TECHNICAL ANNUAL REPORT

INDEPENDENT ENVIRONMENTAL MONITORING AGENCY

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE

Message from the Chair

It is my pleasure to provide this report from the Chair in the fifteenth year of the Independent Environmental Monitoring Agency (the Agency) and to report that BHP Billiton Canada Inc. (BHPB) has continued to do a good job of environmental protection at the EKATI[™] Diamond Mine (Ekati). Major developments in the last year have been the formal approval of the Interim Closure and Reclamation Plan (ICRP), which was conditionally approved the previous year, a subsequent start on calculating the financial security necessary to close the mine based on the ICRP, and the approval of the deposition of tailings into Beartooth Pit. These are, in our view, positive developments, and we have worked with BHPB and others to make them happen.

The process for determining needed financial security is proceeding, and we are making every effort to be engaged in it as required by the Environmental Agreement. If we are successful and the process goes well, we will be able to assure our Society Members that the security held is sufficient to ensure there will be no public liabilities whenever the mine is closed in accordance with the ICRP, and that security can be returned to the company in a timely manner. Last year, we expressed concern about how the Environmental Impact Report (EIR), produced every three years and due in 2012, was being handled. Several meetings on the EIR have taken place. We believe that because of this consultation the current version will be much improved. We will know in a few months.

Last December, at the time of our annual general meeting, we held a workshop focused on Traditional Knowledge. All of our Society Members participated and the Agency is pleased with the results and recommendations, which we have circulated. These formed part of the basis for our recommendation concerning community consultation and closure in this annual report.

In terms of wildlife monitoring, we have seen both positive and negative developments at Ekati. The regional grizzly bear monitoring program appears, at the time of writing this report, to be proceeding well. Caribou monitoring, on the other hand, seems quite uncertain to the Agency and forms the basis for our second recommendation.

For the last few years, the Agency has been told it needs to develop and implement an effective Communications Plan. We are pleased to report major progress in carrying out that task. At the beginning of this year, we hired Allison Anderson as our Communications and Environmental Specialist. She has been working hard to complete several communications tasks described in this annual report. We welcome Allison, and we welcome the return of Sheryl Grieve to the Agency as a director. We also wish to thank Audrey Enge and Monica Krieger, who left the Agency last year, for their contributions.

In the coming year, we will work hard to ensure that the water licence renewal process goes smoothly and results in a good water licence suitably protective of the environment.

We welcome your input and suggestions. As always, we will make our best efforts to address any questions or concerns you may have.

M. d. how

William A. Ross, Chairperson March 31, 2012

Ekati Diamond Mine





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 Chairperson since 2003. His goal for the Agency is that, when the Ekati Mine closes, BHPB 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 First Nations (Łutsel K'e Dene 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 since 1980. He specializes in studies of fish, Arctic seabirds and marine invertebrates and has assisted Aboriginal communities in documenting their indigenous environmental knowledge. Tim would like to see more Aboriginal youth engaged in the environmental sciences and Traditional Knowledge used more effectively in environmental monitoring, research and impact assessments. Tim has served as the Agency's Vice–Chairperson since 2004.



Jaida Ohokannoak APPOINTED DECEMBER 2003 Appointed by Kitikmeot Inuit Association.

Jaida Ohokannoak lives in Cambridge Bay, Nunavut and has lived and worked in small northern communities for 20 years. She is experienced in environmental assessment, renewable resource management, research and monitoring studies. Jaida believes mining can be conducted in an environmentally responsible manner that benefits both industry and local people. Jaida has served as the Agency's Secretary-Treasurer since 2004.



Sheryl Grieve APPOINTED NOVEMBER 2011

Appointed by North Slave Métis Alliance.

Sheryl is a geographer, environmental scientist, longtime northerner and current manager of the Environment, Lands and Resources Branch of the North Slave Métis Alliance. She specializes in culturally appropriate environmental assessment using indigenous values in benefit-cost analysis and Geographic Information Systems.



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 Northwest Territories 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 Tłįchǫ 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 an independent wildlife biologist with over 25 years of experience in the Northwest Territories, Nunavut and British Columbia in the areas of wildlife research and assessment of impacts due to forestry, mining and tourism.



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■ NORTHWEST TERRITORIES ■ NUNAVUT

Agency Recommendations for 2011–12

RECOMMENDATION 1

The Agency recommends that BHPB implement in 2013 a monitoring program with the objective to determine the influence of mine-related activities on the relative abundance and distribution of caribou.

BHPB Response: BHP Billiton monitors for mine-related effects on caribou in several ways. Behavioural scans were augmented in 2011 by remote cameras and enhanced field procedures, which will continue through 2012. Also, an aerial survey is planned for 2012. The specific programs for caribou monitoring in 2013 will consider the information gathered in 2012.

RECOMMENDATION 2

BHPB should undertake more effective community consultation regarding closure in order to:

- > Achieve better community understanding of the closure plan;
- Gain a better understanding of the views of communities regarding closure; and
- Facilitate the incorporation of Traditional Knowledge into closure planning.

BHPB Response: It is important to BHP Billiton that Aboriginal communities participate in planning for closure and reclamation of the EKATI Diamond Mine. The *Interim Closure and Reclamation Plan* approved by the Wek'èezhi Land and Water Board includes programs that will build on established relationships to further enhance community participation. BHP Billiton will seek to work directly with Aboriginal communities through 2012 and beyond to implement these programs.

Themes	Frequency
Environmental management, planning and reporting Traditional Knowledge and Aboriginal involvement Closure and reclamation Aquatic monitoring and fisheries Waste rock management, seepage and characterization Wildlife monitoring Kodiak Lake monitoring Regional monitoring and cumulative effects	
Role of government in environmental management Air quality monitoring	0 2 4 6 8 10 12 14 16 18 20

AGENCY RECOMMENDATION THEMES 1997–2012

Recommendation Recipient	Frequency of Recommendations
ВНРВ	88
Government (GNWT, Government of Nunavut, Government of Canada)) 14
Water Boards (NWT Water Board, MVLWB, WLWB)	8
Environmental Agreement signatories	
Aboriginal Society Members and BHPB	3
Aboriginal Society Members	
All Agency Society Members	1
	Total 118



Agency Activities and 01 Assessing the Agency

HIGHLIGHTS

- > Held four board meetings, an annual general meeting and an open house in Yellowknife.
- Completed an Agency Communications Plan and made further improvements in our communications efforts and website.
- > Hosted a workshop on community-based TK projects.
- > Delivered presentations to members of Łutsel K'e Dene First Nation and North Slave Métis Alliance.
- Participated in the review of aquatic and wildlife monitoring programs, closure and reclamation guidelines and BHPB's annual environmental report.
- > Conducted site visits to the Ekati Mine.

ACTIVITIES 2011–12

The main activities of the Agency over 2011–12 are highlighted in Table 1.

This year, the Agency held four board meetings in Yellowknife as well as our annual general meeting and an open house in December. Participants in our annual general meeting discussed their concerns about environmental changes at Ekati detected to date, winter road operations, pit reclamation and the need to get the new incinerator operational.

The Agency conducted two site visits to the mine this year. Agency staff visited the site in April 2011 to see the widening of the Panda Diversion Channel, and our directors and staff toured the site and met with BHP Billiton (BHPB) staff in June 2011.

Technical Reviews and Input

Throughout the year, the Agency participated in reviews of key regulatory initiatives and BHPB environmental reports (see Tables 2 and 3 for more information).

There has been no effective grizzly bear monitoring in the Slave Geological Province since diamond mine operations commenced in the 1990s. The Agency believes a coordinated and collaborative process is a sound approach to grizzly bear monitoring based on hair snagging and DNA (deoxyribonucleic acid) analysis, a proven technique used by the diamond mines for wolverines. We continued to push for an effective and coordinated regional approach beginning in 2012. In November 2011, we participated in a grizzly bear monitoring workshop sponsored by the Government of the Northwest Territories' (GNWT) Department of Environment and Natural Resources (ENR) to discuss objectives and methods for a regional monitoring program. We were pleased with BHPB's initiative in proposing a joint regional program, which appears to be on track for summer 2012.

In addition, in May 2011, the Agency provided feedback to ENR on the proposed new *Wildlife Act*. We supported an improved framework for wildlife monitoring and management plans. Although the bill with the proposed changes was withdrawn, we understand it is likely to be tabled again in 2012–13.

In July 2011, the Agency participated in a technical meeting to review the filling of the Long Lake Containment Facility with the aim of keeping processed kimberlite out of cell D. In December 2011, the Wek'èezhi Land and Water Board approved an updated *Wastewater and Processed Kimberlite Management Plan* allowing for the use of Beartooth Pit for the disposal of processed kimberlite, but requested additional information from BHPB.

In September 2011, the Agency submitted several comments to Aboriginal Affairs and Northern Development Canada (AANDC) on BHPB's Environmental Agreement and Water Licence Annual Report 2010. While we found the report to be generally satisfactory, we made

TABLE 1: MAIN AGENCY ACTIVITIES

Date and Location	Purpose	Main Issues
May 18, 2011 >>> Yellowknife	Snap Lake Environmental Monitoring Agency Update	> Agency Executive Director provided updates on Agency activities and wildlife, water and air quality issues and activities at Ekati.
June 3, 2011 >>> Yellowknife	Agency Met with BHPB Consultants	 > Agency director and Executive Director met with BHPB consultants (at BHPB's request) to conduct a Human Rights Impact Assessment of BHPB's operations in Canada, including Ekati. > Agency stated there is a good framework for environmental management in the NWT, but it is not always implemented well. BHPB generally performs well, but there is room for improvement. > Report is to be completed by the end of June 2011. BHPB to decide if it will be released publicly.
June 6, 2011 >>> Yellowknife	Inter-Agency Coordinating Team Meeting	 > BHPB provided an update on site activities, including the widening of the Panda Diversion Channel and any related sedimentation. > Some discussion on fish sampling, deposition of processed kimberlite and the incinerator.
June 17, 2011 >>> Yellowknife	Environmental Agreement Implementation Meeting	 > Agency and BHPB gave presentations on communications. > Agency presented an overview of its 2010–11 annual report with recommendations. > Parties discussed opportunities for collaborative monitoring with Diavik on air quality and wildlife. BHPB is increasing community visits to the mine site.
July 15, 2011 >>> Yellowknife	Meeting on Managing Sediments in the PDC	>BHPB staff met with the Agency and DFO to discuss remediation of a pond and sediment source above the newly-widened PDC. BHPB to cap the pond bottom and construct a weir to control drainage.
August 29, 2011 >>> Yellowknife	Extra-Fine Processed Kimberlite Teleconference	> Agency met with BHPB and consultants on settling of extra-fine processed kimberlite in the LLCF. Freezing action in the tailings appears to improve settling.
September 16–19, 2011 >>> Lake Louise, Alberta	International Mine Closure Conference	> Agency director and staff attended plenary and technical sessions and took pre-conference professional development courses on pit lakes reclamation, cover design and water management.
November 2, 2011 >>> Yellowknife	Grizzly Bear Monitoring Workshop	 > GNWT sponsored a workshop to discuss objectives and methods for a regional grizzly bear monitoring program based on hair snagging and DNA analysis. > BHPB consultants proposed a jointly funded regional program.

Date and Location	Purpose	Main Issues
December 7, 2011 >>> Ekati Mine Site	Traditional Knowledge Workshop	 > Agency collaborated with BHPB to bring together community representatives and others to discuss community-based TK projects. > Communities wish to see wildlife incident reports and to be better involved in closure planning. BHPB should better document its use of TK, and BHPB should bring together people working on the TK community-based projects to share experiences.
December 9, 2011 >>> Yellowknife	Agency Annual General Meeting	 > Agency presented its 2010–11 annual report and progress to date on improving Agency communications, including the newsletter, website updates and the Ekati Timeline project. Feedback was given on a new poster design. > Some discussion on need to get the new incinerator operational, nitrate discharges, winter road operations, and closure methods for the pits.
February 2, 2012 >>> Yellowknife	Ekati Financial Security Review	>Agency directors and staff met with WLWB staff to discuss the Ekati financial security review and the Agency's role in the process.
February 3, 2012 >>> Yellowknife	Environmental Agreement Implementation Meeting	 > Agency presented its recommendations and findings, work plan and budgets. > BHPB presented on its operations for 2012–13.
February 10, 2012 >>> Łutsel K'e	Community Visit	 > Agency director and staff met with Elders and the Chief and Council, and made a presentation to a school class. > Agency heard concerns that the company had prevented the AANDC inspector from doing underground inspections at Ekati (we later confirmed this was a misunderstanding) and that wildlife deterrence measures may not be working well. Agency heard the community wants better involvement in closure planning.
February 27, 2012 >>> Yellowknife	Ekati Financial Security Review	 > Agency directors and staff met with BHPB and AANDC staff to discuss the Ekati financial security review and the Agency's role in the process. > Agreement that Agency will receive early background materials used for reclamation cost estimates.
March 12, 2012 >>> Yellowknife	North Slave Métis Alliance Community Meeting	 Agency director and staff attended a North Slave Métis Alliance community meeting, where BHPB and the Agency made presentations and answered questions. Agency was asked about water quality, the zone of influence for caribou, what will happen if the mine is sold, and how various parts of the mine will be reclaimed.



