

**INDEPENDENT  
ENVIRONMENTAL  
MONITORING AGENCY**  
A PUBLIC WATCHDOG FOR ENVIRONMENTAL  
MANAGEMENT AT EKATI DIAMOND MINE

**TECHNICAL ANNUAL REPORT 2014-15**



## MESSAGE FROM THE CHAIR 2015

This past year has, once again, been one of great change both for Ekati and for the Agency. The proposed major expansion of the mine, Jay pipe, is now actively being reviewed. Should the Jay Project proceed, the Agency believes great care will be needed to properly manage adverse effects.

The changes proposed to the Environmental Agreement (Canada ceasing to be a party) remain in abeyance and there is some uncertainty about continuing involvement of the Government of Canada in administering it.

Two long-serving Agency Directors, Laura Johnston and Kim Poole, have been replaced by Doug Doan and Emery Paquin, and my own appointment was extended until December of

this year. We thank Laura and Kim for excellent service and welcome Doug and Emery to the Agency. Our Communications and Environmental Specialist, Jessica Simpson, has gone on parental leave with Tee Lim filling the role during her absence.

The financial security being held by governments under the water licence has now been made adequate to close the mine in accordance with the approved Interim Closure and Reclamation Plan. The Agency is pleased with this development. Security under the Environmental Agreement has not yet been determined. This should be completed and the security posted forthwith.

I remain pleased to report that DDEC has continued the good job of environmental protection at Ekati. The Agency will continue to work to ensure that this good environmental performance can be continued for the life of the Ekati Mine.

The major uncertainties we have before us are: what, if any, changes will be made to the Ekati Environmental Agreement; the

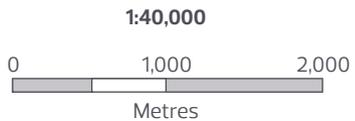
fact that financial security under the Environmental Agreement is not yet determined; and how the environmental assessment for the proposed Jay expansion will unfold.

In my twelfth and last message from the Chair, I would like to add the following. I am proud of the good work the Agency has done over its 18 years and have every reason to expect the good work to continue. It is always satisfying to contribute to effective environmental management (at Ekati) and I am pleased to have done so. The Directors and staff of the Agency are of high quality and are pleasant to work with. It has been my pleasure to serve on the Agency with such fine people.

William A. Ross, Chairperson  
March 31, 2015

# EKATI DIAMOND MINE

- 1** PIGEON STREAM DIVERSION
- 2** PIGEON PIPE
- 3** LONG LAKE CONTAINMENT FACILITY (CELLS A–E)
- 4** INCINERATORS
- 5** WASTEROCK PILES
- 6** BEARTOOTH PIT
- 7** PANDA PIT
- 8** KOALA AND KOALA NORTH PIT
- 9** PANDA DIVERSION CHANNEL
- 10** MAIN CAMP
- 11** HAUL ROADS
- 12** AIRSTRIP
- 13** FOX PIT
- 14** MISERY CAMP
- 15** MISERY PIT
- 16** OLD CAMP



SATELLITE IMAGE 2010/BHP BILLITON CANADA INC.



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All photos by the Agency unless otherwise noted.



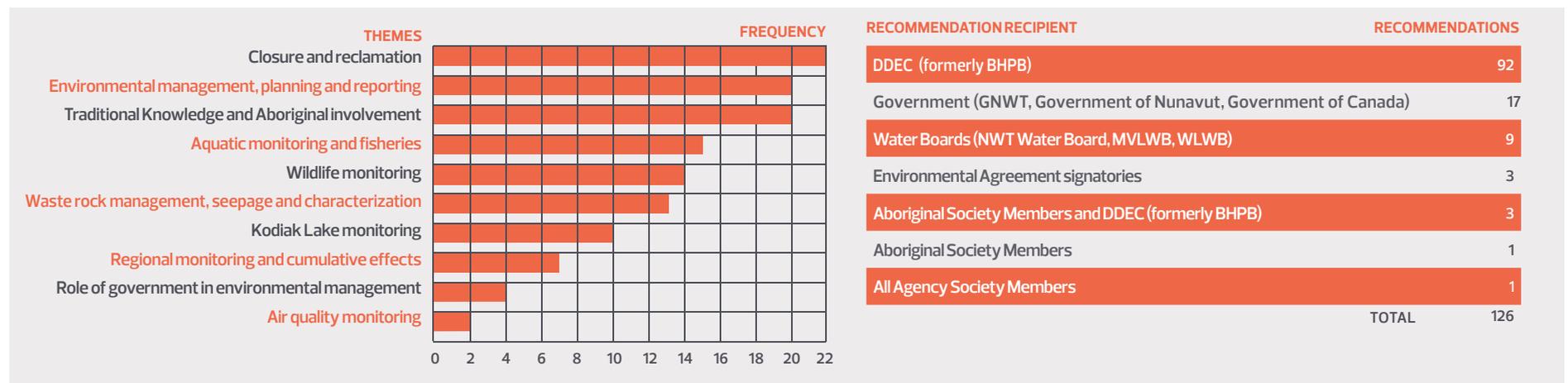
# AGENCY RECOMMENDATIONS 2014–15

## 1 RECOMMENDATION

**RECLAMATION AND CLOSURE** The Agency recommends that the GNWT update the terms and determine the amount of the Environmental Agreement security deposit no later than July 1, 2015, and provide reasons for its decision.

**GNWT RESPONSE:** Over the last number of months the GNWT and DDEC, in consultation with the Agency, have been participating in a review of the Environmental Agreement security deposit, per Article 13.2(b) of the Agreement. This review is near completion and the results and rationale will be shared with the Agency.

FIGURE 1: AGENCY RECOMMENDATION THEMES 1997–2015



## 2 RECOMMENDATION

**AIR QUALITY** The Agency recommends that DDEC investigate and test different dust prevention and suppression methods and evaluate their effectiveness at the Ekati mine. The Agency encourages DDEC to consult with GNWT Environment and Natural Resources, GNWT Transportation, Environment Canada, and others in the design of the testing and evaluation.

**DDEC RESPONSE:** DDEC is currently evaluating our dust suppression and monitoring program. DDEC continues to engage with ENR and other regulatory agencies on the use of other chemical dust suppressants. DDEC intends to trial a new dust suppression product (EnviroKleen) in 2015 and a test project is currently in development.



*Misery waste rock pile.*



Site visit.

## HIGHLIGHTS

- Four Board meetings, the annual general meeting, the environmental workshop and a community visit to Łutsel K'e.
- Participation in the Jay Project environmental assessment.
- Site visits to Ekati Mine.
- DDEC, GNWT and AANDC replace two Agency Directors.

### ACTIVITIES 2014-15

In 2014-15, the Agency held three Board meetings in Yellowknife and one in Łutsel K'e, as well as our environmental workshop and annual general meeting in December 2014. Participants in our annual general meeting discussed environmental concerns around the Jay and Lynx Projects, in particular

dust suppression, impacts on caribou, monitoring of the Coppermine watershed, and the evolving roles of Government of the Northwest Territories (GNWT) and the federal government. There was a commitment from both GNWT and Aboriginal Affairs and Northern Development Canada (AANDC) for consultation with Aboriginal governments

# AGENCY ACTIVITIES AND ASSESSING THE AGENCY

before making any changes to the Environmental Agreement.

The Agency visited the Ekati Mine in June 2014 to view areas such as Cell B of the Long Lake Containment Facility where there is a large scale cover and revegetation study under way. The Agency also took the opportunity for a helicopter tour of the Lac du Sauvage and Lac de Gras areas likely to be affected by the Jay Project. Agency staff also visited the mine site in June and September 2014 as part of the Inter-Agency Coordinating Team (IACT).

### Technical Reviews and Input

A significant amount of the Agency's efforts were devoted to the proposals to expand the life of the Ekati Mine using the Lynx and Jay Projects. The Agency is a party to the Jay Project environmental assessment. We provided extensive comments on changes to the Terms of Reference for the environmental assessment as a result of the company dropping the Cardinal pipe from the project proposal. We also prepared over 50 Information Requests for Dominion Diamond Ekati Corporation (DDEC) and government agencies to help clarify the impact issues of the Jay Project, the collective understanding of the significance of those impacts and how they might be better managed. The Agency also responded to two Information Requests filed by the Review Board (see Tables 1 and 2 for incoming and outgoing correspondence).



Agency visit to Łutsel K'e.

