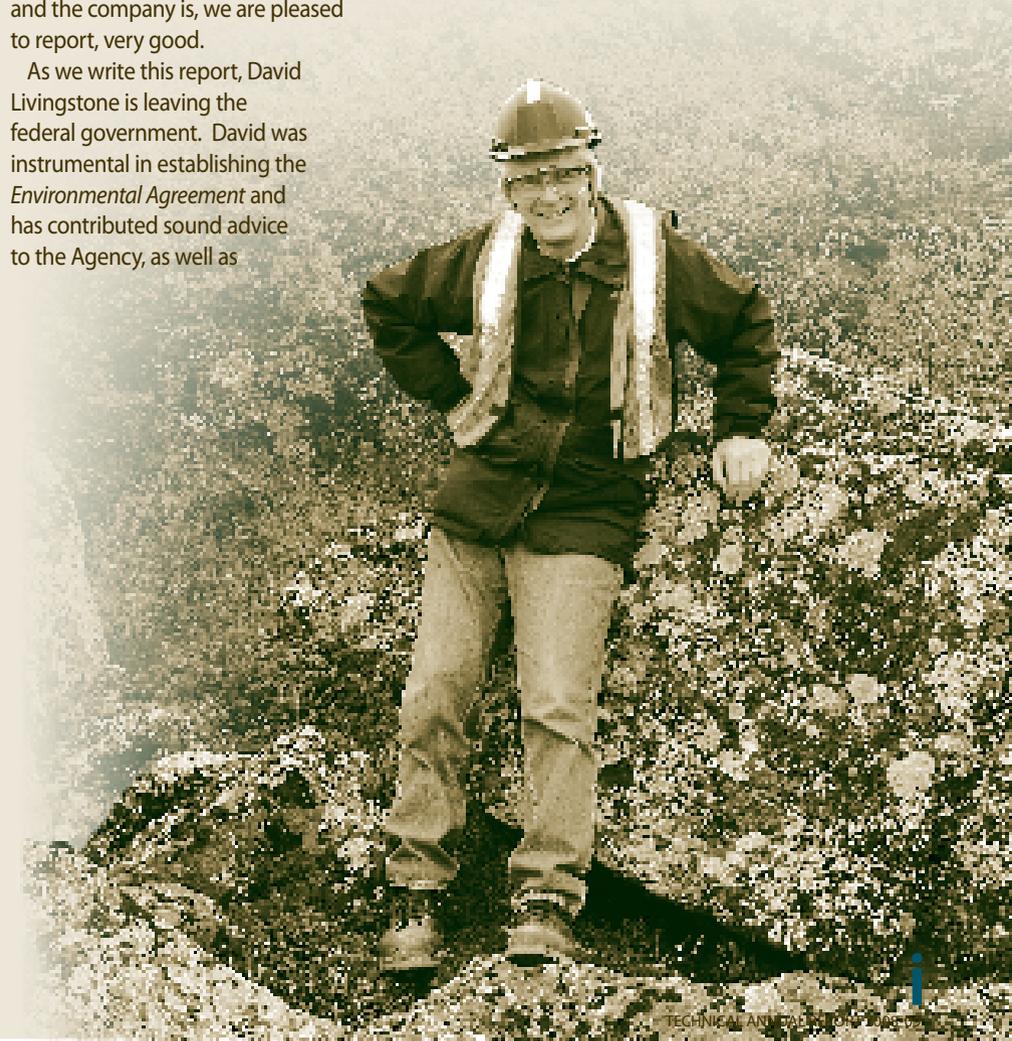
As we write this report, David Livingstone is leaving the federal government. David was instrumental in establishing the *Environmental Agreement* and has contributed sound advice to the Agency, as well as

support for effective environmental stewardship throughout the North. For this, we thank him and wish him well with all his future endeavours. ■



William A. Ross, Chairperson

March 31st, 2009



Ekati Diamond Mine

- 1 Long Lake Containment Facility (Cells A – E)
- 2 Main Camp
- 3 Beartooth Pit
- 4 Waste Rock Piles
- 5 Koala and Koala North Pit
- 6 Panda Pit
- 7 Panda Diversion Channel
- 8 Haul Roads
- 9 Fox Pit
- 10 Misery Site
- 11 Airstrip



SATELLITE IMAGE 2007/BHP-BILLITON DIAMONDS INC.



Independent Environmental Monitoring Agency

- i Message from the Chair 2009
- ii Ekati Diamond Mine
- iii Director Biographies
- 02 Agency Recommendations for 2008-09
- 04 Agency Activities and Assessing the Agency
- 10 Processed Kimberlite and Wastewater Management
- 13 Closure and Reclamation
- 19 Aquatic Effects
- 26 Sable, Pigeon and Beartooth Water Licence Renewal
- 29 Air Quality
- 32 Wildlife Effects
- 36 Regional Monitoring and Cumulative Effects
- 37 Traditional Knowledge
- 39 Assessment of the Regulators
- 41 Assessment of BHP Billiton
- 43 Financial Statements
- 51 Summary of Work Plan and Core Budget 2009-10 and 2010-11
- 53 Acronyms
- 53 Glossary – A listing of all italicized words used in this report.



■ NORTHWEST TERRITORIES
■ NUNAVUT

Agency Recommendations for 2008-09

Recommendation

1

DIAND and WLWB, along with other related bodies, should work together with Aboriginal governments and other interested parties to develop scientifically defensible Water Quality Standards for the Northwest Territories. As this work could contribute towards the review of Effluent Quality Criteria in the water licence for the Ekati Diamond Mine, it needs to be completed well before 2013.

WLWB Response: With respect to Water Quality, in January 2008, the full MVLWB (i.e., the MVLWB and all three regional panels) established the “Standard Procedures and Consistency Working Groups” one of which (working group 3 chaired by Kathleen Racher) was mandated “to develop an approach for creating clear and consistent policy and procedures for deriving water/effluent quality criteria for water licenses”. Based on the information obtained, the working group has just finished its first draft of a Water and Effluent Quality Management Policy that will soon go before the full MVLWB for discussion. This policy is intended to describe how the land and water boards make decisions that will affect water

quality in the environment – for example, in the setting of discharge limits for effluent. Once the policy is approved, working group 3 will begin developing specific guideline documents that are required to implement the policy. The working group envisions several cycles of internal and external review of the draft policy during the course of 2009 and hopes to have it approved by the full MVLWB by the end of this year.

DIAND Response: The paper entitled ‘Towards the Development of Northern Water Standards: Review and Evaluation of Approaches for Managing Water Use in Northern Canada’ identifies a series of tools and options for managing water quality conditions in northern

Canada, including establishment of uniform water quality standards, establishment of uniform or industry-specific effluent quality criteria (EQCs), and establishment of project-specific effluent quality criteria. This paper recommends a multi-stepped approach to the development of effluent quality criteria, with the first step being the establishment of ambient water quality objectives (WQOs).

INAC recognizes that the development of clear guidance for determining WQOs and effluent quality criteria is important for regulatory improvement. Funding constraints will affect the pace at which we proceed on this issue. In 2009-10, INAC will begin to determine WQOs for the Slave

River, as part of transboundary water negotiations with Alberta. The principles and steps of such a process could be applied across the NWT and contribute to the development of a consistent and clear process for the determination of water quality objectives and subsequent effluent quality criteria for industrial projects in the NWT.

BHPB Response: BHPB would support and participate in, as part of a working group that includes the diamond mining industry, an NWT-wide initiative to develop a scientifically defensible process for developing Water Quality Objectives for diamond mines. An inclusive process would work towards enrolment and acceptance by all stakeholders. ■

Recommendation

2

The Agency recommends that GNWT-ENR take the lead in coordinating the diamond mines wildlife monitoring program review, including a workshop in Fall 2009 to review program objectives and study designs.

BHPB Response: GNWT-ENR currently takes a proactive and practical approach to the regular reviews of the wildlife monitoring programs for the EKATI Diamond Mine.

GNWT-ENR Response: GNWT-ENR will convene and lead a workshop in Fall 2009 to review the project objectives and study designs of the wildlife monitoring programs

for all three diamond mines and GNWT monitoring programs and studies in the area. The results of this workshop will be conveyed to the monitoring agencies and parties to the *Environmental Agreements* to ensure that reviews and amendment to existing programs are conducted with a full understanding of the strengths, weaknesses, gaps and opportunities within current programs. ■

Recommendation

3 *BHPB should carry out the wolverine DNA sampling program in 2010.*

BHPB Response: BHPB has been in dialogue with the GNWT-ENR and the other diamond mines around the scope and size of this program based on our experience from implementation of the first program. We shall continue in discussion with the aim to being involved in the program in 2010.

GNWT-ENR Response: Based on research to date, DNA hair snagging is

clearly the most effective technique for monitoring demographic changes and estimating wolverine abundance. GNWT-ENR agrees with the recommendations that all three diamond mines continue DNA sampling as the standard technique for detection of potential impacts to wolverine populations, as soon as possible. ■

Recommendation

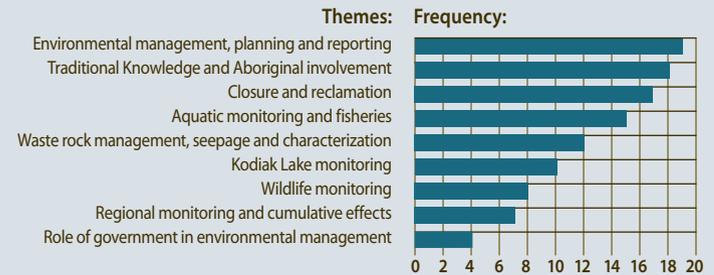
4 *BHPB should carry out and make public a 10-year review of its use of Traditional Knowledge (TK) in its environmental plans and programs. This review should*

document how the company has given full consideration to the incorporation of TK into environmental plans and programs, the successes and lessons learned from the TK Studies, and what changes or improvements in adaptive management can be attributed to TK.

BHPB Response: BHPB recognizes the importance of the inclusion of TK into our practices and designs and that this is a fundamental component of the *Environmental Agreement*. There are a number of past and current successes in which BHPB is proud to have played a part. At this time BHPB continues to invest

its resources into working with the communities in which it operates to develop new, forward-looking TK initiatives. This approach inherently incorporates past experience in a constructive manner that is clearly focused on benefitting the development of new initiatives. ■

Agency Recommendation Themes 1997-2009



Recommendation Recipient	Frequency of Recommendations
BHPB	80
Government (GNWT, GN, Government of Canada)	13
Water Boards (NWT Water Board, MVLWB, WLWB)	8
Environmental Agreement signatories	3
Aboriginal Society Members and BHPB	3
Aboriginal Society Members	1
All Agency Society Members	1
Total	109

Independent Environmental Monitoring Agency (back row, left to right): Audrey Enge, Jaida Ohokannoak, Tony Pearce, Bill Ross, Laura Johnston; and (front row, left to right): Scott Duguid, Kim Poole, Tim Byers, Kevin O'Reilly.



HIGHLIGHTS:

- Five board meetings, the annual general meeting and an environmental workshop hosted by the Agency in Yellowknife.
- Board visit and open house in Lutsel K'e.
- Continued participation in the ICRP working group.
- Participation in the SPB water licence public hearing as an intervenor.
- Participation in a review of wildlife monitoring programs at diamond mines (including Ekati).

Agency Activities and Assessing the Agency

Activities 2008-09

Over the course of 2008-09 the activities of the Agency were carried out according to the approved Agency work plan, which links director and staff activities to our mandate as prescribed in the *Environmental Agreement*. Our work plan is also used for budgeting purposes and guides the focus of the Agency; including the directors' review of technical documents and the funding available for communications and *consultation* events. As in previous years, board meetings were held in Yellowknife along with an annual general meeting and an environmental workshop to discuss environmental monitoring results at Ekati (see summary in Table 1). The Agency funded participants from our Aboriginal Society Members to attend these events. The Agency visited the community of Lutsel K'e in September 2008 for a board



IACT Tour of Ekati Mine in September 2008.

meeting, community open house, and meeting with Chief and Council. There was very good discussion on the mandate of the Agency and members of the community were able to voice their concerns regarding the operation of the Ekati Mine's environmental programs.

The Agency manager and one

of the directors toured the mine site along with a group from the Inter-Agency Coordinating Team (IACT) in September 2008. IACT consists of the Agency and a group of government regulators, including the Department of Indian and Northern Affairs (DIAND), the Department of Fisheries and Oceans

(DFO), Environment Canada (EC) and the Government of the Northwest Territories (GNWT). Many of the photographs taken during these visits to Ekati are found in the pages of this annual report. The Agency is having a board meeting in conjunction with an Ekati Mine site tour in mid-June 2009.

The Agency participated in reviews of key BHP Billiton (BHPB) environmental reports and regulatory initiatives throughout the year. We took part in an Environmental Monitoring Advisory Board (EMAB) sponsored workshop, Adaptive Management and Community Based Monitoring, which lead to improvements in

adaptive management plans for diamond mines. The Agency made a presentation on the use of Traditional Knowledge (TK) in research and monitoring at a DIAND sponsored Aquatic Effects Monitoring Program (AEMP) Guidelines workshop. These guidelines are being set up as a way to more effectively utilize current TK in the establishment of AEMPs.

The Agency strongly supports, and has been involved in, the initiative to review the diamond mine (including Ekati) wildlife monitoring programs. This group has been set up to better coordinate the wildlife monitoring efforts as a means of gaining a clearer picture of the

cumulative effects of the diamond mines and to ensure efficient use of resources. Another main goal is to review study designs to ensure they address objectives. One of the first outcomes of this process is combining the aerial caribou survey which will be undertaken jointly by BHPB and Diavik. The Agency has submitted comments regarding the design and footprint of the study area as shown in the Wildlife Effects section of this annual report.

The Agency made a presentation to the North Slave Métis Alliance Environment Committee at its Ekati workshop in March 2009. In this presentation the Agency mandate was discussed along with

current Agency activities and the Agency role regarding Traditional Knowledge. Also, at this workshop BHPB made presentations about company contingencies during the economic slowdown, human resource activities in relation to Aboriginal peoples, and updates to the Life of Mine Plan.

In order to achieve improved coordination and communication between the Agency and the 'Environmental Agreement' signatories (BHPB, GNWT and the Government of Canada), biannual meetings are held. At these meetings the Agency and the signatories provide an update

Continued on page 8

Lutsel K'e visit September 2008.



Annual general meeting December 2008.



Table 1: Key Agency Activities

Date and Location	Purpose	Main Issues
May 14-15, 2008 Yellowknife	Adaptive Management and Community-Based Monitoring Workshop	<ul style="list-style-type: none"> • Sponsored by EMAB with consultant who reviewed both the Ekati and Diavik adaptive management plans submitted to the Wek'èezhii Land and Water Board (WLWB). • Suggestions made to improve the plans.
May 23, 2008 Yellowknife	Inter-Agency Coordinating Team (IACT) Meeting	<ul style="list-style-type: none"> • Agency staff and regulators met with BHPB. • Detailed discussion on the Fay Lake spill and clean-up efforts. • Further study of fish at site for exposure to hydrocarbons. • <i>Nitrate</i> in Long Lake Containment Facility (LLCF) exceeds Canadian Council for Ministers of the Environment (CCME) guidelines and BHPB responses discussed.
June 2, 2008 Yellowknife	<i>Environmental Agreement</i> Implementation Meeting	<ul style="list-style-type: none"> • Presentations on communications and planning. • Information sharing protocol discussed. • BHPB is looking at new TK programs with communities. • Discussion of preliminary recommendations from Agency's 2007-08 annual report.
September 11-12, 2008 Lutsel K'e	Board Visit to the community, Open House, meeting with Chief and Council	<ul style="list-style-type: none"> • General update on Agency activities. • Good discussion of mandate of Agency. • Letter sent to community member on caribou death at Ekati in 2001. • Letter sent to Council on concerns raised with Agency.
September 12, 2008 Yellowknife	Director meeting with Yellowknives Dene First Nation consultant	<ul style="list-style-type: none"> • Update provided on activities of the Agency and regulatory proceedings.
September 23, 2008 Ekati Mine Site	IACT Site Visit	<ul style="list-style-type: none"> • Agency director and manager participate in a site tour with government regulators. • Some erosion taking place at Fay Lake spill site.
October 21-22, 2008 Yellowknife	AEMP Guidelines Workshop sponsored by DIAND	<ul style="list-style-type: none"> • Director made a presentation on the use of TK in research and monitoring. • Director and staff participated in discussion on the use of TK in AEMPs.
December 3, 2008 Yellowknife	Environmental Workshop	<ul style="list-style-type: none"> • Agency sponsored workshop to present results of the 2007 Ekati environmental monitoring programs. • Concern with sampling effects on fish populations. • Interest in the causes for mercury levels in the fish. • Desire for improved coordination of wildlife and air monitoring for Ekati and Diavik, including better use of TK. • Concern with effects of dust from the mine. • Agency transmitted concerns in a February 17, 2009 letter to BHPB and governments (no response to date).