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Sender	# of Piec	es	Subject #	of F			
AANDC		13	Administration				
Agency Societ	ty		Air Quality				
Members		1	Aquatics, including AEMP, PSD, PDC widening				
BHPB		25	and monitoring, Nero-Nema and Fay Bay				
EC		4	monitoring programs and SNP monitoring				
EMAB		3	Closure and Reclamation, including ICRP,				
		45	draft guidelines and policies and financial secu	rity			
DF0			Community Engagement and Consultation				
GNWT		7	Environmental Agreement and Water				
WLWB		44	Licence Annual Report				
WRRB		2	PK and Waste Rock Management, including				
Тс	otal '	114	WPKMP, WROMP and GCMLP, pumping				
			summaries, PK deposition plan, and waste roc and WRSA seepage report	k			
			Traditional Knowledge				
			Water License, including inspections, approval	s			
			and treshet seepage report				
			Wildlife including WEMP grizzly bear				

Total	114
Other	2
monitoring program, draft <i>Wildlife Act</i> , caribou status report and caribou mortality	14
Wildlife, including WEMP, grizzly bear	
and freshet seepage report	10

TABLE 3: AGENC	Y OUTGOI	ING CORRESPONDENCE 2011–12	
Recipient # o	f Pieces	Subject # of Pie	ces
AANDC	1	Administration	1
Agency Society Members	4	Aquatics, including AEMP, Adaptive Management Plans, and LLCF	3
ВНРВ	3	Closure and Reclamation, including draft guidelines	2
Agency Society		and revegetation sustainability report	2
Members and othe	er	Communications	5
interested parties	6	Community Consultation	3
GNWT	2	Environmental Agreement and Water Licence	
WLWB	5	Annual Report	1
Total	21	PK and Waste Rock Management, including	
		WPKMP and WROMP	2
		Traditional Knowledge	1
		Wildlife, including draft Wildlife Act	3

Total 21



suggestions to improve public reporting and environmental management at Ekati.

In October 2011, the Agency provided comments on the draft Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories, the result of a collaborative effort, which we support, between AANDC and the Mackenzie Valley Land and Water Board. Our comments were based largely on our experience working with BHPB and others on the recently approved Interim Closure and Reclamation Plan.

In February 2012, the Agency also provided extensive comments and recommendations on BHPB's proposed fish sampling program as part of its 2012 Aquatic Effects Monitoring Program (see the Aquatic Effects section of this annual report for further details).

Agency Communications and Collaboration

In December 2011, the Agency, with the assistance of BHPB, hosted a workshop in Yellowknife. The workshop focused

on community-based Traditional Knowledge (TK) projects and featured presentations by community representatives, the Agency, BHPB, and AANDC. The Agency encouraged BHPB to better document its use of TK at Ekati and to better involve TK holders in closure

and reclamation planning.

In February 2012, the Agency was invited to the community of Łutsel K'e to discuss environmental issues and management at Ekati. We met with Elders, the Chief and Council, and staff from the Wildlife. Lands and Environment Committee. We had very good discussions about the Agency's mandate and activities, community concerns regarding caribou, air quality, mine inspections and proper closure planning at Ekati, and consequences for the Environmental Agreement and the Agency if the mine were sold. We also visited the local high school to deliver a presentation about the environmental impacts of diamond mines and to discuss potential careers in the environmental field.

In March 2012, the Agency and BHPB were invited to attend a North Slave Métis Alliance community meeting in Yellowknife. The Agency made a presentation and answered questions from the audience about our mandate and current activities, environmental issues at Ekati relating to caribou, water quality, closure and reclamation, and the consequences if Ekati were sold to another company. Community members also raised the need for BHPB to improve its communications with the communities.

In May and December 2011, the Agency's Executive Director met with the Snap Lake Environmental Monitoring Agency to provide an update on our activities and to discuss wildlife, water and air quality issues and activities at Ekati. In March 2012, the Executive Directors for the Snap Lake Environmental Monitoring Agency and Environmental Monitoring Advisory Board (Diavik Mine) were invited to update the Agency on their organizations' activities.

In June 2011 and February 2012, the Agency and the Environmental Agreement signatories (BHPB, GNWT and the Government of Canada) held their biannual Environmental Agreement implementation meetings. These meetings improve coordination and communication between the Agency and the signatories and provide each party with opportunities to give updates on its activities. The Agency reports on financial expenditures and future plans, and signatories are offered an opportunity to respond to formal

Agency presentations in Łutsel K'e, February 2012.



recommendations made by the Agency in its annual report for the previous year.

In June 2011, the Inter–Agency Coordinating Team (IACT) met. IACT consists of the Agency and a group of government regulators–GNWT, AANDC, Fisheries and Oceans Canada (DFO) and Environment Canada. IACT members usually conduct a joint site visit to Ekati every year and work together to share information related to the environmental management of the mine.

In June 2011, the Agency also met with consultants retained by BHPB to conduct a Human Rights Impact Assessment of BHPB's operations in Canada, including the Ekati Mine. During our interview, the Agency stated that, although there is a good framework for environmental management in the Northwest Territories and BHPB generally performs well, there is room for improvement.

In July 2011, the Agency met with BHPB and DFO staff to discuss the remediation of a pond and sediment source above the newly-widened Panda Diversion Channel.

In September 2011, an Agency director and staff attended an international mine closure conference. Papers were presented on a variety of topics, including pit lakes reclamation, cover design and water management.

ASSESSING THE AGENCY

The Agency has made major strides toward the creation and implementation of a formal Communications Plan (see page 9 for a summary). The Communications Plan assists the Agency in reaching our target audiences through a variety of media, including our newsletter, Ekati Timeline project (timeline.monitoringagency.net) and website (www.monitoringagency.net).

We understand that the TK workshop we hosted in December 2011 was well received by participants, and the Agency appreciated the important advice participants provided.

Although the Agency was unable to conduct a board meeting in a community this year, we plan to hold a board meeting and host an open house in a community in 2012–13. We remain open to requests for director and staff visits to communities.

The Agency has encouraged the parties responsible for reviewing and setting the

financial security for Ekati to seek clarity on the process, including how security will be apportioned under the water licence and Environmental Agreement.

The Agency has advocated for a regional approach to grizzly bear monitoring with some success. The Agency is pleased with BHPB's leadership in initiating an expanded grizzly bear hair snagging program. We will continue to offer advice to BHPB to help improve its wildlife monitoring.

Lastly, we are proud of our contribution to the fish sampling component of BHPB's 2012 Aquatic Effects Monitoring Program for Ekati, with BHPB incorporating all but two of our recommendations for improving fish sampling.



AGENCY COMMUNICATIONS PLAN

In an effort to improve our communications with Aboriginal peoples and the general public, the Agency completed a Communications Plan in October 2011. Key components of the plan are outlined below.

1. KEY MESSAGES

The Agency has several key messages it wishes to communicate:

- The Agency is a public watchdog for environmental management at Ekati.
- > The Agency is independent of BHPB, governments and regulators.
- The Agency makes recommendations to BHPB, governments and regulators to best protect the environment at Ekati.
- > The Agency strives to have a constructive relationship with BHPB, governments and regulators and to work together to best protect the environment at Ekati.
- The Agency is an important source of information for communities and the general public on environmental issues at Ekati.
- > The Agency encourages input from communities and the public on environmental management at Ekati, and conveys input and concerns to BHPB, governments and regulators.

2. TARGET AUDIENCES

The Agency needs and wants to communicate with our target audiences:

- > Agency Society Members;
- Aboriginal organizations (e.g., Land and Environment Committees);
- > Regulatory authorities and policy makers;
- > Agency directors and staff;
- Other diamond mine environmental monitoring agencies; and
- > General public (e.g., media, academic organizations).

3. INFLUENCES

Various factors influence how the Agency will or can communicate, including:

- > The Agency has a limited budget and human resource capacity.
- > Communities and Aboriginal organizations are faced with high workloads and numerous other priorities.
- > Many regulatory and other processes have short timelines for the preparation of comments.
- > Our target audiences vary widely in terms of technical knowledge, English-language skills and computer skills.
- > Ever-changing technology requires the Agency to continually evaluate the effectiveness of its communications methods.

4. OBJECTIVES AND OUTCOMES

Through the Agency's communications activities, we wish to achieve the following objectives and outcomes:

- > Active and empowered Agency directors and staff;
- Informed Aboriginal communities and organizations;
- Informed BHPB, regulators and government agencies; and
- > Informed public.



5. TOOLS AND PRODUCTS

The Agency's communications tools and products include all written, spoken and electronic interactions with our audiences, such as:

- Public registry and resource library storing Ekati–related materials;
- > Publications, technical reports and reviews;
- > Website, Ekati Timeline and email correspondence;
- > Meetings;
- > Community visits;
- > Workshops and conferences;
- > Corporate identity materials; and
- > Internal communications.

6. EVALUATION AND REVISION

The success of the Agency's communications initiatives will be evaluated annually and revised based on feedback from Society Members and the general public. New communications tools and products, as well as improvements to existing tools and products, will be considered and cost effectiveness determined.

For further details on the Agency's Communications Plan, please visit our website at www.monitoringagency.net.



02 Processed Kimberlite and Waste Rock Management

HIGHLIGHTS

- > Beartooth Pit was approved for use as storage for processed kimberlite.
- > Large portions of the Fox waste rock pile not freezing.
- > AANDC inspector directed BHPB to carry out daily inspections of the LLCF.

ACTIVITIES 2011–12

Mining in 2011–12 focused on three kimberlite pipes—Fox Pit and the two underground operations at Koala and Koala North. Plans to resume mining at Misery Pit in 2012 were commenced by initiating a push-back of the rim of the existing pit.

Processed kimberlite (PK) continued to be deposited in cells A and B of the

Long Lake Containment Facility (LLCF), at the rate of some 5 million m³ per year. This operation has presented management challenges to BHPB over the years. The primary difficulty is an increased loss of storage capacity due largely to extra-fine PK not effectively consolidating on the pond bottom.

The last major change in tailings deposition occurred in 2005. BHPB had concluded appropriately that it was time for another look at the LLCF operations to determine if there were additional options for maximizing storage capacity. A number of options were examined, including the use of Beartooth Pit for the deposition of kimberlite tailings. The analysis produced a number of modifications for improving the use of the LLCF. In July 2011, BHPB held a workshop for regulators and the Agency to review the results of this work and to outline proposed changes for the future operation of the facility.

The study found that by raising dyke C and constructing dykes parallel to the existing shoreline at a higher elevation, the storage capacity in cells A and C could be increased significantly. These measures, coupled with PK deposition in Beartooth Pit, would allow a target of some 34 million m³ of storage capacity to be attained. These options also would have the significant benefit of avoiding PK deposition in cell D, thus maintaining it as a water management pond.

These options were included in a revised Wastewater and Processed Kimberlite Management Plan (WPKMP) and submitted to the Wek'èezhìi Land and Water Board (WLWB) for review in October 2011. The Agency reviewed the revised WPKMP and provided comments to the WLWB, generally indicating that the plan was a sound basis for completing the operation of the LLCF to closure.

In December 2011, the WLWB approved the revised WPKMP but stipulated that an update of the plan would be required prior to the deposition of PK into Beartooth, currently scheduled for the fall of 2012. Importantly, an updated water quality prediction model for the LLCF (something the Agency has encouraged for the last few years) is to be submitted at the same time. This model will be extremely helpful in furthering our knowledge of LLCF water quality for future management of water at the end of mine life.

At this time, PK continues to be deposited in the north side of cell A and the west side of cell B. PK deposition into cell C is scheduled to occur near the end of 2013. Reclamation of cell B is scheduled to begin in 2013, when it will have reached its maximum storage capacity for kimberlite tailings.