The greatest number of Agency meetings (Table 3 provides highlights of Agency activities) and submissions on technical issues revolved around financial security for closure and reclamation of the Ekati Mine, including resources for the Agency to be involved throughout closure and post-closure phases as required in the Environmental Agreement. While financial security under the water licence has been resolved and posted, it is uncertain how and when posting of security under the Environmental Agreement will be completed. Further information on this process and the Agency's involvement is found in the Closure and Reclamation section of this report.

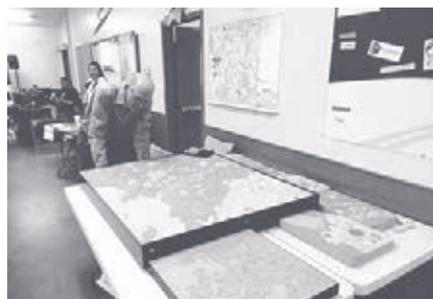
The Agency was also involved in the review of the '2013 Interim Closure and Reclamation Plan Annual Progress Report' where the company proposed major changes

**TABLE 1: AGENCY INCOMING CORRESPONDENCE 2014-15**

SENDER	# OF PIECES
AANDC	2
Agency Society Members	8
DDEC	41
EC	0
EMAB and/or SLEMA	0
DFO	1
GNWT	20
WLWB	33
WRRB or others	5
<b>TOTAL</b>	<b>110</b>
SUBJECT	# OF PIECES
Administration	14
Air quality	0
Aquatics, including AEMP, PSD, PDC widening and monitoring, SNP monitoring, pumping	27
Closure and reclamation (including ICRP, draft guidelines and policies and financial security)	16
Community engagement and consultation	2
Environmental Agreement and Water Licence Annual Report, EIR	10
PK and waste rock management, including WPKMP, WROMP, PK deposition plan and seepage reports	2
Traditional knowledge	1
Water licence (including inspections, approvals and renewals)	10
Wildlife (including WEMP, grizzly bear monitoring program)	12
Other	15
<b>TOTAL</b>	<b>110</b>

**TABLE 2: AGENCY OUTGOING CORRESPONDENCE 2014-15**

RECIPIENT	# OF PIECES
AANDC	0
Agency Society Members	2
DDEC	8
Other interested parties	2
GNWT	7
WLWB	13
<b>TOTAL:</b>	<b>32</b>
SUBJECT	# OF PIECES
Administration	2
Aquatics, including AEMP	5
Community consultation	3
Water licence renewal	1
Traditional knowledge	0
Wildlife	5
Waste rock management, including WPKMP and WROMP	0
EIR	0
Closure and reclamation including Environmental Agreement	7
Other	5
<b>TOTAL:</b>	<b>27</b>



Jay Project information session.

to the closure activities at the site, along with a reduction in security. Our review raised concerns and requested additional information. The Wek'èezhii Land and Water Board (WLWB) generally supported our requests. Responses from the company on some of these matters remained outstanding at the time of writing of the Annual Report.

The Agency reviewed the 'Nitrogen Response Plan' proposed by DDEC in an effort to better track and manage explosive residues that are entering the receiving aquatic environment. Our comments focused on the need for better tracking, full responses to an independent review of blasting practices, and reporting of progress. The WLWB agreed with us and the Plan has since been improved.

The Agency also reviewed two drafts of the WLWB's 'Aquatic Response Framework', the objective of which is to ensure that water and aquatic life monitoring results are analyzed as part of an early warning system so that changes can be made before impacts become significant or irreversible. WLWB accepted most of the Agency's recommendations. Responses from the company are still outstanding at the time of writing.

With respect to wildlife monitoring, the Agency was a member of a technical working group to provide guidance to the Ekati area diamond mines on Zone of Influence monitoring and management actions that should be undertaken to reduce the footprint of the mines with regard to caribou. The Agency also provided comments to DDEC on its wildlife camera monitoring program and grizzly bear hair snagging work. The Agency once again supported DDEC in its nomination for an award for the grizzly bear work. DDEC and Diavik received the Mining Association of Canada's Towards Sustainable Mining Environmental Excellence Award.

## Agency Communications and Collaboration

In December, 2014, the Agency hosted an environmental workshop on wildlife monitoring and dust suppression. DDEC presented its wildlife camera monitoring report results and the grizzly bear hair snagging program results. In attendance were members of the DDEC's environment department, GNWT staff and representatives from our Society Members: Tłı̨chų Government, Akaitcho Treaty 8 and Kitikmeot Inuit Association. The Agency made a presentation on best practices for dust suppression at mines.

On September 24-25, 2014, the Agency visited Łutsel K'e to hold a Board meeting and get a chance to talk with community residents about the Ekati project. Our Board meeting was held in the Łutsel K'e Dene First Nation council chambers and Chief Felix Lockhart was in attendance. In the evening, we held a Community Open House, with about 20 community members attending. They provided the Agency with concerns about the Jay and Lynx Projects, the need for better dust suppression at the Ekati Mine and the general decline in the Bathurst caribou herd.

Environmental Agreement Implementation Meetings are held twice yearly amongst the three signatories to the Environmental Agreement and the Agency. This year the meetings were held in June 2014 and February 2015. These meetings improve coordination and communication between the Agency and the signatories, and provide each party with opportunities for updates on their respective activities. The Agency also reports on financial expenditures and future plans, and signatories are offered an opportunity to respond to formal recommendations made by the Agency in its annual report for the previous year.



Agency visit to Lutsel K'e.

In June and September 2014, site visits were made by the Inter-Agency Coordinating Team (IACT). IACT consists of the Agency and a group of government regulators, including the GNWT, the WLWB, Fisheries and Oceans Canada (DFO) and Environment Canada. The site visits allowed new GNWT staff to better understand the Ekati Mine operations.

One of the Agency's communications goals is to provide information on Ekati and the environment to interested parties, communities and public. We worked with Tamarack Computers to improve the internal communications amongst Directors and staff by using a tool to share documents over the web for our annual report and other matters. We have also automated our file back-up system and have off-site storage. The Agency will begin to re-organize and digitize our reference library for easier access through the website. Given the size of the library, it will take some time to complete this initiative.

The Agency continues to use social media through posting of current activities and events on our page at [www.facebook.com/monitoringagency](http://www.facebook.com/monitoringagency). Our newsletter also continues with the most recent issues from