Date and Location	Purpose	Main Issues
December 4, 2008 Yellowknife	Agency Annual General Meeting	<ul style="list-style-type: none"> • Agency director presented annual report and financial statements for 2007-08. • Questions were raised about caribou monitoring. • Concern expressed about excluding fish from pit lakes at closure and who has jurisdiction over wildlife issues during closure. • Need for more TK programs raised. • Questions about the Fay Lake spill. • Little, if any, progress on the issue of building capacity in Aboriginal communities to participate in <i>Environmental Agreement</i> and regulatory processes.
December 17, 2008 Yellowknife	Diamond Mine Wildlife Monitoring Meeting	<ul style="list-style-type: none"> • Meeting to examine opportunities for better coordination of wildlife monitoring at the diamond mines, and to implement study designs that better address wildlife monitoring objectives. • Need to ensure respective <i>Environmental Agreements</i> are followed.
January 12, 2009 Yellowknife	<i>Environmental Agreement</i> Implementation Meeting	<ul style="list-style-type: none"> • Review of Agency findings and recommendations over 2008-09 and work plan and budget. • BHPB presentation on environmental operations and programs for 2009. • Environmental Impact Report <i>consultation</i> requirements raised. • Support for external review of Agency. • BHPB may use Beartooth Pit as a mine water sump and is examining new mining methods.
February 3-4, 2009 Yellowknife	North Slave Wildlife Research Workshop and Bathurst Caribou Management Plan Workshop	<ul style="list-style-type: none"> • Agency director and staff attended. • Agency director made a presentation on a previous review of caribou aerial survey methods. • Concern with the overall health of the Bathurst caribou herd and progress on <i>cumulative effects</i> management.
February 10, 2009 Teleconference	Use of Traditional Knowledge in AEMP Development	<ul style="list-style-type: none"> • Agency director attended and participated in person. • Working group assembled by DIAND to look at the ways of integrating TK into AEMP guidelines.
March 19, 2009 Yellowknife	North Slave Métis Alliance Environment Committee Ekati Workshop	<ul style="list-style-type: none"> • Agency manager made a presentation on Agency mandate and activities. • Questions about dust suppressants, Agency role on TK, Agency review of regulatory applications.
March 24-26, 2009 Kugluktuk	TK Monitoring Workshop	<ul style="list-style-type: none"> • EMAB sponsored workshop to discuss proposal for community camps near Lac de Gras to better monitor environmental changes. • EMAB to further develop proposal and Agency will consider support after reviewing it.

Note: Activities related to the ICRP and Sable Pigeon Beartooth (SPB) licence renewal are covered elsewhere in our annual report.

**Table 2:
Agency Incoming
Correspondence
2008-09**

Sender	# of Pieces
WLWB or Consultant.....	46
BHPB.....	29
DIAND.....	28
DFO.....	17
GNWT.....	6
Signatories.....	5
EC.....	4
Diavik/EMAB.....	2

Subject	# of Pieces
Water Licences including SPB Amalgamation.....	28
AEMP including Guidelines.....	26
ICRP.....	21
Land Use Permits/Water Licences Inspections.....	11
LLCF.....	10
Wastewater and Processed Kimberlite Management Plan (WPKMP).....	10
Other Environmental Matters.....	9
Annual Environmental Report.....	4
Watershed Adaptive Management Plan.....	3
Wildlife Effects Monitoring Program (WEMP).....	3
Air Quality Monitoring.....	1
Land Use Permits.....	1

**Table 3:
Agency Outgoing
Correspondence
2008-09**

Recipient	# of Pieces
WLWB.....	10
BHPB.....	6
DIAND.....	3
DFO.....	2
Environment Canada.....	1
Signatories.....	1

Subject	# of Pieces
ICRP.....	6
AEMP/AEMP Guidelines.....	4
LLCF.....	3
SPB Amalgamation.....	2
Air Quality Monitoring.....	1
Annual Environmental Report.....	1
Beartooth Pit.....	1
Incineration.....	1
McCrank Report on Northern Regulatory Improvements.....	1
Water Quality Standards.....	1
WEMP.....	1

Continued from page 5
on activities and the responses it has received from BHPB, as well as the Agency reporting on financial expenditures and future plans. The *Environmental Agreement* signatories are offered an opportunity to respond to formal Agency recommendations and other discussions take place.

Agency Consultation and Communication

The key means of communication for the Agency include the production of plain language and technical annual reports, a website and library of Ekati related material, a brochure sent out to each household in our Society Member communities, an annual general meeting and an environmental workshop. Our outgoing and incoming correspondence is summarized at left in Tables 2 and 3. The staff also respond to frequent requests from students and the public for information on and photographs of Ekati.

Director *consultation* visits in the communities are also a key aspect of Agency communications. We attempt to send a director to any community that requests information about Ekati. During 2008-09 we visited Lutsel K'e. We continue to hear comments from our Society Members; they are comforted knowing the

Agency is performing its role in monitoring activities and reviewing environmental reports produced annually by BHPB.

Assessing the Agency

In the spring of 2009 the Agency contracted SENES Consulting to perform an external review of our performance in meeting our mandate. The last time such a review was undertaken was in 2000. There were several recommendations made in the final report (see page 9). While the Agency contracted SENES to carry out the work, we did not influence the report in any way. Directors and staff were interviewed by SENES, as well as Society Member representatives. Most of the recommendations offered by SENES involve communications with our Society Members. We welcome your input on the report and its recommendations. This can be done by phone, e-mail, mail or visiting our office at any time. In an effort to approach the recommendations in a systematic and collaborative manner, we have asked SENES to make a presentation on the report at our 2009 annual general meeting to be held in November or December of this year. Following the presentation and any questions, we would like to have a facilitated discussion of the recommendations and any other ideas for improving the Agency's

performance. We will report on the outcome of these discussions in our next annual report.

The Agency was pleased with the outcome of the SENES review. We appear to be fulfilling our mandate, particularly with regard to technical reviews and submissions. We will try harder to improve our *consultation* and communications efforts and can report that we will be developing a web based historical description of events, following an initial request from the Yellowknives Dene, for the mine that will include operational,

regulatory and environmental information. We expect to be able to launch the project in the summer or fall of 2009.

The Agency is proud of its contribution to the Interim Closure and Reclamation Plan (ICRP) and we believe that when the plan is finally approved, it will serve as a model for other northern mines. As well, the process developed for the ICRP will also be used for other northern mines and we are pleased that the lessons learned will be applied elsewhere too. ■

Agency directors in Lutsel K'e September 2008.



2009 External Review of the Agency

Recommendation 1:

Renew the preparation of an Agency newsletter similar to the 'Ekati Monitor'.

Preliminary Agency Response:

The idea of regular communications from the Agency to our Society Members appears sound to us. We would like to discuss the format and frequency with Society Members and to seek direction on whether an e-mail newsletter and/or hard copy, or a web-based newsletter or blog might work best.

Recommendation 2:

Prepare a "Reporting Back to Communities" pamphlet following community visits.

Preliminary Agency Response:

We believe the idea of a formal follow-up after a community visit is good one and we would like to discuss this further with our Society Members.

Recommendation 3:

Organize more community meetings.

Preliminary Agency Response:

The Agency recognizes that communities have very busy schedules and their own set of priorities. More community

meetings by the Agency are dependent on our financial resources and the interest of communities. We would like to discuss the need for more community meetings further with our Society Members.

Recommendation 4:

Prepare summary notes / highlights from board of directors' meetings.

Preliminary Agency Response:

The Agency accepts this recommendation and we will summarize and distribute board meeting highlights by e-mail to Society Member representatives. We will do this on a trial basis and look forward to discussing the usefulness of this approach at our annual general meeting.

Recommendation 5:

Where appropriate, make action-oriented, prescriptive recommendations in annual reports.

Preliminary Agency Response:

The Agency agrees with this recommendation and we will try harder to improve our formal recommendations in our annual reports. Indeed, we have tried to do so in the report we are now preparing. ■

HIGHLIGHTS:

- Clean-up of PK spill into Fay Lake done well by the company.
- Beartooth Pit proposed to be used for mine water storage.
- Good cooperation and coordination by regulatory agencies regarding the Fay Lake spill.
- BHPB stopped discharges from the LLCF until *nitrate* declined to safe levels.

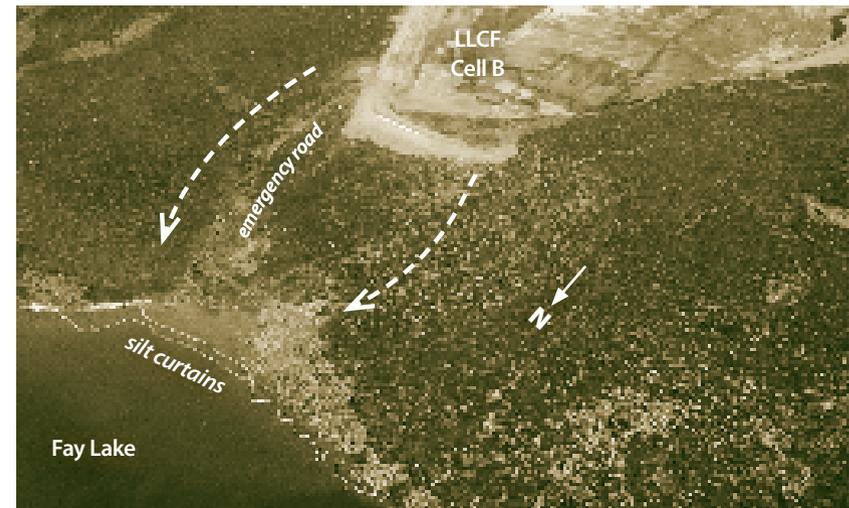
Processed Kimberlite and Wastewater Management

Activities 2008-09

Escape of Tailings from Cell B

Perhaps the most notable event that occurred in 2008 with respect to management of *tailings* in the Long Lake Containment Facility (LLCF) was an escape of *processed kimberlite* (PK) from the facility onto a nearby frozen lake. On May 16, 2008, a BHP Billiton (BHPB) employee flying into Ekati observed a flow of *kimberlite tailings* from the north end of cell B, where PK was being discharged, onto Fay Lake. Ground follow-up by the company revealed that the flow of PK crossed 180 metres of tundra and then ran out onto the frozen surface of Fay Lake. No information has been made available as to the volume of *tailings* that escaped.

Response by the company was prompt. *Tailings* discharge was immediately relocated to another point in the LLCF. A berm to contain the flow was constructed, and the



Fay Lake processed kimberlite spill.

company immediately notified the DIAND Inspector and DFO, other government agencies, Aboriginal leaders and the Agency.

The initial response focused on containing and cleaning up the spilled *kimberlite*. A temporary, emergency road was constructed to Fay Lake using rockfill placed on a

geotextile membrane on top of the easternmost pathway. The PK was moved by trucks, suctioned up or even removed by hand into buckets, back into cell B. Silt curtains were placed to the edge of Fay Lake to prevent the PK from getting farther into the lake.

Following notification of the spill,

and during the next few months, DIAND inspectors visited the site, collected water samples, and monitored progress of the spill cleanup.

On November 7, 2008, following its investigation into this incident, DIAND wrote to BHPB concluding that the company had violated two conditions of its water licence - first, a failure to contain the PK within the LLCF; and second, a failure to regularly inspect the entire LLCF. The inspector informed the company that rather than proceeding with a prosecution of these violations he would be satisfied with a firm assurance from BHPB that this problem would not occur in the future and that the company would undertake increased monitoring and other preventative measures that might be necessary. The inspector also noted that, had the spill occurred a week or two later, BHPB may not have been able to get out on the ice to retrieve the spilled *tailings* as effectively as they had when the lake was completely frozen.

The DIAND warning letter also requested that BHPB provide further information about the cause of the spill and the measures that the company would take to avoid a reoccurrence of *tailings* release from the LLCF. Warning letters were also sent by DFO and EC (although the Agency has not received a copy of the EC letter). DFO and EC left the prevention and follow-up monitoring to the DIAND inspector rather than potentially creating overlapping requirements.

BHPB's response to the inspector stated that the cause of the *tailings* release was unknown, but that the company would carry out daily monitoring of the entire LLCF. To facilitate inspection, a new road connecting the east and west cell B roads would be constructed in 2009, a water diversion structure along the north and east sides of cell B would be constructed prior to the 2009 spring melt to keep waterborne *tailings* away from the shore.

LLCF Operations

Apart from the Fay Lake incident, discharge of PK into the LLCF occurred as planned throughout 2008, alternating between cell A and cell B. As *tailings* are deposited in the upper reaches of these cells, pond water and clay slurries are gradually being displaced into cell C.

As the Ekati operation has moved more into underground mining, the nature of the mine water being discharged into the LLCF has changed. Increasing concentrations of *nitrate* and chloride in the LLCF during 2008 required BHPB to think about how to mitigate these trends.

Nitrate concentrations rose in cell E during 2008 from 3.5 mg/L to 4.3 mg/L, by November. Similarly, chloride rose from 71 mg/L to 109 mg/L by November. Water in cell E is stratified with a stable, low *nitrate* surface layer. *Nitrate* in Leslie Lake, the lake into which discharge from cell E occurs, was approaching 4.5 mg/L by year-end. As a result of these trends, cells D and E were not

pumped down to target elevations, and discharge from the LLCF was less than planned in 2008. BHPB delayed discharge from the LLCF until the CCME guideline of 3.5 mg/L for *nitrate* was reached at the point of release. For the same reasons, there will be no discharge from the LLCF during freshet in 2009. Monitoring of cell E will be done in 2009, and if stratification occurs, producing clean water on the surface, then discharge during the summer would occur.

BHPB experimented with the addition of phosphorus as a means to reduce the *nitrate* concentrations, encouraging phytoplankton consumption of *nitrates*. A second

round of phosphorus addition is planned for cell D in 2009.

More recently, BHPB has proposed a different approach to dealing with these high chloride and *nitrate* source waters. In December 2008, the company wrote to the WLWB requesting a change in its approved Wastewater and *Processed Kimberlite* Management Plan (WPKMP) that would see Beartooth Pit being used to store mine water, particularly water from underground operations.

Open pit mining is scheduled to be completed by mid-2009 in Beartooth, and then the pit would be used to store mine water until close to the end of mine life. Since

IACT visit to Fay Lake spill September 2008.



the *reclamation* plan indicates that the pit will be flooded, BHPB's view of the implications of now using Beartooth to store mine water is that closure plans would not be compromised, assuming that the chloride- and *nitrate*-rich water would remain at depth and that the water quality flowing out of Beartooth, once flooded, meets licence criteria. Using the pit in this manner would see approximately 50% of its total storage capacity being used by the end of mining.

Agency's Assessment

BHPB's quick response to the Fay Lake spill, including the immediate notification of affected parties, is commendable. Unforeseen events such as this are always problematic for an operator, but BHPB responded in exemplary fashion both by taking immediate remedial action at the site and by alerting the regulators and leaders of the Aboriginal Peoples involved in the *Environmental Agreement*.

It is unfortunate that BHPB's inves-

tigation could not identify a cause for this incident, but an obvious lesson is that there are still things to be learned about storing PK waste material in an arctic environment. This will no doubt lead to increased vigilance at the LLCF, but it does pose questions for the stability of this material that needs to be achieved when the LLCF is decommissioned and reclaimed.

In our view, the prompt and thorough follow-up work done by the DIAND inspector to keep on top of the remedial aspects of the Fay Lake event is also commendable. There will need to be careful follow-up to prevent further erosion on the temporary road and to promote revegetation of the areas covered by the spill.

With respect to the emerging water quality issues in cell E, we are pleased to see BHPB's efforts in examining its explosives practices to better control *nitrate* residues, and to experiment with phosphorus addition to reduce *nitrate* in LLCF waters. The chloride issue is a harder one to tackle, and we are not yet comfortable with BHPB's request to use Beartooth Pit as a place to store such water until the end of mining.

This request is currently before the WLWB for approval, but the board has written to BHPB asking for more information about the potential impacts of the proposal on permafrost underneath and adjacent to the pit area. The WLWB's concern appears to be the possibility of a

hydrologic connection between the bottom of Beartooth Pit and the Panda underground workings. This area is now frozen but there is some concern that it may not stay that way with the addition of water into Beartooth.

From our perspective, the loss of Beartooth Pit as a location for disposing of *kimberlite tailings*, particularly the *extra-fine processed kimberlite* (EFPK), as a closure option is a serious issue. The company's current *reclamation* plan is to keep the EFPK in cells C and D at closure. Given the highly unstable properties of these clay slurries, we are skeptical that they can be made secure in the LLCF in perpetuity. An exhausted pit seems a more reliable approach to dealing with these materials, which is why we have been pushing the company to consider such options. This is an issue that will continue to be discussed and, hopefully, resolved in 2009 when the WLWB deliberates on BHPB's request to update the WPKMP. ■

IACT visit in September 2008.



North end of LLCF looking south.



HIGHLIGHTS:

- BHPB has made real progress on getting a good closure plan in place.
- A significant outstanding issue with respect to the acceptability of the current ICRP is BHPB's proposal not to restore the pit lakes for fish use or passage.
- As a result of this disagreement, the company filed a legal motion challenging the WLWB's jurisdiction to require the creation of fish habitat in pit lakes.
- BHPB has recently moved away from mine component-specific objectives for wildlife to a site-wide approach.

Closure and Reclamation

Activities 2008-09

BHP Billiton's (BHPB) existing approved closure plan was written in 2000. The content of that plan is now nine years old, and significant parts of it no longer reflect what is happening at the mine site. An update is long overdue and, as we wrote in last year's report, BHPB has been working over the past two or three years to get an updated closure plan in place.