Nitrate in the Long Lake Containment Facility

An emerging issue over the past few years has been the increase of nitrate concentrations in cell E of the LLCF, the cell from which water is discharged into the receiving environment. BHPB has conducted trial experiments to reduce nitrate concentrations, but it met with some success at lowering levels in the first season only. Studies continue in this regard. BHPB is also engaged in developing a Site-Specific Water Quality Objective for nitrate. (See the Aquatic Effects chapter of this report for further discussion on nitrate.)

Waste Rock Management

BHPB's announcement in 2010 that it would resume mining at Misery (temporarily shut down in 2005) resulted in the WLWB requesting the submission of an updated *Waste Rock and Ore Storage Management Plan* (WROMP). The revised WROMP (due in May 2011) was submitted in November 2011. It still awaits the WLWB's approval as we go to press. The Agency reviewed the revised plan and provided comments to the WLWB, highlights of which are presented below.

Seepage from the various waste rock piles is monitored twice a year, as required by BHPB's water licence. The results of each survey are reported to the WLWB. No long-term problems have been identified to date.

AGENCY ASSESSMENT Long Lake Containment Facility

The Agency supports the revised plan for tailings deposition in the LLCF, particularly because it provides the extra security of being able to avoid the use of cell D.

We also support the idea of using available storage capacity in Beartooth

Pit along with careful water quality monitoring, something we have been pushing BHPB to consider for the past few years. Having PK stored in a secure repository with a substantial water cover at closure is a significant precautionary step to avoid deposition into cell D.

Overall, operations at the LLCF are carried out effectively, and the facility appears to be operated according to BHPB's approved management plans.

The Agency notes there was a minor lapse in monitoring these operations during the 2011–12 winter period. In response to a warning letter from the Aboriginal Affairs and Northern Development Canada (AANDC) inspector regarding the May 2008 spill of tailings from cell B into Fay Bay, BHPB indicated it would inspect the entire facility every shift to ensure earlier detection of potential problems with tailings containment. However, during a flight over Ekati in March 2012, the AANDC inspector noticed there were no signs of regular inspection. He directed BHPB to carry out the inspections on a daily basis and keep a log book of such inspections. He also recommended no further deposition of PK into cell B until the summer, when it can be monitored more closely. BHPB has agreed to comply.

Waste Rock Seepage Survey

As in former years, we found no issues with the company's twice yearly surveys of waste rock seepage. The two surveys of waste rock pile seepage conducted each year are comprehensive and show generally that water quality criteria for mine rock effluent are being met. In a few cases, there are temporary small exceedances of some parameters due to leaching of kimberlite or blasting residues, but these generally stabilize or diminish over time.

Waste Rock Management

In our view, the management of waste rock at Ekati continues to set a good standard. In addition, the revised WROMP we recently reviewed was well done. The Agency has a nagging concern, however, about the continuing failure of some waste rock piles to achieve internally frozen conditions, as predicted and planned for by BHPB. BHPB's strategy for preventing geochemical reactions within the waste rock piles relies largely on the freezing of rainwater and snowmelt that fills the voids during the summer season and the development of permafrost within the pile. The interior of the main Panda–Koala pile has generally attained this frozen condition, with an active annual freeze–thaw layer



Beartooth Pit.



on the surface ranging from 2 to 4 m in thickness. Inconsistent with this is an apparent general warming trend at the base of the Panda-Koala pile.

Perhaps more significantly, large portions of the Fox pile remain unfrozen. In fact, the pile seems to be heating up, and there are at least a few locations where internal pile temperatures are above freezing, ranging up to 10.5° C in the core of the pile and up to 2.7° C at the original ground level.

This appears to be a significant warming of internal pile conditions, and we are not convinced by BHPB's explanation that this is likely a function of placing warm (above-freezing) waste rock and/or placing waste rock in above-freezing temperatures. After all, these same conditions apply to all pile operations at Ekati. In our view, this is a significantly anomalous situation and a more concerted effort to find the cause of this effect is warranted. BHPB also states that freeze back of the Fox waste rock pile is expected, but the time required for this is not known. We interpret this to mean that there is no detectable downward trend for temperatures, so rates for reaching a freezing state cannot be determined.

Consistent with past years, the coarse PK waste rock pile appears not to be freezing, with ground

temperatures being warmer than normal temperatures in undisturbed ground and internal temperatures being warmer than those for Panda-Koala.

The Misery waste rock pile is characterized by a relatively thick active zone, up to 14 m in some cases. In addition, portions of schist layers 10 m below the surface of the Misery pile also remain unfrozen.

Given the delayed performance in the Fox and Misery pile interiors in achieving a frozen state, along with some definite warming trends, it is possible that permanently frozen interiors in these rock piles will not develop. For such an eventuality, a precautionary adaptive management approach would suggest that some thinking about contingencies for unfrozen waste rock pile seepage at closure would be beneficial particularly for Misery, where elevated concentrations of metals in waste rock pile run-off may be expected.



03 Closure and Reclamation

HIGHLIGHTS

- > ICRP was given final approval in November 2011.
- > Limited progressive reclamation and little reclamation research was carried out in the last year.
- > Next step for closure planning is a review of the financial security that should be held to ensure the mine is closed properly.

ACTIVITIES 2011–12

The most important closure development regarding Ekati in the past year was the final approval of the *Interim Closure and Reclamation Plan* (ICRP) in November 2011. We reported on most of the ICRP's important features last year, but highlights include:

- The requirement for BHP Billiton (BHPB) to create shallow areas that will help fish live in and use the pit lakes, including joining the pit lakes to natural aquatic systems;
- Covering the Long Lake Containment Facility with a combination of waste rock and vegetation cover; and

 The remediation of hydrocarbons to an agricultural (instead of an industrial) standard.

Most important are the next steps to implement the ICRP, such as continuing reclamation research to obtain the information needed to carry out progressive reclamation and develop the next closure plan. This includes the defining of closure objectives and criteria to set the benchmarks that would be used to measure reclamation success and the determination of the appropriate amount of financial security that ought to be held by the government to enable closure of the mine in accordance with the approved ICRP.

Progress on reclamation research will be reported on by BHPB in December 2012. This annual progress report on closure activities will be, we think, a helpful addition to closure planning at Ekati. The Agency looks forward to seeing this report and to discussions that will follow between the company and others.

The Agency was asked by BHPB in March 2011 to discuss how the Agency and BHPB could work together on ensuring successful completion of the reclamation research plans. In September, we asked BHPB how best to proceed with this initiative. We were told such action without other interested parties would not be appropriate. While puzzled with the apparent change of heart, we will continue to help where we can with making the results of reclamation research plans as helpful as possible for future closure plans. In 2011–12, BHPB continued monitoring earlier reclamation efforts at Fred's Channel, the Airstrip Esker, South Camp and Fay Bay spill.

We took steps this year to pursue a particular interest of ours-how to determine whether revegetation at Ekati will be self-sustaining. To answer this, we commissioned a special study by a revegetation specialist. The report, entitled Towards Revegetation Sustainability Criteria for Northern Mine Closure, was received in March 2012 and is available on our website. Our intent in commissioning this report was to allow us to understand what early measures of revegetation sustainability there might be and how these may be used as closure criteria. If these indicators were detected early, the revegetation would be more likely to persist, a goal shared by all. The Agency would then encourage the use of these indicators as closure criteria.

Reclamation research on the trial waste rock pads this past year included the transplant of tundra sod to assist plant growth and the continued assessment of planted seedlings and seeded plant cover. Reported results suggest revegetation on the rock piles may be difficult; seedling survival declined in the last year for all species. There was high mortality of fireweed and dwarf birch at the rock pad study sites, attributed to grazing by Arctic hare. Other areas of the site where more abundant alternative food sources are available suffer significantly less impacts from hare grazing. The assessments also showed that seedling

Bench on newly widened PDC to capture sediments, June 2011.



cover generally had a modest increase in the last year for all treatments except on coarse kimberlite, where cover was less.

The effective integration of Traditional Knowledge (TK) into closure planning is another aspect of reclamation research planning that is a part of the approved ICRP. For this to be well done, it is essential that the ICRP be better understood in communities affected by the mine. As noted in the TK section of this report, there are several indications that such an understanding does not now exist. BHPB has been making efforts to meet with communities. However, we frequently hear misunderstandings of the ICRP by our

Tundra flowers.



Society Members and hear they desire to know more about, and be more engaged in, closure planning. The report from our TK workshop last December states:

> There is a strong interest in the use of TK in closure planning at Ekati and the Agency strongly encourages everyone to work together. A TK working group, as proposed by BHPB, would be a good starting point.

> There is still considerable confusion in the communities around what will happen to the Ekati pits at closure. BHPB should spend more time with the communities explaining what is in the closure plan, especially how the pits will be closed and managed.

This finding is, in part, the basis for the recommendation found in the Traditional Knowledge section of this report.

Now that there is a newly approved ICRP, an immediate next step is to determine the financial security deposit necessary to close Ekati in accordance with the ICRP. The government must hold an amount of security adequate to eliminate any public liability in the event that the company is unable or unwilling to fulfill its reclamation obligations at the end of the mine's life.

Determining the right amount of security is complicated, as there are several instruments involved (see sidebar for further details). Given the challenges involved, the Agency is seeking outside expert advice to inform ourselves for the security discussions now underway.

The process of determining security involves the Wek'èezhìı Land and Water Board, Aboriginal Affairs and Northern Development Canada, the Department of Environment and Natural Resources, BHPB and the Agency. We have met with all of these players and are working out how best we can play the role required of us by the Environmental Agreement. It is our view that we should be more involved than less so that we can assure our Society Members that the security held by the government for effective closure of the mine is adequate. Meetings with those involved have been productive so far, but the process has only begun. We will report on how it unfolds.

FINANCIAL SECURITY REVIEW

With the final approval of the ICRP, it is time to review the financial security for the Ekati Mine. Financial security is held by the Government of Canada to make sure that the mine is closed and reclaimed as set out in the ICRP. For Ekati, the financial security primarily has taken the form of irrevocable letters of credit from established banks. These letters can be cashed in at any time by the Government of Canada should it require the funds for the purposes of closing the mine according to the ICRP.

Financial security for closure and reclamation at Ekati is held under the following instruments:

- > Water Licence (for matters that relate to the use of water and deposition of waste into water);
- Environmental Agreement (for matters including the use of land held under surface leases); and
- > Land Use Permits (for land use activities at locations outside of the surface leases).

The total financial security currently held is about \$125 million.

The WLWB has indicated that it will set the total financial security required based on the approved ICRP. It will also consider submissions on how the financial security should be divided up amongst the various instruments.

BHPB, with the WLWB, Agency and AANDC, collaboratively developed a timeline to review the financial security for Ekati:

- > July 2012 BHPB delivers proposed unit costs and cost estimate breakdown to AANDC and the Agency;
- > August 2012 Site visit and meeting to discuss BHPB cost estimate;
- > September 2012 AANDC delivers a cost estimate to BHPB and the Agency;
- October 2012 Meeting to discuss AANDC cost estimate; BHPB may update its cost estimate; and
- > November 2012 Progress report from all the parties to the WLWB.

A concurrent process may be held to review the distribution framework for financial security amongst the various instruments.



Aquatic Effects

04

HIGHLIGHTS

- > BHPB continues to manage nitrate levels in effluent from the LLCF.
- Comparison of sediment sampling techniques was informative, but more needs to be made of the results.
- > Lessons learned from the monitoring of the effectiveness of fish use of the PDC will be applied to the Pigeon Stream Diversion.
- > Ongoing work to widen parts of the PDC may require additional monitoring to ensure that the objectives of the project have been achieved.
- > Fish sampling program was improved to consider effects from hydrocarbon exposure.

Widened section of the PDC.



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-Lac de Gras and King-Cujo) into which regulated mine effluent is released. Water bodies in these two systems as well as backgrounds sites are sampled. The Aquatic Effects Monitoring Program (AEMP) collects information on any trends in water quality, sediment quality, benthic macroinvertebrate communities, zooplankton and phytoplankton, as well as fish populations and fish tissue. Two special studies are undertaken as part of the Special Effects Studies and Monitoring Programs.

ACTIVITIES 2011–12

Processed kimberlite (PK), treated sewage and pit water are discharged into the Long Lake Containment Facility (LLCF). These, especially PK, comprise the main sources of potential contaminants in the downstream environment. Effluent was released from the LLCF from July to November 2011, entering the receiving environment of the Koala watershed through Leslie Lake. The effluent is diluted as it flows downstream through Moose Lake and eventually enters Lac de Gras.

A second source of potential contamination is effluent discharge from the Misery site. Water from the Waste Rock Dam and Misery Pit was discharged into King Pond mainly from July to September 2011. In a two-week period in late August and September, water was pumped from King Pond to Cujo Lake, where it eventually flows into Lac du Sauvage. Water from Desperation Pond was pumped to Carrie Pond in June and July. Minewater continued to be pumped into Beartooth Pit.