TABLE 3: MAIN AGENCY ACTIVITIES 2014-15

DATE AND LOCATION	PURPOSE	MAIN ISSUES
<b>APRIL 21, 2014</b> Yellowknife	Incinerator Stack Emission Test Meeting	<ul style="list-style-type: none"> <li>Agency Directors and staff met with GNWT and EC staff to discuss the incinerator stack test results.</li> <li>Internal peer review done by DDEC and results generally good. Further information on the waste stream at the time of testing would be helpful along with an incinerator management plan.</li> </ul>
<b>MAY 6, 2014</b> Sidney and Yellowknife	Jay-Cardinal Project Meeting	<ul style="list-style-type: none"> <li>Agency teleconference with DDEC staff to discuss the proposed Jay-Cardinal Project and the company's engagement efforts. DDEC indicated it would be dropping the Cardinal pipe and use a horseshoe dyke to mine the Jay pipe.</li> </ul>
<b>MAY 9-12, 2014</b> Anchorage, Alaska	Western Mining Action Network Conference	<ul style="list-style-type: none"> <li>Agency Executive Director participates in mining conference.</li> <li>Lessons learned from other projects include community engagement, US tribal water regulation, and other matters.</li> </ul>
<b>MAY 22, 2014</b> Yellowknife	Boreal Science Panel	<ul style="list-style-type: none"> <li>Agency Chair and Executive Director provided information about the Agency and northern mining issues to expert panel.</li> </ul>
<b>MAY 29, 2014</b> Yellowknife	Air Quality Meeting	<ul style="list-style-type: none"> <li>Pre-consultation meeting among DDEC, GNWT and Agency on the preparation of the 2012-14 Air Quality Monitoring Program report and sampling season.</li> <li>Company encouraged to review the effectiveness of dust suppression efforts and to coordinate monitoring with Diavik.</li> </ul>
<b>JUNE 10, 2014</b> Ekati Diamond Mine	IACT Site Visit	<ul style="list-style-type: none"> <li>Agency Executive Director participated in the site visit that included the Panda Diversion Channel, Beartooth Pit, Pigeon Stream Diversion, Cell B revegetation area, Lynx Project location, and the Fox Pit.</li> </ul>
<b>JUNE 11-13, 2014</b> Ekati Diamond Mine and Yellowknife	Site Visit and Board Meeting	<ul style="list-style-type: none"> <li>Agency visited the Cell B revegetation area, Panda Diversion Channel, Pigeon Stream Diversion, Old Camp, Lynx Project site, Misery Camp and the Fox Pit. A helicopter tour was also given to the Jay Project area.</li> </ul>
<b>JUNE 13, 2014</b> Yellowknife	Environmental Agreement Implementation Meeting	<ul style="list-style-type: none"> <li>GNWT, DDEC and Agency meet to discuss Agency's draft recommendations for 2013-14 Annual Report, and upcoming community engagement activities. Some discussion on proposed changes to the Environmental Agreement but no formal plans for community engagement at this time.</li> </ul>
<b>AUGUST 15, 2014</b> Yellowknife	Environmental Agreement Financial Security	<ul style="list-style-type: none"> <li>Meeting of Agency, DDEC and GNWT on Environmental Agreement financial security.</li> <li>Company outlined its proposal for security. Agency agreed to provide its Environmental Agreement financial security proposal by the end of September 2014.</li> </ul>
<b>SEPTEMBER 19-21, 2014</b> Yellowknife	Traditional Knowledge Festival	<ul style="list-style-type: none"> <li>Agency Directors and staff participated in Tłı̄chǫ Government, Canadian Polar Commission and GNWT Traditional Knowledge Festival.</li> </ul>
<b>SEPTEMBER 23, 2014</b> Ekati Diamond Mine	IACT Site Visit	<ul style="list-style-type: none"> <li>Agency Director and Executive Director visited the Cell B revegetation area, Pigeon Stream Diversion and Old Camp.</li> </ul>
<b>SEPTEMBER 24-25, 2014</b> Lutsel K'e and Yellowknife	Community Visit and Board Meeting	<ul style="list-style-type: none"> <li>Agency Directors and staff visited Lutsel K'e and held a regular Board meeting, Open House and a school visit.</li> <li>Issues raised during the Open House included concerns with the Jay-Cardinal Project impacts on caribou and water, dust suppression and the overall decline of the Bathurst caribou herd.</li> </ul>
<b>OCTOBER 2, 2014</b> Yellowknife	Environmental Agreement Financial Security	<ul style="list-style-type: none"> <li>Meeting of DDEC, GNWT and Agency representatives to discuss the process to finalize Environmental Agreement financial security. DDEC indicated it may have comments on the Agency's proposal for Environmental Agreement security.</li> </ul>
<b>NOVEMBER 25-27, 2014</b> Yellowknife	Geoscience Forum	<ul style="list-style-type: none"> <li>Agency staff participate in a joint trade show booth with EMAB and SLEMA. Agency staff also attend several presentations of interest on devolution, closure and reclamation, and geotechnical investigations at Ekati.</li> </ul>

TABLE 3: MAIN AGENCY ACTIVITIES 2014-15

DATE AND LOCATION	PURPOSE	MAIN ISSUES
DECEMBER 1, 2014 Yellowknife	Waste Rock Storage Area Management	<ul style="list-style-type: none"> <li>Meeting and teleconference amongst DDEC, WLWB staff and consultants and the Agency to discuss the company's ecological risk assessment and thermal modelling work on waste rock piles at Ekati.</li> </ul>
DECEMBER 2, 2014 Yellowknife	Agency Board Meeting	<ul style="list-style-type: none"> <li>Agency Directors and staff discussion on Jay Project, closure timeline submission for setting Environmental Agreement security, the grizzly bear hair snagging report, wildlife camera report and other issues.</li> </ul>
DECEMBER 3, 2014 Yellowknife	Agency Environmental Workshop	<ul style="list-style-type: none"> <li>Society member representatives and other government staff participated in an Agency sponsored workshop on Ekati. Presentations from DDEC on the wildlife camera studies, grizzly bear hair snagging study, and research and monitoring of the Cell B revegetation area. Agency presentation on dust suppression best practices.</li> </ul>
DECEMBER 4, 2014 Yellowknife	Agency Annual General Meeting	<ul style="list-style-type: none"> <li>Agency presentation on operations for 2013-14. Concerns raised and answered around the Lynx and Jay Projects, collaboration between DDEC and Diavik on monitoring programs, changing roles for GNWT, and need for consultation on changes to Environmental Agreement.</li> <li>GNWT proposal to amend Agency by-laws to allow Director changes at any time was passed. Agency agreed to undertake an initial review of its by-laws and report back.</li> </ul>
DECEMBER 11-12, 2014 Yellowknife	Jay Project Developer's Assessment Report (DAR)	<ul style="list-style-type: none"> <li>DDEC information session to present the Jay Project DAR and respond to any questions from interested parties. Agency Directors and staff participated in the meeting and asked questions regarding wildlife, water, environmental assessment methodology, and significance determinations.</li> </ul>
DECEMBER 17, 2014 Yellowknife	Environmental Agreement Financial Security	<ul style="list-style-type: none"> <li>DDEC and the Agency presented their respective approaches and cost estimates for Agency operations until full and final closure of the Ekati Mine.</li> </ul>
DECEMBER 18, 2014 Yellowknife	Ekati Financial Security	<ul style="list-style-type: none"> <li>Meeting held at the request of the Agency and Yellowknives Dene First Nation. GNWT responded to questions about the financial security held for the Ekati Mine including the recently accepted surety bond as a new form.</li> </ul>
FEBRUARY 12, 2015 Yellowknife	Agency Board Teleconference	<ul style="list-style-type: none"> <li>Agency Board and staff discussion about transitions in response to the changes in Directors made by GNWT, AANDC and DDEC.</li> </ul>
FEBRUARY 16-17, 2015 Yellowknife	Environmental Assessment Practitioners Workshop	<ul style="list-style-type: none"> <li>Agency staff participate in a Review Board sponsored workshop covering upcoming changes to environmental assessment as a result of federal legislative changes, evolving roles for GNWT, cumulative impact monitoring, scoping, commitments, participant funding and other issues.</li> </ul>
FEBRUARY 20, 2015 Yellowknife	Environmental Agreement Implementation Meeting	<ul style="list-style-type: none"> <li>Agency presentations on findings and recommendations, and financial expenditures. DDEC presentation on upcoming work at the site and regulatory submissions for 2015-16.</li> </ul>
MARCH 9-10, 2015 Yellowknife	Slave Geological Province Wildlife Monitoring Workshop	<ul style="list-style-type: none"> <li>Agency Director and Executive Director attended portions of the GNWT ENR workshop and presentations on the Bathurst caribou herd, wildlife camera monitoring, caribou population modelling and other issues.</li> </ul>
MARCH 11, 2015 Yellowknife	Agency Board Meeting	<ul style="list-style-type: none"> <li>Agency Board and staff discussed the Jay Project, approved the Agency's 2015-16 budget and work plan, Agency communications, and transition planning with the new Directors.</li> <li>Invited guests included EMAB, GNWT on its involvement in the Jay Project, and the GNWT inspector.</li> </ul>
MARCH 17-19, 2015 Yellowknife	EMAB Environmental Workshops	<ul style="list-style-type: none"> <li>At the request of EMAB, the Agency Executive Director attended portions of an EMAB workshop where recommendations and responses from Diavik were reviewed, including opportunities and challenges for collaborative monitoring with Ekati.</li> </ul>



Agency at Jay Project meeting.

June and October 2014 that were distributed as hard copies and electronically.

### Agency Self-Assessment of Effectiveness

The Agency was pleased that we were able to hold a Board meeting, Open House and school visit in Lutsel K'e. The events were well attended and provides us with useful feedback on issues and priorities.

We are pleased to report that most of the recommendations we have made in the past year to the company, WLWB or the Review Board appear to have been accepted by them. We believe these recommendations have improved environmental management and performance at the Ekati Mine, particularly with regard to future wildlife monitoring and ensuring that aquatic monitoring results are better used to avoid future problems.

The Agency continues to engage GNWT, DDEC and AANDC on future plans for changes to the Environmental Agreement and the need for consultation with the Aboriginal governments. ■



Ekati Main Camp and Panda, Koala, and Beartooth waste rock pile.

# WASTE ROCK AND PROCESSED KIMBERLITE MANAGEMENT

## HIGHLIGHTS

- DDEC conducted three special studies to assess future behaviour of waste rock piles.
- Fox and Misery waste rock piles still not freezing as predicted.

## WASTE ROCK MANAGEMENT

Mining activities underway at Ekati in 2014 comprised:

- underground operations at the Koala and Koala North pipes;
- completion of open pit mining at Fox pipe (with continuing underground assessment work in the deeper parts of Fox);

- start of construction of the Pigeon Waste Rock Storage Area (WRSA) foundation pad, along with roads and water diversion berms in preparation for mining;
- Panda, Koala, and Koala North open pit underground mining areas were reclaimed in preparation for flooding; and
- Beartooth Pit continued to receive fine processed kimberlite tailings and underground mine water.

