



INDEPENDENT
ENVIRONMENTAL
MONITORING AGENCY



A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™

TECHNICAL ANNUAL REPORT 2009-10

Message from the Chair 2010

I am pleased to report that BHP Billiton (BHPB) has continued to do a good job of environmental protection at EKATI™ Diamond Mine. However, the Agency still has concerns that need to be addressed in order for this good environmental performance to be continued for the life of the mine. These deal primarily with water quality downstream from the Long Lake Containment Facility (LLCF) and with wildlife (especially caribou) impacts. The means of dealing with these concerns, and our main focus for this past year, have been the continuing preparation of a new Interim Closure and Reclamation Plan (ICRP), the reporting done by BHPB, and the diamond mine wildlife monitoring program review. The ICRP is the main mechanism by which the Agency, in combination with BHPB, governments and communities are trying to ensure the long term success of this mine.

The main development this year regarding the ICRP is the legal arguments to determine the authority of the Wek'èezhì Land and Water Board (WLWB) to require fish habitat in the closure plan. This involved a hearing before the WLWB and then an appeal before the Northwest Territories Supreme Court. At both of these proceedings, the Agency was represented in largely successful attempts to enable fish to make use of the pit lakes when the

mine is closed and thus to re-establish a reasonably functioning ecosystem. While the process of dealing with the proposed ICRP was stalled by these legal matters, we suggested that BHPB should further develop the reclamation research plans. All agreed and some progress has been made on that matter.

In reviewing the Environmental Impact Report (EIR) prepared by BHPB in 2009, the Agency found serious problems and recommended the EIR not be approved. This recommendation was accepted and led to a very constructive meeting with BHPB, the Agency, governments and communities. This, in turn, resulted in a very significant improvement to the content of the EIR and the process in the future. There are still, in our view, further improvements needed before the next EIR is done (in 2012) and we suggest in this annual report a constructive means of working through these ideas.

We have also continued to address the recommendations made in the 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 was reported in last year's annual report. We have changed our staff positions to include a Communications and Environmental Specialist (now filled by Monica Krieger

– welcome Monica), we circulate short summaries of our board meetings, and report back to communities after a visit using a brochure that is mailed to all households in that community or region.

The progress that started a year ago on wildlife monitoring plans (especially bringing together the monitoring programs of different mines to better understand the very important regional cumulative effects on caribou) seems to have stalled and we very much hope these can be restarted soon.

One of our concerns regarding water quality downstream from the LLCF is the relatively high concentration of nitrate (primarily created by blasting at the mine). BHPB has made efforts to avoid releasing water from the LLCF unless the nitrate concentration is below the “ideal performance standard” (IPS) for nitrate. Unfortunately, the IPS is above a level known to adversely affect lake trout, which are found in lakes downstream from the LLCF. Environment Canada suggests using a lower protective level for nitrate in such a situation. BHPB has been investigating (with some success) means of reducing nitrate concentrations.

We look forward to another year where we hope that a new ICRP will be approved to guide progressive reclamation on site and to revise financial securities to ensure

there are no public liabilities. We also look forward to further improvements in wildlife monitoring (particularly for caribou), and progress on water quality objectives and better management responses to monitoring results. ■

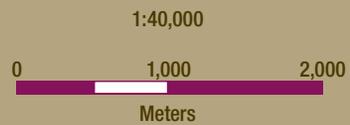


William A. Ross, Chairperson
March 31st, 2010



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
- 12 Pigeon Pipe



SATELLITE IMAGE 2009/BHP BILLITON DIAMONDS INC.



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 (Łutsel 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 Pearse APPOINTED MARCH 1997

Appointed by the Tłı̨chǫ Government.

Tony Pearse 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.

Agency Recommendations for 2009-10

1 Recommendation

The Agency recommends that BHPB, ideally in collaboration with ENR and other mines, complete its diamond mines wildlife monitoring review and develop an improved Wildlife Effects Monitoring Program (WEMP), including addressing recommendations from the September 2009 workshop, evaluating monitoring program objectives, and developing innovative methodologies and study designs to address these objectives.

BHPB Response: BHPB has committed to continuing the WEMP review process and has suggested two workshops in 2010 to facilitate technical and community collaboration with the aim of developing an improved WEMP.

2 Recommendation

We recommend that BHPB invite all interested parties to an Environmental Impact Report (EIR) workshop to be held not later than spring 2011. This will make the results available in time for BHPB's preparation of the 2012 EIR and hopefully avoid disagreement on future EIRs. The workshop should better define the purpose and focus of the EIR, review the methodology used (especially for determining significance of impacts), better define *adaptive management* in the context of the Ekati Mine, and such other matters as others may contribute.

BHPB Response: BHPB has committed to an open "pre-EIR" meeting in 2011 to kick off the 2012 EIR process. The workshop could address the items identified by IEMA as well as other topical issues.

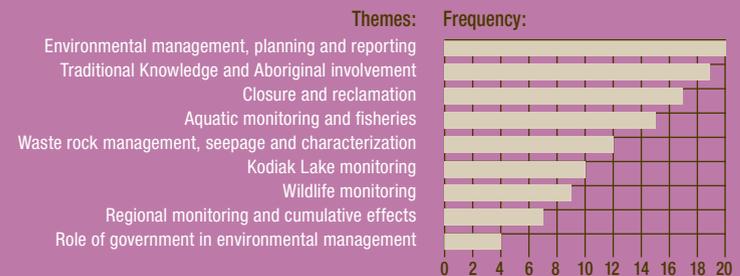
DIAND Response: Indian and Northern Affairs Canada (INAC) supports this recommendation and will participate in any workshops or other discussions concerning the development of the 2012 EIR.

3 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.

BHPB Response: BHPB recognizes the importance of the inclusion of Traditional Knowledge into our environmental practices and designs. There are a number of past and current successes in which BHPB is proud to have played a part. BHPB sees better value in pursuing forward-looking opportunities rather than a retrospective review. This approach inherently incorporates past experience in a constructive manner.

Agency Recommendation Themes 1997-2010



Recommendation Recipient	Frequency of Recommendations
BHPB	83
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	112

Agency Activities and Assessing the Agency

→ Highlights:

Five board meetings and the annual general meeting in Yellowknife.

EIR 2009 meetings in Yellowknife and at the Ekati Mine site.

Board meeting, community visit and open house in Gamèti.

Presentations to North Slave Métis Alliance and Akaitcho Treaty 8 Impact and Benefit Agreement Board.

Participation in the reviews of aquatic and wildlife monitoring programs.

Participation in WLWB public hearing and NWT Supreme Court judicial review on jurisdiction of WLWB over fish and fish habitat as part of Ekati closure planning.

Activities 2009-10

As in previous years, board meetings were held in Yellowknife along with an annual general meeting. Every three years, including 2009-10, BHP Billiton (BHPB) prepares an Environmental Impact Report (EIR) and holds workshops and meetings so the Agency does not host an environmental workshop. An EIR workshop was held at the Ekati Mine site in August 2009, as well as several other meetings and technical sessions in Yellowknife.

The Agency visited the community of Gamèti in October 2009 for a board meeting, community open house, and presentations to the school. We had very good discussions about community concerns regarding caribou, water quality and proper closure planning at Ekati. We were fortunate that there was a large Tłı̨chǫ Government meeting about land use planning taking place in the community when we were there, so our open house was well attended. We also made presentations in Yellowknife to the

Akaitcho Treaty 8 Impact and Benefit Agreement Board in December 2009 and the North Slave Métis Alliance in March 2010. We discussed the Agency mandate, current activities, environmental issues at Ekati, and ways to improve communication with communities.

One meeting was held by the Inter-Agency Coordinating Team (IACT) in February 2010. IACT consists of the Agency and a group of government regulators, including the Department of Indian and Northern Affairs (DIAND), the Department of



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

Above: Monica Krieger.

Fisheries and Oceans (DFO), Environment Canada (EC) and the Government of the Northwest Territories (GNWT). The Agency and other IACT team members participated in reviews of key BHPB environmental reports and regulatory initiatives throughout the year, including the EIR 2009, 3-year Aquatic Effects Monitoring Program (AEMP) Review, and in Wek'èezhii Land and Water Board (WLWB) and NWT Supreme Court jurisdictional hearings.

The Agency took part in a GNWT-sponsored Diamond Mine Wildlife Monitoring Program Review workshop in N'dilo in September 2009. We continue to strongly support this initiative to better coordinate the wildlife monitoring efforts of the diamond mines (including Ekati), 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 current monitoring and management objectives. The Agency has submitted comments regarding these issues, as shown in the Wildlife Effects and Regional Monitoring and *Cumulative Effects* sections of this annual report.

The Agency assisted with the organization of the Northern Latitudes Mining Reclamation workshop, held in Yellowknife in September 2009. The Agency Executive Director also gave a presentation on lessons learned from the Ekati Interim Closure and Reclamation Plan (ICRP) process.

Biannual meetings are held between the Agency and the *Environmental Agreement* signatories (BHPB, GNWT and the Government of Canada). These meetings improve coordination and

communication, and provide opportunities for the Agency and signatories to provide an update on activities and the responses received from BHPB. The Agency also reports on financial expenditures and future plans, signatories are offered an opportunity to respond to formal Agency recommendations, and other discussions take place. These meetings occurred in June 2009 and January 2010.

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.

Throughout the year, we have frequent incoming and outgoing correspondence on various Ekati-related issues (summarized in Tables 1 and 2). The staff also responds to 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 2009-10 we visited Gamèti (October 2009), as well as gave presentations to the Akaitcho Treaty 8 Impact and Benefit Agreement Board (December 2009) and the North Slave Métis Alliance (March 2010) in Yellowknife (see Table 3 for details on these and other communications activities).

We continue to hear comments from our Society Members that they are satisfied the Agency is performing its role in providing oversight of monitoring activities and reviewing environmental reports produced annually by BHPB. The Agency heard other positive feedback and suggestions for improving communications with Aboriginal Society Members at our 2009 annual general meeting.

Assessing the Agency

In response to the SENES Consultants external review, in 2009-10 we introduced several additional communications measures that help us fulfill our mandate.



Left: Gamèti community government office.

Above: Agency directors leave Gamèti.

We now prepare and distribute a summary of discussion from each Board of Directors meeting and the annual general meeting. These full summaries are posted on our website and a briefer version is distributed by e-mail to Society Member representatives. After each community visit, we now produce a “Reporting Back to Communities” pamphlet that provides photos, summarizes the Agency mandate and topics of discussion, and provides contact information.

We also created a new staff position, the Communications and Environmental Specialist, which was filled in late May 2010. Some of the main tasks for 2010-11 will be to create an Agency communications plan and timeline, continue the production of meeting summaries and community pamphlets, update and improve the Agency website, organize and promote the resource

library, renew the preparation of an Agency newsletter a few times each year, and develop the “timeline project”. This last project stems from an initial request by the Yellowknives Dene First Nation, and will be a web-based historical description of events for the Ekati Mine including operational, regulatory and environmental information.

The Agency is proud of its contribution to the ICRP, including the WLWB public hearing and the Supreme Court of the NWT judicial review on the jurisdiction of the WLWB over fish and fish habitat as part of Ekati closure planning. Our consistency and persistence in reviewing the EIR 2009 resulted in a Minister’s Report under the *Environmental Agreement* and BHPB subsequently making important improvements, including a process for better *consultation* on future EIRs. ■



Agency directors visit Ekati Mine site.

Table 1: Agency Incoming Correspondence 2009-10	
Sender	# of Pieces
WLWB	27
DIAND	21
BHPB	19
GNWT	10
<i>Environmental Agreement</i> Signatories	7
DFO	6
Total	90
Subject	# of Pieces
Aquatics including SNP Monitoring, Guidelines, 3-Year AEMP Review, and Water Quality Objectives	16
Land Use Permits/Water Licenses Inspections	15
Wildlife Monitoring including Diamond Mine Wildlife Monitoring Program Review	14
Other Environmental Matters	11
WLWB Jurisdiction/Judicial Review	10
Interim Closure and Reclamation Plan (ICRP)	9
2009 Environmental Impact Report	7
GNWT-Tłıchǫ Government Joint Proposal on Caribou Management	3
Wastewater and Processed Kimberlite Management Plan (WPKMP)	3
Air Quality Monitoring Program (AQMP)	2
Total	90

Table 2: Agency Outgoing Correspondence 2009-10	
Recipient	# of Pieces
WLWB	7
<i>Environmental Agreement</i> Signatories	6
BHPB, DDMI, DBCI, and GNWT	2
MVLWB Guidelines Working Groups	2
BHPB, DIAND and GNWT	1
DIAND	1
Legal Counsels for BHPB and TG	1
Total	20
Subject	# of Pieces
WLWB Jurisdiction/Judicial Review	3
Community Concerns/Meetings	3
Interim Closure and Reclamation Plan (ICRP)	2
Agency Annual General Meeting	2
Diamond Mine Wildlife Monitoring Program Review	2
AEMP including 3-Year Review	1
Agency External Review	1
Water Licence Amalgamation	1
Draft Closure and Reclamation Guidelines	1
Draft Guidelines for Waste Management	1
Agency 2008-09 Annual Report	1
2009 Environmental Impact Report	1
Wastewater and Processed Kimberlite Management Plan (WPKMP)	1
Total	20

Table 3: Key Agency Activities

Date and Location >>	Purpose >>	Main Issues >>
May 19-21, 2009 Yellowknife	2009 Environmental Impact Report (EIR) Technical Sessions	<ul style="list-style-type: none"> • Air, Water and Fish, and Wildlife sessions held. • Methodology and findings of the 3-year EIR presented and discussed. • See EIR section in this report for Agency's concerns.
June 19, 2009 Yellowknife	<i>Environmental Agreement</i> Implementation Meeting	<ul style="list-style-type: none"> • Agency and BHPB gave presentations on communications. • Need to improve communications flow to the Agency was noted. • Agency presented an overview of 2008-09 annual report with recommendations.
July 15, 2009 Yellowknife	Wek'èezhìr Land and Water Board (WLWB) Public Hearing on Jurisdiction	<ul style="list-style-type: none"> • Presentations made to WLWB regarding its jurisdiction over fish and fish habitat, as part of the closure planning process under the water licence. • WLWB found it does have jurisdiction to deal with fish and fish habitat.
August 25-28, 2009 Ekati Mine Site	2009 Environmental Impact Report (EIR) Meeting	<ul style="list-style-type: none"> • Agency and others concerned about focus of 2009 EIR and significance ratings used in the report.
September 9-10, 2009 Yellowknife	Northern Latitudes Mining Reclamation Workshop	<ul style="list-style-type: none"> • Agency Executive Director assisted with workshop organization and logistics, and gave presentation on lessons learned from Ekati Interim Closure and Reclamation Plan process.
September 22-23, 2009 N'dilo	Diamond Mine Wildlife Monitoring Program Review Workshop	<ul style="list-style-type: none"> • Species-specific wildlife monitoring plans reviewed and changes or improvements suggested. • Workshop report prepared and distributed. • No formal response from the diamond mines.
October 6-8, 2009 Gamètì	Board Meeting, Community Open House and School Presentations	<ul style="list-style-type: none"> • Agency Board meeting held in Community Government office October 7-8. • Community open house with presentations and discussions. • General overview of Agency mandate and Ekati Mine site, and update on Agency activities. • Concerns raised regarding caribou, water quality and proper closure planning. • Letter sent to BHPB/DIAND/GNWT on community concerns. • Brochure on open house produced by Agency and distributed to all Tłı̄chq communities.
December 1, 2009 Yellowknife	Akaītcho Treaty 8 Impact and Benefit Agreement Board Meeting	<ul style="list-style-type: none"> • Agency Director and Executive Director made presentation to Board of Directors. • Answered questions about Agency mandate and environmental issues at Ekati. • Agency remains open to further community meetings and improved communications.
December 3, 2009 Yellowknife	Agency Annual General Meeting	<ul style="list-style-type: none"> • Agency Directors presented annual report and financial statements for 2008-09. • Agency Director presented budget and work plan for 2009-11. • Questions about lack of wolverine DNA sampling and the mine zone of influence for caribou. • Questions about the cause and remediation of the Fay Lake spill. • Concerns raised over backfilling of open pits, and need for stronger community involvement in closure planning. • SENES Consultants presented external review of Agency, with discussion on improving Agency communications.