As we go to press, BHPB's new Interim Closure and Reclamation Plan (ICRP) moves into the final stages of review and approval. The past year was spent reviewing the final components of the draft plan submitted to the WLWB at the beginning of 2007. At that time, the WLWB established the Ekati ICRP working group to conduct this review and recommend changes to BHPB to improve the plan. This working group produced a suite of recommended changes and there were directives from the WLWB



Agency visit in September 2008 to rock testing area.

that resulted in BHPB submitting a revised draft plan in December of 2008. This version, with a few more revisions to be added, is scheduled to go to a public hearing in the summer of 2009.

Aside from producing an updated

closure plan, no actual *reclamation* was undertaken at the mine site during 2008. Although BHPB continues to assert that it has a progressive *reclamation* policy in place for Ekati, very little progressive *reclamation* has taken place recently.

Reclamation of Old Camp and Phase 1 tailings facility, the two completed components of the project, was postponed again.

Agency's Assessment

The Agency's contributions to the ICRP and the outcomes are summarized in Table 4 on pages 16 and 17. These outcomes demonstrate why we take a great deal of pride in our closure efforts.

The Agency is disappointed that mine development has not occurred at Ekati in a way that has provided for a meaningful progressive reclamation program to be carried out. The company's Life of Mine Plan indicates that the vast

bulk of reclamation work will not be done until specific operational components of the mine are completed. As far as we can tell, there will be little progressive reclamation undertaken on any of the main components (i.e., open pits, tailings impoundment, waste rock dumps, roads).

With respect to the development of the ICRP, however, we are generally satisfied that BHPB has, through the collaborative working group process established by the WLWB, made real progress on getting a good closure plan in place. We have a couple of reservations about the plan as we go into the July 2009 public hearing, and

these deal with, first, the proposed reclamation option for the open pits and, second, the adequacy of the reclamation research plans.

Pit Lakes and Fish Habitat

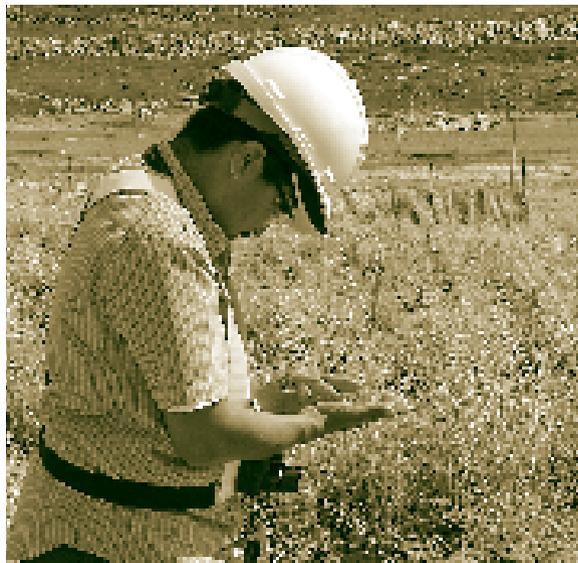
A significant outstanding issue with respect to the acceptability of the current ICRP is BHPB's proposal not to restore the pit lakes for fish use or travel.

BHPB's view is that it is under no obligation to reclaim the pit lakes, or cell E in the Long Lake Containment Facility (LLCF), to the point where they are useable by fish. Fish continue to live in cell E so this should not be an issue. As evidenced throughout last year's working group review, all parties,

except the company, are supportive of this objective. Moreover, the company's position represents a retreat from the currently approved 2002 Abandonment and Restoration Plan which states that "a productive post-closure lake will be developed", and that the constructed littoral shallow zone will include "...fish refuge and spawning areas". The company has most recently agreed to create shallow zones around the pit edges and to undertake riparian revegetation in these areas. It does not appear to be consistent to create areas for fish to use if fish are not allowed back into the pit lakes.

BHPB now argues that the loss of fish lake habitat, as an impact of

Old cell B revegetation plots.



the mine, has been compensated for through previous arrangements with DFO and so nothing further is required in the way of restoring fish habitat at closure. In the Agency's view, arrangements made by other regulators cannot fetter the discretion of the WLWB with regard to its jurisdiction over closure planning. Accordingly, we wrote to the WLWB on several occasions in 2008 to urge that it direct BHPB to revise its closure objective for the pit lakes and cell E to accommodate fish use through the construction of shallow zones with appropriate vegetation to facilitate a return of habitat suitable for fish, and to revise the current ICRP to reflect the appropriate closure methods. In an effort to resolve this impasse, the Agency drafted closure objectives for the pit lakes to allow fish passage and use.

As a result of this disagreement, the company filed a legal motion challenging the WLWB's jurisdiction to require the creation of fish habitat in pit lakes. This issue is scheduled to be resolved by the WLWB before the re-scheduled public hearing on the ICRP in late summer of 2009.

Reclamation Research

BHPB's development of its closure options for Ekati has uncovered a number of uncertainties about the effectiveness of certain measures, such that some research is required to better define the *reclamation* methods. The water licence requires the company to identify these

uncertainties and submit research plans that describe the work needed to get a better handle on the *reclamation* and closure methods. The ICRP now in preparation identifies 26 *reclamation* research plans.

As we prepare this report, the working group has spent significant time over the past year reviewing the *reclamation* research plans and, through this interactive process with BHPB, improvements have been achieved. However, deficiencies remain and we are not yet satisfied with the level of detail provided as to how the company is going to conduct the proposed work. We are also concerned that some of the important *reclamation* research is not being done early enough so that the results can meaningfully inform the implementation of workable closure options.

General dissatisfaction of the working group concerning the quality of the plans has led the WLWB to direct the company to now focus on two of these, and enhance the information content so that they could serve as templates for subsequently upgrading the remaining plans. These two plans will be reviewed in the summer 2009 public hearing.

The two research plans selected as models for improving the content relate to the approach for securing EFPK in the LLCF at closure and identifying revegetation options for the LLCF. These are serious

reclamation issues. Reclaiming EFPK at closure will be challenging, and there is no certainty that this can be achieved by storing this material in the LLCF. EFPK is essentially clay slurry, slightly denser than milk, highly mobile and easily disturbed. The closure challenge is to ensure that it cannot escape into the downstream environment and adversely affect aquatic life.

The ICRP simply states that EFPK that collects in the ponds during operations will be confined to the pond bottoms where it will consolidate over time. All the evidence that is available on EFPK behaviour during the operation of

the facility indicates that this will not happen. In our view, the research plan needs to answer the question about how this material can be effectively contained over the long term, either in the LLCF or in an open pit.

The research task proposed by BHPB to answer this question consists of a desktop evaluation and literature review to determine if future field trials are required. The deposition of *kimberlite tailings* in the sub-arctic environment, particularly *tailings* that include high volumes of clay slurries, is an experimental situation, and

Continued on page 18

Near the old camp.



Table 4: Closure Planning Agency Input and Outcome

ICRP Subject	Agency Input	Outcome
Closure Goal, Objectives and Criteria	<ul style="list-style-type: none"> • More explicit links between closure goal, objectives, and criteria. • Uncertainties about closure options should be linked to research. • Objectives should be developed for each mine component. • Objectives should be based on desired end-state for valued ecosystem components. 	<ul style="list-style-type: none"> • These features are now incorporated into the latest draft of the ICRP.
Open Pits	<ul style="list-style-type: none"> • Since there is no technical reason why fish should not be allowed into the pit lakes after they are flooded, the closure objective for pit lakes should provide for fish passage and safe use by fish. • BHPB should complete pit lake studies as approved, which should resolve uncertainties about fish passage. 	<ul style="list-style-type: none"> • BHPB disagrees with providing fish passage to and from the pits .because, it argues, it has previously made habitat compensation arrangements with DFO. • In the Agency’s view, compensation arrangements with DFO are irrelevant to closure plans required by the WLWB. • Further, BHPB’s position is not consistent with the stated goal to restore to functioning ecosystems. This will need to be resolved through a WLWB decision.
Underground	<ul style="list-style-type: none"> • More assessment is needed about whether to plug the underground connections between Panda and Koala Pits at closure. 	<ul style="list-style-type: none"> • This assessment is still not part of the ICRP but BHPB has committed to further research and engineering studies.
Waste Rock Storage Area	<ul style="list-style-type: none"> • There are lessons to be learned from the Colomac Mine closure. • More effective community <i>consultation</i> should be done to determine wildlife objectives for waste rock pile <i>reclamation</i>. 	<ul style="list-style-type: none"> • BHPB agreed to reconsider the lessons learned from Colomac and to continue <i>consultation</i> with communities; although this has not occurred to date.
Tailings Impoundment (LLCF)	<ul style="list-style-type: none"> • Proposed <i>reclamation</i> research for LLCF will not be done in a timely fashion. • Lack of detail in research plans so it is unclear how proposed research activities will be carried out. • Agency proposed framework for organizing content of research plans. • Known challenges associated with EFPK management at closure are not being seriously addressed in the research plans. • Regarding the open pits, a fish barrier at the outflow of Long Lake is not consistent with closure goals. 	<ul style="list-style-type: none"> • BHPB adopted the framework for describing its proposed research activities, but insufficient detail about research methodology still persists. • BHPB has not considered storage or treatment of the EFPK outside of the LLCF. • No research identified that would lead to the development of closure criteria to measure revegetation sustainability and success. • The LLCF and cell E fish barriers issue will be the subject of a separate hearing with regard to the WLWB’s jurisdiction over fish and fish habitat in the summer of 2009.

ICRP Subject	Agency Input	Outcome
Dams, Dykes and Diversion Channels	<ul style="list-style-type: none"> • Research plans and engineering studies were confused in first draft. • Criteria are needed to determine that closure objectives have been achieved. 	<ul style="list-style-type: none"> • BHPB revised ICRP to distinguish between research plans and engineering studies. • BHPB agreed that revisions to <i>reclamation</i> research plans will provide criteria.
Buildings, Infrastructure and Roads	<ul style="list-style-type: none"> • For road closure, there should be a map, a road classification system, and schedule developed for specific <i>reclamation</i> activities by road type. 	<ul style="list-style-type: none"> • This is not provided in the current ICRP, but BHPB has committed to do this for the next revision in three years.
Environmental Assessment at Closure	<ul style="list-style-type: none"> • Following <i>reclamation</i> and closure, an assessment of residual environmental impacts needs to be conducted. • A 'performance assessment' report on <i>reclamation</i> activities should be prepared. 	<ul style="list-style-type: none"> • BHPB has committed to these activities in the next ICRP.
Progressive Reclamation	<ul style="list-style-type: none"> • Progressive <i>reclamation</i> should occur as opportunities present and be linked to the Life of Mine Plan. 	<ul style="list-style-type: none"> • No significant progressive <i>reclamation</i> is planned.
Reclamation Research Plan	<ul style="list-style-type: none"> • Uncertainties regarding closure objectives, criteria and options or measures need to be linked to research. • Lack of detail in the plans as to how work will be conducted. • Issue of timing of research, as the results may not be available within the timelines suggested by the Life of Mine Plan. • Engineering studies should be distinguished from the <i>reclamation</i> research plans. • BHPB should continue with research under the original approved Pit Lakes Studies Terms of Reference including fish passage and creation of shallow zones. 	<ul style="list-style-type: none"> • BHPB has made the necessary links between objectives, criteria and options for closure. • Research plans still lack necessary content, although this is being reviewed through the public hearing process. • Timelines have been clarified, but important research activities are not being completed early enough to inform <i>reclamation</i> implementation. • Distinction is now made in the ICRP between research plans and engineering work. • The issue of researching fish passage to and from the flooded pits is still not resolved. The company has agreed to create shallow zones with riparian vegetation.
Soil Remediation Standard	<ul style="list-style-type: none"> • The Agency disagreed with BHPB's proposed industrial standard for remediation of hydrocarbon contaminated soils—a higher standard of remediation was recommended. 	<ul style="list-style-type: none"> • WLWB directed BHPB to provide further justification for the remediation standard, and BHPB submitted an analysis that suggested the agricultural standard as most appropriate. The Agency supports this but would like more information on how the site-specific assessment work will be done.

Continued from page 15
substantial field investigations are going to be required to arrive at a workable closure option. It seems unlikely that a literature review and desktop study will produce enough useable information to design effective *reclamation* methods. BHPB does propose to conduct a field trial program to evaluate EFPK stabilization measures if the literature review and desktop study exercises indicate this is needed. We believe based on the evidence that such a program is needed now. There are no details in the research plan about how this would be carried out.

The other revised research plan

deals with answering a number of questions pertaining to revegetating the pond-water PK beach interface zones in the LLCF. To answer these questions, BHPB proposes to carry out a pilot study in the north end of cell B, starting in 2013 when *tailings* disposal ceases in that location, and going to 2019 when all *tailings* disposal into LLCF is finished.

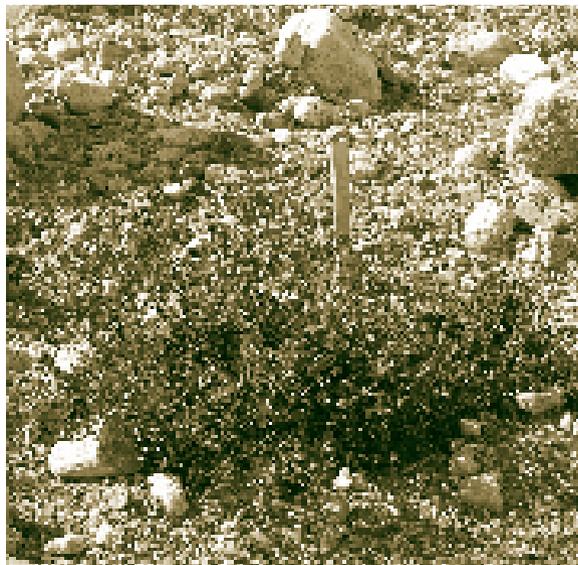
Our concern with this pilot study is that little information is provided about how the specific questions will be addressed. For example, one research objective is to determine what kind of a self-sustaining plant community can be established in the LLCF. The problem remains that

criteria for a plant community being self-sustaining are not known. How will we know when the *reclamation* obligation of the company has been satisfied? Without such criteria for success, we will never know the answer to this question. We had expected to see matters such as species diversity, biomass accumulation, percentage cover, and nutrient cycling presented to begin to assess the sustainability of vegetation covers.

One last issue about the ICRP is of concern to us. BHPB has recently moved away from mine component-specific objectives for wildlife to a site-wide approach, stating that closure objectives and

criteria should be addressed at the scale of the general mining claims block. The company's argument is that the current wildlife monitoring program can also monitor wildlife patterns against those observed pre-development and during operations. We disagree. The wildlife monitoring program is not designed to tell us anything about how animals might be affected by the reclaimed mine components, which is the objective of the ICRP. Whether or not wildlife still use the claims block is not relevant to the success of mine *reclamation*. This is an issue that should be resolved at the public hearing in the summer of 2009. ■

Revegetation test plots.



HIGHLIGHTS:

- Selenium has declined substantially in Leslie, Moose and Nema lakes, in 2008 relative to 2007.
- DIAND released the September 2008 'Draft Guidelines for Designing and Implementing AEMP for Development Projects in the Northwest Territories'.
- In February 2009, DIAND held the first meeting of a working group to develop ways of incorporating TK into the AEMP Guidelines document.

Aquatic Effects

Activities 2008-09

Processed kimberlite, treated sewage and *pit water* are discharged into three of the upper cells (cell A, B and C) of the Long Lake Containment Facility (LLCF). Water released from the LLCF enters the receiving environment of the Koala watershed through Leslie Lake, flowing downstream through Moose Lake, and eventually entering Lac de Gras.

In the fall of 2007 and late August through late September 2008, water totaling 2.4 million m³ was pumped from the LLCF (cell E) to Leslie Lake, down from 8.7 million m³ in the 2007 open-water year. This substantial decrease in volume in 2008 was due, at least in part, to the company holding back water to wait for *nitrates* in cell E water to decline to levels safe for aquatic life.

Monitoring Results

The Agency reviewed the 2007 and the 2008 Aquatic Effects



Grayling captured from the Panda Diversion Channel.

Monitoring Program (AEMP) reports, providing comments to the WLWB and BHP Billiton (BHPB) on the 2007 report in June 2008. Generally, the AEMP reports continue to be of high quality. A reviewer for the

WLWB raised some issues about how scientifically defensible the statistical analyses on the 2007 fish data were and the Board provided direction on two issues: the power analysis for the fish parameters,

Nero-Nema Habitat Enhancement

One addition to the 2007 Monitoring program was a visual survey of fish use of 914 m² of new habitat created in the fall of 2005 by BHPB in Nero-Nema Stream, which flows from Nero Lake into Nema Lake. The new habitat is intended to compensate for destruction of 457 m² of habitat due to construction of the bridge over the stream. The survey was done every one to five days from June 4 to July 3 of 2007. Twenty

Arctic grayling spawners were seen using the habitat in 2007. Grayling *fry* were sampled using three methods: visual surveys, dip netting, and electrofishing. The majority of these *fry* in 2007 and 2008 were observed downstream of spawning habitat, with most found under and within 15 m on either side of the Nero-Nema Bridge. The 2009 report will assess the effectiveness of the new fish habitat. ■

and the perceived inconsistencies between the statistical analyses of fish parameters and the conclusions drawn in the summary.