Changes to the 2011 AEMP

Every three years, BHPB's AEMP is re-evaluated. As required by its water licence, BHPB submitted a revised AEMP design in January 2010, making 33 recommendations for changes. The Wek'èezhii Land and Water Board (WLWB) considered the recommendations made by BHPB and other parties and then directed the company to incorporate a number of changes in 2010, as described in our 2010–11 annual report.

FIGURE 1: AEMP REFERENCE LAKES AND OUTFLOW STREAMS



In the 2011 AEMP report, two additional changes were made:

- The baseline sampling period has been clearly identified in all water and sediment quality graphs to allow for better effects assessment.
- The direction of changes in concentration was added to the summary tables for all of the evaluated variables that showed change.

AEMP Monitoring Results Water Quality Sampling and Results

Each year, BHPB reports the results of its AEMP to the WLWB and provides the highlights in an Environmental Agreement and Water Licence Annual Report.

This is the fourteenth year of monitoring for the Koala–Lac de Gras system and the eleventh year for the King–Cujo system. Some 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 for selected parameters in Table 4. This table is adapted from the AEMP report with additions resulting from the Agency's review of the monitoring results.

In last year's AEMP report, one of the emerging issues was the rising concentrations of nitrate (a contaminant with no discharge limits specified in the water licence) in LLCF water. In 2007, nitrate levels in Leslie and Moose lakes rose above the Canadian Council of Ministers of the Environment's (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 stratification in cell E, when cleaner water (with less nitrates) is at the surface and can be discharged more easily.

BHPB has experimented with removing nitrate by adding phosphate within cell D of the LLCF to stimulate photosynthesis. Experiments have been ongoing since 2008. In summer 2010 and 2011, fertilization of cell D waters continued, but there was no significant reduction in the calculated nitrate load over the open-water seasons.

Molybdenum levels downstream of the LLCF and King Pond continued to decline or remained stable since their peak in 2008, but they continued at or above the CCME guideline, especially under ice. The values remained below the Site-Specific Water Quality Objective (SSWQO) of 19.4 mg/L developed by the company. However, the SSWQO is orders of magnitude above the CCME guideline of 0.073 mg/L and has not yet been approved by the WLWB. Molybdenum levels are also very high in bottom sediments in Leslie Lake and are elevated in Moose, Nema and Slipper lakes in some bottom sediments. These levels are of concern, as molybdenum

Legend Flow from effluent source to ultimate	Par wat	ameters tershed	elevate	d in Koala	1					Paramet King-Cu	ers elev jo water	ated in shed	
receiving lake in watershed Level elevated above reference lake/ stream or different from a constant	Lon Lac	g Lake C de Gras	ontainm	ent Facili	ty 📂	-				King Pond Angele Lac du Sauvage			
Level elevated to or above one or more of CCME guideline value, IPS or SSWQO			-Nero		-Marting			u as Gras		utflo	tine.	see	
Parameters Monitored	Lesli _e	Moose	Moose	Nema	Nema	Slippe	Slippe Lacde	L ^{ac de}	Cujo	Cujo O	Chris Lac di	Lacd Sauva	
рН													
Alkalinity													
Total Dissolved Solids													
Chloride													
Sulphate													
Potassium													
Total Ammonia													
Nitrite													
Nitrate													
Total Phosphate	•	•		•		•			•				
Total Organic Carbon													
Aluminum												•	
Antimony													
Arsenic													
Chromium													
Copper				•		•	•		•				
Iron													
Molybdenum	•	•											
Nickel													
Strontium													
Uranium													

TABLE 4: MINING EFFECTS ON WATER QUALITY FLOWING THROUGH THE KOALA AND KING-CUJO WATERSHEDS

affects trout fry development at high concentrations. The planned restart of open pit mining at Misery Pit is therefore a concern, since it appears that the Misery ore is the source of the elevated molybdenum concentrations.

In the summary tables of the 2011 AEMP report, the addition of the direction and degree of change in concentration for all of the evaluated variables that showed change was a welcome addition. The tables also contain information on the under–ice lake water temperature and total organic carbon.

Other notable results include:

- > Copper concentrations in the Panda Diversion Channel (PDC) and Kodiak Lake continued to rise slightly over the past two years and remain at or above the CCME guideline, similar to all reference lakes. The cause or source of this increase is not known.
- Arsenic levels were elevated under ice in Leslie and Moose lakes.
- > Chromium levels in the August 2011 samples were elevated above the CCME guidelines in Slipper Lake and in one of the reference lakes (Vulture Lake).
- Iron levels were elevated under ice in Kodiak (rising) and Cujo (decreasing) lakes and were near the CCME guideline in King Pond.
- Selenium levels are no longer above the CCME guideline in any AEMP lake, having declined to pre-2007 levels possibly due to a new analytical technique.

- > Dissolved oxygen levels have improved in Cujo Lake likely due to BHPB's mitigation efforts of previous years.
- Chlorides in Leslie and Moose lakes are above the new CCME guideline of 120 mg/L.

One additional change of note in 2010–11 was the collection of water samples from the stream connecting Leslie and Moose lakes. These data were not used in the effects analysis because historical data were not available. The results suggest that the Leslie–Moose stream results are consistent with the concentrations in Leslie and Moose lakes.

Sediment Sampling and Results

In 2011, sediment quality data were collected using both an Ekman dredge (top 2 cm) and a K-B corer (top 1st and 2nd cm, separated). Comparisons were completed between samples collected with the dredge and corer and between the 1st and 2nd cm of the corer sample. In general, sediment quality in the 1st cm of the core sample differed significantly from both the 2nd cm of the core and from the dredge samples. Of the 12 variables evaluated, 8 (total nitrogen, total organic carbon, antimony, arsenic, molybdenum, nickel, selenium, and strontium) had higher concentrations in the 1st cm of the core than the 2nd cm or the dredge samples. Concentrations in the 2nd cm of the core did not differ from concentrations in the dredge samples.

The evaluation of effects was made using the Ekman dredge samples because historical sampling had been done using this method. Three parameters showed change in the Koala watershed lakes. Antimony and molybendum levels have changed over time downstream to Slipper Lake. Strontium levels have increased over time downstream to Lac de Gras. CCME Guidelines for the Protection of Aquatic Life exist for three of the evaluated sediment parameters (arsenic, copper and zinc). Of these, arsenic concentrations exceeded the guideline values at both mid and deep depths in all monitored lakes and reference lakes (except at deep depth in Vulture Lake).

Biota Sampling and Results

Food chain impacts that may ultimately affect fish are being investigated. Rescan has started to study changes in the phytoplankton community and potential impacts of these changes on zooplankton. Changes in community composition have occurred in all lakes downstream of the LLCF as far as Nema Lake, with a decrease in the densities of blue-green algae and an increase in diatoms over the years.

AEMP Fish Sampling

BHPB proposed a revised fish sampling program in response to a direction coming from the WLWB during the three-year review of the AEMP. Changes will be implemented to the fish sampling program in 2012. Frequency of trout and whitefish monitoring will be extended to every six years from the current five. To relieve pressure on lake trout populations from sampling mortality, non-lethal sampling of trout will instead take small plugs of muscle tissue for contaminants analysis. Full muscle sampling will continue to be done for round whitefish and slimy sculpin.

Every three years, slimy sculpin will be monitored as a sentinel species. That is, it will act as an early warning of impacts that may become amplified in fish higher up the food chain. Slimy sculpin is a good species to use in monitoring, as it does not move long distances within or between lakes and so better reflects environmental conditions at the lake site from which it is collected.

Whitefish, sculpin and incidentally-killed trout will be sampled to determine exposure to hydrocarbons. Any gradients or spatial patterns may help in identifying the source of hydrocarbons first detected in fish during the 2007 field season. A laboratory-based testing of fish flesh for chemical compounds that could affect its odour or taste (palatability tests) will also be conducted in 2012.

DELT (deformities, eroded fins, lesions and tumours) monitoring in fish will continue as part of the AEMP and will draw upon the Traditional Knowledge of Aboriginal peoples who will be involved in the sampling.

Special Effects Studies and Monitoring Programs

In 2011, two studies were undertaken as part of the Special Effects Monitoring Programs and Studies:

- > LLCF Nitrate In-Situ Treatment Test (see page 17 for further details); and
- > PDC Monitoring Program (see page 20 for further details).

AGENCY ASSESSMENT

Our review of BHPB's 2011 reports indicates it is generally doing a good job of protecting the aquatic environment at the mine site, although there are still a few challenges. The AEMP continues to be comprehensive in scope and has the ability to detect small changes in the sampled parameters that can alert managers to any emerging problems. We still have concerns with some metals that continue to increase downstream from the mine and are close to or above the CCME guidelines, especially molybdenum.

With regard to nitrate, the Agency remains concerned that the adoption by BHPB of Environment Canada's Ideal Performance Standard guideline for nitrate of 4.7 mg/L on a site-wide basis is not conservative enough. Since this concern was originally raised in May 2010, the CCME has published a draft update to its *Guideline for the Protection of Aquatic Life* for nitrate (3.6 mg/L). We are particularly concerned that lake trout downstream from the LLCF may be subjected to chronic effects of nitrate discharges at 4.7 mg/L. Discussions regarding appropriate limits for nitrate discharges from the LLCF will be concluded, we hope, during the upcoming water licence renewal process.

Now that two years of data are available for the Leslie–Moose stream, consideration should be given as to how the information will be used in future effects analysis.

BHPB's comparison of K-B corer and Ekman dredge results was very informative. While the availability of an historical data record may favour the use of the Ekman dredge, the K-B corer provides a more accurate measure of recent sediment quality and should continue to be used. The greater accuracy will become increasingly important in tracking changes in sediment quality, especially following the end of mining operations. Given their different advantages, the Agency recommends that both sample methods be employed in the future and that data from both be presented in the AEMP.

The Agency welcomes the application of plankton ecology into the assessment of potential mine effects on Ekati lakes. As reported by BHPB, diatoms are a higher quality food than cyanophytes for herbivorous zooplankton due to having more fatty acids. The literature suggests that a shift from diatoms to green algae signals a reduction in water quality in sub-Arctic lakes. This shift is happening in Leslie Lake. BHPB states that a surge in inedible green algae in Leslie and Moose lakes may have effects up the food chain, starting with herbivorous zooplankton. BHPB has proposed to investigate which phytoplankton species are sensitive to changes in Ekati lake water quality and how changes in edible plankton biomass may affect changes in zooplankton biomass. We support this work.

In Leslie, Moose and Nema lakes, cladocerans and rotifers have been replaced by cyclopoid copepods. These changes in zooplankton community composition are likely related to water quality changes, as both rotifers and cladocerans are known to be sensitive to increased water hardness. It is not yet known whether these changes in zooplankton communities have had any impacts on organisms (i.e., fish) further up the food chain. We suggest further study of this issue.

Endocrine-disrupting compounds, pharmaceuticals and personal care products are an emerging water

pollution issue in North America. The Agency's concern stems from evidence of a population crash in a wild minnow population induced by endocrine disruptors. Slimy sculpin occupy the same ecological niche in the lakes at Ekati. We have suggested that BHPB consider some initial investigations on this issue.

The WLWB has indicated that the Water and Effluent Quality Management Policy (March 2011) will be applied during the renewal process. However, the guidance documents proposed in Appendix A of the policy have not yet been finalized. The Agency recommends that the responsible parties continue to move forward as quickly as possible to develop the supporting documentation, as it will be of use to both proponents and intervenors. (See the Agency's recommendation in our 2010–11 annual report.) ■

Pigeon stream.



PANDA DIVERSION CHANNEL MONITORING PROGRAM

2011 Monitoring Results

The Panda Diversion Channel (PDC) was built in 1997. Thirteen years of environmental monitoring of the PDC has been completed. In 2011, six fish species were using the PDC, one fewer than last year (longnose suckers were not found). Arctic grayling captures totaled 171, of which 49 (29%) were previously caught over the last three years. Of the grayling caught, 76 (44%) were spawners, the highest number since 2007 and 2008.

As we reported last year, body condition was significantly lower in PDC grayling fry sampled in 2003 than those in two reference streams, suggesting a lower survival rate for young-of-the-year (YOY) grayling and lower recruitment into the local population. In re-analyzing 2006 and 2007 data, factoring fry body weight into the lipid analysis, BHPB found that the lipid weight of PDC grayling fry was comparable to that of fry in one of the two reference streams (Polar-Vulture).