## SEEPAGE MONITORING

Sampling of seepage along the perimeter of the WRSAs continues to be done twice a year. For the most part, seepage from the rock piles is seasonal, sporadic and generally of low volume. Nonetheless, monitoring data and lab tests demonstrate that there is a potential for non-compliant drainage from the WRSAs to develop in the long-term.

As we reported last year, the emerging trend in seepage quality is that metal leaching is occurring at neutral or near-neutral pH as a result of the weathering of both granite and kimberlite waste material.

In the long-term, Dominion Diamond Ekati Corporation (DDEC) expects waste rock seepage to show 'minor enrichment' in an array of metals (Mg, Ca, K, Mo, Ni, K, Na), in addition to ammonia and sulphate.

Since the start of mining, the company's closure strategy for the WRSAs has relied in large part on the concept that permafrost will aggrade into the interior of the piles from the ground below and maintain the permafrost status quo such that the WRSA is at a colder temperature than the surrounding natural tundra. The concept is that frozen pile interiors are expected to greatly reduce or eliminate water and oxygen infiltration and movement, thereby reducing the potential for acidic seepage and metals release.

Design of the WRSAs includes a stepped profile and a flat top which prevents snow build-up and encourages growth of permafrost in the stockpiles over the long term.

Experience has shown that permafrost has aggraded into the WRSAs with varying degrees of success. The Coarse Kimberlite Rejects Storage Area and the Fox and Misery WRSAs are three facilities where permafrost aggradation has been inconsistent or nonexistent.

In 2014 the Wek'èezhii Land and Water Board (WLWB), in response to Agency concerns about the significant uncertainty in how the Ekati waste rock piles will actually perform after the mine has closed, directed the company to update its predictions about several aspects of the likely long-term behaviour of the WRSAs.



Misery waste rock pile.

As a result of the directive, DDEC undertook further investigations in 2014 and in March 2015, the company reported the results of three preliminary studies that examined various aspects of the seepage risk issue—these being done, as noted by the company as a precursor to the development of a more complex model for evaluating the long-term WRSA seepage risk. The work included:

- a screening level risk assessment of WRSA seepage;
- a thermal modeling of the WRSAs to better understand timeframes and conditions for internal freezing; and
- an evaluation of waste rock geochemistry and seep monitoring data.

## SCREENING LEVEL RISK ASSESSMENT

This screening level risk assessment integrated the results of water and seepage quality modeling (baseline and operations), wildlife receptors and toxicity reference values into a risk characterization for aquatic and terrestrial species. The conclusion was that there are currently no unacceptable health risks to aquatic and terrestrial wildlife as a result of exposure to seepage from the WRSAs. The same exercise for the post-closure condition is still to be done.

## THERMAL MODELING

As noted above, and as we have reported in previous years, there is substantial variation in the degree of 'freeze-back' in the Ekati waste rock piles – internal freezing of the waste rock being an important mitigation strategy for final closure of the WRSAs.

Some WRSAs are now exhibiting generally



Pigeon waste rock pile construction.

well-developed internal freezing, but others reveal that freeze-back is slow and may not be a dependable closure strategy for dealing with post-closure seepage. For example, ground temperatures at Misery WRSA, already warm relative to other WRSAs, have actually increased 1.5° C from 2006 to 2007. As a result of all ground temperature cables at Misery having been lost during operations, more recent data are not available to confirm the trend.

The 13 m thick active layer is also greater at Misery than at other sites.

DDEC notes that if the measured temperatures at Misery reflect actual field conditions, then the relative warming may indicate internal heat generation due to sulphide oxidation in the schist layers, given that data from granite waste rock zones indicate that a large portion has been in a permafrost condition.

Current predictions for the long-term freezing behaviour of the waste rock piles under DDEC's 100-year climate change scenario include:

- the active layer in the central area of the Panda/Koala WRSA will remain frozen (around -2°C or colder) for at least 100 years;
- freeze-back of the Coarse Processed Kimberlite Storage Area will occur in the next 20 years; and
- newly placed granite layers in the Misery WRSA will freeze within 10 years after placement, and waste rock below the active layer will remain frozen.

As for the Fox WRSA freeze-back that has not occurred to the extent predicted and "large portions" remain unfrozen. DDEC notes that the thermal conditions in Fox WRSA "are recognized as a possible issue with respect to long-term waste rock pile

performance", and observes that "further investigation work *could* consist of installation of new ground temperature cables or collection of specific geotechnical and geochemical data."

Additional thermal modeling has been conducted but not yet reported on. DDEC recognizes that there are "unique factors affecting freezing in the Fox WRSA," and has proposed further investigation in 2015.

## GEOCHEMISTRY EVALUATION

A study was done that compared results from humidity cell tests (HCTs) with seepage monitoring data in 2014 to determine whether the former are reliable predictors of seepage water quality.

The study revealed the following:

- pH range in seepage data was 'generally lower' than that measured in the HCTs;



Long Lake Containment Facility.

- sulphate concentrations in the HCTs were generally in the lower range of those measured in seepage;
- metal concentrations in Fox seepage were 'similar or lower' than the HCTs;
- HCT results for the Panda/Koala waste rock were within the range of monitored seepage quality;
- metal concentrations in the HCTs are currently in a similar range as those measured in WRSA seepage;
- HCT results for Misery could not be compared to seep monitoring data due to encapsulation of PAG-metasediments within granite wasterock; and,
- aluminum concentrations in seepage were several times higher than those measured in HCTs.

The study report noted that the maximum values observed in seepage were 'generally higher' than those in the HCTs, but that 'compositions' of the kinetic test leachates were within the range of those measured in seepage.

For the Beartooth and Koala rock, the study concluded that HCT results are 'reasonable approximations' of the long-term metal leaching and Acid Rock Drainage potential of the waste rock seepage.

Results of the comparison for other waste rock piles seem to indicate that the lab results underestimate concentrations found in the seepage.

The study also concluded that granite and diabase may have the potential for metal leaching under neutral conditions. Aluminum and copper concentrations in HCTs of both

rock types were 'consistently' elevated, while sulphate, arsenic, cobalt, nickel and vanadium were 'occasionally' elevated.

The tests showed that the metasediment rock type has a higher potential for acid generation than overburden, granite, diabase and kimberlite, and is capable of leaching an array of metals under both neutral and acidic conditions, including aluminum, arsenic, cadmium, copper, iron, lead, mercury, nickel, selenium and zinc.

Kimberlite waste rock and PK are both non-Potentially Acid Generating due to high amounts of carbonates, but can leach elevated concentrations of aluminum, arsenic, copper, nickel and iron.

## AGENCY'S ASSESSMENT

Given the substantial volumes of mined rock that will be left on the surface at closure, planning on how to address the potential for long-term contaminant release into the receiving environment is a planning priority.

Last year we reported on the growing urgency for the company to gain a better understanding of the uncertainties surrounding the 'freeze-back' of the waste rock dumps. We recommended that DDEC needs to get on with investigating the cause of the lack of freezing in the Fox and Misery waste rock piles, and develop appropriate contingency plans if the piles are not effectively frozen at closure.

Progress on this issue was mixed in 2014. DDEC did a good job reporting on the various aspects of waste rock and PK management at the Ekati mine, and the three special studies conducted this year have added useful information for the long-term management of these rock storage facilities.

Investigations of waste rock seepage by the previous operator, BHP Billiton, concluded that low pHs observed in seepage was, in part at least, a result of interaction with tundra soils — this phenomenon is not acknowledged in the 2014 seepage risk assessment.

Also, because a significant number of ground temperature cables in the Misery and Fox piles have been rendered unusable over the past few years, valuable information for closure planning is not being collected about the internal temperature conditions of these rock piles. DDEC should move quickly to re-install these devices at the appropriate locations in the various rock piles so that the uncertainties about their long-term behaviour can be addressed (especially as the closure of these facilities is almost upon us.)

DDEC notes that it is developing a workplan for the Fox WRSA that will "enable completion of thermal modeling in 2015." Although not stated in DDEC's 2014 report, we trust that the plan includes the reinstallation of the ground temperature cables to provide the input data for the modeling.

The WLWB has continued to exercise thorough oversight on this aspect of the mine operations, and we liked the sound directives it made to DDEC in 2014 to conduct several additional investigations to get more up to date information about the waste rock freezing and geochemical behaviour needed for closure planning. The WLWB has also retained consultants to carry out an independent review of waste rock and seepage management at Ekati.