Highlights of the reports are as follows:

Overall, the primary finding of the 2008 AEMP is that there was no evidence of environmental impacts of mining activities on the aquatic community in Koala and King-Cujo watersheds (see Figures 1 and 2).

In 2007, *nitrates* rose above Canadian Council of Ministers of Environment (CCME) Guidelines for the Protection of Aquatic Life in both Leslie and Moose lakes. Levels declined in both Leslie and Moose lakes in 2008, although continued

increasing above CCME guidelines in winter in both lakes. The Agency is pleased to note that BHPB took mitigative steps in 2008 by holding water within cell E until *nitrate* concentrations declined below the CCME Guideline levels, before continuing water pumping into Leslie Lake.

Molybdenum, which affects trout eggs at high concentrations, continued to rise in 2007 in Moose Lake relative to previous years. In 2008, summer levels declined to below CCME guidelines, as it did in Leslie Lake in both 2007 and 2008. However, under-ice levels continue to increase above the CCME Guideline level.

Average selenium declined substantially in 2008 relative to 2007 when it spiked to levels above the CCME guideline for the first time ever in Leslie, Moose and Nema lakes. However, the July 2008 water samples were still above the CCME Guideline. The reason for the sharp increase in 2007 is unknown. Water-borne selenium toxicity in fish causes teratogenesis (deformities in *fry*), reproductive failure and liver damage.

Total Dissolved Solids (TDS) and chlorides continued to rise at a greater rate of increase in 2007. However, TDS levelled off in 2008 in Leslie and Moose lakes but continued rising in Nema Lake. Chlorides continued to rise in all three lakes, although at a slower rate of increase in Leslie Lake.

Copper continues to be above CCME Guidelines concentrations in the lower Panda Diversion Channel (PDC).

Arsenic in bottom sediments in Kodiak Lake and the furthest downstream points in Koala watershed (Slipper and Lac de Gras) were above CCME Guidelines in 2008. This was also the case for reference lakes in previous years, especially Counts Lake, but none of the reference lakes were above CCME Guidelines in 2008. The cause is uncertain at this time.

Dissolved oxygen (DO) under ice in Cujo Lake decreased throughout winter and fell below the CCME

Guideline (6.5 mg/L) by March 28. Due to limited baseline data for Cujo, it is uncertain whether this oxygen decline is attributable to mining at Misery. BHPB aerated the lake beginning on April 2; by May 3, DO was back to above the CCME Guideline in the top 1.5 metres of the water column. The Agency is curious to know whether BHPB's snow-clearing on lake ice helps with mitigating oxygen declines in these lakes.

After rebounding to pre-development abundance in 2007, the *cladocera* population in Moose and Nema lakes again crashed in 2008 to population numbers seen in 2002-2006 (<6 % of entire *zooplankton* community). However, the same 2008 population decline was also found in two of the reference lakes, namely Nanuq and Vulture.

Results from the 2007 fish studies (last studied in 2002) downstream of the LLCF indicated:

- Infection rates of tapeworm in slimy sculpin are much higher in lakes immediately downstream of mine activity than those further downstream and in reference lakes;
- Hydrocarbon metabolites in the bile of both whitefish and trout in Leslie Lake are equivalent to levels found in areas elsewhere in the world that had been exposed to significant oil spills;
- A cell E fish study was begun

in August 2008. This study is meant to shed light on the causes of tapeworm infestation and whether the LLCF contributes to elevated hydrocarbon and metal concentrations in fish. The study is expected to be completed in 2009; and

- In 2007, Traditional Knowledge (TK) was officially incorporated into the AEMP for the first time. Aboriginal assessment of physical condition of fish in lakes downstream of the mine was used and reported. This DELT (deformities, eroded fins, lesions and tumours) Study found that whitefish and lake trout were in generally good condition, with very few parasites.

Agency Assessment

The Agency notes that summer molybdenum levels in Leslie and Moose lakes have dropped in 2008, which is what the company had predicted would happen given their identification of the source of the molybdenum as the Misery ore. But since winter levels are still elevated above the CCME Guideline level, this remains worrisome, although we suspect this condition may be temporary.

The Agency is pleased to note the addition of selenium to the AEMP as an evaluated parameter. While the decrease in values is encouraging, the AEMP should continue to evaluate selenium in future years.

Overall, the elevated levels of



LLCF discharge into Leslie Lake.

nitrates, chlorides, molybdenum and selenium downstream of the LLCF continue to be of concern, especially the potential consequences under ice for the eggs and fry of fall-spawning fish.

Finally, the Agency is looking forward to the completion of the cell E fish study to help shed light on the causes of tapeworm infestation and whether the LLCF contributes to elevated hydrocarbons and metals. We commend the company on being proactive in seeking out the causes of potential contaminants in Leslie Lake fish.

Modifications to AEMP

In April 2007, the WLWB gave approval (with 11 conditions) to BHPB's updated AEMP Monitoring Plan for 2007-09. The conditions required several different reports to be submitted by BHPB. In September 2008, the WLWB met to consider whether the conditions for approval had been fulfilled. The Board accepted BHPB's proposal regarding the work necessary to determine effect sizes in

Figure 1: Mining effects on water quality flowing through the Koala and King – Cujo Watersheds

Parameters monitored	Long Lake Containment Facility Lac de Gras					King Pond Lac du Sauvage	
	Leslie	Moose	Nema	Slipper	Lac de Gras	Cujo	Lac du Sauvage
pH	●	●	●	●	●	●	
Sulphate	●	●	●	●	●	●	
Potassium	●	●	●	●	●	●	
Total Dissolved Solids	●	●	●	●	●	●	
Chloride	●	●	●	●	●	●	
Total Ammonia	●	●	●	●		●	
Nitrate	●	●	●				
Nitrite	●	●	●				
Total Phosphorus	●						
Aluminum						●	
Arsenic	●	●				●	
Copper	●						
Molybdenum	●	●	●	●	●	●	
Nickel	●	●	●	●		●	
Selenium						●	

Flow from effluent source to ultimate receiving lake in watershed
 Levels elevated above baseline.
 Levels elevated to or above CCME guidelines for the protection of aquatic life

Adaptive Management Plan

Background

The main purpose of the Watershed Adaptive Management Plan (WAMP) should be to reassure all parties that the actual effect on the watersheds are being determined and appropriately managed. This will generally be done by monitoring the project effects, evaluating what the monitoring data show, and adapting the environmental management strategies to incorporate what has been learned. It should be noted that in adaptive environmental management one does not wish to monitor everything, only those things that affect Valued Ecosystem Components (VEC) that respond to management action, and about which there is a knowledge gap or uncertainty leading to identifying important impacts.

BHPB's WAMP

The draft WAMP provides an early warning that before water quality variables reach a point where over 5% of the aquatic community will be impacted. There is a 'warning to act' when threshold concentrations will be exceeded within three years. Numerical thresholds were proposed for contaminants of concern identified in the water licence [total arsenic, aluminum, cadmium, chromium, copper, lead, molybdenum, nickel, zinc, *nitrate* nitrite, phosphorus, Total Suspended Solids, Total Dissolved Solids, chloride, and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)].

The review of the WAMP (submitted by BHPB in November 2007, revised February 2008) commenced in February 2008 when a workshop was held by the WLWB, DFO and DIAND to get everyone 'on the same page' regarding the elements of an appropriate Adaptive Management Plan. In March 2008, the Agency and others requested an extension from April to June 2008 in order to allow for a thorough review of the Plan. As part of its review, the Agency, in cooperation with the Environmental Monitoring Advisory Board (EMAB) for Diavik, contracted Jacques Whitford AXYS Ltd. to review the Diavik and Ekati Diamond Mines' Adaptive Management Plans.

On March 28, 2008, the WLWB suspended review of the Ekati WAMP pending submission of two reports. The report to examine effects size and variability (due February 2008) has not yet been submitted as noted in the section on AEMP design. The reports on the LLCF water quality modeling were received and reviewed in last year's annual report.

The Agency is disappointed with the lack of progress in developing a WAMP for the Ekati Mine. The issue of effects size and variability continues unresolved and we are collectively no nearer to an approved WAMP. BHPB and the WLWB should make every effort to move forward on this. ■

consultation with stakeholders; a proposed scoping document was to be submitted by November 15, 2008. The Board indicated that all of the conditions had been adequately fulfilled, and granted final approval for the 2007-2009 AEMP Re-evaluation. The next review of the AEMP is to take place in December 2009.

The Agency notes that BHPB did not propose any changes to the AEMP and the Agency agrees with the company's recommendation that any changes be held until the next three year review cycle. As part of the review process, the Agency looks forward to seeing the work to determine effects size well in advance of the upcoming review of the AEMP.

Water Quality Guidelines

In response to an audit conducted by the Office of the Auditor General (OAG) in 2005, DIAND commissioned MacDonald Environmental Sciences Ltd. to develop a report on the subject of northern water standards. The resulting discussion paper 'Toward the Development of Northern Water Standards: Review and Evaluation of Approaches for Managing Water Use in Northern Canada', identifies a number of tools and options for managing water quality in northern Canada. Options included were: 1) the establishment of uniform water quality standards; 2) uniform or industry-specific effluent quality criteria; and 3) project-specific effluent quality criteria. Subsequent evaluation of the options indicated

Long Lake Containment Facility.



that development of an integrated framework for water quality management was more likely to address the concerns identified by the OAG. The key elements of a framework are presented in the report, as are a number of recommendations regarding specific initiatives to develop the tools needed to effectively manage water quality conditions in the future.

The Agency is pleased to note that this important work is underway, although it is disappointed by the time delay between preparation of the report in 2006 and the request for comments in late 2008. The whole issue of Water Quality Guidelines/Standards was probably the single most important issue during the recent re-licensing of the Sable, Pigeon and Beartooth operation at Ekati.

AEMP Guidelines

In a related activity, in 2006, DIAND began development of a guidance document to provide project proponents with a better understanding of expectations regarding the development and implementation of AEMPs. This process resulted in the September 2008 draft 'Guidelines for Designing and Implementing Aquatic Effects Monitoring Program for Development Projects in the Northwest Territories' and a number of technical guidance documents. A workshop was held in October 2008 to allow reviewers to comment on the draft document.



Panda Diversion Channel

Construction of the Panda Diversion Channel (PDC) was begun in 1994 and completed in 1997 to divert the natural stream flow away from Panda and Koala lakes such that the *kimberlite* pipes beneath them could be mined. This 3.4 km channel from North Panda dam down to Kodiak Lake became the stream habitat compensation program for the natural streams that were lost. The productivity of the stream habitat that BHPB has constructed in the diversion channel is therefore an important issue to track.

This is the 10th year of monitoring fish in the PDC, and it shows that this channel continues to provide spawning, nursery, and rearing and migration habitats for fish, especially Arctic grayling. Ninety-three grayling adults entered the PDC in spring 2008, 42% being spawners. The last two years (2007 and 2008) had fewer grayling using the PDC than any year since the first monitoring year in 1998. This is explained by Rescan (BHPB's consultants) as a natural leveling off of the population after initial population growth due to exploiting the new PDC habitat. When the PDC opened in 1997, it presented a large new area of stream habitat to the relatively small grayling population of Kodiak Lake. The virgin spawning and rearing habitat was utilized by the grayling spawners, resulting in a high population from 2000-2004. Gradually through competition for available spawning

sites and other competitive stresses of a burgeoning population utilizing the new habitat (leading to higher *fry* mortality), the rate of population increase declined to naturally sustainable levels where Rescan believes the population sat in 2007 and 2008.

Four grayling migrated through the PDC into North Panda Lake from Kodiak Lake, indicating the PDC is still being used as a migration corridor by a portion of the population.

Grayling production in the PDC is annually compared to that of two reference streams unaffected by mining (Pigeon and Polar-Vulture). Survival of out-migrant *fry* in the PDC (0.3%) was lower than in the two reference streams (0.8 and 3.9%), and unlike the reference streams, was the second lowest in the 10 years of monitoring. BHPB's consultants believe this is likely due to colder water temperatures in the PDC during the egg-hatching period. This could delay spawning and prolong incubation, resulting in hatching of the neonates during suboptimal conditions

Production of *fry* was comparable in the PDC (0.006 g/m²/year) and Polar-Vulture (0.012 g/m²/year), but higher in Pigeon (0.256 g/m²/year) in 2008. However, although Polar-Vulture *fry* production, always low relative to Pigeon, fluctuates up and down through the years, that in the PDC has declined steadily since at least



Panda Diversion Channel.

2003 (when *fry* production was first estimated) from a high of 0.20 g/m²/year to its present level.

Monitoring the physical condition of grayling *fry* in 2006 and 2007 showed that PDC-raised grayling *fry* had as much fat content as those in the two reference streams. This means that PDC *fry* should be physiologically equipped to survive their first winter in Kodiak Lake. Experimental evidence suggests that growth rates are more strongly influenced by rearing habitat conditions than genetics. So *fry* in Pigeon stream grew at a faster rate than in the PDC or Polar-Vulture even when some were experimentally placed in the other two streams.

Although 2008 was to be the final year of monitoring fish and fish habitat in the PDC, monitoring will continue in 2009 to determine the percentage of *fry* (fin-clipped in 2003 to mark them) which migrate into the PDC as 6-year-old first-time spawning adults. This information should give a clear idea of the ability of the PDC to provide viable habitat to produce a self-sustaining population of grayling.

Agency Assessment

The trend of diminishing *fry* production in the PDC does not bode well for the future success of PDC spawning habitat, and by extension, the integrity of the PDC as being considered fish habitat compensation under the Fisheries Authorization

The Agency looks forward to seeing the results of next year's monitoring of fin-clipped spawner recaptures to determine the successful maturation of PDC-hatched *fry* in Kodiak Lake. ■



Grayling sampling from the PDC.

The Agency provided comments following the workshop. The major concern was the almost total lack of information regarding the use of TK in AEMP development or overall management of aquatic resources. This need was noted by many of the other participants.

On the scientific side, a concerted effort is required to adapt this document for the northern environment, as there is currently too much emphasis on the US Environmental Protection Agency practices. The potential impact of a mine on ground water, and the impact of ground water on a mine, need to be addressed. In addition, the structure of some of the documents needs work to ensure ease of use.

In February 2009, DIAND held the first meeting of a working group to develop ways of incorporating TK into the Guidance document. A contract for a literature review of TK best practices was awarded with the report due by end of March 2009.

Recommendation



DIAND and WLWB, along with other related bodies, should work together with Aboriginal governments and other interested parties to develop scientifically defensible Water Quality Standards for the Northwest Territories. As this work could contribute towards the review of Effluent Quality Criteria in the water licence for the Ekati Diamond Mine, it needs to be completed well before 2013.



Tailings discharge point into the LLCF.

The Agency believes this project is headed in the right direction and is pleased to see the establishment of a working group to help incorporate TK into the Guideline document. The Agency encourages all parties to arrive at a final document incorporating both science and TK as quickly as

possible. The completed document will hopefully provide BHPB, among other developers, with guidance in using more TK in its aquatic effects monitoring. As noted earlier in this chapter, BHPB has initiated the use of TK in the last two years in its fish DELT program. ■

HIGHLIGHTS:

- Board ruling made in September 2008 to amalgamate two previous water licences for the Ekati Mine.

- The public hearing was held in Behchokò in March 2009.

- Agency commends WLWB for a comprehensive, although lengthy licence renewal process.

Sable, Pigeon and Beartooth Water Licence Renewal

Activities 2008-09

In February 2008, BHP Billiton (BHPB) provided proposed changes to the Sable, Pigeon and Beartooth (SPB) water licence to the Interagency Coordinating Team. In March 2008, BHPB applied to the Wek'èezhii Land and Water Board (WLWB) for a renewal of the SPB water licence and associated land use permits. BHPB argued that, as no material changes were proposed to the SPB project, the application should be exempt from environmental assessment. The submission included a draft of proposed changes to the water licence.

The company proposed that the effluent discharge limits in the main licence should replace the more stringent limits in the new SPB licence. The Agency and a number of reviewers (EC, DFO, DIAND, and GNWT-ENR) suggested that the SPB water licence should be amalgamated with the water



Sable, Pigeon and Beartooth water licence public hearing March 2009.

licence for the main site at Ekati and also commented on the proposed changes. The major issues were with BHPB's proposed changes to discharge limits, removal of sump stations from the Surveillance

Network Program (SNP), and reduced timelines for review of documents. In BHPB's response, the main issues were its disappointment with the preliminary nature of the comments made by reviewers; the

proposed changes to the effluent discharge limits; the question of licence amalgamation; and the proposed term of the licence.

On May 23, 2008, the WLWB ruled that the renewal applications were exempt from preliminary environmental screening.

Following receipt of the submissions of all interested parties, on September 15, 2008, the WLWB determined it was in the public interest to initiate a process that would result in an amalgamated water licence for the entire Ekati Mine development. The amalgamation process would be restricted and would not allow for changes to the scope of the existing

main licence or the SPB licence. In addition, the WLWB indicated that substantive changes to terms and conditions of the main licence would not be considered.