A program in 2003 clipped a fin of some of these fish as a permanent mark to determine whether grayling return to the PDC. In 2011, for the second straight year, the ratio of fin-clipped to total grayling was the same as when the fish were clipped as fry (19%). This suggests grayling return to the PDC, although the sample size is too small to make any definitive conclusions.

Evaluation of PDC Monitoring

In light of an Agency–commissioned review of 10 years of PDC monitoring results, a final evaluation study of the PDC's effectiveness in providing fish habitat was conducted collaboratively by researchers from the University of Alberta and BHPB's consultants (Rescan). This work took place in the summer of 2011.

The evaluation study found that important biological variables (mostly for invertebrate production) for PDC biota are getting closer over time to those measured in reference streams. However, the growth rate of YOY grayling is significantly lower than that of grayling in the reference streams. The evaluation study attributes this lower growth rate to lower biomass of insect larvae. This is likely due to significantly less organic matter in the PDC compared to the reference streams, even though riparian zone cover has tripled in the past 10 years in the PDC.

BHPB's final monitoring report, on the other hand, attributes the lower YOY growth to colder temperatures in the PDC, which is at least partly due to the upstream ice accumulation and sun-shadowing at the steep-banked canyon section. Both of these problems likely will be mitigated by PDC-widening currently underway and additional revegetation of the stream banks. BHPB believes this work will fulfill the requirements of the Fisheries Authorization for the PDC and that no further monitoring will be required.

The good news is that the lessons learned from the PDC are being used in designing and constructing fish habitat in the Pigeon Stream Diversion. Stabilization of stream banks and construction of a variety of invertebrate and fish habitat will take place in the Pigeon Stream Diversion.

Air Quality

HIGHLIGHTS

- > Incinerator is operational, but the Waste Management Plan should be updated.
- > Agency has not received the 2011 AQMP report.

ACTIVITIES 2011–12

Air quality monitoring is required under Article VII of the Environmental Agreement. BHP Billiton's (BHPB) Air Quality Monitoring Program (AQMP) was initiated in 1998 and is reported on every three years in concert with an extended sampling program. At the time of writing this report, the Agency had not received the 2011 AQMP report, and we are therefore unable to provide a detailed assessment of the results. However, BHPB provided a summary of the results in its Environmental Agreement and Water Licence Annual Report 2011, which we report on and briefly assess below. The AQMP consists of the following: > Meterological monitoring (daily):

- Air emissions and greenhouse gas reporting (monthly and annual reports);
- > Ambient air quality monitoring, consisting of:
 - High-volume air sampling (samples taken every six days); and
 - Continuous air monitoring (continuous 24-hour sampling);
- Dustfall monitoring (sampled during summer months);
- Snow core chemistry monitoring (sampled every three years-2011);
- Lichen tissue sampling (sampled every three years-2011); and
- CALPUFF air dispersion model (used to compare initial impact predictions and significant operational changes—last conducted in 2006).

Air Emissions

05

From 2009 to 2011, greenhouse gas emissions have decreased by 21% over the previous three-year period (2006 to 2008).

High–Volume Air Sampling

During the 2009 to 2011 monitoring period, two measurements exceeded the 24-hour Canadian Ambient Air Quality Objective of 120 µg/m³. BHPB reports that these exceedances were due most likely to measurement error and that all other values were generally well below the set standard. BHPB also reports that the results from 1994 to 2011 reveal a decreasing trend of total suspended particulates (TSP). The winter of 2010–11 was the first year that high-volume sampling was conducted, as recommended by the Agency and government regulators. BHPB reported that the extreme winter conditions onsite were hard on equipment and caused frequent failures due to freezing motors, frost and snow.

Continuous Air Monitoring

Results from 2009 to 2011 indicate that mean monthly NO₂ and NO_x have a slight decreasing trend, while mean monthly SO₂ and TSP have increased slightly. BHPB reports that NO₂ and SO₂ never exceeded the Northwest Territories (NWT) standards during the 2009 to 2011 monitoring period and that there was only one exceedance of the NWT Particulate Matter standards (PM_{25}) by 3%. However, over 75% of the PM₂₅ data was invalid, possibly due to tape tension or equipment miscalibration errors. BHPB also reports that other TSP data from August to December 2011 were invalid due to miscalibration errors, and that there were a total of five exceedances of NWT TSP standards (ranging from 4% to 107% over): one in May 2010, three in May 2011 and one in June 2011.

Dustfall Sampling

Sampling results indicate that dustfall was much higher close to the haul roads and decreased with distance from the road, reaching near background reference values at 1 km away from site activities. BHPB also calculated acid deposition from nitrate and sulphate concentrations, and these non-background samples had a median value of 90.6 eq/ha/yr, which is below the relevant Canada–Wide Standards. Metal deposition in the dust was also analyzed, but all values were low, below 0.8 mg/dm²/d.

Snow Chemistry Sampling

BHPB reports that the 2011 results were generally lower than those for 2005 and 2008. They found that winter loading of total suspended solids (TSS) and metals are not elevated in the zone directly surrounding the mine footprint and that concentrations remained low with distance from mining activity, with the exception of three sampling locations (between 15 and 30 km) that had elevated concentrations. Compounds associated with gaseous emissions, blasting and long-range transport (e.g., NO₃⁻, NH₃, SO_4^{2-}) did not show strong trends with distance from mining activity.

Lichen Tissue Sampling

The lichen plots sampled coincided with snow core and dustfall sampling sites to allow for comparisons. Statistics and spatial analysis of lichen tissue data indicate results are generally consistent with snow chemistry data, and that the influence of dust from the mine is confined to a relatively small area and declines with distance from the mine site. BHPB found that the concentrations of most dust-borne metals and crustal elements have decreased in 2011 compared to 2005 and 2008, with the exception of nickel and copper. Sulphur and nitrogen concentrations have a more generalized distribution, but have increased in some locations possibly due to gaseous emissions rather than from dust.

CALPUFF Air Dispersion Model

BHPB compared the 2006 CALPUFF air dispersion model results with observed field data (i.e., snow core chemistry, high-volume air samples, lichen and dustfall). The modeled sulphate deposition contributions from Ekati, Misery operations and the Diavik Mine are of the same magnitude as background levels beyond 3 to 5 km from active mining areas. No other data are presented in the summary.

Incinerator

BHPB restarted work on the new incinerator (onsite since 2006) in September 2011. A stack test is to be conducted in 2012 to ensure proper operations.

Community Involvement

In May 2011, BHPB hosted an AQMP community engagement tour with participants (Elders and youth) from the Kitikmeot Inuit Association, North Slave Métis Alliance, TłĮchǫ Government and Yellowknives Dene First Nation. The tour provided hands-on experience to community members on how BHPB's environment staff conducts its day-to-day, site-based AQMP. During the tour, BHPB collected and recorded participants' recommendations, ideas and thoughts and took the opportunity to address their concerns. A summary report was produced from the tour.

AGENCY ASSESSMENT

While only a summary of the AQMP report was available for the Agency's review, we believe that the summary does not support BHPB's conclusions that "[r]esults from the 2009 to 2011 AQMP suggest that management measures implemented at EKATI are currently effective at mitigating the effects of the mine on air quality".

It appears there are still major problems in data collection due to measurement, equipment and calibration errors. It is particularly troublesome when there are months, even years, when 75% of the data is not valid due to equipment or miscalibration errors. BHPB has been conducting air quality monitoring since 1998, and methodological problems such as these should have been identified quickly and rectified. BHPB needs to invest considerably more effort into training staff and ensuring its equipment is properly calibrated.

Standard operating procedures are still to be developed for

the new incinerator. The Waste Management Plan should be revised to reflect the new incinerator operations and the technical guidance available from Environment Canada for proper batch waste incineration.

The Canadian Council of Ministers of the Environment has published an ambient air quality monitoring protocol for PM_{2.5} and ozone. This protocol is intended as a reference tool for jurisdictions and the public on the operation and coordination of ambient air monitoring programs for particulate matter and ozone. We encourage BHPB to adopt it. ■





Wildlife Effects

06

HIGHLIGHTS

- > A joint diamond mine regional grizzly bear monitoring program appears likely for 2012.
- > Limited monitoring of caribou is being conducted.

ACTIVITIES 2011–12

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 fifteenth year. This year's WEMP report covers the period October 1, 2010 to December 31, 2011. In subsequent years, it will cover a calendar year. As in previous years, the 2011 WEMP focused on wildlife habitat and wildlife species of greatest interest: caribou, grizzly bear, wolverine, wolf, fox and falcons. Monitoring techniques included compilation of incident reports and visual observations, ground-based surveys, behaviour observations and testing of new monitoring techniques.

Ekati Mine Footprint

The mine footprint increased by only 4 ha during 2011. The total footprint of the mine site now covers 3,002 ha (30 km²).

Wildlife Incidents

BHPB continues its efforts to improve its waste management practices and reduce attractants at landfills, reduce wildlife incidents, and deter wildlife from areas of danger (e.g., airstrip, high traffic areas). Adherence by employees to proper waste disposal practices is an ongoing challenge. Some observations from the 2011 WEMP report include:

- > Eight vehicle-related animal mortalities (one red fox, one Arctic ground squirrel, two Arctic hare, three ptarmigan, and one common raven) were reported at Ekati in 2010-11; none of these animals were Valued Ecosystem Component species;
- > Seven non-vehicle related wildlife mortalities were observed onsite, involving five caribou (primarily predation) and two muskrats.
- Deterrents were required to move five grizzly bears and two wolves away from site.
- Two moose were captured on remote cameras.

Orange plastic fencing was established around the airstrip in 2010 to eliminate the likelihood of entanglement by caribou, as had occurred with the electric fencing. Although no mortalities have been attributed to entanglement with the new fence, there remains a problem from snow drifting over portions of the fencing in winter. This drifting contributed to a cow caribou being shot in December 2011 with approval from the Department of Environment and Natural Resources (ENR). She was inside the fencing and feeding adjacent to the airstrip, despite attempts at deterrence by BHPB staff.

Caribou Monitoring

In the past, BHPB has documented caribou abundance, distribution, incidental observations and behaviour relative to the mine using aerial and ground-based surveys. No aerial surveys have been conducted since 2009. In 2010–11. observers estimated 14.766 caribou within the Ekati study area. Groups of over 3,000 and 5,000 animals passed through the mine site on October 4 and 12, 2010 respectively. Road closures were instituted during these migrations. Misery Road was closed to all traffic between October 4 and 8 and from October 12 to 13. 2010 and was restricted to essential traffic between October 13 and 18. 2010, when the groups were in the vicinity of the road. Sable Road was also closed from October 13 to 18, 2010. Migration numbers were lower in fall 2011, as only 628 caribou were observed passing near the Ekati mine site.

Caribou continue to be of paramount concern for northerners. The major decline in Bathurst herd numbers is of direct relevance to Ekati, since low

population densities can affect the ability of a population to adapt to further change, which in turn influences the amount of risk to populations from development. The Bathurst herd will be counted in spring 2012, which may indicate that the decline has halted and numbers have started to rebound. A number of causes of the decline have been suggested, including natural cycles, climate change, habitat change, predation, harvest levels and disturbance from mineral exploration and developments. Although in all likelihood mineral development did not cause the decline, community members have singled out the diamond mines

for impacting caribou distribution and causing injuries as a result of road development. There is clearly a need to identify the causal mechanism underlying why caribou are avoiding the zone of influence around mine sites.

During 2011, the behaviour of 27 individual caribou was documented near Ekati. However, sample sizes were too small to make any definitive conclusions regarding types of behaviour exhibited and responses to stressors. The WEMP report states that 50 remote cameras were deployed within the property in 2011, ostensibly to replace the Caribou Distribution Relative to Roads and Road Permeability to Caribou (Snow



Track Survey) programs; however, no results are presented in the report.

Grizzly Bear Monitoring

Grizzly bears are a top carnivore and Valued Ecosystem Component species that occur at low densities within the Barrens. Pilot studies that tested hair snagging structures, lures and logistics were conducted in 2010 (8 posts, September only) and 2011 (13 posts). Of the 15 grizzly bears identified, 9 were male and 6 female, but no further assessment is provided. BHPB has partnered with Diavik and proposed a joint regional DNA study to begin in June 2012.

Regional Grizzly Bear Monitoring

ENR hosted a workshop on grizzly bear monitoring techniques in November 2011. The objectives were to review the existing grizzly bear monitoring programs conducted at the mines and in Nunavut and to discuss possible study design options for the 2012 field season. Experiences with design and results from recent projects were shared. During the workshop, all mines formally adopted the revised recommendation from the June 2010 workshop: to determine if mine-related activities influence the relative abundance and distribution of grizzly bears in the study area over time.