Date and Location >>	Purpose >>	Main Issues >>
December 16, 2009 Yellowknife	2009 Environmental Impact Report (EIR) Meeting	<ul style="list-style-type: none"> • Attempt to resolve issues that led to the Minister's Report on the 2009 EIR. • Some progress made on clarifying methods and definitions, review of significance ratings, and a process for the next EIR. • BHPB commits to produce a Technical Addendum to EIR and a Close-Out Report to supplement the plain language EIR.
January 18, 2010 Yellowknife	<i>Environmental Agreement</i> Implementation Meeting	<ul style="list-style-type: none"> • Review of Agency findings and recommendations over 2009-10 to date, work plan and budget. • BHPB presentation on environmental operations and 2010 programs. • BHPB agrees to reconsider TK initiatives, including a review of past efforts. • BHPB proceeding with Misery Pit pushback, with a need for more haul trucks on site and traffic on Misery road. • Agreement to further discuss communications at next IACT meeting.
February 3, 2010 Yellowknife	Supreme Court of the NWT Hearing on BHPB vs. WLWB	<ul style="list-style-type: none"> • Court hearing re: a BHPB-initiated judicial review of WLWB decision that it has jurisdiction over fish and fish habitat as part of closure planning (see July 15, 2009). • Agency and Tłı̨chǫ Government appear as interveners with WLWB as respondent. • Ruling issued March 15, 2010 dismissed appeal as it is premature. Judge also notes there does not appear to be a conflict between jurisdictions of WLWB and Fisheries and Oceans Canada.
February 11-12, 2010 Yellowknife	Aquatic Effects Monitoring Program (AEMP) 3-Year Review Workshop	<ul style="list-style-type: none"> • Well-attended session to review BHPB's proposed changes to the AEMP. • Most discussion focused on critical effects size determinations and August-only sampling. • BHPB agrees to conduct some further data analysis to support proposed changes.
February 15, 2010 Yellowknife	2009 Environmental Impact Report (EIR) Meeting	<ul style="list-style-type: none"> • Meeting to discuss the form and content of BHPB's response to the Minister's Report on the 2009 EIR. • BHPB proposes a Technical Addendum and Close-Out Report to better present methods and ratings.
February 22, 2010 Yellowknife	Inter-Agency Coordinating Team (IACT) Meeting	<ul style="list-style-type: none"> • BHPB clarifies contacts for communications. • BHPB not prepared to provide wildlife incident or spill reports directly to the Agency.
March 8, 2010 Yellowknife	Presentation to North Slave Métis Alliance	<ul style="list-style-type: none"> • General overview of Agency mandate and Ekati Mine site. • Update on Agency activities. • Discussion about water quality and security calculation for <i>reclamation</i> liability.
March 22-23, 2010 Yellowknife	Wek'èezhì Renewable Resources Board (WRRB) Public Hearing on Joint Proposal on Caribou Management	<ul style="list-style-type: none"> • Public hearing on the Joint Proposal by the Tłı̨chǫ Government and GNWT to address the decline in the Bathurst caribou herd. • Agreement by governments on restricting non-Aboriginal harvest. • Different views on Aboriginal harvest limits, monitoring and management measures. • Agency Executive Director observed proceedings. • WRRB adjourned hearing to allow further negotiations between the two governments, with specific reporting requirements.

Processed Kimberlite and Wastewater Management

→ Highlights:

Monitoring of Fay Lake after 2008 spill shows site is stable with no signs of erosion.

WLWB approved use of Beartooth Pit as minewater retention pond, to the Agency's disappointment.

Second phase of *nitrate* experiment in cell D completed.

Agency identified a number of deficiencies in the revised 2010 WPKMP.

Activities 2009-10

During the past year the Long Lake Containment Facility (LLCF) operated without incident. The high road around the north side of cell A was constructed to increase the size of cell A and hence the storage capacity in the impoundment.

The area affected by the spill of *kimberlite tailings* from cell B into Fay Lake in May 2008 was reclaimed during the 2008 field season, and an impervious dam was constructed at the cell B spill point (north end) as a measure to prevent future occurrences. BHP Billiton (BHPB) reports that monitoring in 2009 showed that the entire site was stable, and that there were no signs of erosion on the roadbed or adjacent areas where vegetation had been removed. Natural revegetation is underway — BHPB notes that residual *kimberlite* on the tundra has apparently stimulated growth of blueberry and dwarf birch.

BHPB had applied for the use of Beartooth Pit as a minewater retention pond or sump in its 2008 update to the 2007 Wastewater and Processed Kimberlite Management Plan (WPKMP). The WPKMP is the document that details how BHPB will manage its mine wastewater and *tailings*, most of which ends up in the LLCF. Using the exhausted Beartooth Pit as an

'optional retention pond for minewater' was approved by the Wek'èezhìi Land and Water Board (WLWB) in June 2009.

Production from Beartooth Pit ceased in 2009 and, as of June 2009, the pit has been used to store *chloride* and *nitrate* enriched minewater from Panda/Koala underground operations instead of pumping it into the LLCF. The reason for this is to reduce the levels of *chloride* and *nitrate* in the LLCF by diverting the waters rich in *chloride* and *nitrate* to Beartooth Pit.

As a result of the Beartooth Pit request, the WLWB asked that a complete revision to the 2007 version be submitted. BHPB submitted a revised WPKMP in January 2010, and this is still under review by the WLWB as we go to press.

A second phase of the *nitrate* experiment in cell D was conducted in 2009. This project was started in 2008 to investigate measures to reduce *nitrate* concentrations in the LLCF so that discharges from the *tailings* facility would not unduly overload receiving waters with *nitrate*. BHPB's approach was to add phosphate to the LLCF to stimulate biological growth, as biological growth is limited by *phosphorus* as a nutrient. This growth will also use *nitrate*, another nutrient, thereby reducing *nitrate* concentrations.

The 2008 experiment was conducted in isolated enclosures in cell D and, according to BHPB, resulted in a more than 10-fold increase in chlorophyll and a 13% reduction in *nitrate* concentration. In 2009, some 16 tonnes of phosphate fertilizer were added to the entirety of cell D. This increased *phytoplankton* mass by 24-fold, with increases also documented in *zooplankton* biomass and abundance. The net decrease in *nitrate* loading in cell D during 2009 was 19%. No chemical or biological changes in either the upstream cell C or the downstream cell E were documented by the company.

Unfortunately, BHPB's report on the *nitrate* experiment does not draw any conclusions about whether this might be a practicable approach for controlling *nitrate* loadings in the LLCF in the future.

Agency Assessment

Beartooth Pit

The use of Beartooth Pit as a minewater retention pond, while solving the company's immediate operational concerns about what to do with *nitrate* and *chloride* enriched minewater, poses longer-term closure issues for site *reclamation* planning. As we wrote

in last year's report, the WLWB was reviewing BHPB's proposal. At the time, we were anxious that the opportunity to place *processed kimberlite* in a pit may be negated by this move. Indeed, the opportunity to experiment with Beartooth Pit (for example, determining if the pit lake would be *meromictic* or not, a characteristic that may be very important for managing pit lakes generally) is now lost because the pit is used as a sump rather than being turned into a pit lake. Such experimenting with a pit lake must now be delayed for many years, a result, we fear, that may interfere with effective and informed mine closure. We expressed our hope that the WLWB would keep these closure issues in mind when considering approval of BHPB's request.

The Agency raised concerns about BHPB's proposed use of Beartooth as a temporary retention pond for minewater. The Agency cited the loss of opportunity to use the pit for *tailings* disposal, with the idea that *tailings* storage in cell D may ultimately be avoided and/or that the pit might serve as a viable deposition site for *extra-fine processed kimberlite* (EFPK). In approving the use of the pit for minewater retention, the Agency believes it would have been useful if the WLWB had had some assessment of alternative options and the opportunity costs associated with foreclosing other uses of the pit. Further, we think the decision significantly decreases the operational

flexibility that would be desirable at closure. For these reasons, the Agency is disappointed in the WLWB's decision.

Wastewater and Processed Kimberlite Management Plan

While *tailings* operations in the LLCF appear to be running smoothly, BHPB's management plans for the facility are lacking. We reviewed the 2010 WPKMP, and submitted comments to WLWB identifying a number of deficiencies in the revised document. Our general finding was that the updated plan provides significantly less useful information about *tailings* management in the LLCF than was provided in previous plans.

Importantly, a number of issues or challenges identified in earlier versions of the WPKMP were dropped from the updated Plan, so there is no way of knowing whether these have been

resolved or not. For example, the 2007 Plan identified unknowns about processing Fox ore, but these are not mentioned in the 2010 version. Other examples of omissions include *processed kimberlite* deposition plans and schedules, the staged volume curves for the cells, and the water balance, all of which describe in detail how the LLCF is being managed.

While the Plan presents brief descriptions of what is being done, there is a pattern of not explaining why it is being done. Previous versions of the Plan provided rationale, objectives, and methodologies for the management of each wastewater component on the mine site. Arrangements for dealing with surface minewater are vague, as are plans for Fox mine drainage. By now there should be good and sufficient information about the character of *processed kimberlite* (PK) and its behaviour provided in the Plan so that the WLWB can have

a reasonable understanding of the operational and closure issues for the LLCF. This is particularly true for the LLCF, arguably the most challenging closure issue for the company.

The Plan alludes to the early use of cell B as a *reclamation* research plot, but little information is provided about timing or other identified uncertainties, such as PK erosion susceptibility. This lack of clarity about *reclamation* research activities necessary to determine revegetation and stabilization feasibility of the PK beaches is an ongoing concern to the Agency.

The Plan mentions four monitoring programs that are underway with respect to the LLCF, but no information is provided. The result is that there is no understanding about what is being learned, how operational procedures may be being adapted, and what the implications might be for operations or *reclamation*. ■



Engineering work at the north end of cell B.

Closure and Reclamation

→ Highlights:

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.

The company filed a legal motion challenging the WLWB jurisdiction to require the creation of fish habitat in pit lakes.

The NWT Supreme Court ruled that the application for judicial review was premature.

Activities 2009-10

At the beginning of April 2009, we were preparing for the scheduled Wek'èezhii Land and Water Board (WLWB) hearing on BHP Billiton's (BHPB) proposed Interim Closure and Reclamation Plan (ICRP), which had evolved through an ICRP working group process. This was subsequently interrupted by legal arguments over the authority of the WLWB to require the creation of fish habitat at mine closure as part of closure planning under the company's water licence. These are both discussed in this section.

The Agency's May 5, 2009 submission to the WLWB's scheduled hearing on BHPB's proposed ICRP stated:

"We are now about halfway through the active mine life, and as we move into this latter phase, there is a need to be increasingly attentive to the plans being developed for closure and *reclamation* of the site. In our view, closure planning for Ekati should now be the overriding focus for all parties. This is the process that will establish the conditions for the site and the legacy left behind long after the

company has left, and it is important for obvious reasons to get it right."

We also stated that the WLWB's working group process had resulted in the evolution of a closure plan that more closely meets the closure needs of the site, future users and the regulators and therefore ought to be seen as a qualified success.

We proposed that BHPB should carry out more work to complete aspects of the ICRP that, by agreement, were not complete prior to the hearing date, and submit the results of this work prior to



Waste rock pile revegetation plot.

approval of the ICRP. We also suggested that two serious issues needed to be dealt with before approval of the ICRP. The first of these was a requirement to allow fish passage into cell E and the pit lakes, and to establish shallow zones in pit lakes for fish use. This position was the major point of dispute between BHPB and all other participants in the ICRP working group.

The second serious issue for the Agency was the adequacy of *reclamation* research plans, which were incomplete and which may not be completed until the next review of the ICRP.

Agency Assessment

Pit Closure and Fish

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. All previous versions of the ICRP up to January 2007 contained no mention of fish barriers. BHPB's current 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 or even safe for fish passage. This is, according to BHPB, because it entered into an agreement with Fisheries and Oceans Canada (DFO) in which it compensated for the fish habitat in exchange for authorization to destroy fish habitat. Therefore, according to BHPB, it has no further obligation to create fish habitat.

The company is alone in this view. The Agency and all others see the proper *reclamation* objective for the pits and cell E is to at least provide opportunities for fish travel through them and, further, to promote the development of ecological conditions such that fish might once again inhabit the pit lakes. These objectives are consistent with the overarching goal of returning the site to a functioning ecosystem, while BHPB's plans are not. We argue that BHPB should be required to adopt closure objectives for the pits and LLCF regarding fish passage and creation of shallow zones that are consistent with this goal. This is the right thing to do, and it is consistent with the best mine restoration standards

being used today by progressive mining companies. During the working group process, the Agency specifically asked BHPB whether there was any technical reason or research that created a need to prevent fish from entering the pit lakes or cell E (e.g. poor water quality that could kill or harm fish), and the answer was an unqualified 'no' from the company.

Reclamation Research Plans

When a mining company initially develops its ideas for closure, some of the *reclamation* measures have significant uncertainties associated with them. In other words, not everything about the mine and about what might work as an

effective closure approach is known ahead of time. Therefore, these uncertainties need to be identified as early as possible in *reclamation* planning, with a plan to conduct the necessary research to answer the questions. This is a key element of 'planning for closure', the reason why the proponent needs to prepare *reclamation* research plans for approval, and why provisions for doing this were included in the original water licence. An important aspect of this exercise is that the research must be conducted early enough in the mine life so that the answers can arrive in time to inform the *reclamation* and closure work that needs to be done. Therefore, in order to determine whether the company's proposed research is



Waste rock pile revegetation area.

acceptable, we need to know both the content of the plans (i.e., what the research is and how it will be carried out) and the timing of the research. In the Agency's view, more detail on content and timing of the research activities is needed.

Jurisdiction over Fish and Fish Habitat at Closure

When we submitted our intervention on May 5, 2009 for the ICRP public hearing, we stated:

"In the Agency's view arrangements made by other agencies cannot fetter the discretion of the Board with regards to its jurisdiction over closure planning..." and the Board "... thus has the authority and

jurisdiction to direct changes to the ICRP, including where such changes may deal with fish or fish habitat."

On May 11, 2009 the company wrote to the WLWB stating:

"These statements are fundamentally contrary to BHP Billiton's position regarding the Board's jurisdiction and to the manner in which BHP Billiton has, in good faith, operated the EKATI Diamond Mine for over 10 years. BHP Billiton believes that it would be unproductive to continue with any further review or planning of *reclamation* work with this issue unresolved because the direction of further review or planning is dependent on its resolution."