Based on the comments regarding the renewal application itself, the WLWB decided to host technical sessions in November 2008 to discuss and clarify initial comments submitted by reviewers. A number of issues were resolved during the session. However, additional information from BHPB was still required to inform the discussion regarding proposed licence discharge limits and other changes proposed by the company. The WLWB requested more information

on the water quality predictions for the Two Rock sediment pond, the final discharge limits being proposed, the predicted effects on Horseshoe Lake, and the mitigation for discharge impacts.

In January 2009, BHPB responded to the information request, and provided a report entitled 'Review of Effluent Quality Criteria for the Sable Pit' and a new draft amalgamated licence. In February 2009, BHPB provided its response to questions from the January 2009 information session.

At this stage, the main unresolved issues, as outlined in the Agency submission to the public hearing,

were BHPB's requests which included:

- Changes to some discharge limits (especially nickel, *nitrate* and chloride) were too high;
- Removal of air quality monitoring requirement in SNP;
- Removal of a condition requiring fish passage in Pigeon Stream Diversion;
- Shortening of timelines for document review;
- Changes in the wording of a condition that would weaken the requirement for evaluating *cumulative effects*; and
- Changes to the definition of receiving environment.

Beartooth Pit.



One additional issue was BHPB's assumption that Beartooth Pit would be used for storage of mine water, but this was left to the review process for an amended Wastewater and *Processed Kimberlite* Management Plan.

The public hearing was held in Behchokò in March 2009. In our concluding remarks at the hearing, we reported that some of our issues had been resolved either through additional information provided by the company, or as a result of commitments made by the company. Those issues remaining to be resolved were:

- Provision for fish passage in Pigeon Stream Diversion;
- Need to address the company's contribution to *cumulative effects*;

- Need for air quality monitoring; and
- Need for information to help set discharge limits for chloride at the mine, if the studies originally proposed under the SPB licence will not be required as part of the renewal.

One additional issue raised at the hearing was the need for a better understanding of how mine effluent discharged from Two Rock Lake would behave in the Horseshoe Lake, the first downstream lake from the sediment pond. As a result, BHPB will be required to submit a study design to the WLWB for approval of what type of diffuser would be used and how the plume would disperse in Horseshoe Lake.

Agency Assessment

The process established for the SPB licence renewal resulted in a comprehensive, although lengthy, review of the issues associated with this development. The decision by the WLWB to amalgamate the licence will, in the view of the Agency, help consolidate and simplify future inspections and reporting on mining activities at Ekati. The technical workshops helped to resolve a number of issues before the hearing, and ensured that adequate information was available for the review. That said, it would have been more helpful and efficient if BHPB's additional information had been provided

earlier in the process. The public hearing was handled smoothly, largely due to the advanced preparation and information sharing facilitated by the WLWB staff. The draft licence to be prepared by the WLWB staff will greatly simplify the review of proposed conditions.

A major concern of ours was the limited Aboriginal participation in the process. This is a continuing problem which we have highlighted in earlier annual reports.

A second issue was the significant amount of time and energy spent by the parties in recommending appropriate effluent discharge limits for the new licence at both the public hearing and in the preceding technical sessions. An assessment of the proposed licence limits was made more difficult by the lack of information for some parameters, although the 'Review of Effluent Quality Criteria (EQC) for the Sable Pit' was a useful document. In addition, DIAND's discussion paper 'Toward the Development of Northern Water Quality Standards: Review and Evaluation of Approaches for Managing Water Use in Northern Canada' contributed to the Agency's understanding of the possible approaches to setting discharge limits.

The Agency recommends that both DIAND and the WLWB, in *consultation* with other affected parties, complete this valuable work well in advance of the 2013 water licence renewal. ■

Pigeon stream culvert.



HIGHLIGHTS:

- Improved AQMP implemented in 2008, but limited results are available.
- New Air Quality Management and Monitoring Plan submitted March 2009.
- Continuous air monitoring building re-located to a central location at the mine site to ensure representative readings are obtained.

Air Quality

Activities 2008-09

BHP Billiton's (BHPB) Air Quality Monitoring Program (AQMP) was initiated in 1998 as part of the *Environmental Agreement*. In 2008, following review by the Agency, Environment Canada (EC), and Government of the Northwest Territories, Environment and Natural Resources (GNWT-ENR), BHPB reviewed and revised its AQMP to fix a number of deficiencies identified by the reviewers.

The current AQMP consists of:

- Air emissions and greenhouse gas calculations;
- Continuous air monitoring;
- High volume air sampling (HVAS);
- Dust fall monitoring; and
- Snow and lichen sampling.

The results of the AQMP are reported on every three years. Given this lead time, it is disappointing that, at the time of writing, the data report for 2006-2008 monitoring period has still not



Continuous air quality monitoring building (new location).

been submitted. As a consequence, results presented below are preliminary and we expect to comment more fully in next year's annual report once we have the completed analysis from BHPB.

Air Emissions and Greenhouse Gas Calculations

Air quality at Ekati can be affected by particulate and gaseous emissions from stationary and mobile diesel-powered equipment

and from fugitive dust. The primary sources for these are the ore crusher, power plant, vehicle traffic (including haul trucks and aircraft on unpaved roads and airstrip), mining activities (including blasting, waste rock and ore handling), and waste incineration.

BHPB's emissions tracking and monitoring program includes measurements for nitrogen oxides (NO_x); sulphur dioxide (SO₂);

particulate matter (PM) - total suspended particulate (TSP), PM₁₀ and PM_{2.5} (fine particulate matter); and greenhouse gases - carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O).

Emissions calculations (based on fuel consumption) and measurements of greenhouse gases are conducted on a yearly basis and BHPB reports them to the Environment Canada's National Pollutant Release Inventory (NPRI) and the Greenhouse Gas Challenge Registry.

In 2008, the calculated greenhouse gas emissions were slightly lower than in 2006 and 2007. BHPB has a number of on-site initiatives to lower the consumption of fuel and minimize emissions including using environmentally benign products, making sure equipment is working efficiently,

using low sulphur fuels, initiating an Energy Smart Program and a No Idle Campaign, reducing light vehicles on site, and introducing a shuttle service. Fuel consumption has also decreased as the mine has moved to more underground operations.

Continuous Air Monitoring

BHPB has constructed a special building for its continuous air monitoring program which measures the ambient air quality parameters of TSP, PM_{2.5}, NO_x and SO₂, as well as ambient outdoor temperature throughout the year. These measurements are used in combination with the fuel consumption calculations for submission to the NPRI and greenhouse gas reporting registry.

Last year we reported that the station was not calibrated properly and that the appropriateness of the location was under review. This year

we can report that the continuous air monitoring building operated at the Grizzly Lake location until August 2008 when it was relocated to the Polar Explosives site. It again began taking measurements in October. The new site was chosen based on its central location, predominantly downwind of generators and the majority of mine site sources. The company has also brought in experts to ensure that the equipment was calibrated and operating properly.

The Ekati Mine has adopted the Canadian Ambient Air Quality Objectives as operational targets, which are equivalent to the GNWT standards for TSP, PM_{2.5}, NO_x and SO₂ parameters. In 2008, monthly averages for all parameters were reported as below the federal and territorial air quality objectives. A stand-alone report on the 2008 continuous ambient monitoring activities and results is expected to be prepared by BHPB in the 2008 AQMP report.

High Volume Air Sampling (HVAS)

The ambient air quality or the concentrations of total suspended particulates (TSP) are collected using the high volume air sampler (HVAS). The HVAS takes in large volumes of air at a specific rate and filters any particles in the air. It is operated continuously for 24 hours every six days from May to October. There are currently two operational samplers, one located at Grizzly Lake (since

1999) and the other at cell B, which was installed in 2007 downwind of the main Ekati site.

In 2008, thirty samples were collected from both stations. At Grizzly Lake the average concentration of TSP was 15.5 g/m³, which was a three-fold increase over the 2007 average of 4.9 g/m³. At cell B the average concentration was 36.6 g/m³ which was a six-fold increase over the 2007 average of 5.9 g/m³. All measurements were less than the GNWT daily maximum guidelines of 120 g/m³, with the exception of two occasions when the instantaneous maximum daily concentration at cell B exceeded the daily standards. No explanations were offered for the increases in TSP or the occasions of excessive levels in the documents available at the time of writing. The Agency suggests that BHPB provide some insights into this issue in the full report.

Dust Fall Monitoring

In July 2006, dust fall monitoring was incorporated into the AQMP with stations along the Fox, Misery and Sable roads to measure dust deposition patterns. Stations were located at 30 m upwind and at 30 m, 90 m and 300 m downwind of the centreline of the haul roads. As noted previously, the dust fall monitoring program was reviewed by the Agency and government departments, and re-designed as a result. The Sable road site

Dust from haul truck.



was dropped due to inactivity on the road and the dust sampling station was relocated to northwest of the airstrip. An additional site was installed at the Long Lake Containment Facility (LLCF) at cell B. As well, additional monitors were installed 1000 m downwind along the Fox and Misery haul roads to test the prediction from the 'Environmental Impact Statement' of 1995, that dust would settle from road sources within 1 km of the road. Deposition is also measured at two background sites approximately 20 km and 35 km west of the mine site. These sites are also snow and lichen collection sites and can be used for comparison of results.

Each station consists of two canisters, one for sulphate, *nitrate* and insoluble and soluble particulate analysis, the other for metal analysis. Results show that the greatest deposition rates are along the Fox haul road followed by Misery and Sable roads. Fugitive dust levels are elevated immediately adjacent to the road but fall off quickly with distance and at 1 km, as predicted in the 1995 'Environmental Impact Statement'; the deposition rates are similar to background sites. The exception was in July 2008 along the Fox haul road where the results suggest that dust levels did not settle to background levels by the 1000 m sampling point. In 2008, the dust deposition along the Misery haul road was lower than

previous years due to inactivity at the Misery Pit and no hauling of ore.

There are no specific guidelines in the Northwest Territories for fugitive dust. However, the monitoring results indicate that BHPB's dust suppression efforts through road watering, applying dust suppressants (DL-10 on roads, EK-35 on airstrip), reducing vehicle speed limits and routing, and trip reductions have had some positive results on the quantity of dust generated.

Snow and Lichen Sampling

Snow and lichen sampling was carried out in 1998, 2001, 2005 and 2008. The vegetation distribution surveys that were done in previous years were discontinued in 2008 as they did not yield meaningful results. It was felt that it would be very difficult to attribute any changes in plant communities to changes in air quality and that better indicators could be found.

In 2008, a more comprehensive snow and lichen sampling program was conducted. This included the addition of new sampling locations, some within the mine footprint, and others in a generally radial pattern away from the mine site to better measure effects over distance and define the zone of influence. A new protocol for lichen sampling was established and a new species of lichen preferred by caribou was also added. We also understand that BHPB retained a lichen expert this

past summer to properly sample and analyze lichen, as well as to train the staff. The use of lichens as an indicator of metal, sulphur and nitrogen uptake can be an excellent method of monitoring air quality emissions, can demonstrate *cumulative effects* over time and can be linked to caribou ecology.

At the time of writing this report, the Agency had not received the results of this program and will comment on them next year.

Agency Assessment

As noted in our last year's annual report, we have for some time recommended that BHPB update its Air Quality Management and Monitoring Plan to properly document its current air quality monitoring programs. In March 2009, BHPB submitted a newly updated plan, and from the description in the 2009 'Environmental Impact Review' of how this was implemented last year, it appears that the program was conducted in accordance with our recommended changes. Importantly, BHPB has committed to review this plan every three years and/or when significant changes in technology or site use occurs.

The Agency is pleased with the progress and cooperation shown by the company in working with EC, GNWT-ENR and ourselves in improving air quality management

and monitoring at Ekati. However, when BHPB next reports out to the communities on the status of its environmental monitoring activities, it should describe the changes it has made to the AQMP and seek further input on air quality concerns.

Our primary concern continues to be the potential for significantly high levels of dust deposition around Ekati and the possible effects on water, vegetation and wildlife, particularly caribou. During the 2006 Environmental Impact Review sessions, there was an indication from BHPB that it would investigate the potential linkages among the different monitoring programs to attempt to link dust deposition and ambient air quality effects, particularly with regard to lichen and the potential effects on caribou. This analysis of linkages is still lacking in BHPB's monitoring reports.

It has been over two years since we reported that BHPB had purchased a new incinerator, and we are disappointed to find that, as of this writing, it is still not operational.

This past year GNWT-ENR lost its air quality specialist. This person had played a major and very helpful role in getting the company's AQMP reconfigured, and there will be a gap in that department to oversee the implementation of the new program in years to come. We trust that ENR will fill the position in the near future. ■

HIGHLIGHTS:

- During 2008, no DNA sampling of wolverines was conducted.
- BHPB is to better coordinate future caribou monitoring with Diavik.
- A collaborative approach involving BHPB, Diavik and De Beers began to improve wildlife effects monitoring plans and to increase their efficiency and effectiveness.

Wildlife Effects

Activities 2008-09

BHP Billiton's (BHPB) Wildlife Effects Monitoring Program (WEMP) documents wildlife impacts resulting from its mining activities at Ekati, and assesses the effectiveness of wildlife mitigation and management efforts. The WEMP is in its 12th year. As in previous years, the 2008 WEMP focused on wildlife habitat, caribou, grizzly bear, wolverine, wolf, falcons and upland breeding birds. Additional focus on foxes was added to this year's program. Monitoring techniques included aerial surveys, ground behaviour observations, snow tracking, and compilation of incident reports and visual observations. The mine footprint did not increase during the reporting period, and continues to cover 2,057 ha (20.6 km²).



Caribou.

Wildlife Incidents

BHPB has worked hard to improve its waste management practises to reduce attractants at landfills, and to reduce wildlife incidents and exclude wildlife from areas of

danger (airstrip, high traffic areas). Nine vehicle-related animal mortalities were reported at Ekati in 2008 (five Arctic hares, two Arctic ground squirrels, one red fox and one ptarmigan). None of the mor-

talities involved Valued Ecosystem Component (VEC) species. Ten non-vehicle related wildlife mortalities were observed on site, involving one caribou, one wolf, three foxes, one Arctic hare and four birds (one raven, one snowy owl, and two sparrows). No rabies was detected in wildlife at the mine. Incidental observations of caribou groups (66), grizzly bears (62), wolves (55), wolverines (40) and foxes (174) were documented during 2008, with deterrents used for 15 bear, five wolf, three wolverine and 16 fox incidents. One injured and starving wolf was killed on site. The vast majority of fox sightings were red foxes, contrary to the mid-1990s when Arctic foxes were more commonly reported. A pair of moose was observed near Exeter Lake in July 2008, the first recording of this species by the Ekati wildlife monitoring program.

Caribou Monitoring

BHPB spends considerable effort to document caribou abundance, distribution, and behaviour relative to the mine, including incidental observations and a suite of aerial and ground-based surveys. The aerial surveys provide data to assess abundance, distribution and habitat use relative to distance from mine infrastructure. In 2008, 5,367 caribou were observed during aerial surveys within the Ekati study area between June 15 and October 11, with peak numbers in mid-July and mid-October.

Previous analyses have suggested that the relative abundance of caribou over time has declined in proximity to mine infrastructure. Data obtained during 2008 continue to indicate that there was a greater probability of caribou being observed as distance from the mine infrastructure increased.

Snow track surveys and road monitoring continue to suggest that higher snow banks and heavy truck traffic decrease the chance that caribou will cross a road, and that caribou did not appear to habituate to roads in place for a long time. During 2008, the sample size of behavioural observations was too small for meaningful analysis; a full sampling effort is expected to resume in 2009 in collaboration with Diavik (see box about 2009 WEMP changes). Tracks and observations suggest that *processed kimberlite* in the Long Lake Containment Facility (LLCF) does not inhibit caribou movement or act as an attractant to caribou.

Grizzly Bear

The grizzly bear sign survey is the main monitoring program used to assess and determine the potential mine-related effects on barren-ground grizzly bear movements and presence within the Ekati study area. The technique involves searching 500 m radius plots in wetland (spring) and riparian (summer) areas for recent bear sign. Results from 2008 concluded



Young Gyrfalcon.

that there was no significant effect of distance from the mine on bear sign occurrence. Bear sign was observed more frequently in riparian habitat closer to the mine than in wetland plots.

Since 2000 the cumulative data indicate significant differences among years and different indications of a distance from mine effect, but no trend over time. The WEMP acknowledged changes in bear presence or habitat use from mining activity may not be detectable from the current study design.

Wolf Monitoring

Annual surveys of den sites are the main monitoring program used to assess the potential mine-related effects on wolf movements and presence within the Ekati study area. Of 16 historic dens surveyed in collaboration with ENR in 2008, two were occupied in June, but no wolves were sighted at these dens in August. A new den with three pups was incidentally observed 3 km north of the LLCF.

Wildlife Effects Monitoring Program Review

During winter 2008-09, the Agency participated in workshops co-hosted by BHPB to evaluate the current WEMP and propose a number of changes to the 2009 program. This review was conducted in conjunction with Diavik and De Beers and was facilitated by GNWT-ENR, to coordinate programs among mines and to share resources. Proposed major changes to the 2009 Ekati WEMP were to:

- Share helicopter and staff with Diavik during aerial caribou surveys;
- Coordinate behavioural survey data with Diavik such that BHPB will focus its sampling close to mine development, with Diavik focussing their efforts at greater distances (>15-20 km) from the mine footprint;
- Discontinue grizzly bear sign surveys; and
- Suspend the upland breeding bird surveys and conduct a comprehensive analysis of the 13 years of data collected.