In response to recommendations from the workshop, BHPB, Diavik and De Beers agreed in principle to work together on a large-scale, long-term grizzly bear DNA program. During the spring and summer of 2012, the northern portion of the proposed study area will be sampled using 111 cells within a 16,000 km² study area centred on Lac de Gras. The second year of sampling of the northern portion and the first year of the southern portion are proposed for 2013.

Wolf and Fox Monitoring

Annual surveys of den sites are the main monitoring program used to assess potential mine-related effects on wolf movements and presence within the Ekati study area. Of 19 historic and 3 new dens surveyed in collaboration with ENR in 2011, 4 were occupied in June, but no pups were observed in August. Only 1 den has been successful since 2007, likely reflective of lower Bathurst caribou numbers.

In 2010–11, 66 incidental foxes were observed, all but one (an Arctic fox) were red foxes. During the mid–1990s, Arctic foxes were more commonly reported than red foxes. Competitive dominance of red foxes, perhaps aided by climate change, may partly explain why red foxes outnumber Arctic foxes at Ekati in recent years.

Wolverine Monitoring

As a follow-up to DNA sampling conducted in 2005 and 2006, concurrent studies were conducted at Ekati, the Diavik Mine and Daring Lake in April 2010 and 2011. Over the four years, 63 individual wolverines (35 males, 28 females) were identified in the Ekati study area. The final results combining all four years of data are pending.

Bird Monitoring

Tundra breeding bird monitoring is no longer conducted at Ekati, although the North American Breeding Bird Survey was conducted for the ninth year. As recommended at the 2010 technical and community workshops, regional raptor surveys were discontinued. Rough–legged hawks, peregrine falcons and common ravens nested successfully in pits during 2011.

AGENCY ASSESSMENT Review of the 2011 WEMP Report

The WEMP report covers existing programs conducted at the Ekati Mine. Most results and analyses are well presented, although it contains limited information on the 2010 and 2011 grizzly bear pilot studies and the recent wolverine DNA surveys. BHPB has removed raw wildlife monitoring data and weather data from the WEMP report, citing response to stakeholder reviews. The Agency would appreciate seeing some of these data summarizednotably brief weather summaries and dates of partial and complete snowmelt. These types of data set the context for much of the ecology and timing of events in the Arctic. In addition, a summary of the temporal pattern of observations of caribou at Ekati would be useful.

As mentioned in previous reviews, we suggest that the discussion portion of each section focus on long-term trends and the importance of results, rather than reiterating results. The Agency would like to see future WEMP reports 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.

The Agency also suggests that plans for future monitoring be included in the annual WEMP report. In March 2011, BHPB proposed a number of changes to its WEMP. Major programs were removed from the WEMP over the past three years (e.g., aerial surveys for caribou distribution and abundance, grizzly bear sign surveys, tundra breeding bird and regional raptor monitoring). Emphasis was to be directed towards greater focus on caribou behavioural studies and testing of remote techniques for monitoring. Much movement has been made on developing a regional grizzly bear DNA program for 2012, and we commend BHPB for this leadership.

However, progress has been slow in offering alternative monitoring programs to determine the influence of mine-related activities on the relative abundance and distribution of caribou. BHPB appears reluctant to commit to reinstituting aerial surveys in 2012, a methodology proven to provide robust data, especially in relation to establishing a zone of influence related to mine activity. Hauling from Misery Pit will expand in 2012, greatly increasing vehicle traffic and potential impacts on caribou. In 2011, 50 remote cameras were deployed on mine property, but study objectives, design and results

RECOMMENDATION 1

The Agency recommends that BHPB implement in 2013 a monitoring program with the objective to determine the influence of mine-related activities on the relative abundance and distribution of caribou.

have not been provided as of this writing. Follow-up discussions on hi-resolution photos from helicopters flown at higher altitude or videos from remote aircraft have not occurred. Movement on studies to identify mechanisms (possibly dust deposition) that may be influencing the distribution of caribou relative to the mine footprint is not evident. Given that 2012 will be the third year since aerial monitoring was last conducted, we strongly believe that BHPB either must restart the aerial survey flights or provide an alternative monitoring program design that examines the distribution and abundance of caribou relative to mine infrastructure.

Red fox (left). Wolf (right).



07

Regional Monitoring and Cumulative Effects

HIGHLIGHTS

- > ENR has yet to complete the Bathurst caribou herd summer-range pilot project.
- AANDC partially accepted recommendations from WRRB to develop best practices for the mitigation of impacts to caribou, but no deadlines specified.
- > Caribou, fish and water will be the focus of CIMP over the next three to five years.

ACTIVITIES 2011–12

In this section, we review new developments with regard to regional monitoring and cumulative effects. Regional monitoring is a useful tool for cumulative effects monitoring and management.

The Department of Environment and Natural Resources (ENR) committed to carry out a pilot project in the Bathurst caribou herd summer range in 2008. This work has still not been released. Given the importance of caribou, this work should be completed and made available, as it will provide information on how to improve caribou monitoring programs.

The Wek'èezhìi Renewable Resources Board (WRRB) released its decision on caribou management in October 2010. In its decision, the WRRB made a number of caribou management and monitoring recommendations to Aboriginal Affairs and Northern Development Canada (AANDC), ENR and the TłĮchǫ Government. We discussed this in our last annual report, and below is an update on the most relevant recommendations for caribou management in relation to the Ekati Mine.

An implementation plan for the WRRB recommendations has been developed by ENR and the TłĮchǫ Government and approved by the WRRB. The WRRB also recommended that AANDC and ENR collaboratively develop best practices for mitigating effects on caribou during calving and post–calving. These would include consideration of mobile caribou protection measures (temporary restrictions on land use activities tied to caribou movements) and monitoring landscape changes (including fires and industrial exploration and development) to assess potential impacts to caribou habitat.

The WRRB provided its recommendations to AANDC in

October 2010 and a follow-up letter in January 2011. The AANDC Minister responded in August 2011 to partially accept the recommendations but offered no timelines (see Table 5). We understand that work has started on these initiatives, but it is not clear when they may be completed and submitted to the WRRB and others.

The Cumulative Impact Monitoring Program (CIMP) was intended to provide information on the state of the environment for the Mackenzie Valley and to evaluate the functioning of the integrated resource management system. To date, CIMP has emphasized the need for community involvement, capacity building, improved coordination, and the synthesis and analyses of environmental information at scales that are relevant to northern regulators, communities and industry. In 2011, 43 projects received funding under the program in the Northwest Territories, totalling more than \$1.5 million. These projects included:

 Cumulative impact monitoring in Thaidene Nene (Łutsel K'e Dene First Nation); and

TABLE 5: WRRB CARIBOU RECOMMENDATIONS AND RESPONSES

WRRB RECOMMENDATION (October 2010)	AANDC RESPONSE (August 2011)
ENR and AANDC to collaboratively develop best practices for mitigating effects on caribou during calving and post-calving, including the consideration of implementing mobile caribou protection measures.	AANDC agrees with the intent of the recommendation. AANDC will work with ENR as appropriate.
ENR and AANDC to monitor landscape changes, including fires and industrial exploration and development, to assess potential impacts to caribou habitat.	AANDC agrees with the recommendation. AANDC anticipates developing a territory-wide cumulative impacts inventory for this purpose.
ENR, Tłįchǫ Government and AANDC to implement its recommendations no later than January 1, 2011.	AANDC agrees with the intent of the recommendation. AANDC notes that this recommendation cannot be implemented by the identified deadline and will work with ENR and the TłĮchǫ Government to develop long-term management approaches.

 > TłĮchǫ knowledge research and development program (Tłįchǫ Government).

CIMP hosted a results workshop in the fall of 2011 to facilitate the exchange of results and ideas between CIMP-funded researchers, decision makers and communities. A priority-setting workshop involving decision makers from the Northwest Territories resulted in the selection of three priority Valued Ecosystem Components—fish, caribou and water—that will be the focus of the program for the next three to five years. This work should improve overall understanding of cumulative effects in the Lac de Gras region and management of these impacts.

Caribou from Bathurst herd.





08 Traditional Knowledge

HIGHLIGHTS

- > Agency hosted a TK workshop.
- > BHPB is implementing a TK strategy for Ekati.
- > BHPB should encourage and make better use of TK in closure planning.

ACTIVITIES 2011–12 BHPB's Traditional Knowledge Strategy

The Agency is aware of the recent Traditional Knowledge (TK) strategy for Ekati, and we commend BHP Billiton (BHPB) for beginning to build stronger relationships with communities. BHPB's new TK specialist is currently working with the Aboriginal Society Members to help them develop and implement their own TK projects (see below).

BHPB proposes to set up a TK advisory group to assist with closure planning. This is a commendable initiative, and we encourage BHPB to move forward on this quickly.

Community Engagement Tours

BHPB held a number of community engagement tours intended to demonstrate and provide hands-on experience to community members (Elders and youth) on how BHPB's environment staff conducts its day-to-day, site-based environmental monitoring programs. During the tours, BHPB collected and recorded recommendations, ideas or thoughts from community participants. The tours also provided the opportunity to participants to express their concerns. (See BHPB's summary reports for details.)

BHPB hosted an Air Quality Monitoring Program community engagement tour May 4 to 5, 2011, which included participants from the Tłįchǫ, Kitikmeot Inuit Association (KIA), North Slave Métis Alliance (NSMA) and Yellowknives Dene First Nation (YKDFN). The company also conducted week–long Wildlife Effects Monitoring Program tours, hosting community members from Kugluktuk from June 1 to 8, Łutsel K'e from August 24 to 31, YKDFN from September 8 to 14, and NSMA from September 21 to 25.

Agency TK Workshop

In December 2011, the Agency hosted a TK workshop in Yellowknife. The purpose of the workshop was to review BHPB's use of TK in environmental management at Ekati and to give communities an opportunity to discuss their own TK projects, including work with BHPB. BHPB's TK specialist delivered a presentation summarizing BHPB's TK strategy and the Phase II TK projects BHPB is supporting. Community members also presented on TK projects in their communities:

- In Łutsel K'e, starting in 1999, a Geographic Information System (GIS) has been used to store information on hunting, fishing, trapping, place names, burials and industrial uses of Łutsel K'e Dene First Nation (LKDFN) lands.
- > NSMA Community Heritage
 Project aims to help define the
 North Slave Métis community and
 create an archive and database
 of information on its land use.
- Yellowknives Dene are digitizing recordings of interviews with Elders conducted as far back as the 1960s. The compilation of Elders' TK could form the basis for a library and research centre for the YKDFN.
- KIA is studying the effects of development on caribou using both Inuit Traditional Knowledge (Inuit Qaujimajatuqangit) and western science.

A representative of AANDC presented information on how to better collaborate with communities and discussed some of the benefits to industry of working with Aboriginal peoples. The Agency presented an overview of BHPB's use of TK to date as well as the Agency's role in facilitating TK use at Ekati. The TK workshop participants made several recommendations to BHPB, including the following:

- > BHPB should provide significant wildlife incident reports directly to communities and other interested parties.
- BHPB should better document its use of TK at Ekati in improving environmental management.
- There would be value in bringing together people working on various TK documentation projects to share information and methods, especially those building usable databases and GIS.
- There is substantial interest in the use of TK in closure planning at Ekati, and the Agency strongly encourages everyone to work together. A TK advisory committee, as proposed by BHPB, would be a good starting point.
- There is still considerable confusion in the communities around what

will happen to the mine pits and waste rock piles at closure. BHPB should spend more time with the communities explaining what is in the *Interim Closure and Reclamation Plan* (ICRP), particularly how the pits will be reclaimed and managed.

AGENCY ASSESSMENT

ICRP Research Plan #26 states that community consultations and engagement tours about TK incorporation into closure planning will begin in 2012 and end in 2013, when a strategy document for undertaking TK incorporation will be distributed. It is apparent to the Agency that, even though the ICRP has been finalized after several years of development with input from communities, there is still confusion in communities as to the closure options, objectives and criteria for each mine component. This suggests a weakness in the consultation processes. This is evident from discussions the Agency has

Elders in Łutsel K'e, February 2012.



had with residents during Agency community visits. These discussions reveal that even participants in BHPB's meetings and workshops, who helped develop the ICRP, are unclear about how the mine components will be reclaimed and what their final use will be. TK use in

RECOMMENDATION 2

BHPB should undertake more effective community consultation regarding closure in order to:

- Achieve better community understanding of the closure plan;
- Gain a better understanding of the views of communities regarding closure; and
- > Facilitate the incorporation of TK into closure planning.

reclamation planning is an important part of the overall ICRP research plans, and the company should do its best to better incorporate TK into closure planning for each mine component.