In order to seek clarity for both mine development planning and for the preparation of the ICRP, BHPB requested that the WLWB hold a public hearing

"to determine whether the board has the jurisdiction to require that BHP Billiton establish and maintain fish or fish habitat in the closed pit lakes or cell E of the LLCF at the Ekati Mine."

On this notice, the WLWB postponed the ICRP public hearing date scheduled for May 2009 and convened another hearing date in mid-July 2009 to hear arguments from the parties on BHPB's motion.

The Agency, Tłı̨chǫ Government, DFO and the Department of Indian Affairs and Northern Development (DIAND) were intervenors at this hearing—all taking

positions that supported the view that the WLWB did, indeed, have the power to make determinations respecting the creation of fish habitat in BHPB's *reclamation* plans under the water licence. This power, we argued, was not affected by any agreement the company had previously struck with DFO respecting its original authorization to destroy or alter fish habitat. BHPB's position was that its original agreement with DFO was, in essence, a deal by which it had compensated for the loss of fish habitat forever and was no longer subject to any other jurisdiction that might require the establishment of fish habitat.

On July 27, 2009 the Board ruled that the DFO-BHPB Habitat Compensation Agreement did not limit the exercise of its jurisdiction to require the re-establishment of fish habitat as part of the ICRP for the Ekati site. BHPB's reaction was to seek a judicial review of the WLWB's ruling in the Supreme Court of the Northwest Territories.

At the court hearing on February 3, 2010 only two of the original intervenors, the Agency and Tłı̨chǫ Government, attended. The basic arguments of all parties were essentially unchanged. Tłı̨chǫ Government's original position, which had supported the notion of the WLWB having jurisdiction over the fish habitat restoration issue, had also argued that to make such a determination was premature because the WLWB had made no decision at that



Left: Wek'èezhii Land and Water Board public hearing on jurisdiction, July 2009.

Above: Agency directors and legal counsel.

point on the fish habitat issue for the Ekati Mine and thus BHPB's rights or interests had not yet been affected in any way.

On March 15, 2010 Justice Vertes rendered his decision—the application for judicial review was premature, and BHPB is free to bring the issue back for determination once the proceedings before the WLWB (i.e. ICRP approval) have been concluded.

In reaching this decision, the judge agreed with the argument of Tłı̨ch̨o Government that the order sought by BHPB would amount to the WLWB's being foreclosed from considering any issue relating to fish habitat and *reclamation* with respect to the pit lakes. Tłı̨ch̨o Government had argued that the WLWB should be allowed the 'elbow room' to decide the substantive issues relating to BHPB's *reclamation* plan on their merits, including all issues surrounding the pit lakes, without requiring the court to prematurely decide legal issues that, in the end, may or may not be relevant or necessary to decide.

The judge also noted that there is no question that *reclamation* is within the authority of the WLWB to decide. He observed that whatever type of agreement BHPB might have with DFO, it is something external to any statute (such as the *Mackenzie Valley Resource Management Act*), and how it affects the WLWB's exercise of its jurisdiction is within the mandate of the WLWB to decide. ■

BHP Billiton Diamonds Inc. vs. Wek'èezhì Land and Water Board

Reasons for Judgement of the Honourable Justice J. Z. Vertes, Supreme Court of the Northwest Territories. March 15, 2010.

Is there a conflict between DFO and WLWB legislation?

paragraph 35 – All of the responding parties dispute the applicant's premise that there is a conflict in the legislation so as to warrant the application of the "special over general" doctrine. ...The test for unavoidable conflict is where two pieces of legislation are directly contradictory. It is not a question of two statutes dealing with the same subject-matter. The application of one must implicitly or explicitly preclude application of the other. Here there is nothing in the Fisheries Act which would, on its face, be directly contradictory to anything in either the *MVRMA (Mackenzie Valley Resource Management Act)* or the *Northwest Territories Waters Act*. These statutes are all part of an integrated resource management scheme and are meant to work in a complementary fashion.

Does the Compensation Agreement limit the jurisdiction of the WLWB?

paragraph 41 – There is no question that the particular matter, reclamation, is within the authority of the Board to decide. In BHPB's submission, the scope of that decision is circumscribed by the 1996 compensation agreement. But that is something external to any statute. It may be part of the s. 35(2) authorization, as argued by some, or it may be an agreement to pay compensation, and a contract as argued by BHPB. How that affects the Board's exercise of its jurisdiction is something within the Board's mandate to decide. It is no different than any other external document.

Is it premature to bring forward the judicial review?

paragraph 61 – Counsel for Tłı̨ch̨o argued that the order sought by BHPB would amount to an

order of prohibition. The Board would be foreclosed from considering any issue relating to fish habitat and reclamation with respect to the pit lakes. He also submitted that the Board should be allowed the "elbow room" to decide the substantive issues relating to BHPB's reclamation plan on their merits, including all issues surrounding the pit lakes, without requiring the court to prematurely decide legal issues that, in the end, may or may not be relevant or necessary to decide. I agree.

For the full document, see:

<http://www.justice.gov.nt.ca/dbtwwpd/textbase/judgments/pdfs/2010nwtsc23.pdf>



Aquatic Effects

→ Highlights:

Two water licences covering the entire Ekati Mine site now amalgamated into one.

BHPB is managing *nitrate* but concentrations in LLCF water remain high.

Draft “Water and Effluent Quality Management Policy” released by Land and Water Boards of the Mackenzie Valley.

Draft “Toolbox for Including Traditional Knowledge in Aquatic Effects Monitoring Programs (AEMPs) in the NWT” released by DIAND.

Sediment samples near Ekati show effects from the on-site incinerator.

Each year BHP Billiton (BHPB) carries out a number of programs and studies to determine if changes in the aquatic environment downstream from its operations are occurring as a result of mining activities. There are two separate watersheds (Koala and King-Cujo) into which regulated mine *effluent* is released, and water bodies in these two systems as well as reference sites are sampled. The Aquatic Effects Monitoring Program (AEMP) collects information on any changing trends in water quality, sediment

quality, benthic macroinvertebrate communities, *zooplankton* and *phytoplankton*, as well as fish populations and fish tissue. Special studies are also undertaken on an as required basis.

Activities 2009-10

Processed *kimberlite*, treated sewage and *pit water* which are discharged into the Long Lake Containment Facility (LLCF) comprise the main point source of potential contaminants in the downstream

environment. *Effluent* released from the LLCF in July to November enters the receiving environment of the Koala watershed through Leslie Lake, flows downstream through Moose Lake, and eventually enters Lac de Gras (see Figure 1). The volumes pumped into Leslie Lake returned to quantities of previous years following the 2008 efforts to address elevated *nitrate* levels in cell E of the LLCF, when less water was discharged because of the high *nitrate* concentration in the LLCF.



Staff sampling grayling.

A second source of potential contamination is *effluent* discharge from the Misery site. Mine water from the Waste Rock Dam and Desperation Pond was discharged into King Pond, mainly from July through October. *Effluent* is released from King Pond to Cujo Lake and eventually into Lac du Sauvage.

Mine water was pumped into Beartooth Pit after the Wek'ëezhì Land and Water Board (WLWB)'s approval of this activity in June 2009.

Water Licence MV2001L2-008, which regulated use of water and waste deposition for the current development of the Beartooth Pit and future activities at Sable and Pigeon, was renewed on August 15, 2009 as W2009L2-0001. This new licence also replaces the main Water Licence MV2003L2-0013 so there is one water licence for the entire Ekati Mine.

Monitoring Results

Each year BHPB reports the results of its AEMP to the WLWB and provides the highlights in its Environmental Agreement and Water Licences Annual Report. Our review of the 2009 report revealed that the company is generally doing a good job of protecting the aquatic environment at the mine site, although there are still a few challenges.

This is the 12th year of monitoring for the Koala-Lac de Gras system and the 9th year for the King-Cujo system.



AEMP 3-Year Review

Background: Every three years BHPB's AEMP is re-evaluated to see if it is performing as necessary or if it needs refinement. The last evaluation was approved by the WLWB in 2007. As required by its water licence, BHPB submitted a revised AEMP design in January 2010. In the document "2009 Aquatic Effects Monitoring Program Re-evaluation", the company made 33 recommendations for changes to the AEMP design. BHPB held a workshop in Yellowknife in February 2010 to discuss the proposed changes with all interested parties. Following the workshop, BHPB submitted additional information which was used in the review process.

Issues: The two most contentious issues that arose during the review were the determination of 'Critical Effects Size' (CES) and the switch to sampling in August-only rather than in three open water months (July, August and September).

Critical Effects Size: CES refers to the amount of change and/or effects to the environment that are considered significant enough that some kind of *adaptive management* action is required. The Agency agrees with BHPB's definition of CES as a "pre-determined size of change in a variable that constitutes the greatest level of acceptable change for the aquatic environment". But the Agency, and others, took issue with the trigger points recommended by BHPB (Canadian Council of Ministers of Environment guidelines or similar thresholds).

In its submission to the WLWB regarding the proposed update of the AEMP, the Agency pointed out that the problem was bigger than BHPB and the Ekati Mine, specifically:

"The question of how to set CES values (i.e. what is the level of acceptable changes) is not solely a scientific issue but needs to include a wide range of people and values. In addition, the discussion needs to take place over a broad area, not the area occupied by one mine. The Agency believes that the broad discussion of scientific and community values over a large area would be best led by the WLWB rather than an individual mine."

Several reviewers and WLWB staff agreed with the Agency's view. The Agency understands that the Mackenzie Valley Land and Water Board (MVLWB) is currently working on guidelines for a Monitoring Response Framework (formerly called an "adaptive management plan") which will require the development of trigger points or CES in *consultation* with all parties. It is hoped that the framework will prove useful in developing CES values for the Ekati Mine.

August-only sampling: Three years ago, BHPB requested a change to August-only lake sampling, rather than three monthly sampling periods during open water season. The Agency did not support that proposed change and the WLWB did not grant it in the 2007 review. In the latest submission, the company provided a lot of data analysis in support of this request, something that the Agency stated was necessary in 2007. Based on comments from reviewers and the WLWB's independent experts, the WLWB has agreed to BHPB's request to go with August-only lake water sampling. The original request was amended to include a fallback sampling schedule (if problems arose in August).

Two other issues raised during the review process were of concern to the Agency:

- **Sediment sampling methodology:** The Agency recommended a small study to determine sedimentation rates in one or two lakes as a means of assessing the need to change the sediment sampling methodology. BHPB has committed to conducting a side-by-side comparison of the use of an Ekman dredge versus a sediment corer in order to recommend a final sampling method prior to the next scheduled sediment sampling in summer 2011.
- **Use of slimy sculpin:** BHPB recommended that slimy sculpin not be used as a direct surrogate for round whitefish and lake trout. The Agency agreed with the recommendation but suggested that 2008 results indicated that slimy sculpin could be a useful bio-indicator for between-lake comparisons. BHPB has committed to consider this use and, prior to the next fish sampling year (2012), submit a proposal for non-lethal fish sampling of trout and whitefish which will discuss potential for (a) collecting tissue samples without harming the fish and (b) using slimy sculpin in fish monitoring.

Agency Assessment: The WLWB's process established for this review of the AEMP was sound. The Board hired its own technical expertise and received extensive advice from those consultants. The company was responsive to reviewers' comments, including those of the Agency. The regulators were also fully engaged in the process.

The AEMP reference lakes and outflow streams are shown in Figure 1. The mining effects on water quality in the Koala and King-Cujo watersheds are shown as parameters elevated for each watershed in Figure 2. Concentrations of several water quality variables were found to have changed (increased) in the lakes and streams downstream of the LLCF and the King Pond Settling Facility.

One of the emerging issues is rising concentrations of *nitrate* (a contaminant for which no discharge limits are specified in the Water Licence) in LLCF water. As noted in our last year's report, 2007 *nitrate* levels in Leslie and Moose lakes immediately downstream of the LLCF discharge point, rose above Canadian Council of Ministers of Environment (CCME) Guidelines for the Protection of

Aquatic Life. In 2008, BHPB took steps to address these elevated levels by holding water within cell E until *nitrate* concentrations had declined below the 2.9 mg/L CCME guideline. In 2009, the timing of *effluent* discharge was changed to begin in mid-summer rather than spring. This approach helped reduce the amount of *nitrate* released by taking advantage of summer water stratification in cell E. While the mitigative measures introduced by BHPB seem to have helped, the Agency notes that *nitrate* levels in Leslie and Moose lakes are still above the interim CCME guideline of 2.9 mg/L.

BHPB has experimented with removing *nitrate* by adding phosphate within cell D of the LLCF to stimulate photosynthesis. Preliminary results showed that addition of phosphate caused a more than



King pond.

Figure 2: Mining effects on water quality flowing through the Koala and King-Cujo Watersheds

	Parameters elevated in Koala watershed							Parameters elevated in King-Cujo watershed			
	Long Lake Containment Facility → Lac de Gras							King Pond → Lac du Sauvage			
Parameters monitored	Leslie	Moose	Nema	Nema-Martine	Slipper	Slipper-Lac de Gras	Lac de Gras *	Cujo	Cujo Outflow	Christine-Lac du Sauvage	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
 * Two sites with same results

Nero-Nema Stream Fish Habitat Study

Due to the construction of a bridge over the stream connecting Nero and Nema lakes, BHPB has had to compensate for the resulting destruction of fish habitat in the stream. The habitat (spawning beds) have been built in the stream and are now monitored to make sure they are being used by fish.

In 2008, 22 Arctic grayling spawners were estimated to be in the stream; peak numbers occurred in late June in both 2007 and 2008.

The determination of use of the constructed spawning beds is so far inconclusive, although some spawners were seen at them. However, the following evidence supports the idea that Arctic grayling spawners used the gravel spawning beds built by the company.

Arctic grayling spawners were observed in close proximity to two of the eight new spawning beds, while grayling eggs were found at five. High numbers (over 1200) of grayling *fry* were counted immediately downstream of four constructed spawning beds, but they may have drifted to those locations in stream current.

One of the two unused beds was in poor condition: 20% of its surface was covered by decayed organic material and fine sediment.

10-fold increase in chlorophyll levels and a similar drawdown of *nitrate* levels. The net decrease in the *nitrate* load in cell D during the 2009 open water season was 19%. At the same time, there were no observed increases in total *phosphorus* or *phytoplankton* biomass in cell E, confirming that the

changes were contained within cell D.

Molybdenum levels have decreased or remained stable downstream of the LLCF, but they remain high. In the case of Leslie Lake, September levels were above the CCME guideline. Molybdenum affects trout *fry* development at high

concentrations. Recently approved plans to restart open pit mining at Misery Pit are a concern in this regard since it appears that the Misery ore is the source of the elevated molybdenum concentration, and additional mining of this ore may result in increased levels in the future.

Other changes in dissolved metal concentrations of note:

- While copper concentrations in the Panda Diversion Channel (PDC) and Kodiak Lake continue to decline they remain above the CCME guideline of 0.002 mg/L ;
- Arsenic levels are elevated under ice in Leslie Lake;
- Chromium levels are elevated under ice in Slipper Lake and Lac de Gras;
- Cobalt and iron levels are elevated under ice in Kodiak and Cujo lakes; iron is above CCME guidelines in Cujo Lake;
- Selenium is close to CCME guidelines in Leslie Lake and above CCME guidelines in streams flowing into and out of Nema Lake; and
- For Kodiak Lake, increases in three water quality variables (pH, *chloride*, and total nickel) were attributed to mine activities in 2009.