As the currently scheduled mine closure for 2019 is fast approaching, we find a growing urgency to get on with resolving the long-term seepage and freezing issues with Ekati's waste rock piles. ■



Agency Directors at Panda Diversion Channel.

## HIGHLIGHTS

- Water licence security has been posted.
- The Environmental Agreement security review has not been completed.
- Delays in reclamation research are a serious concern.

## CURRENT CLOSURE PLAN

The closure plan for Ekati, as described in the current 'Interim Closure and Reclamation Plan' (ICRP), is to flood the seven open pits and connecting underground mines to create pit lakes that will once again be connected with their surrounding watersheds. Three lakes (Ursula Lake, Upper Exeter Lake and Lac de Gras) are currently identified potential water sources for flooding that is expected to take approximately 35 years. Berms will be

constructed around the perimeter of the pits to deter wildlife during the flooding period.

Research to determine the best strategies for pump flooding and other potential water sources is continuing in order to optimize the pumping schedule and minimize aquatic impacts.

The feasibility of placing processed kimberlite (PK) into the Panda and Koala pits during operations is being investigated.

The Long Lake Containment Facility (LLCF)

# RECLAMATION AND CLOSURE

will be capped with a combination of rock and vegetation, and then reconnected with the surrounding watershed through a system of external and internal drainage channels and ponds. All dikes and dams within the LLCF will be breached at closure to allow flow-through to occur.

The Panda Dam will continue to divert watershed flow through the Panda Diversion Channel (PDC) and will have a spillway to allow freshet flow to the Panda and Koala pit lakes. The PDC will remain as functional fish habitat. The Pigeon Stream Diversion will also remain in place, directing stream flow from the upper Pigeon stream to Fay Lake.

Waste rock disposal areas will be covered by 4–5 m of granite and/or glacial till and allowed to revegetate naturally.

## 2014 CHANGES TO THE CLOSURE PLAN

Dominion Diamond Ekati Corporation's (DDEC) 2014 Closure and Reclamation Progress Report notes several recent changes to the ICRP have been approved by the Wek'èezhii Land and Water Board (WLWB) or are in the process of review. These include:

- flooding of Fox pit with water sourced principally from the LLCF;
- Lynx waste rock to be added to the nearby Misery WRSA;

- using a 3 m glacial till plus 1 m of granite cover for the Pigeon WRSA instead of 5 m of granite. Pigeon granite is apparently too finely interlayered with potentially acid generating (PAG) metasediment such that it cannot be effectively segregated. Granite, therefore, would have to be hauled from Panda/Koala WRSA which DDEC states would be cost prohibitive. Using till has the added benefit of raising the active layer and reducing infiltration;
- elimination of caribou access ramps on the future Pigeon WRSA, and the construction of flatter slopes on the perimeter of the WRSA as a means of increasing safety factors for caribou moving on and off the rock piles;
- removal and scarification of materials from the new power line from Main Camp to Misery Pit; and
- a change in the closure cover strategy for the landfill from the currently approved 'permafrost encapsulation' to 'physical stabilization'. DDEC notes that only inert solid materials that are not expected to have any impacts to the receiving environment are being placed in the operations landfill.



Revegetation and rock cover at Long Lake Containment Facility.

## RECLAMATION WORK IN 2014

### Old Camp

Reclamation of Old Camp commenced, and included:

- discharge of compliant Phase 1 pond water into the lowland area flowing into Larry Lake (with some additional non-compliant water being transferred to mine sumps for later transfer to the LLCF);
- transfer of PK to the Coarse Rejects Storage Area (CRSA);
- transfer to Ekati landfill of plastic and clay liner materials from the Phase 1 pond;

- removal of PK, followed by placement of clean esker material, graded and shaped to provide drainage through the excavated area and to provide a cover for some residual PK that could not be removed during excavation; and
- the south berm of the South Pond breached to permit freshet flow into the lowland discharge area flowing into Larry Lake.

Works left until next year include the North Pond and the Camp Pad reclamation. Water quality monitoring of the reclaimed areas will be conducted in 2015 to evaluate the performance of the reclamation completed to date.

### Panda Diversion Channel

Final reclamation work on stabilizing the PDC was virtually completed.

### Koala Underground

Underground mining of the Koala pipe continued, although four mining areas were completed. DDEC reports that all hazardous materials, debris, garbage, and salvageable materials were removed and barricades installed to control access.

### Revegetation and Topsoil Salvage

Additional seedlings were planted at Pigeon Stream Diversion, and earlier plantings monitored. Topsoil from the Pigeon pit was salvaged and added to the soil stockpile on

the northeastern portion of the Panda/Koala WRSA.

## RECLAMATION RESEARCH AND PLANNING

There are approximately 21 scheduled reclamation research projects, each with some 3–9 discrete research tasks. Thirteen of the projects have had one or more scheduled research tasks deferred to later in the operational period. A number of tasks (typically, initial literature surveys, field monitoring) have been completed on schedule. The general picture, however, is that there is slippage of a significant number of research activities.

### Reclamation Research on Schedule

Progress was made on the following reclamation research programs.

As the closure plan for Fox Pit proposes to use the LLCF as a water source for flooding, research comprised hydrometric data collection, stream profile surveys, and completion of a modeling study. Results showed that water can be pumped from the LLCF to flood Fox Pit without creating impacts to aquatic species.

The current closure plan for Beartooth is to create a water cover over processed kimberlite. To support the concept, water quality monitoring and PK depth measurements were conducted, with a 'preliminary evaluation' of the data to be completed in 2015.

An ecological risk assessment and thermal analysis for the WRSAs has been initiated (see the Waste Rock and Processed Kimberlite Management section).

DDEC's operational water quality model for the LLCF and downstream lakes was extended

to incorporate the closure period. Model results generally predict that water quality in the LLCF will improve once PK and mine water are no longer discharged into the facility, with 'most' water quality variables decreasing quickly in the first 5–10 years. No report on the closure model has been submitted to date, though DDEC notes that the model will be updated in the next two years and will incorporate pore water expulsion and final design elevations for the breached dykes.

In the spring of 2014, an additional 18 hectares in cell B of the LLCF were seeded with barley and rye crops to establish an initial ground cover. Species trials within various areas of Cell B were also completed. First year of monitoring was completed on seeded ground covers (annual and perennial) and the various rock configurations. Preliminary results are apparently supportive of the ability to establish an initial ground cover on processed kimberlite.

## RECLAMATION RESEARCH SLIPPAGE

As we noted in last year's annual report, various investigations to resolve uncertainties about reclamation strategies are slipping behind schedule by at least one or more years. These include the following:

- identification of pit perimeters requiring barriers and safe shoreline access for pit lakes;
- location of unstable parts of pit walls;
- while modeling of pit water quality (RP 1.4) during and after pit flooding was initiated in 2014 through a review of model inputs and parameters, reporting of results has been delayed, with DDEC noting that the schedule

has been changed "to accommodate a possible presentation to stakeholders in 2015/2016";

- development of the conceptual groundwater study was delayed in 2014;
- evaluation of appropriate capping depths for WRSAs cover has been extended by one year;
- the study of long-term weathering of PK and its effects on vegetation and water quality in the LLCF is still in a literature review stage, such that a laboratory test phase has been extended by a year;
- investigation of extra-fine PK in the LLCF is at least one year behind;
- incorporation of Traditional Knowledge (TK) in the reclamation program is being implemented through community site visits in 2014 of 'specific reclamation projects'. Although DDEC concludes that the site tours were 'an effective means of observing reclamation success and discussing closure and reclamation planning', there is no evidence that TK was meaningfully incorporated into any of the reclamation research activities;
- no significant work was completed on developing closure objectives and criteria for safe wildlife access to the mine area;
- no significant work toward identifying the species composition and location of potential sustainable riparian and upland sites;
- no research on identifying the ecological attributes of reclamation sites suitable for natural recovery was done; and
- no work was done on developing closure objectives and criteria for addressing geotechnical stability of WRSAs and other mine components.



*Revegetation plot on Long Lake tailings.*

## ACTIVITIES OF DDEC, BOARDS AND GOVERNMENTS WLWB

Following its review of DDEC's '2013 CRP Progress Report' and the amount of held security, the Board:

- approved the use of Exeter Lake as a water source for the closure flooding of Panda, Koala and Koala North pits;
- did not approve DDEC's proposed changes to the closure objectives, cover design, or security to the operation and closure of landfills;
- required better tracking of slippage in the reclamation research programs;
- required DDEC to investigate aquatic

impacts from decreased flows and decreased connectivity between lakes downstream from the LLCF, and to identify options to mitigate impacts of decreased connectivity;

- requested confirmation of the flooding time for Fox Pit and updating of the reclamation estimate accordingly;
- deferred making a decision on any proposed changes to security until the requested information above is received; and
- requested that future ICRP reports include a discussion of the security implications of any proposed changes to the ICRP.