We recommend that BHPB review its community engagement practices with a view to maximizing the effectiveness of its planned incorporation of TK into reclamation planning and execution. The company's TK specialist should be an asset in achieving this. (See Recommendation 2 above.)

In this regard, the Agency has suggested in the past that BHPB employ best practices, such as the following:

 Extending the time spent in communities to take full advantage of TK holders' availability and eagerness to offer advice (including overnight stays when accommodations are available); and

> Sending communities presentation and discussion materials in advance of planned meetings and workshops to allow participants more time to digest the information, and to give translators more time to familiarize themselves with concepts to translate materials and discussions more accurately.

The Agency believes increased involvement by communities in closure planning is well worth the company's time and effort. When done effectively, it can provide the company with more informed consideration by communities of proposed ICRP options, objectives and research planning. A TK advisory panel appears to offer a promising approach and should involve all Aboriginal Society Members.



09 Assessment of the Regulators

HIGHLIGHTS

- > AANDC does effective inspections, but more resources are needed to continue this work and for the upcoming water licence renewal.
- > DFO and EC have been helpful in understanding the protection of the aquatic environment.
- > ENR should strengthen its technical input into decision-making around the environment at Ekati.
- > WLWB should provide clearer direction on content and detail for management plans, and should complete the work on adaptive management guidance and supporting documents for the Water and Effluent Quality Management Policy.

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 government agencies and regulatory authorities regulating the mine. The following are our comments regarding their performance in 2011–12.

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 2011–12, we identified some instances where we felt they performed well and some instances where their involvement could have been improved. We were pleased to observe the willingness among all regulators to collaborate and share resources. For example, the Government of the Northwest Territories (GNWT) coordinated discussion of regional grizzly bear monitoring, and Environment Canada (EC) and Fisheries and Oceans Canada (DFO) have been helpful in giving the Agency a better understanding of the regulatory regime with regard to mixing zones in the aquatic environment (i.e., a designated portion of a water body where effluent is diluted to acceptable levels).

Aboriginal Affairs and Northern Development Canada

The Agency is pleased with the thorough and effective inspections carried out by the Aboriginal Affairs and Northern Development Canada (AANDC) inspector over the past year. However, we note that inspections were reduced from nine in 2010–11 to six in 2011–12. This was due largely to the reassignment of the regular inspector for Ekati to other duties. We hope that AANDC soon finds the resources to ensure timely and thorough inspections of Ekati.

AANDC continued to provide sound technical advice on water issues. With the upcoming water licence renewal, it will be important that AANDC retains the ability to hire independent technical expertise.

Fisheries and Oceans Canada

DFO staff continue to be helpful to the Agency and others. For example, when the widening of the Panda Diversion Channel was underway and a site tour was being planned, DFO asked if the Agency could send a representative. DFO also provided leadership and funding in a final, collaborative evaluation study of stream habitat within the Panda Diversion Channel conducted by researchers from the University of Alberta and BHPB's consultants (Rescan). We look for ward to DFO's publication of the toxicity testing on northern fish species, which will yield helpful information in the setting of more appropriate water quality objectives and contaminant discharge limits.

Environment Canada

Environment Canada continues to provide sound advice to BHPB and the Agency on air quality monitoring. We note that one long-term employee with extensive experience on Ekati environmental issues has moved away but remains available, which is very helpful. EC also has been helpful in better understanding the policy and practice for protection of aquatic ecosystems.

Department of Environment and Natural Resources

The Department of Environment and Natural Resources (ENR) has provided helpful advice on air quality monitoring, particularly as BHPB begins to operate its new incinerator. We were pleased with ENR's initiative in hosting a grizzly bear monitoring workshop, where BHPB took on a leadership role in proposing a joint regional approach with other diamond mines. We are hoping the same approach might be fostered by ENR for improved caribou monitoring.

We understand that a new version of the *Wildlife Act* is a priority for the new territorial government. We look forward to the improved regulation of wildlife monitoring and management plans.

The Agency believes ENR, given its broad mandate for environmental protection, should be more involved in a technical capacity with reviewing BHPB submissions under the water licence and should provide more review, input and advice on wildlife monitoring at Ekati.

Wek'èezhìı Land and Water Board

The Agency continues to have a good working relationship with Wek'èezhi Land and Water Board (WLWB) staff. We were generally pleased with the WLWB's decision and direction given on the management plans submitted by BHPB over the last year. However, there is still a need for clearer guidelines or direction that set out the WLWB's expectations for the content and level of detail in management plans.

We are pleased that the new Water and Effluent Quality Management Policy will be implemented for the Ekati water licence renewal, whereby all the Effluent Quality Criteria will be reviewed as well as the results from aquatic monitoring programs to identify new contaminants of concern. However, the Agency encourages further work and development of the supporting documentation required to implement the policy.

The Agency is also growing increasingly anxious to see the completion of guidelines for Adaptive Management Plans. We encourage the completion of this work in the next 6 to 12 months.



Assessment of BHP Billiton

HIGHLIGHTS

- > BHPB continues to operate Ekati in an environmentally sound manner.
- > Revised version of the ICRP was approved and sets a high standard.
- Improvements to caribou monitoring and community consultation are needed.
- > Aquatic effects monitoring and reporting were improved.

In the view of the Agency, BHP Billiton (BHPB) continues to operate Ekati in an environmentally sound manner, as it has for many years. There were no significant adverse effects that arose this past year, largely due to BHPB's good environmental management. However, there is always room for improvement, as we have noted below. We will continue to work with the company and others to ensure that good environmental practices and management are maintained through to the closure of Ekati.

While we do on occasion disagree with the company, we continue to enjoy a good working relationship with BHPB's environment staff. BHPB held helpful meetings on the upcoming water licence renewal and the 2012 Environmental Impact Report, both of which we expect to devote significant time and effort to over the next year.

One of the more significant milestones in 2011–12 was the approval of the *Interim Closure and Reclamation Plan* (ICRP), first submitted in 2007. We believe that the final version is of good quality and sets a high bar for closure planning. Despite the ICRP, there is still a considerable lack of information and knowledge at the community level about how Ekati will be reclaimed and closed. We have made recommendations in the past to the company on how it can improve its community consultation, and further advice is found in earlier sections of this annual report. We also look forward to the first annual progress report on closure planning due in December 2012.

The new incinerator at site began to operate in early 2012. We look forward to standard operating procedures for the unit and a revised Waste Management Plan that reflects best practices and Environment Canada's guidelines for batch incineration.

We commend BHPB for its leadership in moving for ward with a joint diamond mine regional approach to a grizzly bear hair snagging program for DNA analysis. There appears to be good progress on grizzly bear monitoring.

At the same time, we have recommended that caribou monitoring

be improved to determine the influence of mine-related activities on relative abundance and distribution of caribou. Having had a three-year break from monitoring, the Agency believes it is time for BHPB to recommence aerial surveys.

The Agency was pleased to be part of a BHPB meeting to review the performance of the Long Lake Containment Facility (LLCF). The follow-up teleconference with BHPB's consultant to discuss the mechanisms and management implications for the settling of extra-fine processed kimberlite was particularly helpful.

The Agency supports BHPB's efforts to keep processed kimberlite out of cell D, including deposition into Beartooth Pit. We look forward to the supplemental information BHPB will provide in 2012 regarding water quality modeling of LLCF discharges, pit water quality modeling and plans for monitoring Beartooth Pit water quality.

The company has improved its presentation and interpretation of water quality and sediment sampling data in the Aquatic Effects Monitoring Program. Fish sampling has been expanded to include early warning indicators and to test if there are any spatial patterns for exposure to hydrocarbons and organochlorines. Plankton ecological analysis and interpretation has also been improved—all making for a better integrated and more comprehensive Aquatic Effects Monitoring Program.

Lastly, the Agency appreciates the improved documentation of community site visits. We were pleased to see several reports from such visits, which is consistent with our recommendations in the past.



Financial Statements

Management Responsibility Statement

The management of Independent Environmental Monitoring Agency is responsible for preparing the financial statements, the notes to the financial statements and other financial information contained in this annual report.

Management prepares the financial statements in accordance with Canadian generally accepted accounting principles. The financial statements are considered by management to present fairly the management's financial position and results of operations. The organization, in fulfilling its responsibilities, has developed and maintains a system of internal accounting controls designed to provide reasonable assurance that management assets are safeguarded from loss or unauthorized use, and that the records are reliable for preparing the financial statements.

The financial statements have been reported on by MacKay LLP, Chartered Accountants, the Agency's auditors. Their report outlines the scope of their examination and their opinion on the financial statements.

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Jaida Ohokannoak Secretary–Treasurer June 29, 2012

Independent Auditors' Report

To the Directors of Independent Environmental Monitoring Agency

We have audited the accompanying financial statements of Independent Environmental Monitoring Agency, which comprise the statement of financial position as at March 31, 2012, and the statements of operations, changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian generally accepted accounting principles, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

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 comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the organization's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the organization's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained in our audits is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Independent Environmental Monitoring Agency as at March 31, 2012, and the results of its operations and its cash flows for the years then ended in accordance with Canadian generally accepted accounting principles.

Mackay LLP

Chartered Accountants Yellowknife, Canada June 29, 2012

STATEMENT OF OPERATIONS

For the year ended March 31

REVENUE	2012	2011
Core funding – BHP Billiton Canada Inc.	\$ 589,914	\$ 578,776
Separate funding – BHP Billiton Canada Inc.	40,000	40,000
One-time funding	-	15,120
NWT payroll tax refund	4,186	-
Interest income	2,000	1,119
	636,100	635,015
EXPENDITURES		
Advertising and promotion	372	2,633
Amortization	5,106	4,897
Auditing and accounting fees	17,635	15,250
Board support		
– honoraria	131,430	105,073
- travel, meals and accommodations	61,865	43,830
Community consultation		
- annual general meeting	16,816	16,624
- annual report	58,228	52,001
- community visits	15,460	37,169
– environmental workshop	16,994	15,383
Consultants	968	12,275
Consultants – prior year	(5,000)	5,000
Equipment lease	484	928
Insurance	5,057	5,736
Office rent and maintenance	32,336	33,833
Office supplies	10,278	7,478
Postage and courier	1,508	1,067
Professional development	7,633	1,950
Staff recruitment	7,708	5,000
Staff travel	3,057	4,558
Telephone and fax	5,584	5,742
Wages and benefits	192,074	194,335
Separate fund		
– honoraria	14,802	13,320
– professional fees	1,057	33,672
– travel, meals, accommodation	-	2,082
	601,452	619,836
Excess of revenues over expenditures before other items	34,648	15,179
Transfer to contributions repayable		
Unspent funding – core	10.507	59
Unspent funding – separate funding	24,141	-
	34,648	59
Excess (deficiency) of revenues over expenses	\$ -	\$ 15,120

STATEMENT OF CHANGES IN NET ASSETS

For the year ended March 31

	2012	2011
General operating fund, beginning of year Excess of revenues over expenditures	\$ 12,685 -	\$ (2,435) 15,120
General operating fund, end of year	\$ 12,685	\$ 12,685

STATEMENT OF FINANCIAL POSITION

March 31

ASSETS	20	2	2011
Current Cash Short-term investments (note 4) Accounts receivable Prepaid expenses	\$ 196,90 250,02 4,39 5,65	3 4 5 9	\$ - 150,523 - 4,905
Capital Assets (note 5)	456,98 11,33	31	155,428 16,439
	\$ 468,31	4	\$ 171,867
LIABILITIES			
Current			
Bank indebtedness Accounts payable and accrued liabilities Deferred revenue Contributions repayable (note 6)	\$ 96,83 324,09 34,70	- 31 91 97	\$ 45,306 113,817 - 59
	455,62	9	 159,182
FUND BALANCES			
General operating fund	12,68	5	12,685
	\$ 468,31	4	\$ 171,867

Approved on behalf of the board:

The

William A. Ross, Director

Jaida Ohokannoak, Director

STATEMENT OF CASH FLOWS

For the year ended March 31

ASSETS	2012	2011
Cash provided by (used for) operating activities Excess of revenues over expenditures Item not affecting cash	\$ -	\$ 15,120
Amortization	5,106	4,897
	5,106	20,017
Change in non-cash working capital items Accounts receivable Prepaid expenses Accounts payable and accrued liabilities Deferred revenue Contributions repayable	(4,395) (754) (16,986) 324,091 34,648	- 144 69,173 (296,024) (5,740)
Increase (decrease) in cash	341,710	(212,430)
Cash, beginning of year	105,217	317,647
Cash, end of year	\$ 446,927	\$ 105,217
Cash consists of: Cash Short-term investments Bank indebtedness	\$ 196,903 250,024 -	\$ - 150,523 (45,306)
	\$ 446,927	\$ 105,217

March 31

NOTES TO THE FINANCIAL STATEMENTS

1. Nature of operations

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) 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. Significant accounting policies

These financial statements are prepared in accordance with Canadian generally accepted accounting principles. The significant policies are detailed as follows:

(a) Cash equivalents

The Agency's policy is to disclose bank balances under cash and cash equivalents, including bank overdrafts with balances that fluctuate frequently from being positive to overdrawn and short-term investments because they can be converted to cash in a reasonably short period of time.