Dissolved oxygen (DO) levels under ice remains an issue in Cujo Lake. From February to May, 85% of the DO levels measured fell below the CCME guideline (6.5 mg/L) in the majority of the water column. This effect has

since largely been mitigated by aeration, which was started in mid-March. The Agency anticipates that the situation will continue to be monitored and that aeration will be used when necessary.

Agency Assessment

The AEMP continues to be comprehensive in scope and has the ability to detect very small changes in the sampled parameters that can alert managers to any emerging problems with waterborne contaminants from mining activities. We commend BHPB in its efforts to deal with elevated *nitrate* levels released from the LLCF, although we still have concerns with some metals that continue to increase in concentration and are close to or above the CCME guidelines, especially molybdenum and copper.

Biota

According to BHPB's consultant (Rescan), *zooplankton* diversity was the lowest ever recorded in Leslie and Moose lakes and this was attributable to the mine. Rescan believes this is due to the disappearance of three species (two rotifers and a *cladoceran*). It is not yet known whether this has any potential impacts to organisms (i.e. fish) farther up the food chain.

The *Cladocera* populations in Moose and Nema lakes are again depressed to very low numbers and as a relative proportion of total *zooplankton* community in each lake. Rescan attributes this decline to the

reduced presence of a single dominant *cladoceran* species (*Holopedium gibberum*) in lakes downstream of the LLCF. This suggests that an elevated contaminant, likely *chloride*, is likely causing contaminant-intolerant species to die off or be displaced by contaminant-tolerant species which can out-compete the more sensitive species. Increasing *chloride* was identified in an earlier statistical multivariate analysis as correlated with changes in *zooplankton* abundance.

As a result of the discovery of high *hydrocarbon* levels in fish in a 2008 study in cell E, the company will be investigating possible sources of *hydrocarbons* in the LLCF. Samples will be taken along the shorelines of cell E and other water bodies adjacent to roads and other mine structures that could be sources of *hydrocarbons*.

Water Quality Guidelines

In last year's annual report, the Agency recommended that:

DIAND [Department of Indian Affairs and Northern Development] 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.

The Agency believes that the draft "Water and Effluent Quality Management Policy", recently received from the Land and Water Boards for the Mackenzie Valley, is a step in the right direction. The choice of the project-specific *effluent* quality criteria approach would appear to be reasonable based on the available information. However, the Agency was disappointed to note that the Water/Effluent Quality Guidelines working group does not appear to have consulted with DIAND or any other parties in preparing this document.

That said, the process set forth in the Policy document, particularly Appendix A, will hopefully result in useful guidance for both proponents and intervenors in the Land and Water Boards' processes. The Agency recommends that the responsible parties move forward as quickly as possible to finalize the Policy and to develop the supporting documentation.

Aquatic Effects Monitoring Program Guidelines

As noted in last year's annual report, a guidance document has been drafted by DIAND for developers interested in working in the NWT. The Agency had identified a lack of information regarding the use of Traditional Knowledge (TK) in developing the guidelines. We are pleased to report that a TK component has now been included in the latest draft

version. DIAND led a working group tasked with developing a "toolbox" for TK use by developers. The working group included representatives of all three diamond mine monitoring groups. The resulting document, titled "Toolbox for Including Traditional Knowledge in Aquatic Effects Monitoring Programs (AEMPs) in the NWT" details a step-by-step approach for gathering and incorporating TK into an AEMP, with a number of case studies to illustrate how it can successfully be achieved.

Special Studies

In April 2008, Environment Canada, in co-operation with BHPB, undertook a study to determine if there was a link between air emissions from incineration and environmental concentrations of contaminants in lakebed sediments. For the first ten years of operation, Ekati has used a single chamber incinerator located near the shores of Kodiak Lake. Sediment cores were collected from comparable depths for depositional areas in Kodiak Lake and Counts Lake (a reference site). Up to four layers from each core

were analyzed for 17 *dioxin and furan* congeners. Toxicity Equivalency factors (CCME 2004) were applied to the results to calculate toxic equivalencies (TEQs) which could be compared between sites and layers. The CCME Interim Sediment Quality Guideline is 0.85 TEQ/kg. The average TEQ for layers one and two in both Kodiak Lake sites was above 0.85 TEQ/kg. The upper two layers of the Counts Lake core, as well as the bottom two layers from all cores, were below this value. The results indicate that incineration products are ending up in nearby waters. Water quality and general operations of mining developments are regulated under water licences and land use permits in the NWT and Nunavut; however, air quality is a regulatory gap. Given that this study shows that incineration products are ending up in nearby waters, it is Environment Canada's position that it is time to include waste management conditions in water licences to ensure the Canada-Wide Standards for Dioxins and Furans are met and the surrounding environment is protected from these contaminants. ■



Grizzly Lake potable water source at break-up.

Sable, Pigeon and Beartooth Water Licence Renewal

The public hearing for the renewal of the Sable, Pigeon and Beartooth (SPB) water licence occurred in Behchokq in March 2009. At that time, the Agency had a number of unresolved issues: provision for fish passage in Pigeon Stream Diversion; need to address the company's contribution to *cumulative effects*; need for air quality monitoring in the licence; need for information to help set discharge limits for *chloride* at the mine; and need for a better understanding of how mine *effluent* discharged from Two Rock sedimentation

pond would behave in Horseshoe Lake. These issues were largely addressed in the final Water Licence (W2009L2-0001) granted effective August 15, 2009 and in the Reasons for Decision provided by the WLWB.

In the previous SPB licence there was a requirement for BHPB to determine "appropriate criteria for regulating chloride levels within the Sable, Pigeon and Beartooth expansion". This requirement does not appear in the current water licence. Elevated *chloride* levels are not expected to be an issue during development of the three pits (i.e. Sable, Pigeon and Beartooth), as long as they remain within the permafrost and do not intersect the *chloride*-rich waters occurring below the permafrost. However, elevated *chloride* levels may be an issue elsewhere at Ekati and a site-wide standard needs to be developed. This matter is being addressed, as noted in the Reasons for Decision: "BHPB is currently developing a site-wide WQO [Water Quality Objective] for chloride under the Adaptive Management Plan [now called the monitoring response framework]".

One other issue addressed during the hearing was BHPB's proposed use of the Environment Canada Ideal Performance Standard (IPS) for *nitrate* of 4.7 mg/L as a site specific water

quality objective for Horseshoe Lake. Since that time, BHPB appears to have adopted this standard for the entire Ekati site. While the Agency did not object to this approach for the Horseshoe Lake site, we have concerns with extending the approach to the entire site. We note the following quote from the Environment Canada *nitrate* IPS report:

"Although there may be low level effects on weight of lake trout at the proposed IPS value, no effects on survival would be expected as McGurk et al. (2006) also reported a [Maximum Acceptable Toxicant Concentration] for lake trout mortality of 886 mg/L NO3 (Table 8). **CCME (2007) recommends using the lower point as the criterion in watersheds where lake trout occur and are considered an important component of the ecosystem.**" [pg. 36, emphasis added]

Given the presence of lake trout downstream of the LLCF, we have requested that BHPB provide a full explanation why the *nitrate* IPS of 4.7 mg/L should be used.

The Agency and others had advocated the amalgamation of the two water licences covering the Ekati Mine site. We believe that the new amalgamated licence will facilitate water and waste management at Ekati and greatly simplify the reporting requirements. The Agency commends the WLWB for a productive and well run process resulting in the granting of Water Licence W2009L2-0001.



Staff sampling fish.

Panda Diversion Channel and Ten-Year Review of Monitoring Results

2009 Panda Diversion Channel Fish Monitoring:

In 2009, the 11th year of fish monitoring of the Panda Diversion Channel (PDC), monitoring concentrated on (1) adult population of the PDC and reference streams; and (2) return of adipose fin-clipped fish to the PDC.

Habitat properties (water flows and temperatures) continued to be measured. The study of grayling eggs and *fry* are no longer carried out by BHPB.

Only 2 of 1666 *fry*, fin-clipped in 2003, were caught as adults in 2009. Since most adults returning to the PDC in previous years were 7-9 year olds, we would expect to see a peak in fin-clipped grayling catches in 2010-12 if the 2003 *fry* have survived.

Ten-Year Review of Monitoring Results

Rescan's synthesis of 10 years (1999-2008) of PDC results has shown that the density (number/m² of wetted area) of grayling spawners is steadily declining in both the PDC (since 2003) and Pigeon stream which is a reference stream (since 2004). However, the Agency notes that absolute numbers of spawners using the streams has

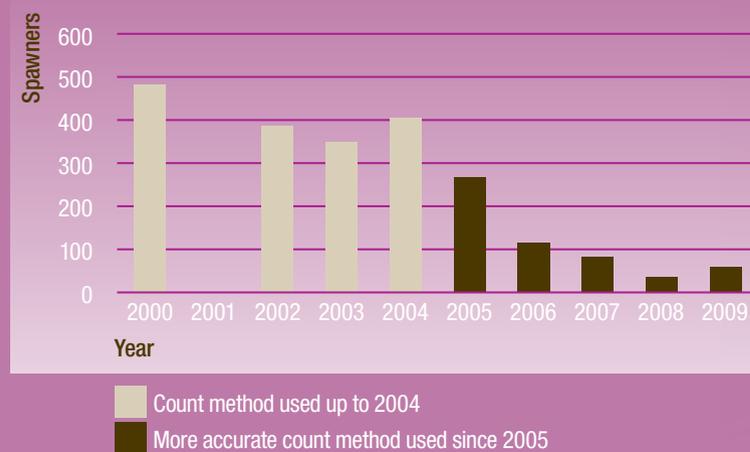
steadily declined only in the PDC (since 2004), with a slight rebound in 2009 (Figure 3). Rescan believes this is likely due to "abnormally high abundance" of grayling in the initial years (1998-2000) of PDC monitoring, due to higher primary and secondary productivity (*phytoplankton*, *zooplankton* and benthic invertebrates) as a result of sewage disposal into Kodiak Lake. Abundance stayed high until 2006 when a decreasing trend began.

The Agency is concerned that a possible alternative explanation is that the fish hatched in the early years in the PDC have not done as well as the fish hatched before the PDC was created. If this were the case, few fin-clipped fish would be seen in 2010-2012. This is why we are anxiously awaiting the monitoring results of the next few years.

The proportion of spawners that used the PDC in more than one year averaged 12% over the life of the monitoring program, with that rate increasing from 2006 to 2008. The increase in numbers of spawning grayling returning to the PDC for spawning in subsequent years indicates good-quality spawning habitat that appears to be working.

The body condition of spawners, calculated as weight x 10³/ length³, averaged 1.15 gm/mm³ (range of 1.0-1.4), similar to 18 other lakes in the region (0.77 to 1.33). Their mean fecundity is 6.7 eggs/gm (range of 2.9-9.3). Hatching success was good and the lipid content of *fry* was higher in the PDC than those in the two reference streams.

Figure 3. Number of grayling spawners using the PDC



Staff sampling grayling.

Air Quality

→ Highlights:

2006-2008 Air Quality Monitoring Program Report submitted.

Agency commissioned SENES review of 2008 AQMP report.

BHPB purchased new incinerators in 2006 yet they are still not operational.

Activities 2009-10

BHP Billiton's (BHPB) Air Quality Monitoring Program (AQMP) was initiated in 1998 and is required under the *Environmental Agreement*. BHPB currently conducts the following monitoring activities to keep track of changing air quality:

- Meteorological monitoring;
- Air emissions and greenhouse gas calculations;

- Continuous air monitoring;
- High volume air sampling;
- Dustfall monitoring;
- Snow chemistry monitoring; and
- Lichen tissue monitoring.

Emissions and greenhouse gas calculations and ambient air quality monitoring are conducted on an annual basis, while snow and lichen sampling are generally conducted every three years, with the most recent sampling year being

2008. Dustfall monitoring was initiated in 2006 and measurements are taken annually over the summer months.

BHPB's AQMP is reported on every three years. The 2008 report, released in February 2010, presents and interprets the results of the air quality monitoring programs conducted between 2006 and 2008. The results of the 2008 AQMP are also compared against the predictions of the 2005 CALPUFF modeling.



Inside continuous air quality monitoring building.

Meteorological Monitoring

Meteorological data (temperature, precipitation, wind speed and direction, etc.) are collected at three locations on site (see Figure 4).

Air Emissions and Greenhouse Gas Calculations

Calculations based on fuel consumption are used to estimate annual emissions of greenhouse gases (GHG). The average annual GHG emissions from 2006 to 2008 was 187,554 tonnes of CO₂ equivalent, 25% less than originally estimated for the 2003 to 2005 period. According to BHPB, this reduction in GHG emissions is a result of its efforts to reduce fuel consumption since 2006. This includes the company's Energy Smart Program, the "No Idle" campaign, the use of recycled oil as heating fuel and the shift from open pit mining to underground mining.

Continuous Air Monitoring

Continuous air monitoring has been conducted on site since 2007 (see Figure 4). Continuous measurements are made of concentrations of sulphur dioxide, nitrogen oxides, airborne particulates, and ambient outdoor temperature. The main benefit of the continuous data set is to complement emission calculations that were previously based on fuel consumption alone.

BHPB reported that the monthly average

concentrations are all within the Canadian Ambient Air Quality Objectives and the Northwest Territories Ambient Air Quality Standards. However, both these guidelines are intended to be compared to 1 hour, 24 hour or annual average concentrations. BHPB's data provides only monthly average concentrations and therefore should not be used to assess performance against these standards. Also, more years of data are needed to determine any temporal trends in air quality.

High Volume Air Sampling

Ambient concentrations of airborne particulate matter at Ekati have been

collected during summer since 1997 using the high volume air samplers at Grizzly Lake (TSP2) and at cell B of the Long Lake Containment Facility (TSP3) (see Figure 4). BHPB operates the samplers from June through September but does not operate them through the winter because, it states, "the electric motors that draw the air through the filter do not function properly under the extreme winter conditions".

In 2006, we recommended to BHPB that the samplers be run throughout the year. While experts agree that it is not feasible to operate the samplers on a 6-day schedule during the winter

months due to blowing snow and extreme cold, other mining operations in Nunavut and northern Saskatchewan, as well as Environment Canada, have all operated these instruments successfully in -30°C conditions. We think that BHPB should schedule sampling periods during the winter months to ensure annual ambient air quality monitoring results are accurately reflected, and to properly compare average annual suspended particulate concentrations to national and territorial standards.

In 2008, the Northwest Territories (NWT) maximum acceptable 24 hr Total Suspended Particulates (TSP)



Dust from aircraft during takeoff.

Figure 4: Dustfall and Air Quality Monitoring Stations 2008



concentration of $120 \mu\text{g}/\text{m}^3$ was grossly exceeded on two occasions: in July ($259.4 \mu\text{g}/\text{m}^3$) potentially due to forest fire smoke in the air; and in September ($267.5 \mu\text{g}/\text{m}^3$) where the field data sheet noted the presence of excessive soiling, suggesting a high concentration of suspended particulates had been deposited but the source could not be identified. The current data suggest that while Ekati Mine operations produce suspended particulates, annual concentrations are generally within accepted guidelines (less than the federal guideline of $60 \mu\text{g}/\text{m}^3$).