## Government of the Northwest Territories (GNWT)

As of April 1, 2014, the implementation date for devolution, GNWT now is in charge of financial securities. We understand that GNWT is in the process of staffing its new Liabilities and Financial Assurances Directorate within the Department of Lands (established in September 2014). There is to be a public review process undertaken during 2015 to develop a much needed policy framework for financial securities including how to calculate the amount due and its form.

## ENVIRONMENTAL AGREEMENT SECURITY DEPOSIT

Last year, we recommended DDEC submit a proposal for security under the Environmental Agreement. It did so in a timely manner and this resulted in many meetings and exchanges of information among the Agency, DDEC and GNWT. These are highlighted in Table 4.

The latest position is that DDEC and the Agency are rather far apart (DDEC about \$9.0 million, IEMA about \$47.4 million). The Agency position is based on the obligations under the Environmental Agreement and the empirical costs of meeting those obligations. The current submissions are summarized in Table 5 associated with all responsibilities in the Agreement that may give rise to obligations where security should be held.

There was an agreement that GNWT would provide its draft position on the security deposit and both DDEC and the Agency would provide comments to GNWT, which would then make a determination of the amount to be required. GNWT has since informed the Agency that it would provide this draft only to DDEC (and not to the Agency). We believe it unfortunate that greater transparency has been lost.

TABLE 4: CHRONOLOGY OF EVENTS FOR ENVIRONMENTAL AGREEMENT SECURITY REVIEW

DATE	EVENT OR ACTIVITY
FEBRUARY 27, 2012	<ul style="list-style-type: none"> <li>BHPB, AANDC, GNWT and Agency discussion on a process for the company to develop a reclamation cost estimate and how that would relate the various instruments including the Environmental Agreement</li> </ul>
AUGUST 12, 2013	<ul style="list-style-type: none"> <li>Agency letter to AANDC and WLWB requesting that process for reviewing Environmental Agreement security be initiated.</li> </ul>
OCTOBER 7, 2013	<ul style="list-style-type: none"> <li>Meeting held amongst DDEC, AANDC, GNWT and Agency on the Environmental Agreement security deposit. General agreement to follow the process in the Environmental Agreement. DDEC agrees to submit a proposal for the security deposit.</li> </ul>
NOVEMBER 1, 2013	<ul style="list-style-type: none"> <li>DDEC distributes a draft discussion paper on obligations under the Environmental Agreement and potential duplication with water licence security.</li> </ul>
NOVEMBER 4, 2013	<ul style="list-style-type: none"> <li>DDEC, AANDC, GNWT, WLWB and Agency meet to discuss sections of the Environmental Agreement where obligations may require financial security. DDEC agrees to distribute a proposal for the Environmental Agreement security deposit by November 12, 2013.</li> </ul>
MAY 7, 2014	<ul style="list-style-type: none"> <li>Agency sends its 2013–14 Annual Report draft recommendations to DDEC and GNWT. The recommendations include a call for DDEC to submit a proposal for the Environmental Agreement security deposit by July 1, 2014.</li> </ul>
JUNE 20, 2014	<ul style="list-style-type: none"> <li>DDEC sends its proposal for an Environmental Agreement security deposit to GNWT.</li> </ul>
JULY 15, 2014	<ul style="list-style-type: none"> <li>GNWT sends a letter to DDEC accepting the proposal as sufficient to begin the security review as provided for in the Environmental Agreement. DDEC is urged to send its proposal to the Agency.</li> </ul>
JULY 29, 2014	<ul style="list-style-type: none"> <li>DDEC sends the Agency its proposal for an Environmental Agreement security deposit.</li> </ul>
AUGUST 15, 2014	<ul style="list-style-type: none"> <li>Meeting of Agency, DDEC and GNWT on Environmental Agreement financial security.</li> <li>Company presented its proposal for security. Agency agreed to provide its Environmental Agreement financial security proposal by the end of September 2014.</li> </ul>
OCTOBER 1, 2014	<ul style="list-style-type: none"> <li>Agency sends its proposal for an Environmental Agreement security deposit to DDEC and GNWT.</li> </ul>
OCTOBER 2, 2014	<ul style="list-style-type: none"> <li>Meeting of DDEC, GNWT and Agency representatives to discuss the process to finalize Environmental Agreement financial security. DDEC indicated it may have comments on the Agency's proposal for Environmental Agreement security.</li> </ul>
OCTOBER 24, 2014	<ul style="list-style-type: none"> <li>DDEC provides comments to GNWT and the Agency on the Agency's October, 2014 proposal for an Environmental Agreement security deposit.</li> </ul>
NOVEMBER 13, 2014	<ul style="list-style-type: none"> <li>GNWT requests additional information from DDEC and Agency on closure timelines and funding for the Agency into post-closure as part of the Environmental Agreement security deposit.</li> </ul>
DECEMBER 9, 2014	<ul style="list-style-type: none"> <li>DDEC sends GNWT and the Agency its response on closure timelines and the Agency's post-closure financial needs.</li> </ul>
DECEMBER 10, 2014	<ul style="list-style-type: none"> <li>Agency sends GNWT and DDEC its response on closure timelines and the Agency's post-closure financial needs</li> </ul>
DECEMBER 17, 2014	<ul style="list-style-type: none"> <li>DDEC and the Agency presented their respective approaches and cost estimates for Agency operations until full and final closure of the Ekati Mine.</li> </ul>
DECEMBER 19, 2014	<ul style="list-style-type: none"> <li>GNWT request to DDEC and the Agency for further information and rationale on operation of the Agency into post-closure for the Ekati Mine as part of the Environmental Agreement security deposit.</li> </ul>
JANUARY 28, 2015	<ul style="list-style-type: none"> <li>Agency sends GNWT and DDEC its submission on its post-closure operations and financial requirements.</li> </ul>
FEBRUARY 2, 2015	<ul style="list-style-type: none"> <li>DDEC sends GNWT and the Agency its submission on Agency post-closure operations and financial requirements.</li> </ul>
MARCH 11, 2015	<ul style="list-style-type: none"> <li>GNWT e-mail to the Agency (copied to DDEC) informing the Agency that it would no longer be involved in the Environmental Agreement security review. GNWT expects to provide its position on the Environmental Agreement security deposit directly to DDEC within two weeks and to finalize the amount soon. Offer of meeting with the Agency after decision made.</li> </ul>
MARCH 16, 2015	<ul style="list-style-type: none"> <li>Agency letter to GNWT expresses disappointment that GNWT position will not be shared with the Agency prior to a decision as previously stated.</li> </ul>

TABLE 5: SUMMARY OF PROPOSALS FOR ENVIRONMENTAL AGREEMENT SECURITY DEPOSIT

ENVIRONMENTAL AGREEMENT ARTICLE	AGENCY PROPOSAL AMOUNT	DDEC PROPOSAL AMOUNT
IV—Agency Funding (to final closure)	\$20,437,275 (based on Jan. 2015 proposal)	\$8,007,397 (based on Feb. 2015 proposal)
V—Annual Report (by company)	\$400,000	\$0 (\$130,000 reallocated from within Post-Closure Monitoring & Maintenance tab)
V—Environmental Impact Report (EIR)	Agree with DDEC proposal except it should not cover public meetings	\$250,000 (includes public meetings)
V—Public Meetings (by company)	\$7,360,000	Included in Annual Report and EIR above
VI—Revision of Environmental Management Plans (by company)	\$160,000	\$0 (\$130,000 reallocated from within Mobilization tab)
VII—Environmental Monitoring Programs (by company)	\$1,080,000	\$0 (not included in the monitoring period chosen by DDEC)
IX—Ongoing Environmental Compliance (by company)	Additional information requested of DDEC	\$750,000
X—Archaeological Sites	Additional information requested of GNWT	\$0 (\$60,000 reallocated from within Post-Closure Monitoring & Maintenance tab)
XI—Traditional Knowledge	Agency prefers to deal with TK as part of Article XII	\$0 (\$50,000 reallocated from within Mobilization tab)
XII—Reclamation Research	\$15,500,000 for reclamation research	\$0 (\$850,000 reallocated from within Mobilization tab for RRP and TK work)
XII—Other Studies	\$200,000	\$0 (Not covered by DDEC)
XIII—Cost Variance and Progress Review	\$300,000	\$0 (Not covered by DDEC)
XIII—Serious and Imminent Threat	\$2,000,000	\$0 (Not covered by DDEC)
<b>TOTAL</b>	<b>\$47,437,275</b>	<b>\$9,007,397</b>

NOTE: \$42,675,170 is currently held by GNWT in a letter of irrevocable credit under the Environmental Agreement.