(b) Capital Assets

Capital assets are recorded at cost. The Agency provides for amortization using the declining balance method at rates designed to amortize the cost of the capital assets over their estimated useful lives. Amortization is calculated by the declining balance method at the annual rates set out in note 5.

(c) Deferred revenue

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

(d) Fund accounting

The general operating fund accounts for programs and general operations.

(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 made. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

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

Interest income is recorded when earned.

(f) 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.

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.

(g) Use of estimates

The preparation of the financial statements 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 balance sheet date and the reported amounts of revenues and expenses during the year. Actual results could differ from those estimates.

3. Future changes to significant accounting policies

Not-for-Profit GAAP

In December 2010, the Accounting Standards Board issued a comprehensive set of new Canadian accounting standards for not-for-profit organizations (ASNPO) effective for fiscal periods beginning on or after January 1, 2012. When the end of a not-for-profit organization's annual reporting period does not coincide with the end of the calendar year, the mandatory date for first-time adoption of ASNPO is effective for fiscal periods beginning on or after January 1, 2012. The Agency is currently analyzing the effects of these changes on its financial statements.

4. Short-term investments

Short-term investments consist of guaranteed investment certificates maturing on March 28, 2013 and earning interest at 0.89% per year. The certificates are transferable on demand to the Agency's bank account.

5	Canital accets					2012		2011
5.	Capital assets	Rate	Cost	Ac an	cumulated	Net book value	1	Net Book value
	Equipment Computer equipment Computer software Website	20% 30-55% 100% 30%	\$ 12,180 11,956 2,543 15,120	\$	10,591 11,208 2,543 6,124	\$ 1,589 748 - 8,996	\$	1,985 1,602 - 12,852
			\$ 41,799	\$	30,466	\$ 11,333	\$	16,439

		2012		2011
5.	Contributions repayable			
	BHP Billiton Canada Inc.			
	Core funding 2012 Core funding 2011 Separate fund 2012	\$ 10,507 59 24,141	\$	- 59 -
		\$ 34,707	 \$	59

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

7. Commitment

As at March 31, 2012 the Agency has an operating lease for office space expiring December 31, 2013. The annual payment for the next two years are as follows:

2013 2014	\$ 31,500 23,625
	\$ 55,125

8. Economic dependence

The Agency receives 99% (2011 – 99%) of its contribution funding from BHP Billiton Canada 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:

(a) Fair value

The Agency's financial instruments include cash and cash equivalents, accounts receivable, bank indebtedness and accounts payable and accrued liabilities. The carrying value of these instruments approximates their fair value due to their short-term maturities.

(b) Interest rate risk

The Agency's exposure to interest rate fluctuations is with respect to the use of its bank revolving credits and demand instalment loan which bear interest at floating rates.

(c) 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 contributions receivable are due from one source. This risk is managed as BHP Billiton Canada Inc. is required by the Environmental Agreement with the Governments of Canada and the Northwest Territories to remit payments to the Agency.

10. Capital disclosure

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.

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

	2012	201
Current assets Current liabilities	\$ 456,981 455,629	\$ 155,42 159,18
	\$ 1,352	\$ (3,754

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

11. Comparative amounts

The financial statements have been reclassified, where applicable, to conform to the presentation used in the current year. The changes do not affect prior year earnings.



Summary of Work Plan and Core Budget 2012–13 and 2013–14

The Agency's work plan is based upon the direction and feedback received from our Society Members at our annual general meeting in December 2011 and our 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 2012-13, BHP Billiton (BHPB) will contribute approximately \$648,000 to the Agency and in 2013-14 approximately \$664,000 (assuming a 2.5% increase in CPI). The second year of the work plan will be refined and modified based on direction received during next year's annual general meeting of Society Members and any changes or modifications to the mine.

11

MAJOR ACTIVITIES Board Meetings and Conference Calls

The major means of fulfilling our mandate is through Board meetings that are held approximately every three months. Board meetings provide an opportunity for directors to discuss, review and make recommendations on recent, ongoing

TABLE 6: CORE BUDGETS 2012-13 AND 2013-14

	FORECASTED	PROPOSED	PROPOSED
Activity	2011-2012	2012–2013	2013-2014
Board Meetings	80,813	110,250	113,006
Review of Documents	44,381	47,625	48,816
Separate Fund	15,859	40,000	40,000
Communications	188,309	159,750	179,118
Outside Contracts	5,600	10,000	10,000
Mgmt and Admin	281,680	280,000	287,000
TOTAL	616,642	647,625	677,940
(approved)	629,250	648,181	664,385

and anticipated initiatives. Guests are invited to meetings to provide updates and receive input on their specific activities. Regular guests include staff from BHPB and the Wek'èezhìr Land and Water Board as well as the Aboriginal Affairs and Northern Development Canada (AANDC) inspector.

Proposed Activities: Annually, three 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 2012–13:

- > The regular environmental monitoring reports for 2012 if received in time (Aquatic Effects Monitoring Program, Wildlife Effects Monitoring Program, and Panda Diversion Channel);
- Various management plans, including the Waste Rock and Ore Storage Management Plan, Wastewater and Processed Kimberlite Management Plan, Wildlife Management Plan, and Waste Incineration Management Plan;

- Interim Closure and Reclamation Plan progress report and Long Lake Containment Facility (LLCF) pilot revegetation design;
- > 2012 Environmental Impact Report;
- > Pit lakes water quality report and LLCF water model; and
- > BHPB's Environmental Agreement and Water Licence Annual Report.

There are also two meetings for the Agency, BHPB, AANDC and the Government of the Northwest Territories to better coordinate implementation of the Environmental Agreement.

Beartooth Pit lookout.



The same workload is expected in 2013–14, although the focus may shift with more work on closure planning.

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 2012–13, the Agency expects to review the water licence renewal application and participate in technical sessions and meetings related to the renewal process.

For 2013–14, the Agency anticipates a public hearing on the water licence renewal.

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 will 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 the Ekati Timeline project covering development of the mine, regulatory events and environmental issues) and public registry. The Agency will continue to produce two annual reports, one in plain language and one technical. The Agency also will implement other parts of our new Communications Plan, including producing some printed material and sound files in Aboriginal languages.

The same activities are anticipated in 2013–14.

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 an Executive Director and a Communications and Environmental Specialist. The Agency now manages its own office space and equipment.

Proposed Activities: Maintain current staff and benefit levels. ■



Acronyms

AANDC – Aboriginal Affairs and Northern Development Canada, previously known as "Department of Indian Affairs and Northern Development (DIAND)" and "Indian and Northern Affairs Canada (INAC)"

AEMP – Aquatic Effects Monitoring Program

AQMP - Air Quality Monitoring Program

BHPB – BHP Billiton Canada Inc. ("the company")

CCME – Canadian Council of Ministers of the Environment

CIMP – Cumulative Impact Monitoring Program

CPI – Consumer Price Index

DELT – deformities, eroded fins, lesions and tumours

DFO – Fisheries and Oceans Canada (also known as "Department of Fisheries and Oceans")

DIAND – See AANDC

DNA – deoxyribonucleic acid

EC – Environment Canada

EDC – endocrine disrupting compound

EIR – Environmental Impact Report

ENR – Department of Environment and Natural Resources (NWT), previously known as "Department of Resources, Wildlife and Economic Development (RWED)" **GCMLP** – Geochemical Characterization and Metal Leaching Management Plan

GIS – Geographic Information System

GNWT – Government of the Northwest Territories

IACT – Inter-Agency Coordinating Team

ICRP – Interim Closure and Reclamation Plan

IEMA – Independent Environmental Monitoring Agency ("the Agency")

INAC - See AANDC

IPS – Ideal Performance Standard

KIA – Kitikmeot Inuit Association

LKDFN – Łutsel K'e Dene First Nation

LLCF – Long Lake Containment Facility

MVLWB – Mackenzie Valley Land and Water Board

NSMA – North Slave Métis Alliance

NWT – Northwest Territories

- PDC Panda Diversion Channel
- **PK** processed kimberlite
- PM particulate matter
- PSD Pigeon Stream Diversion
- SNP Surveillance Network Program

SSWQO – Site–Specific Water Quality Objective

TK – Traditional Knowledge

TSP – total suspended particulates

TSS - total suspended solids

WEMP – Wildlife Effects Monitoring Program

WLWB – Wek'èezhìi Land and Water Board

WPKMP – Wastewater and Processed Kimberlite Management Plan **WROMP** – Waste Rock and Ore Storage Management Plan

WRRB – Wek'èezhìı Renewable Resources Board

WRSA – Waste Rock Storage Area

YKDFN - Yellowknives Dene First Nation

YOY - young-of-the-year



Glossary

Adaptive Management – A management system with 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 sediments and mud at the bottom of rivers, lakes and ponds that can contain living organisms (e.g., benthic invertebrates). Benthic invertebrates such as mosquito larvae are an important food source for small fish.

Chloride – Salt resulting from the combination of the gas chlorine with a metal. Fish and aquatic communities cannot survive in high levels of chlorides.

Cladocera – An order of small crustaceans (i.e., zooplankton) that live in water (commonly called water fleas).

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 natural factors and effects from other past, present and future human activities.

Endocrine Disrupting Compound –

Synthetic chemical that, when absorbed into the body, either mimics or blocks hormones and disrupts the body's normal functions.

Environmental Agreement – Created as a legally binding instrument to provide monitoring and input into management practices not covered by other authorizations. Parties include BHPB and the federal and territorial governments. Akaitcho Treaty 8 First Nations (LKDFN and YKDFN), Kitikmeot Inuit Association, North Slave Métis Alliance and Tłįchǫ Government were involved in the negotiations.

Esker – Long, low, narrow, sinuous, steep-sided ridge or mound composed of irregularly stratified sand and gravel that was deposited by a subglacial or englacial stream flowing between ice walls or in an ice tunnel of a continuously retreating glacier.

Extra-Fine Processed Kimberlite – This material comprises approximately 12% by mass but 35% by volume of the PK deposited into the LLCF. Because of its fine nature, it can take a long time to settle properly and consolidate.

Fry – Early life-stage of fish following absorption of yolk sac (i.e., alevin) stage.

Hydrocarbons – Organic compounds which contain only hydrogen and carbon. This includes fossil fuels (i.e., 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.

Molybdenum – A metal that can affect trout just after they hatch.

Nitrate – A nutrient, like a fertilizer, derived from nitrogen. Nitrate can affect the growth of baby fish if it gets too high.

Phosphorus – A plant nutrient that can cause rapid bacteria and algae growth when present in high amounts, leading to eutrophic (i.e., low oxygen) conditions.

Phytoplankton – Microscopic plants (e.g., algae) found in freshwater and ocean environments. They are an important food source for zooplankton.

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".

Progressive Reclamation – Reclamation that can be carried out during the construction and operation phases of a mine prior to final closure (e.g., rock waste dumps).

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

Slave Geological Province – Area between the City of Yellowknife and the Arctic coast.

Tailings - See "Processed Kimberlite".

Total Suspended Particulates – The fraction of airborne particulates that will remain airborne after their release in the atmosphere.

Total Suspended Solids – Concentration of total suspended material in a waterbody as determined by an analysis of a representative subsample of an entire collected water sample.

Valued Ecosystem Component – Environmental element of an ecosystem that is identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance.

Waste Rock – Rock containing diamonds but too low in grade to be mined or processed economically. Also other rock that must be removed to access kimberlite pipes.

Waste Rock Seepage – Water that drains over the waste rock piles. This water may pick up contaminants as it touches the waste rock and may enter the receiving environment.

Wastewater – Water that contains wastes from the mining process, including sewage and chemicals from explosives.

Zone of Influence – Area of reduced caribou occupancy.

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.

TECHNICAL ANNUAL REPORT

INDEPENDENT ENVIRONMENTAL MONITORING AGENCY

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE

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All photos by the Agency unless otherwise noted.