Dustfall Monitoring

There are 14 dustfall monitoring stations at sites around Ekati along the Fox and Misery (and previously Sable) roads, at the airstrip and at the Long Lake Containment Facility (LLCF) at cell B (see Figure 4). The stations were established to measure dust deposition patterns and supplement the existing air quality monitoring program. Each dustfall station consists of two canisters, one for sulphate, *nitrate* and insoluble and soluble particulate analysis, and the other for metal analysis. *Nitrate* and sulphate are substances that are of concern and are known to be harmful to terrestrial and aquatic environments. These substances are also measured in other components of the air monitoring program, although the 2008 report provides no discussion or interpretation as to whether the measured

nitrate and sulphate levels in the dustfall program are of concern, or how these results relate to those found elsewhere in the air quality monitoring program.

BHPB's two background reference sites for dustfall collection (AQ-49 and AQ-54) are located 21.5 km and 36 km west of the mine, coinciding with the snow and lichen collection sites. With no guidance in the Northwest Territories with regard to dustfall standards or objectives, BHPB compares Ekati dustfall levels to objectives used by British Columbia for the mining industry (1.7 to 2.9 mg/dm²/day as a 30-day average). BHPB reports that for some months, concentrations exceeded these guidelines at the reference locations AQ-49 and AQ-54. The company's conclusion is that these guidelines therefore may not be appropriate for the area, but an alternative explanation is that the reference sites are being exposed to airborne contaminants from the site.

BHPB reports that dustfall levels decrease with distance from the haul roads, with deposition rates similar to reference levels at approximately 1 km from the road. However, there is no discussion as to why in two instances (July 2007 and 2008) the maximum dustfall levels occur at the farthest measured distance (300 m and 1 km, respectively) from the Fox haul road. The company also reports that in 2007 dust deposition was highest at the Fox haul road, followed by Misery and Sable roads. BHPB concludes

that this result corresponds to the level of vehicular activity experienced on each road during those years. However, the data presented in accompanying graphs do not appear to support this generalization, as in 2007 there were higher near-field dustfall concentrations for Misery road than for Fox road. The reason for these discrepancies is unclear.

Snow Sampling

The snow sampling program was revised in 2008 in *consultation* with Environment Canada (EC), Government of the Northwest Territories (GNWT) and the Agency. It now consists of 33 sampling site locations in a generally radial pattern outward from the mine site in order to measure change with distance from the mine site (see Figure 5). The snow chemistry parameters monitored are the same as those used in the AEMP for water quality.

To analyze the data spatially, the distance from each sampling site to the nearest centre of activity was calculated. However it is not clear what was used as the point of origin of the mining source for each sample. Positive relationships were observed for a number of variables likely associated with fugitive dust such as aluminum, chromium and suspended fine particulates, with loading rates being highest close to the mine source and dropping off with increasing distance from the mine.

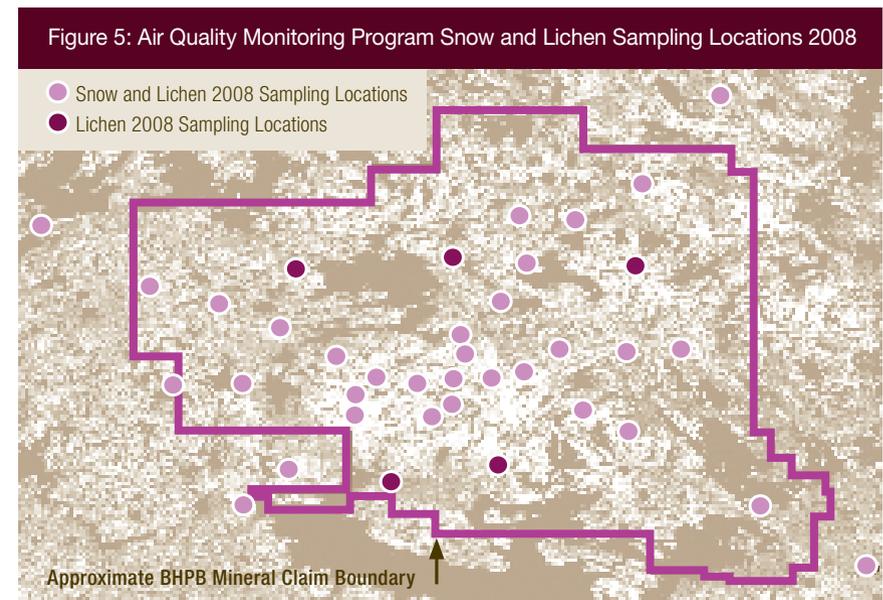
No spatial trends (up to 50 km) were observed for those variables associated with gaseous emissions, blasting, and long-range transport such as *nitrate*, ammonia and sulphate. These compounds are products of combustion and blasting at the mine and are of special concern as they are associated with acid deposition, which is known to have harmful effects on terrestrial and aquatic ecosystems.

During the past review of the AQMP, the Agency noted that there were quality assurance and quality control issues with the snow sampling methodology that may result in a degradation of *nitrates*

and sulphates in the samples. This problem in sampling does not appear to have been corrected and may result in inaccurate results and conclusions.

Lichen Sampling

Lichens are well known for being good indicators of air quality because they concentrate a variety of pollutants in their tissues including sulphur, nitrogen and metals. Lichen sampling for metals analysis is carried out every three years in conjunction with snow core sampling to measure dust dispersion from Ekati (see Figure 5). In previous reports data



limitations, including small sample size and lack of detailed lichen tissue data, prevented the analysis of change in lichen tissue concentrations over time. In 2008, improvements were made to the program including increasing the number of sample locations to 37, better sample location distribution, and refining the types of lichen sampled. In each lichen sampling plot, lichens *Peltigera rufescens* and *Flavocetraria cucullata* were sampled and field observations were taken to record the presence of dust deposition and potential smothering of vegetation. There was no visible dust apparent on the surfaces of vegetation in any of the lichen plots.

A total of 28 chemical parameters were analyzed from the lichen tissue lab results. Three metals (barium, copper and mercury) showed slightly higher concentrations in 2008 than in 2005, while six metals (aluminum, arsenic, lithium, molybdenum, uranium and vanadium) showed a decrease in concentration. The concentrations of these metals were very low for both years and, although the differences are statistically significant, the concentrations are not elevated in relation to reference values at distance from the mine.

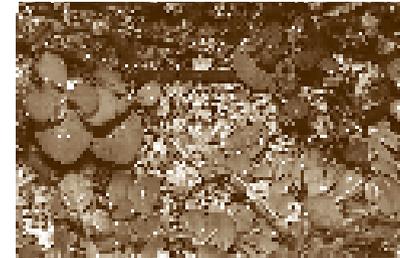
The lichen collections made in August 2008 show that dust from the mine is confined to a relatively small area around the mine site, and declines with distance outward. The results show higher concentrations of crustal elements in a

cluster surrounding the mine site and in lichens to the south and southwest of the mine site buildings. The results also indicate that volatile elements such as nitrogen and sulphur show considerable variation in concentrations over the landscape. Levels are high near the mine due to local sources such as vehicle exhaust and mining activity, but also can be sporadically high at distances from the mine.

Dustfall monitoring site results were compared with lichen tissue concentrations

for seven sites that had both sets of data available. Analysis showed that for most elements a direct relationship exists between the amount of dustfall and the concentration of elements in the lichen tissues. Concentrations in lichen tissues (*F. cucullata*) were also compared to the concentration of the same elements in snow water samples. The data from snow and lichen measurements made in 2008 indicate that a relationship between some elemental concentrations in snow water and lichen tissue is relatively strong.

CALPUFF is a widely used and respected air quality simulation model for predicting air dispersion patterns and air quality. A CALPUFF modelling exercise conducted in 2005-06 produced results that compared favourably with recent observed field data (i.e. snow core chemistry, high volume air sampling, lichen and dustfall). The model predicted that ambient sulphur (SO_2) and nitrate (NO_2) concentrations would meet industry standards and government guidelines outside of the active mining area, and that the maximum



Left: Dustfall monitoring site.

Above: Blueberries on the tundra.

nitrate deposition rates would be negligible beyond five to 10 km from the mine areas. The 2008 lichen and snow chemistry results, however, indicated that volatile elements such as nitrogen and sulphur show considerable variation in concentrations over the landscape and do not show a decreasing trend of deposition with increased distance from the mine.

In the model, the predicted dust deposition isopleths show a steep gradient of deposition close to the sources, with the deposition of suspended particulates resulting from mine fugitive dust emissions being indistinguishable from background deposition rates at a distance of 14 to 20 km from the active mining areas. This finding is consistent with the 2008 AQMP results described in the report.

Agency Assessment

The Agency has not yet completed its assessment of the 2008 AQMP Report. In early 2010, the Agency commissioned independent air quality experts at SENES Consultants to review the document and we will be providing our detailed evaluation of the AQMP in the near future. We will summarize our findings in next year's annual report. Our initial examination of the report notes that while there were improvements from the 2005 AQMP, there are areas that still need improvement, including how the results are presented and interpreted and the

methodology used for data collection. For example, the snow sampling and dustfall monitoring programs both monitor deposition rates, and a comparison of results between the two programs may provide insight into, or validation of, monitoring program results. BHPB also needs to include a brief description of the Quality Assurance/Quality Control (QA/QC) measures. The Agency suggests that BHPB re-run the CALPUFF model with the latest results to predict ambient air quality and TSP deposition, and to compare these predictions with actual

measurements taken around site.

A variety of operations at the mine affect air quality in the vicinity, and consequently have the potential to affect water quality and vegetation important to wildlife. In 2006, during technical discussions on improving the AQMP, BHPB and its consultants agreed to look at potential linkages amongst various data sets collected as part of different monitoring programs. In many of our past annual reports, the Agency has highlighted the importance of understanding the

linkages between different monitoring programs, such as the link between dust deposition and ambient air quality effects on lichen and subsequently its potential effects on caribou. Also, the linkage between air quality, the contaminants in water, and their subsequent impact on fish should be examined particularly in light of the *hydrocarbons* detected in fish in Leslie Lake. BHPB, however, has not reported on any of these linkages in its monitoring reports.

The Agency would like to see the AQMP further improved and we continue to recommend that BHPB not only involve those people with scientific expertise but also involve Aboriginal peoples with Traditional Knowledge expertise. We continue to urge BHPB to coordinate its AQMP with its neighbour, Diavik, as the influences of dust and dust deposition undoubtedly extend beyond individual mineral claims.

On a final note, the Agency is disappointed that BHPB is not yet using the new incinerators purchased in 2006. These more efficient incinerators have the potential to significantly reduce air emissions, yet they are still not operational. We note that this may be especially important given that the 2009 Environment Canada study shows *dioxins and furans* originating from the mine are collecting in lake bottom sediments (see discussion on this subject in the Aquatic Effects section of this report). ■



Grizzly Lake air monitoring station.

Wildlife Effects

→ Highlights:

Diamond mine wildlife monitoring review stalled.

Changes to wildlife monitoring – aerial caribou surveys dropped, wolverine DNA sampling restarted, and grizzly bear DNA sampling trial.

Activities 2009-10

BHP Billiton's (BHPB) Wildlife Effects Monitoring Program (WEMP) documents wildlife impacts resulting from mining activities, and assesses the effectiveness of wildlife mitigation and management efforts. The WEMP at Ekati is in its 13th year, and covers the period October 1, 2008 to September 30, 2009. As in previous years, the 2009 WEMP focused on wildlife habitat, caribou, grizzly bear, wolverine, wolf, fox and falcons. Monitoring techniques included aerial

surveys, ground behaviour observations, and compilation of incident reports and visual observations. A companion report provided a 13-year review of the upland breeding bird monitoring program.

Ekati Mine Footprint

The mine footprint increased by 41 ha during 2009, related primarily to increases in cell A of the Long Lake Containment Facility (LLCF). However, because of a change in 2009 to “centralized” calculations, and the recognition that

the entire LLCF should be included in the footprint, the revised footprint of the mine site now covers 2,992 ha (essentially 30 km²). This represents a 43% increase over values reported in 2008 (2,057 ha; 20.6 km²).

Wildlife Incidents

BHPB has worked hard to improve its waste management practices to reduce attractants at landfills, and to reduce wildlife incidents and exclude wildlife from areas of danger (e.g. airstrip, high traffic



PHOTO: KIM POOLE

Gyrfalcon nestlings.

areas). Seven vehicle-related animal mortalities were reported at Ekati in 2009 (two Arctic hares, two Arctic ground squirrels, one red fox, one muskrat, and one ptarmigan). None of the mortalities involved Valued Ecosystem Component (VEC) species. Nine non-vehicle related wildlife mortalities were observed on site, involving eight caribou and one fox. Incidental observations of grizzly bears (69), wolves (58), wolverines (12) and foxes (126) were documented during 2009, with deterrents used for 19 bears, one wolf and 13 fox incidents. A moose was observed south of Lac de Gras in July 2009, the second year in a row that Ekati monitoring staff has sighted this species.

Four caribou mortalities associated with airport fencing were observed in 2009, which was of deep concern to a Łutsel K'e resident who witnessed two of these

mortalities. Staff of the Łutsel K'e Wildlife, Lands and Environment Committee expressed their concerns about this to the Agency. The company took some immediate steps such as trimming willows around the fences and flagging the posts, and is considering long-term solutions to avoid further fence-related mortalities. The Agency has asked BHPB to send us the wildlife incident reports that it files with the Government of the Northwest Territories, Department of Environment and Natural Resources (GNWT-ENR), as had been done in the past.

Caribou Monitoring

BHPB documents caribou abundance, distribution, and behaviour relative to the mine, including incidental observations and aerial and ground-based surveys. The aerial surveys provide data to assess

abundance, distribution and habitat use relative to distance from mine infrastructure. In 2009, 9,979 caribou were observed during aerial surveys within the Ekati study area between June 18 and October 18, with peak numbers during September. Data obtained during 2009 combined with data from previous years 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. During 2009, behavioural observations collected in collaboration with Diavik suggested no change in feeding behaviour with distance from mine. Caribou habitat suitability modelling was conducted in 2009 (it is calculated every three years), and showed a 15% decrease in the mean Habitat Suitability Index (HSI) for indirect habitat loss.

Caribou are currently of paramount concern for northerners. The summer 2009 census of the Bathurst herd estimated approximately 32,000 animals, a 90% decline over the past two decades and a 75% decline since 2006. A number of causes have been suggested including natural cycles, climate change, habitat change, predation, harvest levels, and disturbance from mineral exploration

and developments. Community members have singled out the diamond mines for impacting caribou distribution, and causing injuries as a result of road development. A 14 to 20 km zone of influence (ZOI) around mining infrastructure has been determined from a number of studies within which caribou densities are roughly 75% lower. We believe that BHPB should make greater efforts to determine the mechanism behind this change in distribution. We also urge BHPB to give greater consideration to its responsibility to understand and minimize impacts on the caribou herd at large.

Grizzly Bear Monitoring

During 2009 BHPB dropped the grizzly bear sign survey formerly used as the main monitoring tool to assess the potential mine-related effects on barren-ground grizzly bear presence and movements within the Ekati study area. The company acknowledged that the sign surveys (tracks, droppings, diggings) were likely unable to detect changes in bear presence or habitat use due to mining activity. As such, there was no formal monitoring program in place in 2009, a year that was supposed to be used to develop a program for implementation in 2010.