Long Lake Containment Facility revegetation area.

## FINANCIAL SECURITY

### Water Licence Security

Last year we expressed concern about the large gap between the security determined and the security then held under the water licence. We recommended that the security held should be quickly increased to the proper amount. This has now been accomplished and, because the form of security held changed (from irrevocable letters of credit to surety bonds), the Agency requested a meeting with the GNWT to have the relevant regulator (GNWT) explain the difference and to reassure us that security is held in a suitable form. We had that meeting (along with a representative of the Yellowknives Dene) in December 2014 and were told clearly that the funds would be available to the GNWT if and when needed. Indeed, the GNWT insisted the fund availability would be "absolute, unconditional and irrevocable". Based on these assurances, the Agency has concluded that the security held is appropriate as is its availability if needed.

## AGENCY'S ASSESSMENT

The Agency is pleased that DDEC made good progress on the reclamation of Old Camp and the widening of the PDC. We note that some parts of Old Camp (North Pond and Camp Pad) are not yet reclaimed, and we hope to see these completed in 2015.

WLWB's review of 2013 CRP Annual Report was rigorous; it requested supplementary information to fix the deficiencies and responded conservatively by not approving some change requests, such as the reduced cover on waste rock piles as a result of the lack of thermal monitoring and reduced cover on the landfill because the ICRP objectives have not been modified.

The Agency recognizes that GNWT has inherited a financial security system that requires greater accountability and transparency. The Agency offers the following observations and suggestions based on the experience to date with both the water licence

# 1 RECOMMENDATION

The Agency recommends that GNWT make a determination of the Environmental Agreement security deposit no later than July 1, 2015, and provide reasons for its decision.



Long Lake Containment Facility rock cover area.

and Environmental Agreement security reviews:

- DDEC did not fully respond to information requested by the Agency during the Environmental Agreement security review. It would be more helpful if there was a formal information request process to obtain information from those operators that are required to provide financial security.
- GNWT should consider a public registry style disclosure system for information submitted during the consideration of financial security and to post final determinations, with reasons for decision.
- It would be very helpful if all interested parties could become more familiar with RECLAIM as a tool for estimating reclamation liability. As we understand it, Version 7 is now in use even though the ICRP and Environmental Agreement security reviews to date have used Version 6.2. GNWT should work with its consultant to ensure that the model is kept up to date and is publicly accessible. Some consideration should also be given to building in components or line items that relate to the split between land and water, and water licence vs. Environmental Agreement requirements. This would facilitate a better coordination of the review of securities held under the two different instruments.
- It would be helpful to have a "lessons learned" review and/or meeting or workshop of interested parties when the current Environmental Agreement security review is completed for Ekati.
- It is our understanding that the MVLWB Working Group on Securities completed a report but it was not implemented due

to the complexities and time constraints of devolution. It may be time to revisit that work and re-establish the Working Group with a view to coordination of water licence and Environmental Agreement security. Some consideration might be given to how security reviews have worked for other mines or other jurisdictions.

The Agency is increasingly concerned that key uncertainties about the feasibility of various approaches for mine reclamation have not yet been resolved. In large part, and as we have pointed out in previous years, this is due to the lack of progress on substantial components of the reclamation research program.

DDEC needs to improve tracking of annual updates and additions to the closure plan, particularly with respect to what activities have been approved and what have not.

The end of mine life (2019, as currently approved) is fast approaching, and viable closure strategies for some important components, such as revegetation sustainability are lagging behind schedule.

The Agency views the slippage in reclamation research as an increasingly serious issue for closure planning. DDEC needs to make greater effort toward getting the necessary research and planning done in a timely way.

The company should be moving visibly toward a final 'Closure and Reclamation Plan' by the end of 2016 or, if Jay Project is approved, an updated 'Interim Closure and Reclamation Plan' by the same date. ■



Fish box at Pigeon Stream Diversion.

## HIGHLIGHTS

- Water quality results from the north arm of Lac de Gras provide evidence of the need for additional permanent monitoring sites.
- Some major ions, nutrients and metals remain elevated downstream of the Long Lake Containment Facility, especially potassium which is of particular concern.
- Lac du Sauvage remains relatively unaffected by mining activities.
- Re-evaluation of the AEMP is expected sometime in 2015.

Each year Dominion Diamond Ekati Corporation (DDEC) carries out programs and studies to determine if changes in the aquatic environment downstream of its operations are occurring as a result of mining activities. There are three watersheds (Koala-Lac de Gras, King-Cujo-Lac du Sauvage and Pigeon-Fay-Upper Exeter) which could be affected by the mining operation. Lakes and streams in these three systems, as

well as background sites, are sampled each year under the Aquatic Effects Monitoring Program (AEMP), which is a requirement specified in DDEC's Class A Water Licence. Using information collected through the AEMP, any changing trends in water and sediment quality, benthic macroinvertebrate communities, zooplankton and phytoplankton, as well as fish populations and health, can be identified.

## AQUATIC EFFECTS

The total precipitation in the Ekati area during the 2013-14 hydrologic year (mid October 2013 to mid-October 2014) was significantly below average with 263 millimetres (mm), compared to the average value of 345 mm of precipitation.

### ACTIVITIES 2014-15

Processed kimberlite, treated sewage and surface sump water continued to be discharged into the Long Lake Containment Facility (LLCF) while underground minewater and additional processed kimberlite were pumped to the Beartooth Pit. More than 1.3 million cubic metres (m<sup>3</sup>) of effluent was released from the LLCF between July and November, entering the Koala watershed through Leslie Lake, and being diluted as it flowed downstream through Moose Lake and eventually entering Lac de Gras (Figure 2). The LLCF effluent comprised the main source of water contaminants to the aquatic environment from Ekati's operations.

A second source of contaminants to the aquatic environment is effluent discharged from the Misery site. Water collected from Desperation Pond was pumped to the King Pond Settling Facility (KPSF) during July 2014. Because no water was pumped from either the Waste Rock Dam or Misery Pit into the KPSF, no water needed to be discharged to Cujo Lake.

The inlet and outlet sections of the Pigeon Stream Diversion (PSD) and related fish habitat features were completed and connected to the natural Pigeon Stream. As a result, during 2014 freshet the PSD became the main route for water flow and fish movement. The final phase of the Panda Diversion Channel stabilization project was completed in 2014.

### AEMP MONITORING RESULTS

#### Water Quality Sampling and Results

Each year DDEC reports the results of its AEMP to the Wek'èezhii Land and Water Board (WLWB) and provides the highlights in its Environmental Agreement and Water Licence Annual Report.

This is the 17th year of monitoring physical limnology, water quality and aquatic ecology for the Koala-Lac De Gras system and the 14th year for the King-Cujo system. Aquatic variables evaluated by DDEC in 2014 are listed in Table 6. The AEMP reference lakes and outflow streams are shown in Figure 2. The effects on water quality in the Koala and King-Cujo watersheds are shown for selected variables in Table 7.