Agency Assessment

In large part we are in support of the short-term changes to the WEMP proposed for the 2009 wildlife research permit period (May 2009 to May 2010). BHPB has recognized that some of the programs have fulfilled their

purpose (e.g., provided sufficient data to establish trends over time), and others may not adequately address the objectives in question (e.g., the bear sign surveys).

We reiterate that a comprehensive review of the WEMP objectives and study designs is needed to better plan for the 2010 and future WEMPs. The Agency recommends that GNWT-ENR facilitate a collaborative review of the diamond mines wildlife monitoring programs, which should include its purpose, use of best practices, and lessons learned from the on-going monitoring and other studies. Once the current review is completed, we suggest that there should be a regular review of the WEMP at least every three years possibly in conjunction with the Environmental Impact Review. When changes are made to the WEMP, the Wildlife Management Plan should also be updated.

During this review there was agreement to conduct a workshop in fall 2009 to carry out a comprehensive review of the WEMP objectives, and to establish studies designed to better address objectives. ■

Recommendation



The Agency recommends that GNWT-ENR take the lead in coordinating the diamond mines wildlife monitoring program review, including a workshop in Fall 2009 to review program objectives and study designs.

Wolverine Monitoring

BHPB has continued with efforts to reduce incidents with wolverines, including waste management, building inspections, reinforced skirting around buildings, and use of escalating deterrents. The number of incidental wolverine observations and incidents increased in 2008 in contrast to the two previous years.

In 2005 and 2006, BHPB and three other mining developments

(Diavik, Snap Lake and Gahcho Kué) participated in a regional wolverine Deoxyribonucleic Acid (DNA) sampling program developed and coordinated by GNWT-ENR. Results of the DNA sampling program showed that the technique is successful at producing reliable population and range estimates to enable tracking of wolverine density and activity relative to mines. During 2008, no DNA sampling was conducted; however,

Wolf.



a snow track survey was conducted by helicopter on a 100 km loop transect surrounding the mine. The WEMP stated the helicopter was used “because transitioning staff had not yet been trained to conduct the surveys using snowmobiles”. No wolverine tracks or animals were observed during the survey.

Bird Monitoring

Surveys for upland breeding birds at Ekati continued in 2008 for the 13th year, with no overall change in species densities. Raptors continue to nest on pit walls at Ekati, although in most cases BHPB actively deters nesting in all active pits. Raptor surveys were conducted in conjunction with GNWT-ENR, and found that occupancy of sites by peregrine falcons was high, but productivity was low. A pair of gyrfalcons nested successfully at the Misery atomization building, fledging three young. Peregrine falcons successfully nested and fledged three chicks at the Fox Pit, even though it was actively mined throughout the nesting period.

Agency's Assessment

Overall the Agency found the WEMP, with few exceptions, to be a comprehensive monitoring program and the report well written. We are pleased to see that a number of our past suggestions were adopted by BHPB including; to ensure that all historic wolf dens are surveyed each

year, and the inclusion of the Diavik Mine footprint in distance from infrastructure calculations.

One main disappointment is BHPB's treatment of the wolverine monitoring program. The initial two-year DNA inventory conducted in 2005 and 2006 was designed to anchor the trend analysis in wolverine demography, with the intent that trend monitoring must be carried out by conducting DNA inventories every second year. No DNA sampling was conducted in April 2008 or April 2009. Our understanding (from the April 2009 Wildlife Research Permit application to GNWT-ENR) is that the helicopter snow track survey will continue in April 2010; there is no indication that further DNA inventories are proposed. The Agency's opinion, shared by a number of researchers and regulators in the North, is that snow track counts are not robust indicators of wolverine densities or relative abundance over time, and have limited value in determining mine-related effects on wolverine populations in the area. The main problems with conducting the survey by helicopter, as was done in April 2008, are that:

- a) a 100 km loop transect provides poor statistical power to detect change over time, and no power to determine zone of influence;
- b) the survey does not provide high levels of sightability of tracks, and removes the opportunity for use

Recommendation



BHPB should carry out the wolverine DNA sampling program in 2010.



Wolverine on post for DNA sampling program.

- c) conducting track counts 12 hours after snowfall (as occurred in 2008), does not allow adequate time for track deposition.

We therefore recommend BHPB should, in collaboration with ENR, recommence wolverine DNA

monitoring in 2010 for continuation every second year. All cells within the BHPB study area should be sampled (varying numbers of cells were not sampled in 2005 and 2006). The snow track surveys for wolverine, especially a loop transect flown by helicopter, should be discontinued in favour of the DNA monitoring. ■

HIGHLIGHTS:

- Progress being made on *cumulative effects* management related to caribou through two special studies to be released in the spring of 2009.

- Further improvements in diamond mine wildlife monitoring programs needed to allow for *cumulative effects* assessment and management.

- Little or no progress on MPEMA or the EMF.



Caribou cow and calf.

Regional Monitoring and Cumulative Effects

Activities 2008-09

Government regulators are making progress on regional and *cumulative effects* assessment and monitoring of caribou. The Agency participated in the Bathurst Caribou Management Plan workshop hosted by GNWT-ENR in Yellowknife in February 2009. In spring 2009, two reports will be released that relate to *cumulative effects* of diamond mines on caribou. One analyzes zone of influence of caribou distribution around the mines, and the other examines *cumulative effects* as a pilot project in the Bathurst caribou herd summer range. These reports should shed further light on the cumulative impacts of the mines on caribou and should provide insights into how best to revise wildlife monitoring programs.

Coordination of aerial caribou surveys between Ekati and Diavik, as planned for 2009, will contribute to more effective

regional scale monitoring. Ekati and Diavik essentially represent a single footprint because of close geographic proximity to each other, and both mines need to be treated at the same time to enable better mine-specific assessment of effects. Similar coordination of programs (e.g., grizzly bear monitoring) should be considered at larger regional scales by coordinating programs between mines.

The joint Ekati-Diavik aerial caribou survey program should ensure adequate coverage. Given impending construction of the Sable road and pit and the desire that distance from mine coverage should be sufficient in all directions out from mine footprint, the proposed survey area should include consideration of the Sable road and areas out to 30 km south of Diavik.

The Agency encourages GNWT-ENR to work with BHP Billiton (BHPB) and other companies to develop a regional dust monitoring program [through faecal pellet (ash content,

an indication of ingested dust) and/or lichen monitoring (to examine metals and contaminants on vegetation)] or modeling of cumulative impacts on caribou. These are examples of programs that could be instituted in order to assess *cumulative effects* at larger scales.

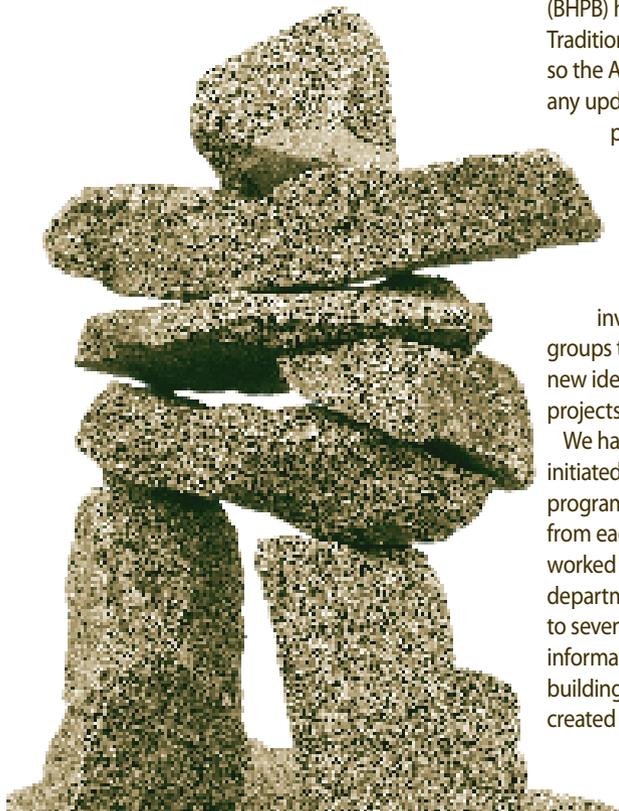
The Environmental Management Framework (formerly known as the *Cumulative Effects Assessment and Management Framework* or CEAMF) held its sixth annual gathering in February 2008. There was to be an update to the 2002 Slave Geological Province Regional Plan of Action by summer of 2008. We have not seen the draft of this report, and there does not appear to be any further progress.

The Multi-Project Environmental Monitoring Agency (MPEMA) terms of reference were completed in 2008. There has been no further progress on ratification or implementation over the past year. ■

HIGHLIGHTS:

- DIAND has initiated steps to begin the process of developing TK requirements for AEMPs.
- BHPB is soliciting new TK project proposals from communities.
- Agency participated in an EMAB workshop to review a proposal for diamond mine monitoring using TK.

Traditional Knowledge



Activities 2008-09

For the 2008-09 year, BHP Billiton (BHPB) has not distributed any Traditional Knowledge (TK) reports so the Agency is unable to provide any updates on the current TK projects being undertaken over the last year. BHPB, however, has reported that they held several community workshops over the last year and invited each of the Aboriginal groups to identify and develop new ideas for community-based TK projects.

We have also learned that BHPB initiated a new job shadowing program where a representative from each of the communities worked with the environment department staff at Ekati for five to seven days. Opportunities for information sharing and capacity-building within the community were created as a result. This project is

expected to continue in 2009.

DIAND has initiated steps to begin the process of developing TK requirements for Aquatic Effects Monitoring Programs (AEMPs). DIAND established a working group together with representatives of the three mine monitoring agencies, holding their first meeting in February 2009. As we go to press, this working group is reviewing a review of the literature dealing with TK incorporation into AEMPs and best-practices in using TK in aquatic impact assessments.

A director attended the Environmental Monitoring Advisory Board (EMAB) TK workshop in Kugluktuk in March 2009. This workshop was facilitated by Dr. Allice Legat (an anthropologist working with the Wek'èezhii Renewable Resources Board) and reviewed EMAB's proposal for an environmental monitoring program (focusing on caribou and fish) using

TK. This program would establish camps in the vicinity of Lac de Gras, and would run for about 10 days during the spring and fall migrations of the Bathurst herd.

The Agency has long advocated the assessment of *cumulative effects* of all the diamond mines together with other human activities in the region, and using TK in that effort is advisable. The EMAB proposal has the potential to monitor the *cumulative effects* from both Ekati and Diavik on the Bathurst caribou herd. The workshop discussed whether to have one camp for all of the Aboriginal participants, or separate camps for each Aboriginal group, and where to locate such camp or camps. There was a preference by most participants for separate camps, with the location and funding for them yet to be decided.

Also discussed was the use of satellite collars to monitor caribou

Recommendation



BHPB should carry out and make public a 10-year review of its use of Traditional Knowledge (TK) in its environmental plans and programs. This review should document how the company has given full consideration to the incorporation of TK into environmental plans and programs, the successes and lessons learned from the TK Studies, and what changes or improvements in adaptive management can be attributed to TK.

and possible alternatives. Many Aboriginal people, especially elders, do not like to see the use of satellite collars due to their belief that it is harmful to attach any man-made device to a wild animal and may be counterproductive to the study if it causes the animal to change its normal behaviour. The question of habituation of caribou to mines was also raised. One elder said this probably would not occur since he believes that every year a significant number of the passing groups comprise individuals that had not previously travelled in the vicinity of the mines and so would not have previous mine exposure.

Lutsel K'e elder.



The participating Agency director described the use of TK at Ekati, including the survey of fish health using the physical indicators used by Aboriginal fishers, and elders' survey of caribou groups on site to assess the interaction of caribou and roads.

The Agency believes that the proposed TK camps, with the appropriate monitoring activity, could help answer such questions as the zone of influence around the mines, direction of travel of migrating caribou relative to the mine sites, caribou behaviour in relation to various stressors (such as aircraft flying overhead) and vegetation choices in feeding.

Agency Assessment

The *Environmental Agreement* (Article X1, Item 11.3) explicitly states that:

"BHP shall incorporate all available traditional knowledge in the Environmental Plans and Programs and shall give all available traditional knowledge full consideration along with other scientific knowledge as the Environmental Plans and

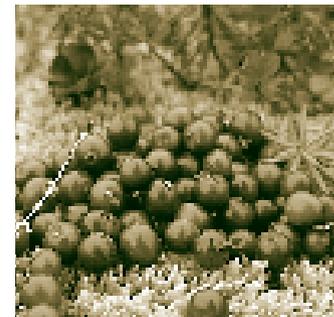
Programs are developed and revised."

In accordance with the *Environmental Agreement*, one of the principal tasks the Agency has when reviewing BHPB's annual reports and other documentation is to make recommendations concerning "the integration of traditional knowledge and experience of Aboriginal Peoples into Environmental Plans and Programs" (*Environmental Agreement* Article II, Item 5.2 (iv)).

Over the last ten years of mine operations the Agency has followed the progress of TK studies funded by BHPB. During this time, BHPB has conducted or funded TK studies of relevance to environmental management of Ekati mine including:

- a) Naonaiyaotit Traditional Knowledge Project (1996 - 2009) - with the Inuit of Kugluktuk;
- b) Lutsel K'e GIS Project (2000 - 2004) - the development and operation of a Geographic Information System (GIS)-based

Cranberries.



- land management system in the community of Lutsel K'e;
- c) Caribou and Roads Project (2002 - present) – biologists working with elders from Kugluktuk to provide advice on wildlife, particularly caribou behavior in and around the mine site; and
- d) Fish Health (2007) - TK holders from each Aboriginal group using their extensive knowledge of fish morphology to assist biologists in a visual examination of fish for deformities, eroded fins, lesions and tumours (DELT).
- e) BHPB has also used TK less formally in problem-solving (e.g., releasing caribou entangled in guy wires).

Presently, however, one cannot determine what information and experiences BHPB has gained from these programs, site visits and other *consultation* efforts. It is our view that all affected parties would be well served by a compilation, under one cover, of all documentation and uses of TK in the environmental management, monitoring and impact mitigation at Ekati. This review should describe how TK was and is being used in monitoring, management and problem-solving to demonstrate the utility of the experience and expertise of our Aboriginal Society Members. It should also describe what lessons have been learned and future plans for TK solicitation and use. ■

HIGHLIGHTS:

- Regulators remain effective in ensuring that BHPB operates Ekati as an environmentally sound mine.
- WLWB developed and managed a useful review and approval process for the renewal of the SPB water licence, and its amalgamation with the main Ekati water licence.
- DIAND has been vigilant through mine inspections and its investigation of the Fay Lake PK spill.
- DFO performed consistently and made good use of outside expertise.
- GNWT and EC can improve performance.

Assessment of the Regulators

The Regulators and Our Mandate

As the public watchdog for environmental management at Ekati, we monitor not only the performance of BHP Billiton (BHPB) but also the federal and territorial government agencies that regulate the mine. The following are our comments regarding the regulators' performance in 2008-09.

Agency's Overall Assessment

As we have stated in previous years, in our view the regulators remain effective in ensuring that BHPB operates an environmentally sound mine. Over the course of 2008-09, we identified some instances where we felt that government agencies performed very well and some instances where their involvement could be more extensive. We were pleased

to observe willingness among all regulators to collaborate and share resources. The following are some comments on individual regulators and their performance in 2008-09.

Department of Fisheries and Oceans (DFO)

DFO was a key participant in the Sable, Pigeon and Beartooth (SPB) relicensing process as an intervenor commenting on fish habitat and fish passage through the Pigeon Diversion Channel and end of pipe screening. DFO continued to play an active role in the Interim Closure and Reclamation Plan (ICRP) process, and has defended the concept, along with ourselves, of having BHPB leave its flooded pits in a condition to be used by fish. This means not constructing permanent fish barriers at the outflows of the Long Lake Containment Facility (LLCF) or the pit lakes, and

establishing riparian vegetation and fish habitat at the edges of pit lakes. We commend DFO for its increased level of engagement on Ekati and its diligence in obtaining effective outside expertise, especially in regards to synthesizing the scientific literature on pit lakes, United States Environmental Protection Agency (USEPA) expertise on chloride toxicity, and tapeworm infestation in fish.

Department of Indian Affairs and Northern Development (DIAND)

The Agency is pleased with the regularity and thoroughness of the inspections carried out by the DIAND inspector over the past year. We also noted the prompt response and follow-up to the Fay Lake incident where processed kimberlite (PK) escaped from the north end of cell B in May 2008. DIAND, with

outside expertise, acted as an intervenor on the SPB water licence public hearing. They also played a key role in the discussions on water quality objectives and effluent quality criteria. DIAND should place greater effort and priority on developing water quality objectives for the Northwest Territories.

Environment Canada (EC)

During the SPB process, EC provided helpful background rationale for some regulatory conditions. In other regulatory reviews including parts of the ICRP, EC was not present or did not make a submission. This is unfortunate, because it is acknowledged that EC has considerable technical and historical regulatory expertise

relevant to operations at Ekati, and we would like to see more consistent participation in the future.