Grizzly bear habitat suitability modelling was conducted in 2009, using a ZOI of 9 km developed from sign surveys. A 13-19% reduction in mean HSI values for indirect habitat loss for sexes and seasons was calculated, but BHPB



Peregrine nest.

largely dismisses these results. Given that the sign surveys were shown to be a poor technique to assess impacts to grizzly bears, we wonder why these data were used as the basis for modelling.

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 18 historic dens, surveyed in collaboration with ENR in 2009, three were occupied in June, but none were successful. The Wedge Lake den 3 km northwest of the mine, which was used by wolves in 2008, was not surveyed in 2009.

Wolverine Monitoring

The number of incidental wolverine observations and incidents was much reduced in 2009 in comparison to previous years. No track counts were conducted in 2009, and the DNA study was reinstated in April 2010, with concurrent studies conducted at Diavik.

Bird Monitoring

While the North American Breeding Bird Survey was conducted for the seventh year in 2009, other surveys for upland breeding birds at Ekati were suspended. A comprehensive “closing report” of the 13 years of data was prepared. The

review found that mean species richness (the number of different bird species), species evenness (the relative abundance of species), and species diversity (species richness and species evenness) did not differ between mine and reference sites and have remained relatively stable. Species density for the overall community was higher at mine sites. Individual species densities differed for nine species between mine sites and reference sites, but trends in densities over time were consistent. This suggests that other variables (e.g. habitat, weather, etc.) may have created inherent differences at the two types of sites. On the whole, the bird monitoring detected little overall impact to tundra breeding bird populations, except for the removal of habitat by mine infrastructure footprint.

Raptors continue to nest on pit walls at Ekati and in the surrounding study

area. Raptor surveys, conducted in conjunction with ENR, found continued high use by peregrine falcons (13 sites occupied; chicks at three sites), while only one site was occupied by gyrfalcons (unsuccessful nest site in Fox Pit). No influence of distance from mine on site occupancy was observed.

Review of Diamond Mine Wildlife Monitoring Programs

During September 2009, the Agency participated in a workshop facilitated by ENR and the three diamond mines. The main objectives of the meeting were to determine whether monitoring objectives should be changed, whether the study designs should be changed and/or standardized among the mines, and how the mines' wildlife monitoring efforts could be better linked with ENR or Environment

Canada monitoring programs. Two dozen recommendations and suggestions were made on how the mines could revise or improve their wildlife monitoring efforts, with caribou and grizzly bears at the forefront. As of this writing there has been no response to the workshop report other than some reductions in monitoring efforts and a proposal for a field trial of grizzly bear hair snagging, even though this is a proven technique.

Proposed major changes to the 2010 Ekati WEMP over previous years were to:

- Discontinue the aerial caribou surveys;
- Discontinue grizzly bear sign surveys and conduct a pilot study using hair-snagging posts for DNA analysis at historical sign survey locations; and
- Conduct the wolverine DNA study in spring 2010.



Left: Arctic Hare.

Above: Capitulate lousewort.

The Agency urges BHPB and the other diamond mines to collectively respond to the recommendations and suggestions in a timely manner. We also suggest that there be a regular (every three years) review of wildlife monitoring and management, just as there is of the Aquatic Effects Monitoring Program (AEMP) pursuant to the water licence. This approach would be consistent with s. 6.3 (b) of the *Environmental Agreement* where the company is required to develop and update its Operating Environmental Management Plan, including wildlife management plans. Note that the Agency has used the terms “monitoring and management” as it is important to not just monitor wildlife, but to apply mitigation and then measure its success.

Agency Assessment

Review of the 2009 WEMP Report

The WEMP report, while comprehensive in scope, appears at times to minimize the conclusions of the analyses, and continues to present findings that BHPB admits are tenuous at best, often based on very weak data and sample sizes. Examples of this include:

- Use of an 11 km ZOI in caribou HSI calculations, when the source report clearly stated that a 14 km ZOI is vastly more realistic and better supported by the data;

- Statements that caribou do not appear to be avoiding roads, when the scale of analysis may be totally inappropriate and BHPB admits that observer bias could be causing the results; and
- Use of a 9 km ZOI for grizzly bear calculations in HSI calculations, derived from sign surveys that it admits are limited in usefulness.

Discussions within various sections are often a regurgitation of the results, and do not provide larger trend or big-picture perspectives. The Agency hopes that the next WEMP will include more information on the big picture of what is happening to wildlife at Ekati and a more thorough assessment of the efficacy of mitigation measures. We are also disappointed that the 13-year tundra breeding bird report did not include a “what’s next” or future recommendations section. Finally, portions of the WEMP appear repetitious (for example, the 2005-06 wolverine DNA results in this WEMP are a repeat of the 2008 WEMP). BHPB should try to avoid such duplication in future reports.

Review of the Diamond Mine Wildlife Monitoring Programs

In last year’s assessment we stated general support for many of the temporary modifications made by BHPB to the WEMP for 2009, on the understanding that the WEMP program would be re-evaluated expeditiously. Primary among the

1 Recommendation

The Agency recommends that BHPB, ideally in collaboration with ENR and other mines, complete its diamond mines wildlife monitoring review and develop an improved Wildlife Effects Monitoring Program (WEMP), including addressing recommendations from the September 2009 workshop, evaluating monitoring program objectives, and developing innovative methodologies and study designs to address these objectives.

changes were dropping the wolverine snow track survey (in favour of continued DNA monitoring which recommenced in spring 2010), dropping the grizzly bear sign surveys (in favour of development of a more robust alternative, likely using hair snagging and DNA analysis), and suspension and review of the upland breeding bird surveys. The aerial caribou surveys were suspended in 2010, to “allow us the resources...to review impact predictions, objectives and methodologies for monitoring the influence of mining activities on caribou” (17 Dec. 2009 letter from Diavik and BHPB to ENR).

The Agency is, however, disappointed with the lack of progress in developing realistic and sound monitoring alternatives. Little movement has occurred since the last comprehensive wildlife workshop in September 2009, despite several efforts and joint letters from all the diamond mine

monitoring bodies. The Agency is not aware of any further action to revise the WEMP objectives and to identify mechanisms (e.g. dust deposition) that may be influencing the distribution of caribou relative to the mine footprint. In 2009, no formal grizzly bear monitoring program was conducted in order to give BHPB time to update its program. Despite this, in 2010, BHPB elected only to test hair snagging methods (a relatively well-proven methodology) rather than implement a new, more comprehensive monitoring program. We find these delays frustrating.

Although it is preferable that this work be carried out in collaboration with ENR and the other two diamond mines (because of the importance of understanding *cumulative effects* on caribou), if results cannot be attained in a reasonable length of time, then the Agency urges BHPB to proceed on its own. ■

Environmental Impact Report 2009

→ Highlights:

The Agency concluded that the 2009 EIR was unsatisfactory, resulting in a Minister's Report under the *Environmental Agreement*.

BHPB Close-Out Report and Technical Addendum addressed most concerns.

The *Environmental Agreement* requires BHP Billiton (BHPB) to produce an Environmental Impact Report (EIR) every three years. The purpose of the EIR is to report on the longer term effects of the Ekati diamond mine and the results of the environmental monitoring programs, to compare the actual environmental performance of the mine against what was predicted in the 1995 Environmental Impact Statement (EIS) and to evaluate how BHPB's adaptive environmental

management has performed to the date of each report. BHPB released the 2009 EIR in May and held technical meetings to discuss the findings later in May followed by a community meeting at the mine site in August. The Agency participated in both the technical and the community meeting. We found the meetings to be well done. They provided an excellent opportunity for those interested in or affected by the mine to hear from BHPB and its consultants what had happened

at the mine and to discuss the findings.

The Agency reviewed the EIR and provided comments in October. We had serious concerns about several aspects of the EIR, many of which had been raised three years earlier with the company, but had still not been properly addressed. In our view the EIR did not clearly identify the most important effects of Ekati, namely the rising contaminant levels in water downstream from the mine and the project



Environmental Impact Report site visit.

effects on the declining Bathurst caribou herd. We also noted that many impact significance ratings were not supported by adequate monitoring data and that this resulted in the downplaying of impacts. Moreover, there were claims of positive impacts that were false (e.g. current environmental conditions at the site have been affected by the mine but BHPB believes that this state of the environment is better than it would have been without a mine, and thus claimed it as a positive impact). There were claims of adaptive environmental management that did not make sense as the items cited were simply regular practices or routine maintenance. There were also, of course, examples of very good adaptive environmental management. These we feared would be ignored by readers because of the

presence of poor or irrelevant examples.

For these reasons, we concluded the EIR was not satisfactory and recommended it be corrected before it was accepted as final. We also observed that a requirement of the *Environmental Agreement* was not met: that BHPB must “consult with representatives of the Minister [of Indian Affairs and Northern Development], the GNWT and the Monitoring Agency as BHPB compiles the information and data to be included in such Environmental Impact Report”. The Agency requested such a meeting early in 2009 but none was held.

The Minister agreed with the Agency that the EIR was not satisfactory. A Minister’s Report was issued to BHPB pursuant to the *Environmental Agreement*, recommending that a meeting of the



Environmental Impact Report site meeting.

2 Recommendation

We recommend that BHPB invite all interested parties to an Environmental Impact Report (EIR) workshop to be held not later than spring 2011. This will make the results available in time for BHPB’s preparation of the 2012 EIR and hopefully avoid disagreement on future EIRs. The workshop should better define the purpose and focus of the EIR, review the methodology used (especially for determining significance of impacts), better define *adaptive management* in the context of the Ekati Mine, and such other matters as others may contribute.

parties (the Agency, governments, and communities) should take place to discuss how best to deal with the concerns raised. This meeting took place in December 2009. It was seen as successful by participants and identified ways of dealing with some concerns. This, we believe, is why it would have been productive to have held such a meeting before rather than after the EIR was released. The next steps to repair the deficient aspects of the EIR were agreed to at the meeting.

Subsequently, BHPB produced an EIR Close-Out Report and a Technical Addendum to deal with the matters discussed. The Agency reviewed these documents and concluded that BHPB has addressed many of our concerns regarding the methodology and findings.

However, we believe several issues remain largely unresolved, in particular the ratings for mine effects on caribou and downstream water quality, and the overall purpose and focus of the EIR. It is too late to resolve these issues for the 2009 EIR, but they do need to be properly addressed before the next EIR is produced in 2012. To assist with the process, and hopefully to avoid continued disagreement on future EIRs, the Agency intends to prepare a short discussion paper on the purpose and focus of the EIR for distribution in the fall of 2010. We recommend that these (and other EIR matters) be discussed at a workshop involving all interested parties. This workshop should be held not later than spring 2011 so that the results can be accepted in time for BHPB’s preparation of the 2012 EIR. ■

Agency Comments on the Environmental Impact Report 2009

The following observations are comments we made about the EIR as originally submitted in October 2009.

First, the EIR 2009 concluded that the only adverse effects that were assigned a 'moderate' rating were for parasites in sculpin and changes in fish biology due to the impacts from oversampling. In the Agency's view, these are not substantive or significant matters in terms of the overall effects of the project.

On the other hand, we had expected to see the rising contaminant levels downstream of the mine identified as a significant matter. In the case of *nitrate* and molybdenum, downstream discharges have exceeded CCME (Canadian Council of Ministers of the Environment) guidelines for the protection of aquatic life. BHPB decided not to release water from the Long Lake Containment Facility (LLCF) at times because of high *nitrate* concentrations, indicating the importance of this matter. Other parameters that are not regulated, such as *chloride* and nutrients, have dramatically increased within the LLCF and resulted in detectable changes as far downstream as Lac de Gras. Such changes were not predicted in the original Environmental Impact Statement (EIS).

The other important matter that we had expected to see with a much higher significance rating is the effect of the project on caribou. Several studies have now shown that there is a 14-20 km zone of influence around the mine site where caribou are less likely to be found. Given the decline in the Bathurst herd itself and that there has been no systematic monitoring of the effectiveness of caribou

mitigation measures, we had expected to see caribou identified in the EIR as a significant issue of concern. BHPB is, of course, not solely responsible for the precipitous decline in the population of the Bathurst herd, but public concern is high and monitoring and mitigation efforts should reflect this.

The EIR contained many examples of mitigative measures and environmental policies that are clearly not adaptive management as defined by BHPB but which were identified as examples of adaptive environmental management. For example, preventative maintenance programs for diesel generators are not *adaptive management* at all, but simply best practices.

Additionally, the comparison of the significance of residual effects presented in the EIR to the predictions in the EIS is not accurate. In some cases, the EIR stretches the limited information from monitoring programs to improperly draw conclusions that certain residual effects are rated as negligible.

Even though ambient air quality modeling and, more importantly, monitoring has not taken place to help determine compliance with standards and guidelines and any residual effects, the EIR concludes that there are negligible residual effects. Such a conclusion cannot be soundly drawn since the results of the 2008 air quality monitoring program (including the dustfall work, vegetation and snow sampling) were not released until March 2010, well after the EIR was distributed in May 2009.

We also had to challenge the EIR 2009 assertions that there had been no exceedances of CCME guidelines for water discharges from the LLCF. We have checked the data and had discussions with Department of Indian Affairs and Northern Development (DIAND) personnel, who found many such exceedances for *nitrate* and molybdenum based on the SNP data over the period 2006-08.

Again, while the EIR asserts that grizzly bear habitat use near the mine and the bears' movements and life histories do not appear to be significantly affected by mine activities, the EIR also notes that there are poor data to support the second half of this statement, and that changes in bear presence or habitat use from mining activity may not be detectable from the current study design. Thus, the EIR claim of insignificance is not supported.

The EIR concluded that four project residual effects are positive. It is important to note that the project effect is what is measured compared to what would have been had there been no project. Thus, the claim that the development of permafrost in the waste rock piles is a positive effect means that BHPB views the permafrost in the rock piles as being better than the undisturbed tundra. This claim was dropped by BHPB in its EIR Close-Out Report.

The EIR asserts that the removal of Leslie Lake from the mine plan is an example of a mitigative measure for land disturbance. We have always understood that Leslie Lake pipe was removed from the mine plan as a result of its poor economic potential, rather than a conscious effort by the company to limit its footprint.

Regional Monitoring and Cumulative Effects

→ Highlights:

Report on *cumulative effects* in the Bathurst herd summer range not yet released.

Revised joint management proposal for Bathurst caribou herd to be submitted by Tłıchǫ Government and GNWT to WRRB by May 2010.

CIMP program part of \$8 million funding in the 2010 federal budget over two years.

Activities 2009-10

As noted in our last annual report, Environment and Natural Resources (ENR) was to have released a report examining *cumulative effects* as a pilot project in the Bathurst caribou herd summer range in spring 2009. This report has not been released as of this writing. We hope that this report will soon be made available, to shed further light on the cumulative impacts of the mines on caribou and to

provide additional insights into how best to revise wildlife monitoring programs.

The Wek'èezhìi Renewable Resources Board (WRRB) asked for a joint proposal on caribou management actions for the Bathurst herd from the Tłıchǫ and Northwest Territories governments in 2009 as a result of public concern over the decline in the Bathurst and other caribou herds. The joint proposal from GNWT and the Tłıchǫ Government referenced

the ongoing review of the diamond mine wildlife monitoring programs as a management measure. All three diamond mine monitoring agencies submitted a joint letter of comment to the public hearing held in Behchokǫ in March 2010, highlighting the lack of progress on improving caribou monitoring and management of diamond mine effects and stating this work should become a higher priority for GNWT and the companies. The March hearing ended with the request for a revised joint management proposal to the WRRB by May 31, 2010 and we will report further progress next year.

Finally, we have some good news to report on funding for development and implementation of the Cumulative Impact Monitoring Program (CIMP) under the *Mackenzie Valley Resource Management Act* and the Nunavut General Monitoring Program under the Nunavut Land Claims Agreement. The federal government announced an allocation of \$8 million over the next two years for these two programs that should see them begin to function properly. This should prove helpful in better monitoring and managing Ekati's contribution to *cumulative effects* in the Slave Geological Province and on the Bathurst caribou herd range. ■



Caribou trails at Ekati.

Traditional Knowledge

→ Highlights:

BHPB is soliciting new TK project proposals from the communities.

DIAND has released a draft Toolbox for Applying Traditional Knowledge in Aquatic Effects Monitoring Programs (AEMPs) in the NWT.

Agency repeats our recommendation from last year requesting that BHPB document its use of TK over the last 10 years.

Activities 2009-10

For the 2009-10 year, BHP Billiton (BHPB) has not distributed any stand-alone Traditional Knowledge (TK) reports.

BHPB, however, stated in its 2009 Environmental Agreement and Water Licences Annual Report that it had invited each of the Aboriginal governments

to participate in community-based TK workshops to identify and prioritize ideas for new TK projects, and that summary reports of these workshops were prepared for the communities. BHPB also reported that it held two internal TK workshops to generate ideas for site-based projects.

BHPB reported the following four TK projects were undertaken in 2009:

- Continuation of training and support for the Naonaiyaotit Traditional Knowledge Project (NTKP) project for the Kitikmeot Inuit Association (KIA);
- Preliminary technical assessment of TK data and TK data management systems for the Łutsel K'e Dene First Nation, with further work in 2010;



Drummers in Gamèti.

- On-site environment job-shadow program offered to all Impact and Benefit Agreement groups and implemented with Łutsel K'e Dene First Nation, to be continued in 2010; and
- Donations support for the Dene National Assembly, National Aboriginal Day, Łutsel K'e Spiritual Gathering and Tłı̄chų Annual Gathering.

The Department of Indian Affairs and Northern Development (DIAND) led a working group composed of representatives of all three diamond mine monitoring groups (IEMA, EMAB and SLEMA) to develop guidelines for developers to use in incorporating TK into their Aquatic Effects Monitoring Programs (AEMPs). These guidelines are designed to promote the effective engagement of Aboriginal communities in the development of AEMPs. Released in December 2009, "Toolbox for Including Traditional Knowledge in Aquatic Effects Monitoring Programs (AEMPs) in the NWT" is a step-by-step approach to gather and use TK in designing an AEMP. The toolkit describes the benefits to both the developer and the communities in using TK. It also provides an understanding of Aboriginal community expectations when companies seek to use their TK.

In helping to develop the toolkit, we emphasized the need for understanding Aboriginal taxonomies (i.e. how Aboriginal harvesters classify organisms), as

distinct from biologists' taxonomies, which can provide important site-specific information on species or subspecies that developers may need to know in better designing their projects.

Agency Assessment

Over the past 10 years of mine operation, BHPB has conducted or funded several TK activities that it believes are relevant to environmental management of the Ekati Mine. These include the NTKP (1996-present), Łutsel K'e GIS (Geographic Information System) Project

(2000-2004), Caribou and Roads Project (2002-present) and fish health as part of the AEMP (2007), as well as site visits and other *consultation* efforts with Aboriginal communities.

However, it remains unclear what information BHPB has gained from these programs, and how TK has and is being documented and used in environmental monitoring, management and impact mitigation at Ekati. Almost since its inception in 1997, the Agency has requested that BHPB systematically document the use of TK in improving its

Ekati operations. The Agency made the following recommendation in 2008-09:

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.



Gamèti residents.

3 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.

BHPB's response was as follows:

“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” (IEMA Annual Report 2008-09, p. 3).

BHPB's response to our recommendation last year included wanting to develop “new, forward-looking TK initiatives”. Some new

projects, such as the preliminary technical assessment of TK data management for Łutsel K'e Dene First Nation, sound promising and we will be interested to see details on how this will inform environmental management at Ekati.

Other projects, such as the 2010 plans to bring elders to Ekati to demonstrate the making of traditional drums, are valuable in passing along TK within communities and between generations. Donations for community cultural and spiritual gatherings are also listed as a “TK project”, and it is mentioned that Ekati Diamond Mine was awarded a “prestigious” BHPB Health, Safety, Environment and Community award in recognition of 10 years of Impact Benefit Agreements. While these may have some value in better educating the general Ekati work force on Aboriginal culture and further BHPB's “social

contract” to mine at Ekati, whether or how such initiatives improve environmental management plans and programs at Ekati is unclear—hence our recommendation.

Other projects may have some potential to document and utilize TK in a meaningful way, such as the on-site environment job shadow program, and the hiring of Aboriginal community members to conduct wolverine DNA sampling studies. However, it remains unclear whether there is any meaningful information exchange between environment staff and Aboriginal community members (and if so, how this information is shared, documented and used), or whether Aboriginal community members are merely participating in BHPB-designed and directed projects. “Participation by itself, however, is not equivalent to the inclusion of TK.” (Draft Toolbox for Applying Traditional Knowledge in Aquatic Effects Monitoring Programs in the NWT, DIAND 2009, p.22)



Blueberries.

One of the Agency's principal tasks is to review BHPB's activities and make recommendations concerning “the integration of traditional knowledge and experience of the Aboriginal Peoples into Environmental Plans and Programs”. Without a clear understanding of how BHPB has incorporated TK in its environmental plans and programs or used it in problem-solving, it is difficult for us to fulfill this task, and to have a real basis for evaluating and identifying potentially meaningful future TK projects.

And for 2009-10 the same outstanding questions remain. Over the past 10 years, how has TK been incorporated into the Environmental Plans and Programs at Ekati? How has TK been given full consideration as the Environmental Plans and Programs are developed and revised? What are the successes and lessons learned from these processes? What changes or improvements to design, operations and mitigation over the past 10 years at Ekati can be attributed to TK? How is the expertise and experience of Aboriginal Peoples being integrated into Environmental Plans and Programs today, and what are the plans for future inclusion of TK?

Therefore, to further stress its significance and value, for 2009-10 we repeat our previous recommendation and look forward to working with BHPB on this review. ■

Assessment of the Regulators

→ Highlights:

Regulators remain effective in ensuring that BHPB operates Ekati as an environmentally sound mine.

DFO and DIAND did not participate in the judicial review over the ability of the WLWB to regulate fish and fish habitat as part of closure planning.

EC conducted a useful study showing the link between air emissions and lake sediment effects.

GNWT active on caribou issues.

WLWB ran well managed processes for water licence amalgamation and review of the AEMP but progress is needed on a response framework for aquatic monitoring.

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 2009-10.

Agency's Overall Assessment

As in previous years, the regulators remain effective in ensuring that BHPB operates an environmentally sound mine. Over the course of 2009-10, we identified some instances where we felt that government agencies performed well and some instances where their involvement could have been improved. We were pleased to observe willingness among all regulators to collaborate and share resources.



Explaining Ekati geology.

Department of Fisheries and Oceans (DFO)

DFO was a key participant in the Wek'èzhìi Land and Water Board's (WLWB's) public hearing to deal with BHPB's challenge to the jurisdiction of the WLWB to determine fish and fish habitat issues as part of the Ekati Interim Closure and Reclamation Plan (ICRP) process. DFO sided with all the intervenors that the WLWB, indeed, had the power to determine what role fish and fish habitat issues would play in mine closure. The WLWB ruled that it did have the jurisdiction in this area, but when BHPB appealed this decision to the NWT Supreme Court, DFO declined to intervene. The Agency believes that DFO should have continued to participate in the process and defend its position as the public trustee for fisheries resources.

On other matters relating to the Ekati Mine, DFO staff continues to be helpful to the Agency and others. DFO is exploring effective means of using the remaining fish compensation funds to offset the original impacts from loss of lake habitat when the mine was constructed. Toxicity testing of northern fish species is well underway with support from the diamond mines and others, and will yield some helpful information in setting more

appropriate water quality objectives and contaminant discharge limits.

Department of Indian Affairs and Northern Development (DIAND)

The Agency continues to be pleased with the regularity and thoroughness of the inspections carried out by the DIAND inspector over the past year. The inspector shows initiative and consistently produces high quality reports. We noted with interest the efforts to obtain and analyze independent seepage samples. With very limited resources, DIAND also contributed to the Environmental Impact Report (EIR) 2009 review process and the Aquatic Effects Monitoring Program (AEMP) three year review. As well, DIAND developed a useful guideline document for developers in designing AEMPs for projects in the NWT.

Like DFO, DIAND was a key participant in the WLWB public hearing about the board's jurisdiction in closure planning, but then



PHOTO: JASON BRENNAN

Inspector taking water sample.

dropped out when the matter was appealed to the NWT Supreme Court. The Agency believes that DIAND was wrong to drop its involvement, since serving the public interest lay in continuing to defend the ability of the regulator (i.e. the WLWB) to make decisions about needed closure conditions for the mine.

Environment Canada (EC)

EC continues to provide excellent advice to BHPB and the Agency on proper methods for monitoring and managing air quality at the Ekati Mine. EC also provided the Agency with key contacts and a detailed understanding of the *nitrate* Ideal Performance Standard (IPS), its development and applicability.

The Agency is particularly pleased with the special study undertaken by EC to conduct sediment sampling to determine whether waste incineration has resulted in aquatic contamination issues (see a fuller discussion in the Aquatic Effects section). This important work has clearly established a causal link between airborne contamination from the mine's incinerator and lake sediment quality that regulators and the company will need to address.

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

GNWT involvement in the EIR 2009 review was helpful, especially with respect to some of the wildlife matters. Although we think that caribou monitoring at the diamond

mines should be a higher priority, GNWT work with the Wek'èezhì Renewable Resources Board (WRRB) to deal with caribou management and the collapse of the mainland herds has understandably taken up much of its time. GNWT facilitation of the Diamond Mine Wildlife Monitoring Program Review workshop in September 2009 was also commendable. We look forward to working with GNWT's recently recruited air quality specialist.

Wek'èezhì Land and Water Board (WLWB)

The Agency has a good working relationship with WLWB staff who are open and helpful in providing information.

In July 2009, the WLWB finalized the amalgamation of the two BHPB Type A water licences, now referred to as W2009L2-0001. This was done in a well run process, which should facilitate improved water monitoring and management. The Agency also appreciated the good process for the three year review of the AEMP.

WLWB is involved in several Standard Procedures and Consistency Working Groups created in 2008 as a joint initiative of the Land and Water Boards of the Mackenzie Valley. The Agency has offered comments on guidelines related to waste management and closure planning, and will be dealing with the water and *effluent* quality management guidelines shortly.

The Agency appreciated the efforts of the WLWB to deal with the issue of its authority over fish and fish habitat as part of closure planning under the Ekati water licence.

The Agency is concerned that the WLWB did not take a more critical view of BHPB's proposal for the use of the Beartooth Pit as a mine water sump. The lost opportunities for closure planning and need for careful monitoring do not appear to have been reflected in the decision-making on this proposal. We will continue to pursue our concerns through the ICRP process and review of the Wastewater and Processed Kimberlite Management Plan updates.

During the ICRP process, WLWB staff also worked with BHPB and reviewers to refine the format and content of Reclamation Research Plans. BHPB was directed to revise their research plans into this new format, and they have been circulated for review. *Reclamation* research has emerged as one of the highest priorities in the ICRP process, so this is a significant step.

The Watershed Adaptive Management Plan (WAMP) has been before the WLWB for over two years now, and progress has been slow at best. Resolution of the issues of critical effects size, *chloride* and molybdenum discharge criteria and *nitrate* management has been hampered by the lack of direction. We look forward to getting these matters back on track very soon with a set of draft guidelines for a Monitoring Response Framework. ■

Assessment of BHP Billiton

→ Highlights:

BHPB continues to operate Ekati Mine in an environmentally sound manner, although there is always room for continued improvement.

Need to move forward on *reclamation* planning and research.

The lack of progress in reviewing the wildlife monitoring programs was a disappointment.

BHP Billiton (BHPB) continues to operate the Ekati Mine in an environmentally sound manner, although there is always room for improvement. We continue to enjoy a good working relationship with the company and its staff. The focus of our work with the company over the last year was largely on the Environmental Impact Report (EIR) 2009, the three-year review of the Aquatic Effects Monitoring Program (AEMP), and as an intervenor in the jurisdictional dispute concerning fish and fish habitat as part of closure planning.

We were pleased that the company agreed to revise its Reclamation Research Plans as part of the Interim Closure and Reclamation Plan (ICRP) while we awaited the outcome of the judicial review on jurisdictional matters. While we believe it was appropriate for BHPB to seek clarity on the jurisdictional matters around fish and fish habitat at closure, we are disappointed that after more than a year involving a significant expenditure of financial and human resources, we are back at the same point with little

progressive *reclamation* in the meantime. We all need to move forward with the most important priority for the Ekati Mine—ensuring that there is a proper and detailed plan in place to close the mine in an environmentally sound and sustainable manner. An approved plan must also form the basis for a review of the outstanding *reclamation* liability and full financial security which is now years out of date.

The Agency viewed the EIR 2009 as inadequate and unsatisfactory, resulting in a Minister's Report under



Underground Operations Centre at Ekati.

the *Environmental Agreement*, a very infrequent occurrence. It appeared to the Agency that the company had not reviewed or considered our comments on the last EIR, and that many of the methodological and analytical flaws had been carried forward. We are pleased to report that many of the Agency's and others' concerns were resolved in some constructive and helpful meetings after the Minister's Report. We wish to point out that most of this could have been avoided had BHPB taken our earlier advice about meeting beforehand. However, there is broad agreement now on how to address the requirements of the *Environmental Agreement* in a more collaborative process next time around.

The Agency remains concerned that the EIRs do not reflect the most significant

long-term environmental issues at site, namely the changing water quality downstream of *effluent* discharges and the avoidance of the site by caribou. We do not see any advantage to BHPB in maintaining a narrow focus on the predictions from an Environmental Impact Statement (EIS) that is now over 15 years old. We hope to arrive at a better shared view of the purpose and focus for future EIRs.

The Agency was disappointed at the lack of progress on the review of the diamond mine wildlife monitoring programs. While we appreciate the difficulty in coordination amongst three different mines, there is a critical need for regular evaluations of the programs, something that used to take place on an annual basis with the environmental workshops that were held. With the high public concern over

caribou, there is a need to respond with more effective monitoring and mitigation measures. The Agency remains willing to work with BHPB and others to ensure that wildlife monitoring and management is the best it can and should be.

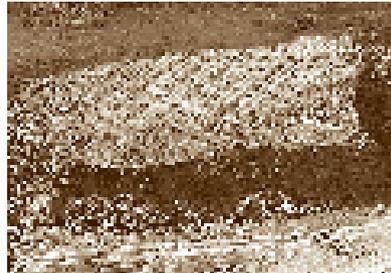
In 2009, BHPB conducted the Fay Lake monitoring program in response to the accidental *processed kimberlite* release from cell B of the Long Lake Containment Facility (LLCF) in 2008. There was a very significant engineering project at the north end of cell B to prevent further spills and completion of the ring road all around the LLCF. We await a full report on the remediation efforts to review their effectiveness and the lessons learned.