Government of the Northwest Territories, Department of Environment and Natural Resources (GNWT)

GNWT involvement in the closure plan review, the most prominent Ekati-related process of the year, was not consistent or strong over the last year. We hope that those departments having mandates related to diamond mining will be able to improve their participation in the regulation of the mine in future years, particularly in the

wildlife monitoring programs. The recent loss of GNWT's air quality expertise is a concern, and the gap should be filled at the earliest opportunity. GNWT is leading the wildlife *cumulative effects* initiatives associated with the diamond mines, and we look forward to the results in the near future.

Wek'èezhii Land and Water Board (WLWB)

Since its inception in 2006, the WLWB has had a steep learning curve in dealing with the several major mining projects under its jurisdiction. For a new board, operating under an evolving regulatory regime, it has faced substantial challenges in implementing review and approval processes and getting on top of the many technical issues associated with these projects. This past year has seen the WLWB maturing into an efficient and responsible regulatory authority. The learning phase is not yet over, but much progress has been made in smoothing out the bumps in the process and refining its operating procedures. The WLWB and its staff are to be commended for persevering in this formidable task of refining and improving their performance.

Over the past year the WLWB coordinated timely reviews of BHPB's technical reports and plans, including the 2007 Aquatic Effects

Monitoring Program (AEMP), 2007 Waste Rock and Waste Rock Storage Area Seepage Report, a revised Wastewater and *Processed Kimberlite* Management Plan, and Watershed Adaptive Management Plan. The WLWB not only held a smoothly managed public hearing for the relicensing of the Sable, Pigeon and Beartooth projects, but took on the courageous and challenging task of integrating BHPB's two water licences into a single licence, an exercise talked about for several years. To its credit, the WLWB retained outside technical advice at the appropriate points in its review process. The added step of facilitating a technical session to better scope issues prior to the hearing was clearly a benefit to the process. Throughout the review of BHPB's newly updated closure plan, the WLWB again relied on an outside consultant to assist it. The staff continues to be technically strong and constructive participants in the collaborative process set up by the WLWB to review the closure plan. The Agency is pleased with the WLWB's performance. There is a need for further guidance from the WLWB on adaptive management plans and progress on the development of water quality objectives and effluent quality criteria for the Northwest Territories as this will also assist with environmental management at Ekati. ■

Waste rock piles.



HIGHLIGHTS:

- BHPB continues to operate Ekati mine in an environmentally sound manner.
- BHPB responded well to an accidental release of *tailings* in terms of immediate notification of all parties and prompt cleanup response and mitigation.
- The absence of wolverine DNA sampling for 2008 and 2009 was a disappointment.

Assessment of BHP Billiton

BHP Billiton (BHPB) continues to operate Ekati Mine in an environmentally sound manner. We give the company and the environment department staff high marks overall in their collaborative approach to working with the regulators and the Agency. Apart from its regular environmental monitoring programs, BHPB has been focused during the past year on developing its Interim Closure and Reclamation Plan (ICRP), and getting its Sable, Pigeon and Beartooth (SPB) projects relicensed.

Again this year, our most frequent interaction with BHPB staff has been at our regular board meetings and as part of the ICRP working group process. The Agency was pleased to see steady progress and improvements to the ICRP that was originally submitted in January 2007. Commitments towards further revisions, including reformatting and providing more details on the *Reclamation* Research Plans and Engineering Studies respond



Ekati Mine main camp.

to most of our issues, although we remain concerned with the pace of progressive *reclamation* and the need to move forward quickly with pilot studies. The lone major outstanding issue is BHPB's

proposed use of permanent fish barriers on the pit lakes and cell E of the Long Lake Containment Facility (LLCF) at closure, which represents a change from the 2002 approved ICRP. We still do not fully understand

BHPB's reluctance to ensure that aquatic ecosystems at the mine site at closure can become self-sustaining, but this matter will likely be resolved in upcoming public hearings and we will report on the results.

BHPB has proposed some changes to its Wildlife Effects Monitoring Program (WEMP) for the 2009 monitoring season. The Agency supports a more coordinated approach to wildlife monitoring amongst the Northwest Territories diamond mines in the interest of consistency and providing better information to allow for *cumulative effects* assessment and management. We agreed with most of the short-term changes

in the WEMP, such as a pause in the Upland Breeding Bird Study for 2009 to produce a stand-alone report with thorough analysis of the data obtained to date (1998 to 2008). However, the Agency is disappointed there was no wolverine DNA sampling in 2008 or 2009 and strongly encourages resumption for 2010. We believe there is a need for a collaborative review of all the diamond mine wildlife monitoring and for longer term improvements to ensure that it addresses the necessary questions. We are prepared to work with BHPB and others to make this happen.

The company has made a solid commitment to its Air Quality Monitoring Program (AQMP) and

greenhouse gas monitoring through new and more comprehensive snow and lichen sampling. To help reduce airborne pollutants, we suggest that BHPB needs to get its new incinerator operational.

In May 2008, *tailings* escaped from the north end of the LLCF and spilled across the tundra and onto the frozen surface of Fay Lake. We are of the view that the response to the Fay Lake spill was well handled in terms of immediate notification and communication with all parties, clean-up and mitigation. The Agency recognizes the need for careful monitoring and mitigation of the potential erosion created on the emergency road surface. Please see the full analysis of Fay Lake spill on

pages 10 and 11.

An issue that was seen as outstanding in the 2007-08 annual report was the inability of the company to deliver environmental reports in a timely manner. Our position remains that there should be a firm earlier date for the delivery of the annual monitoring reports incorporated into the *Environmental Agreement*.

As we go to print, we are in the process of participating in the 2009 three-year Environmental Impact Review (EIR) technical sessions. BHPB has indicated that it plans to use these EIR sessions to inform Aboriginal communities of the changes and updates to the AQMP. The Agency would like to see BHPB not only inform Aboriginal communities about the changes to its monitoring programs (both AEMP and WEMP) but engage in discussions with them and other interested parties if there are any further changes or improvements that can be made to the programs. In 2008, BHPB approached each of the Aboriginal groups with whom it has Impact Benefit Agreements to jointly identify and develop new ideas for community-oriented Traditional Knowledge (TK) projects. We encourage the company to continue to engage the Aboriginal communities whose participation is crucial to sustained environmental stewardship. ■

Remediation of Fay Lake spill.



Financial Statements

Management's Report

The management of the Independent Environmental Monitoring Agency is responsible for the integrity of the accompanying financial statements. The financial statements have been prepared by management in accordance with the accounting principles disclosed in the attached notes. The preparation of the financial statements necessarily includes some amounts which are based on the best estimates and judgments of management.

To assist meeting its responsibility, management maintains accounting, budget and other internal controls. These controls provide reasonable assurance that transactions are appropriately authorized and accurately recorded, and that assets are properly accounted for and safeguarded, in order that the integrity of the financial records is maintained.

The financial statements have been audited by the independent firm of MacKay LLP, Chartered Accountants. Their report to the directors of Independent Environmental Monitoring Agency, stating the scope of their examination and opinion on the financial statements, follows.



Jaida Ohokannoak
Secretary-Treasurer

May 22, 2009

Auditors' Report

To the Directors of Independent Environmental Monitoring Agency

We have audited the statement of financial position of the Independent Environmental Monitoring Agency as at March 31, 2009 and the statements of operations and changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of the Agency's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Agency as at March 31, 2009, and the results of its operations and cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.



Mackay LLP
Chartered Accountants

Yellowknife, Northwest Territories
May 22, 2009

FINANCIAL STATEMENTS

Statement of Operations

For the year ended March 31,

	2009	2008
Revenue		
BHP Billiton Diamonds Inc. - core funding	\$ 610,072	\$ 595,569
External review (Schedule 1)	28,000	-
Interest income	8,776	6,332
Mediation (Schedule 2)	-	7,524
Other	-	2,988
	646,848	612,413
Expenditures		
Accounting and auditing fees	21,750	18,291
Advertising and website	3,419	32
Amortization	2,796	2,517
Board support		
- honoraria	103,552	172,871
- payroll deductions on honoraria	1,924	10,211
- travel, meals and accommodation	51,242	72,608
Community consultation		
- annual general meeting	17,680	19,504
- annual report	43,039	42,946
- community visits	33,546	10,009
- environmental workshop	31,927	10,176
- other	-	2,242
- travel, meals and accommodation	-	4,065
Consultants	5,400	-
Equipment lease	1,217	1,648
External review (Schedule 1)	18,688	-
Insurance	6,985	4,131
Mediation (Schedule 2)	-	7,685
Office rent and maintenance	32,529	30,575
Office supplies	2,817	3,835
Postage and freight	811	365
Professional development	840	1,695
Separate fund		
- honoraria	35,700	-
- other	1,637	-
- travel, meals and accommodation	12,508	-
Staff recruitment	12,028	-
Staff travel	1,188	3,021
Telephone and fax	5,307	5,182
Wages and benefits	181,380	169,539
	629,910	593,148
Excess revenue before the following	16,938	19,265
Contribution repayable (Note 8)	(16,329)	(21,782)
Loss on disposition of capital assets	(609)	(1,110)
Excess expenditures	\$ -	\$ (3,627)

**Statement of Changes
in Net Assets**

For the year ended March 31,

	2009	2008
General operating fund, beginning of the year	\$ 6,247	\$ 9,874
Excess revenue (expenditures)	-	(3,627)
General operating fund, end of year	\$ 6,247	\$ 6,247

**Statement of Financial
Position**

As at March 31,

Assets	2009	2008
Current		
Cash	\$ 75,750	\$ 318,541
Short term investments (Note 5)	340,971	80,045
Receivable from directors	2,361	3,147
Accounts receivable (Note 6)	-	7,524
Prepaid expenses	2,941	2,538
	422,023	411,795
Capital assets (Note 7)	22,897	6,247
	\$ 444,920	\$ 418,042
Liabilities		
Current		
Accounts payable and accrued liabilities	97,597	93,983
Contributions repayable (Note 8)	45,978	29,649
Deferred revenue	295,098	288,163
	438,673	411,795
General operating fund	6,247	6,247
	\$ 444,920	\$ 418,042

Approved on behalf of the Board



William A. Ross, Director



Jaida Ohokannoak, Director

FINANCIAL STATEMENTS

Statement of Cash Flows

For the year ended March 31,

	2009	2008
Cash flow sources (used for)		
Operating activities		
Funding received - current year	\$ 366,208	\$ 604,889
Funding received - 2009/2010 advance	295,098	288,163
Paid to suppliers	(234,928)	(203,425)
Paid to employees	(183,236)	(169,539)
Paid to directors	(204,952)	(243,438)
	38,190	276,650
Financing activity		
Withdrawal from (investment in) GIC	(260,926)	95,836
Investing activity		
Purchase of capital assets	(20,055)	-
Change in cash position	(242,791)	372,486
Cash position, beginning of the year	318,541	(53,945)
Cash position, end of the year	\$ 75,750	\$ 318,541

Notes to Financial Statements

March 31, 2009

1. Organizational Purpose

The Independent Environmental Monitoring Agency ("the Agency") is a not-for-profit organization incorporated under the *Societies Act* of the Northwest Territories. It is exempt from income tax under Section 149(1)(l) of the *Income Tax Act*.

The mission of the Agency is to oversee environmental management at the Ekati mine site in the Northwest Territories.

2. Implemented Accounting Changes

General standards for financial statement presentation

The CICA has amended Handbook Section 1400 "General Standards of Financial

Presentation" effective for periods beginning on or after January 1, 2008 to include requirements to assess and disclose the Agency's ability to continue as a going concern. The adoption of this new section did not have an impact on the Agency's financial statements, except by way of note disclosure.

Capital disclosures

In July 2008 the CICA amended Section 1535 to apply to fiscal years beginning on or after October 1, 2007. The standard requires the Agency to make disclosures regarding:

- The existence of any externally imposed capital requirements;
- Whether the company had complied with such requirements; and
- If it has not complied, the consequences of such non-compliance.

This new requirement is for disclosure only and did not impact the financial results of the Agency.

3. Significant Accounting Policies

The following is a summary of the significant accounting policies used by management in the preparation of these financial statements.

(a) Financial instruments - Recognition and Measurement

Section 3855 requires that all financial assets and financial liabilities be measured at fair value on initial recognition except for certain related party transactions. Measurement in subsequent periods depends on whether the financial asset or liability has been classified as held-for-trading, available-for-sale, held-to-maturity, loans and receivables or other liabilities.

Financial instruments classified as held-for-trading are subsequently measured at fair value and unrealized gains and losses are included in net income in the period in which they arise. The Agency has classified cash and short-term investments as held for trading.

Available-for-sale assets are those non-derivative financial assets that are designated as available-for-sale or are not classified as held-for-trading, held-to-maturity, or loans and receivables. Available-for-sale assets are subsequently measured at fair value with unrealized gains and losses recorded directly to changes in net assets until realized, at which time they will be recognized in net income. The Agency does not have any financial instruments classified as available for sale.

Held to maturity assets are those non-derivative financial assets with fixed or determinable payments and fixed maturity that the company has an intention and ability to hold until maturity, excluding those assets that have been classified as held-for-trading, available-for-sale, or loans and receivables. They are subsequently measured at amortized cost using the effective interest method. The Agency has classified no accounts as held to maturity.

Financial instruments classified as loans and receivables are non-derivative financial assets resulting from the delivery of cash or other assets by a lender to a borrower in return for a promise to repay on a specified date or dates, or on demand, usually with interest. These assets do not include debt securities or assets classified as held-for-trading. They are subsequently measured at amortized cost using the effective interest method. The Agency has classified receivables from directors and accounts receivable as loans and receivables.

All other financial liabilities that are not classified as held-for-trading are subsequently measured at cost or amortized cost. The Agency has classified accounts payable and accrued liabilities and contributions repayable as other financial liabilities.

(b) Financial instruments - Disclosure and Presentation

Section 3861 establishes standards for presentation of financial instruments and non-financial derivatives and identifies the information that should be disclosed about them. Under the new standards, policies followed for periods prior to the effective date generally are not reversed and therefore, the comparative figures have not been restated.

(c) Fund accounting

The general operating fund accounts for programs and general operations.

(d) Capital assets

Equipment purchases are recorded on the balance sheet at historical cost less accumulated amortization. Amortization is calculated by the declining balance method at the annual rates set out in Note 7. In the year of acquisition, amortization is taken at one-half the annual rates.

(e) Revenue recognition

The Agency follows the deferral method of accounting for contributions.

Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and its collection is reasonably assured.

Revenue received and not spent is reflected as a repayable contribution.

Interest income is recorded when earned.

(f) Use of estimates

The preparation of this financial information in conformity with Canadian generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial information and the amounts of revenues and expenditures during the period. Actual results could differ from those estimates.

4. Future Changes to Significant Accounting Policies

Effective April 1, 2007, the Agency implemented the new CICA Handbook Section 1506 "Accounting Changes". Under these new recommendations, voluntary changes in accounting policy are permitted only when they result in the financial statements providing reliable and more relevant information. This section requires changes in accounting policy to be applied retrospectively unless doing so is impracticable, requires prior period errors to be corrected

retrospectively and requires enhanced disclosures about the effects of change in accounting policies, estimates and error on the financial statements.

These recommendations also require the disclosure of new primary sources of generally accepted accounting principles that have been issued that the Agency has not adopted because they are not yet in effect.

The impact the adoption of this Section will have on the Agency's financial statements will depend on the nature of future accounting changes.

Financial instruments

In December 2006, the CICA amended Handbook Section 3862, "Financial Instruments – Disclosures" and Section 3863, "Financial Instruments - Presentation". Originally required to be implemented for fiscal periods beginning on or after October 1, 2007, the CICA has extended the implementation date for one year, to fiscal years beginning on or after October 1, 2008. Management now intends to implement these sections effective April 1, 2009.

Section 3862 establishes standards for disclosures about financial instruments and non-financial derivatives and identifies the information that should be disclosed about them. Section 3863 establishes standards for presentation of financial instruments and non-financial derivatives. Transitional provisions are complex and vary based on the type of financial instrument under consideration. The effect on the Agency's financial statements is not expected to be material.

International Financial Reporting Standards

In January 2006, the CICA Accounting Standards Board (AcSB) adopted a strategic plan for the direction of accounting standards in Canada. As part of that plan, accounting standards in Canada for public companies are expected to converge with International Financial Reporting Standards ("IFRS") by the end of 2011. The impact of the transition to IFRS on the Agency's financial statements has not yet been determined.

Allocation of expenses

In January 2009, the CICA issued Handbook Section 4470, which is effective for fiscal years beginning on or after January 1, 2009. The section specifies (i) the disclosure of accounting policies adopted for the allocation of expenses among functions, the nature of the expenses being allocated and the basis for which such allocations have been made, and (ii) that the amounts allocated from fundraising and general support expense and the amounts and functions to which they have been allocated should be disclosed. This new Section relates to disclosures and does not have an impact on the Agency's financial results.

5. Short Term Investments

Short term investments consist of guaranteed investment certificates that earn interest at 3.75% per year. The certificates are transferable on demand to the Agency's bank account.