The three-year review of the Aquatic Effects Monitoring Program (AEMP)

was satisfactory, and the company was responsive to suggestions for changes and requests for additional information.

The often delayed 2008 Air Quality Monitoring Program report was distributed in October of 2009. The Agency commissioned a peer review and is in the process of working through that with the company and regulators to ensure that further improvements are ready for the 2011 sampling season. We have been pleased with BHPB's responsiveness to date on this review and will report the outcome next year.

As a general observation, we have noted that monitoring programs at Ekati have generally improved and become more focused on important issues. However, it is not always clear what happens with the results of the monitoring programs and how they inform improved environmental management including mitigation. For example, the good aquatic monitoring program currently in place is detecting changes downstream of the mine, but few thresholds have been set and there are no comprehensive management responses or plans for contingencies in place. The forthcoming Mackenzie Valley Land and Water Board guidelines on a response framework for AEMPs may provide some assistance, but it may also be time for BHPB to update and distribute revisions to its Operating Environmental Management Plans. ■



Left: Fox Pit.

Above: Fox Pit *kimberlite* ready for blasting.

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 judgements 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.



Jaída Ohokannoak
Secretary Treasurer

May 20, 2010

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, 2010 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, 2010, and the results of its operations and cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.



Chartered Accountants
Yellowknife, Northwest Territories

May 20, 2010

STATEMENT OF
OPERATIONS

For the year ended March 31

	2010	2009
REVENUE		
BHP Billiton Diamonds Inc. - core funding	\$ 624,494	\$ 610,072
External review	-	28,000
Interest income	3,727	8,776
	628,221	646,848
EXPENDITURES		
Auditing	12,000	13,958
Accounting fees	6,505	7,792
Advertising and website	5,492	3,419
Amortization	2,825	2,796
Board support		
- honoraria	150,759	103,552
- travel, meals and accommodation	61,989	51,242
Community consultation		
- annual general meeting	20,192	17,680
- annual report	47,398	43,039
- community visits	29,073	33,546
- environmental workshop	1,160	31,927
Consultants	4,764	5,400
Equipment lease	812	1,217
External review	-	18,688
Insurance	2,844	6,985
Office rent and maintenance	33,725	32,529
Office supplies	5,110	2,816
Postage and freight	686	811
Professional development	1,480	840
Separate fund		
- honoraria	10,032	35,700
- other	1,410	1,637
- professional fees	55,559	-
- travel, meals and accommodation	2,931	12,508
Staff recruitment	12,000	12,028
Staff travel	1,714	1,188
Telephone and fax	4,972	5,307
Wages and benefits	153,253	183,305
	628,685	629,910
Excess revenue (expenditures) before the following	(464)	16,938
Transfer to contribution repayable	(7,569)	(16,329)
Loss on disposition of capital assets	(647)	(609)
Excess (expenditures)	\$ (8,680)	\$ -

**STATEMENT OF CHANGES
IN NET ASSETS**

For the year ended March 31

	2010	2009
General operating fund, beginning of the year	\$ 6,247	\$ 6,247
Excess (expenditures)	(8,680)	-
General operating fund, end of year	\$ (2,433)	\$ 6,247

**STATEMENT OF FINANCIAL
POSITION**

For the year ended March 31

	2010	2009
ASSETS		
Current		
Cash	\$ 67,243	\$ 75,750
Short term investments (Note 5)	250,404	340,971
Receivable from directors	-	2,361
Prepaid expenses	5,049	2,941
	322,696	422,023
Capital assets (Note 6)	21,335	22,897
	\$ 344,031	\$ 444,920
LIABILITIES		
Current		
Accounts payable and accrued liabilities	\$ 44,641	\$ 97,597
Contributions repayable (Note 7)	5,799	45,978
Deferred revenue	296,024	295,098
	346,464	438,673
FUND BALANCE		
General operating fund	(2,433)	6,247
	\$ 344,031	\$ 444,920

Approved on behalf of the Board


William A. Ross, Director



Jaida Ohokannoak, Director

STATEMENT OF CASH FLOWS

For the year ended March 31

CASH FLOW SOURCES (USED FOR)	2010	2009
Operating activities		
Funding received current year	\$ 285,374	\$ 366,208
Funding received 2009/2010 advance	296,024	295,098
Paid to suppliers	(366,879)	(234,928)
Paid to employees	(153,253)	(183,236)
Paid to directors	(158,430)	(204,952)
	(97,164)	38,190
Financing activity		
Withdrawal from (investment in) short term investments	90,567	(260,926)
Investing activity		
Purchase of capital assets	(1,910)	(20,055)
Change in cash position	(8,507)	(242,791)
Cash position, beginning of the year	75,750	318,541
Cash position, end of the year	\$ 67,243	\$ 75,750

NOTES TO FINANCIAL STATEMENTS

March 31, 2010

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

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 did not have an impact on the Agency's financial results.

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 nonfinancial derivatives and identifies the information that should be disclosed about them. Under the new standards, policies followed for periods prior to the effective dated 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 6. 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) Deferred revenue

Contributions received in advance are deferred. The amounts will be taken into income as services and goods are acquired.

(g) 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**International Financial Reporting Standards**

In 2006 the Canadian Accounting Standards Board ("AcSB") published a new strategic plan that will significantly affect financial reporting requirements for Canadian entities. The AcSB strategic plan outlines the convergence of Canadian GAAP with International Financial Reporting Standards ("IFRS") over a five-year transitional period.

In February 2008, the AcSB announced that for fiscal years beginning on or after January 1, 2011, all entities in Canada have to adopt IFRS to enable comparison of similar entities in the public and private sectors.

The Agency, not being a Publicly Accountable Enterprise ("PAE"), could adopt Public Sector Accounting Standards ("PSAS") or Private Enterprises GAAP ("PE GAAP"), instead of IFRS. The Agency must choose which of these sets of standards they will adopt, but has not yet made that choice. Implementation of whichever set of standards the Agency chooses is mandatory for fiscal years beginning on or after January 1, 2012, but earlier adoption is permitted. The impact on the financial statements of the Agency of either options has not yet been determined.

5. SHORT TERM INVESTMENTS

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

	2010	2009
Cashable Government Investment Certificate (matures March 2011)	\$ 200,000	\$ 250,000
Cashable Government Investment Certificate (matures October 2010)	50,404	90,971
	\$ 250,404	\$ 340,971

6. CAPITAL ASSETS

				2010	2009
	Rate	Cost	Accumulated Amortization	Net Book Value	Net Book Value
Office equipment	20%	\$ 12,180	\$ 9,700	\$ 2,480	\$ 3,100
Computers	30%	5,719	5,306	413	1,236
Website	30%	15,120	-	15,120	15,120
Computers	45%	4,327	2,915	1,412	-
Computers	55%	1,910	-	1,910	3,137
Computer software	100%	2,543	2,543	-	304
		\$ 41,799	\$ 20,464	\$ 21,335	\$ 22,897

7. CONTRIBUTIONS REPAYABLE

	2010	2009
BHP Billiton Diamonds Inc.		
2006/2007 fiscal year	\$ -	\$ 7,867
2007/2008 fiscal year	-	21,782
2008/2009 fiscal year	(1,770)	7,017
2009/2010 fiscal year	7,569	-
External Review		
BHP Billiton Diamonds Inc.	-	3,771
Government of Canada Indian Affairs and Northern Development	-	5,541
Total contribution repayable	\$ 5,799	\$ 45,978

Contributions repayable arising from one fiscal year are normally deducted from contributions provided by BHP Billiton Diamonds Inc. in the following fiscal year. During the year, the Agency made a \$1,770 overpayment to BHP Billiton Diamonds Inc. that related to the external review from the prior year. This amount has been reconciled against the current year's contribution repayable.

8. ECONOMIC DEPENDENCE

The Agency receives 99% (2009: 99%) 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.

9. 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

Residual risk is rated using a ranking system that involves subjective judgements of the severity of the risk, the exposure of the Agency to that risk or threat, and the probability of the risk or threat actually happening. It is important to note that the Board of Directors and staff collectively make the evaluation of risk and that this evaluation is reviewed at least on an annual basis.

Source of Risk

This refers to Agency's fixed assets (e.g. computers, furniture, administrative records, and the overall office), human resources (e.g. the Agency's staff or Directors), activities (actions of the Agency's staff or Directors), or issues that may arise that would affect the Agency's status and credibility.

Threat or Risk

This refers to potential physical threats or risks that may affect the function, efficiency, or credibility of the Agency. Threats and risks are identified for the purposes of planning and scenario building.

Mitigation and Management Action

Measures already in place for the Agency and its staff, to reduce the probability and impacts of any perceived threats or risks.

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.

10. 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:

	2010	2009
Current Assets	\$ 322,696	\$ 422,023
Current Liabilities	(346,464)	(438,673)
	\$ (23,768)	\$ (16,650)

Summary of Work Plan and Core Budget 2010-11 and 2011-12

→ Highlights:

Five board meetings and the annual general meeting in Yellowknife.

Environmental Impact Report 2012 meetings in Yellowknife and at the Ekati Mine site.

Board meeting, community visit and open house.

Presentations to communities upon request.

Participation in the final hearing on the closure plan and revisions to financial security for *reclamation*.

Improved communications from the Agency.

The work plan is based upon the direction and feedback received from our Society Members at our annual general meeting in December 2009 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 2010-11 BHP Billiton (BHPB) will contribute approximately \$622k to the Agency and in 2011-12 approximately \$638k (assuming a 2.5% increase in CPI) (see Table 4).

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, ongoing

and anticipated initiatives. Guests are invited to meetings to provide updates and receive input on their specific activities. BHPB, Wek'èezhii Land and Water Board (WLWB) staff and the Department of Indian Affairs and Northern Development (DIAND) inspector are regular guests.

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 2010-11:

- The regular environmental monitoring reports for 2009 if received in time (AEMP, WEMP, and Panda Diversion Channel);
- Special reports such as Phase I Processed Kimberlite Containment Area *reclamation* plan, and processes such as the Diamond Mine Wildlife Monitoring Program Review; and

Table 4. Core Budgets 2010-11 and 2011-12

Activity	Forecasted 2009-2010	Proposed 2010-2011	Proposed 2011-2012
Board Meetings	130,709	114,350	115,250
Review of Documents	46,206	36,000	36,250
Separate Fund	63,982	40,000	40,000
Communications	153,956	172,850	175,150
Outside Contracts	4,764	10,000	10,000
Mgmt and Admin	209,651	251,200	257,480
TOTAL	609,268	624,400	634,130
(approved)	616,925	622,737	638,306

- BHPB's Ekati Annual Environmental Report.

There are also two new meetings for BHPB, GNWT, DIAND and the Agency to better coordinate implementation of the *Environmental Agreement*.

The same workload is expected in 2011-12, although the focus may shift with some work on the next Environmental Impact Report.

Separate Fund Activities

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 2010-11, the Agency expects the following:

- Participation in the WLWB public hearing (scheduled for September 2010) and follow up on the Interim Closure and Reclamation Plan (review of *reclamation* liability and securities).

For 2011-12, 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, and 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 will host an

environmental workshop in 2010-11 as the company is not preparing an Environmental Impact Report. The Agency will continue to produce two annual reports, one in plain language and one technical.

The same activities are anticipated in 2011-12 although a communications strategy may result in some additional initiatives.

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 executive director and one communications and environmental specialist. 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. ■



Agency board meeting in Gamètì.

Acronyms and Glossary

Acronyms

AEMP	Aquatic Effects Monitoring Program	IPS	Ideal Performance Standard
AQMP	Air Quality Monitoring Program	LLCF	Long Lake Containment Facility
BHPB	BHP Billiton	MVLWB	Mackenzie Valley Land and Water Board
CPI	Consumer Price Index	MVRMA	Mackenzie Valley Resource Management Act
CCME	Canadian Council of Ministers of the Environment	NWT	Northwest Territories
CES	Critical Effects Size	PDC	Panda Diversion Channel
CIMP	Cumulative Impacts Monitoring Program	PK	Processed Kimberlite
DBCI	De Beers Canada Inc.	QA/QC	Quality Assurance/Quality Control
DDMI	Diavik Diamond Mines Inc.	SLEMA	Snap Lake Environmental Monitoring Agency
DFO	Department of Fisheries and Oceans	SNP	Surveillance Network Program
DIAND	Department of Indian Affairs and Northern Development (also known as Indian and Northern Affairs Canada or INAC)	SPB	Sable, Pigeon and Beartooth
DNA	Deoxyribonucleic Acid	TG	Tłı̨chǫ Government
DO	Dissolved Oxygen	TK	Traditional Knowledge
EC	Environment Canada	TSP	Total Suspended Particulates
EFPK	Extra-fine Processed Kimberlite	VEC	Valued Ecosystem Component
EIR	Environmental Impact Report	WAMP	Watershed Adaptive Management Plan
EIS	Environmental Impact Statement	WEMP	Wildlife Effects Monitoring Program
EMAB	Environmental Monitoring Advisory Board (for the Diavik mine)	WLWB	Wek'èezhìi Land and Water Board
ENR	GNWT's Department of Environment and Natural Resources (previously known as RWED or Resources, Wildlife and Economic Development)	WPKMP	Wastewater and Processed Kimberlite Management Plan
GHG	Greenhouse Gases	WQO	Water Quality Objectives
GN	Government of Nunavut	WRRB	Wek'èezhìi Renewable Resources Board
GNWT	Government of the Northwest Territories	ZOI	Zone of Influence
HSI	Habitat Suitability Index		
IACT	Inter-Agency Coordinating Team		
ICRP	Interim Closure and Reclamation Plan		
IEMA	Independent Environmental Monitoring Agency ("the Agency")		
INAC	See DIAND		

Glossary

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

Adaptive Management - Continual monitoring so that if initial mitigation measures are ineffective, additional or alternative mitigation is applied to keep the impact within acceptable levels.

Benthos - The bottom of rivers, lakes and ponds that can contain living organisms (e.g. benthic invertebrates). Benthic invertebrates like mosquito larvae are an important food source for small fish.

Chlorides - Salts resulting from the combination of the gas chlorine with a metal. Small amounts of chlorides are required for normal cell functions in plant and animal life, but fish and aquatic communities cannot survive in high levels.

Cladocera - A type of zooplankton.

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.

Dioxins and Furans - Toxic substances released into the atmosphere primarily from waste incineration. They are extremely persistent and can accumulate in biological tissues.

Effluent - Waste water that flows into a receiving body of water.

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 (Akaitcho 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.

Hydrocarbons - Organic compounds which contain only hydrogen and carbon. This includes fossil fuels (coal, petroleum and natural gas) as well as their derivatives such as plastics, solvents and oils.

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.

Meromixis - A lake that is chemically stratified with incomplete circulation. In a meromictic lake, the two layers do not mix.

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

Phosphorus - A plant nutrient that can cause rapid bacteria and algae growth when present in high amounts.

Phytoplankton - Microscopic plants, such as algae, found in freshwater and ocean environments. They are an important food source for zooplankton.

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 from the ore. 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 - See "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. They are an important food source for small fish.

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™

TECHNICAL ANNUAL REPORT 2009-10

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