	2009	2008
Cashable Government Investment Certificate (matures March, 2010)	\$ 250,000	\$ -
Cashable Government Investment Certificate (matures October, 2009)	90,971	80,045
	\$ 340,971	\$ 80,045

6. Accounts Receivable

	2009	2008
BHP Billiton Diamonds Inc.	\$ -	\$ 3,762
Government of Canada		
Indian Affairs and Northern Development	-	1,881
Government of the Northwest Territories	-	1,881
	\$ -	\$ 7,524

7. Capital Assets

				2009	2008
	Rate	Cost	Accumulated Amortization	Net Book Value	Net Book Value
Office equipment	20%	\$ 12,180	\$ 9,080	\$ 3,100	\$ 3,873
Computers	30%	11,268	10,032	1,236	1,765
Website	30%	15,120	-	15,120	-
Computers	45%	-	-	-	609
Computers	55%	4,327	1,190	3,137	-
Computer software	100%	2,543	2,239	304	-
		\$ 45,438	\$ 22,541	\$ 22,897	\$ 6,247

8. Contributions Repayable

	2009	2008
BHP Billiton Diamonds Inc.		
2006/2007 fiscal year	\$ 7,867	\$ 7,867
2007/2008 fiscal year	21,782	21,782
2008/2009 fiscal year	7,017	-
External Review		
BHP Billiton Diamonds Inc.	5,541	-
Government of Canada - Indian Affairs and Northern Development	3,771	-
Total contribution repayable	\$ 45,978	\$ 29,649

Contributions repayable arising from one fiscal year are normally deducted from contributions provided by BHP Billiton Diamonds Inc. in the following fiscal year.

9. Economic Dependence

The Agency receives 99% (2008: 97%) of its contribution funding from BHP Billiton Diamonds Inc. Management is of the opinion that operations would be significantly affected if the funding was substantially curtailed or ceased.

10. Financial Instruments

The Agency is exposed to the following risks in respect of certain of the financial instruments held:

Financial risk management objectives and policies

The Agency does not have formal risk management objectives and policies but it operates with the goal of recovering 100% of its expenditures.

(a) Credit risk

Credit risk is the risk that one party to a financial instrument will fail to discharge an obligation and cause the other party to incur a financial loss.

The Agency is exposed to a concentration of credit risk as the majority of the contributions receivable are due from one source. This risk is managed as BHP Billiton Diamonds Inc. is required by the Environmental Agreement with the Governments of Canada and the Northwest Territories to remit payments to the Agency.

11. Capital Disclosures

The Agency's objectives when managing capital are:

- (a) To safeguard the Agency's ability to continue to fulfill its mandate under the Environmental Agreement.
- (b) To provide an adequate return on investment of capital by providing services commensurate with the level of risk.

The Agency manages the capital structure in light of changes in economic conditions and the risk characteristics of the underlying assets. The Agency monitors capital on the basis of the working capital ratio. The ratio is calculated as current assets minus current liabilities as follows:

	2009	2008
Current Assets	\$ 422,023	\$ 411,795
Current Liabilities	(438,673)	(411,795)
	\$ (16,650)	\$ -

Statement of External Review Contributions and Expenditures

For the year ended March 31,

Schedule 1

	2009	2008
Revenue		
BHP Billiton Diamonds Inc.	\$ 10,000	\$ -
Government of Canada - Indian Affairs and Northern Development	18,000	-
	28,000	-
Expenditures		
Professional fees	18,688	-
	9,312	-
Less: contributions repayable		
BHP Billiton Diamonds Inc.	3,771	-
Government of Canada - Indian Affairs and Northern Development	5,541	-
	9,312	-
Excess revenue	\$ -	\$ -

Statement of Mediation Contributions and Expenditures

For the year ended March 31,

Schedule 2

	2009	2008
Revenue		
BHP Billiton Diamonds Inc.	\$ -	\$ 3,762
Government of Canada - Indian Affairs and Northern Development	-	1,881
Government of the Northwest Territories - Environment and Natural Resources	-	1,881
	-	7,524
Expenditures		
Meals and accommodation	-	975
Meetings	-	4,242
Other	-	550
Travel	-	1,918
	-	7,685
Excess revenue (expenditures)	\$ -	\$ (161)

2008 annual general meeting.



Summary of Work Plan and Core Budget 2009-10 and 2010-11

The work plan is based upon the direction and feedback received from our Society Members at our annual general meeting in December 2008 and the Agency's own initiatives.

With the Resolution Agreement from January 2006, the Agency's core budget is now fixed at \$560,000 per year as of April 1, 2005 with automatic increases tied to the Consumer Price Index (CPI) for Canada. For 2009-10 BHP Billiton (BHPB) will contribute approximately \$611k to the Agency and in 2010-11 approximately \$620k (assuming a 1.5% increase in CPI).

The second year of the work plan will be refined and modified based on direction received during next year's annual general meeting of Society Members, and any changes or modifications to the project.

Major Activities

Board Meetings, Conference Calls

The major means of fulfilling our mandate is through Board meetings that are held approximately every two months. Board meetings provide an opportunity for

directors to discuss, review and make recommendations on recent, on-going and anticipated initiatives. Guests are invited to meetings to provide updates and receive input on their specific activities. BHPB, WLWB staff and the DIAND inspector are regular guests.

Table 1. Core Budgets 2009-10 and 2010-11

Activity	Forecasted 2008-2009	Proposed 2009-10	Proposed 2010-11
Board Meetings	127,204	140,000	140,735
Review of Documents	19,802	51,750	26,242
Separate Fund	56,384	30,515	40,000
Communications	152,568	147,550	165,575
Outside Contracts	10,000	10,000	10,000
Mgmt and Admin	236,200	239,743	243,339
TOTAL	602,158	619,558	625,891
(approved)	604,825	619,341	634,824

Notes: Approved amounts do not include deductions made for copier lease (approx. \$928) and office lease (approx. \$30,000). Interest on Agency investments (estimated at \$6,000) are not included in the budget.

Proposed Activities: Annually, four board meetings (not including one in a community) and two conference calls

Review of Reports, Plans and Programs, and Implementation of the Environmental Agreement

Directors review and make recommendations on the major reports, programs, studies and plans required under the *Environmental Agreement*, water licences and other regulatory approvals.

Proposed Activities: The Agency expects to deal with the following in 2009-10:

- The regular environmental monitoring reports for 2008 if received in time (AEMP, WEMP, Air Quality, and Panda Diversion Channel);
- 2009 Environmental Impact Review report; and
- BHPB's Ekati Annual Environmental Report.

There are also now two annual meetings for BHPB, GNWT, DIAND and the Agency to better coordinate implementation of the *Environmental Agreement*. The Agency has also been participating in a review of the diamond mine wildlife monitoring programs and an advisory working group to DIAND on Traditional Knowledge and AEMPs. A review of the AEMP is also anticipated in 2009-10

The same workload is expected in 2010-11, less the Environmental

Impact Review and the latter work on reviewing WEMPs and AEMPs.

Separate Fund

As a result of the most recent mediation, the March 2008 Resolution Agreement sets out that the Agency is entitled to allocate expenses up to \$40,000 per year for matters where a public hearing is reasonably assured as indicated in approved work plans or budgets, or as confirmed by a regulatory body.

Proposed Activities: For 2009-10, the Agency expects the following:

- Participation in the WLWB public hearing (scheduled for summer, 2009) and follow up on the Interim Closure and Reclamation Plan (review of *reclamation* research plans and further changes); and
- Review of the draft amalgamated water licence for Ekati coming out of the Sable, Pigeon and Beartooth water licence renewal public hearing.

For 2010-11, the Agency expects the following:

- Review of other regulatory documents submitted by BHPB that may result in a public hearing.

Consultation and Communication

Consultation and communications with northern communities and the general public is an important part of the Agency's mandate.

Proposed Activities: The Agency will maintain its visits to communities, host one Board meeting and open house a year in a community. The Agency will continue to attend workshops and meetings relevant to its mandate. The Agency will maintain its website (including a new timeline project covering development of the mine, regulatory events and environmental issues) and public registry. The Agency does not plan to host an environmental workshop in 2009-10 as the company is conducting one in connection with its Environmental Impact Review report. The Agency will continue to produce two annual reports, one in plain language and one technical.

The same activities are anticipated in 2010-11 except that an environmental workshop will likely be hosted by the Agency as the company is not expected to hold one.

Agency site visit September 2008.



Outside Contracts

On occasion, the Agency turns to other experts to help analyze reports, studies and plans.

Proposed Activities: It is difficult to predict what, if any, outside expertise the Agency may commission but aspects of closure and *reclamation* may require some outside expertise.

Management and Administration

The Agency provides the majority of its management and administrative services through its Yellowknife office and staff of one manager and one environmental analyst. BHPB provides office rent and photocopier rental and these costs are deducted from the semi-annual payments from the company.

Proposed Activities: Maintain current staff and benefit levels. ■

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™



Independent Environmental Monitoring Agency

Technical Annual Report 2008-09

How To Reach Us

In Person

Suite 203
5006 Franklin Avenue
Yellowknife NT

By Mail

P.O. Box 1192
Yellowknife NT
X1A 2N8

By Telephone

(867) 669-9141

By Fax

(867) 669-9145

By E-mail

monitor1@yk.com
Or visit our website:
www.monitoringagency.net

Office Hours

Monday to Friday
9:00 a.m. — 12:00 p.m.
1:00 p.m. — 5:00 p.m.

Directors

Bill Ross

Chairperson

269 Edgebank Circle
Calgary AB T3A 4V8
Phone: (403) 547-0415
E-mail: ross@ucalgary.ca

Tim Byers

Vice-Chairperson

Box 1049, Teulon MB R0C 3B0
Phone/Fax: (204) 886-4642
E-mail: Byerses@escape.ca

Jaida Ohokannoak

Secretary-Treasurer

P.O. Box 2366
Cambridge Bay NU X0B 0C0
Phone: (867) 983-2153
E-mail: jaida@polarnet.ca

Audrey Enge

92 Hordal Road
Yellowknife NT X1A 3N4
Phone: (867) 873-2117
E-mail: audreysenge@hotmail.com

Laura Johnston

611-16th Avenue North
Creston BC V0B 1G5
Phone: (250) 402-0036
E-mail: laurajo@shaw.ca

Tony Pearce

RR1 - S6, C - 9
Mayne Island BC V0N 2J0
Phone: (250) 539-3015
Fax: (250) 539-3025
E-mail: tpearse@gulfislands.com

Kim Poole

2305 Annable Road
Nelson BC V1L 6K4
Phone: (250) 825-4063
Fax: (250) 825-4073
E-mail: kpoole@aurorawildlife.com

Office Staff

Kevin O'Reilly
Manager

Scott Duguid
Environmental Analyst



Recycled
Supporting responsible
use of forest resources

Cert no. SCS-COC-00867

www.fsc.org

© 1996 Forest Stewardship Council

All photos by the Agency unless otherwise noted.



Independent Environmental Monitoring Agency

Director Biographies



Bill Ross *Appointed April 1997*

Appointed by BHP Billiton, Government of the Northwest Territories and Government of Canada (in consultation with the Aboriginal governments).

Bill Ross has studied and participated in the professional practice of impact assessment for 35 years with a focus on *cumulative effects* assessment and follow up studies. He has served as a director of the Agency since its inception and as its Chair since 2003. His goal for the Agency is that, when the Ekati Mine closes, BHP Billiton will be recognized as having operated the best environmentally-managed mine in Canada's North.



Tim Byers *Appointed May 2001*

Appointed by Akaitcho Treaty 8 (Lutsel K'e First Nation and Yellowknives Dene First Nation).

Tim Byers is an independent consultant living in Manitoba who has been working on projects in the Canadian arctic all his professional life, specializing in studies of arctic seabirds, fish and marine invertebrates. He has also assisted Aboriginal communities in documenting their indigenous environmental knowledge. Tim is keenly interested in seeing more Aboriginal youth become engaged in the environmental sciences, as well as Traditional Environmental Knowledge (TEK) being more frequently used in environmental monitoring and research.



Jaida Ohokannoak *Appointed December 2003*

Appointed by the Kitikmeot Inuit Association.

Jaida Ohokannoak has served as the secretary-treasurer since 2004. She has resided in northern Canada for over 16 years, currently in Cambridge Bay, and has experience in environmental assessment, renewable resource management, research and monitoring studies. She believes that mining can be conducted in an environmentally responsible manner that will benefit both industry and local people without long-term impacts to the environment.



Audrey Enge *Appointed March 2009*

Appointed by the North Slave Métis Alliance.

Audrey Enge is a Certified Human Resource Professional with experience in both the public and private sectors. Audrey is an indigenous Aboriginal, born and raised in the Northwest Territories. Audrey brings a diverse knowledge of the North and is currently working on a Masters degree in Business Administration. Her area of interest is in Traditional Environmental Knowledge and Archaeology.



Laura Johnston *Appointed December 2006*

Appointed by BHP Billiton, Government of the Northwest Territories and Government of Canada (in consultation with the Aboriginal governments).

Laura Johnston retired from Environment Canada after 30 years of service, the last 15 in environmental protection in the NWT and Nunavut. Her expertise is in the fields of chemistry and geology with a focus on water related issues, especially groundwater quality.



Tony Pearce *Appointed March 1997*

Appointed by the Tłı̨ch̨o Government.

Tony Pearce is a resource planner specializing in planning and policy development for First Nations in areas related to treaty negotiation and land use.



Kim Poole *Appointed December 2006*

Appointed by BHP Billiton, Government of the Northwest Territories and Government of Canada (in consultation with the Aboriginal governments).

Kim Poole is a professional, independent wildlife biologist with over 25 years experience in the NWT, Nunavut and BC in the areas of wildlife research and assessment of impacts due to forestry, mining and tourism.



Acrynomns

AEMP	Aquatic Effects Monitoring Program	HVAS	High Volume Air Sampling
AQMP	Air Quality Monitoring Program	IACT	Inter-Agency Coordinating Team
BHPB	BHP Billiton	ICRP	Interim Closure and Reclamation Plan
CPI	Consumer Price Index	IEMA	Independent Environmental Monitoring Agency (“the Agency”)
CCME	Canadian Council of Ministers of the Environment	LLCF	Long Lake Containment Facility
DELT	Deformities/Eroded Fins/ Lesions/Tumours	MPEMA	Multi-Project Environmental Monitoring Agency
DFO	Department of Fisheries and Oceans	MVLWB	Mackenzie Valley Land and Water Board
DIAND	Department of Indian Affairs and Northern Development (also known as Indian and Northern Affairs Canada or INAC)	NPRI	National Pollutant Release Inventory
DNA	Deoxyribonucleic Acid	NWT	Northwest Territories
DO	Dissolved Oxygen	OAG	Office of the Auditor General
EC	Environment Canada	PDC	Panda Diversion Channel
EFPK	Extra-fine Processed Kimberlite	SNP	Surveillance Network Program
EIR	Environmental Impact Review	SPB	Sable, Pigeon and Beartooth
EMAB	Environmental Monitoring Advisory Board	TK	Traditional Knowledge
EMF	Environmental Management Framework	TSP	Total Suspended Particulates
ENR	GNWT’s Department of Environment and Natural Resources (previously known as RWED or Resources, Wildlife and Economic Development)	VEC	Valued Ecosystem Component
EQC	Effluent Quality Criteria	USEPA	United States Environmental Protection Agency
GN	Government of Nunavut	WAMP	Watershed Adaptive Management Plan
GNWT	Government of the Northwest Territories	WEMP	Wildlife Effects Monitoring Program
		WLWB	Wek’èezhii Land and Water Board
		WQO	Water Quality Objectives

Glossary (A listing of italicized words used in this report.)

Cladocera - Very small animals (Zooplankton) that live in water; for example, a water flea.

Consultation - (i) The provision, to the party to be consulted, of notice of a matter to be decided in sufficient form and detail to allow that party to prepare its views on the matter; (ii) the provision of a reasonable period of time in which the party to be consulted may prepare its views on the matter, and provision of an opportunity to present such views to the party obliged to consult; and (iii) full and fair consideration by the party obliged to consult of any views presented.

Cumulative Effects - The environmental changes that occur from a project or activity combined with effects from other human activities.

Environmental Agreement - Created as a legally binding instrument to provide monitoring and input into management practices not covered by other authorizations. Parties to the Ekati Environmental Agreement include BHP Billiton, the federal and territorial governments (Akaicho Treaty 8, Kitikmeot Inuit Association, North Slave Métis Alliance and Tłı̨chǫ Government were involved in the negotiations).

Extra-fine Processed Kimberlite - This material comprises approximately 12% by mass but 35% by volume of the processed kimberlite tailings deposited into the LLCF.

Fry - Early life stage of fish following absorption of yolk sac (alevin) stage.

Kimberlite - A rare, potentially diamond bearing iron and magnesium rich rock from deep in the Earth’s mantle. Kimberlites are generally found as vertical pipe-like structures.

Nitrate - A nutrient, like a fertilizer, derived from nitrogen.

Phytoplankton - Microscopic plants, such as algae, found in freshwater and ocean environments.

Pit Water - Water found within the pit containing wastes from mining practices.

Processed Kimberlite - The waste material and water mixture that is left over after the mill removes the diamonds. Also referred to as “tailings”.

Reclamation - The recovery to viable ecosystems of areas of land and water bodies that have been disturbed during mining.

Tailings - The waste material and water mixture that is left over after the mill removes the diamonds from the ore. Also referred to as processed kimberlite.

Zooplankton - The small, mostly microscopic animals that live suspended in freshwater (and ocean) environments. Zooplankton feed on phytoplankton and small particles in the water.