Concentrations of each of the water quality variables shown in Table 7 remain elevated above levels found in reference lakes. In general, the extent to which concentrations

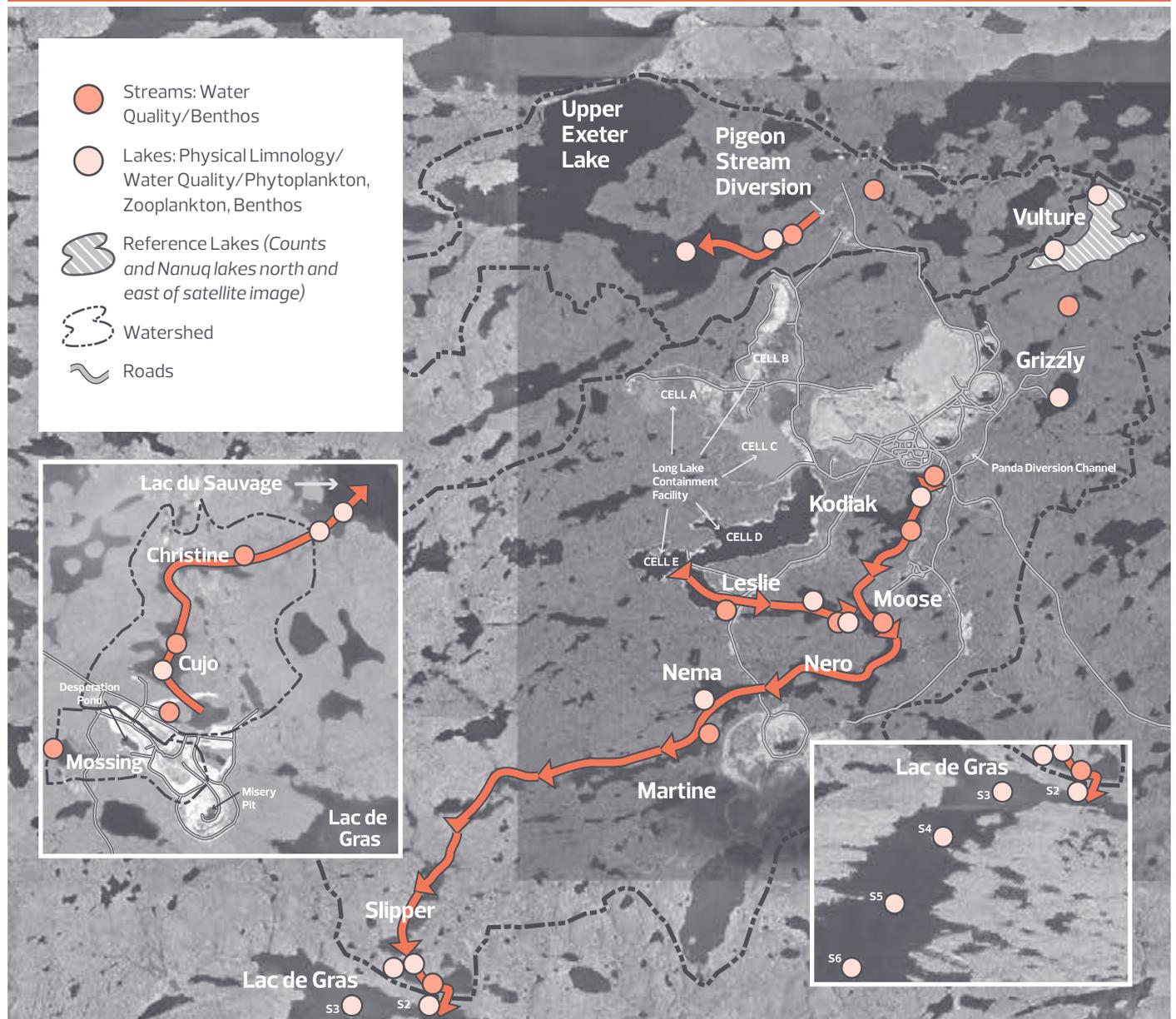
have changed decreases with downstream distance from both the LLCF and KPSF. This supports the conclusion that changes in water quality continue to result from the discharge of effluent from Ekati operations.

In Lac de Gras, concentrations of eight water quality variables (pH, hardness, chloride, sulphate, potassium, barium, molybdenum and strontium) monitored at site S2 continue to exceed reference lake levels although alkalinity returns to reference levels at site S3. This water quality trend provides further evidence for the need of additional monitoring sites along the north arm of Lac De Gras in order to determine the extent of impacts the mine may be having on the lake (refer to Special Effects Studies below). None of the observed concentrations in Lac de Gras exceed either the Site Specific Water Quality Objective (SSWQO) established for Ekati or the Canadian Council of Ministers of the Environment (CCME) Guideline for the Protection of Aquatic Life.

Monitoring results suggest that total ammonia concentrations remain elevated in lakes downstream of the LLCF as far as Slipper Lake, although concentrations in Leslie, Moose, and Nema lakes have stabilized or decreased in recent years. Trends are more readily defined during the ice-covered season because oxidization of ammonia to nitrite, then nitrate (a highly bioavailable form of nitrogen), occurs more rapidly during the summer.

Eutrophication issues were identified previously by the AEMP due to experimental inputs of phosphorus into the LLCF to mitigate a nitrate problem. Like total ammonia, total phosphate concentrations have increased in lakes downstream of the LLCF as far as Moose

FIGURE 2: AEMP REFERENCE LAKES AND OUTFLOW STREAMS



Lake during the ice-covered season. During the 2014 open water season, the average concentrations of total phosphate in all lakes downstream of the LLCF and in two reference lakes were greater than levels triggering trophic level changes.

Total potassium continues an increasing trend above the SSWQO of 41 mg/L for Leslie and Moose lakes in winter. The Water Quality model predicted potassium will peak at 100% and 103% of the SSWQO under ice in Leslie and Moose lakes respectively by 2020, but it has already happened in 2013 and 2014 under ice in both Leslie and Moose (between 49 and 58 mg/L). The model has underestimated current levels.

Other notable observations include:

- Monitoring indicates that pH, alkalinity, hardness, total dissolved solid (TDS), chloride, sulphate, total molybdenum and total strontium levels continue to be elevated downstream of the LLCF and into Lac de Gras.
- No water quality variables above reference levels have been measured at the Lac du Sauvage monitoring site, although seven elevated variables have been identified downstream of the KPSF as far as the Christine-Lac du Sauvage Stream.
- Surveillance Network Program (SNP) sampling in the Beartooth Pit in July show no stratification of the water column as yet. Water sampling is done at surface and 30 m below the surface. Chlorides are especially high (1300 mg/L).

### Sediment Quality

Eleven sediment quality variables were monitored in 2014 in the Koala-Lac de Gras and King-Cujo watersheds. Total copper was also monitored in the King-Cujo watershed only.

TABLE 6: AQUATIC VARIABLES EVALUATED IN 2014

PHYSICAL LIMNOLOGY – LAKES	WATER QUALITY – LAKES AND STREAMS		SEDIMENT QUALITY – LAKES	AQUATIC ECOLOGY	
<ul style="list-style-type: none"> <li>Under-ice dissolved oxygen</li> <li>Secchi depth</li> <li>Open water dissolved oxygen<sup>1</sup></li> <li>Hydrology</li> </ul>	<b>Physical/Ions</b> <ul style="list-style-type: none"> <li>pH</li> <li>Total alkalinity</li> <li>Water hardness</li> <li>Chloride</li> <li>Potassium</li> <li>Sulphate</li> <li>Total suspended solids<sup>1</sup></li> </ul> <b>Nutrients</b> <ul style="list-style-type: none"> <li>Total ammonia-N</li> <li>Nitrite-N</li> <li>Nitrate-N</li> <li>Total phosphate-P</li> <li>Total organic carbon</li> </ul>	<b>Metals</b> <ul style="list-style-type: none"> <li>Total antimony</li> <li>Total arsenic</li> <li>Total barium</li> <li>Total boron</li> <li>Total cadmium</li> <li>Total copper<sup>2</sup></li> <li>Total molybdenum</li> <li>Total nickel</li> <li>Total selenium</li> <li>Total strontium</li> <li>Total uranium</li> <li>Total vanadium</li> </ul>	<b>Nutrients</b> <ul style="list-style-type: none"> <li>Available Phosphorus</li> <li>Total Nitrogen</li> <li>Total Organic Carbon</li> </ul> <b>Metals</b> <ul style="list-style-type: none"> <li>Antimony</li> <li>Arsenic</li> <li>Copper<sup>2</sup></li> <li>Cadmium</li> <li>Molybdenum</li> <li>Nickel</li> <li>Phosphorus</li> <li>Selenium</li> <li>Strontium</li> </ul>	<b>Phytoplankton</b> <ul style="list-style-type: none"> <li>Chlorophyll a concentrations</li> <li>Phytoplankton density</li> <li>Phytoplankton diversity</li> <li>Relative densities of major phytoplankton taxa</li> </ul> <b>Zooplankton<sup>3</sup></b> <ul style="list-style-type: none"> <li>Zooplankton biomass</li> <li>Zooplankton density</li> <li>Zooplankton diversity</li> <li>Relative densities of major zooplankton taxa</li> </ul>	<b>Lake Benthos<sup>3</sup></b> <ul style="list-style-type: none"> <li>Lake benthos density</li> <li>Lake benthos dipteran diversity</li> <li>Relative densities of major dipteran taxa</li> </ul> <b>Stream Benthos<sup>3</sup></b> <ul style="list-style-type: none"> <li>Stream benthos density</li> <li>Stream benthos dipteran diversity</li> <li>Relative densities of major dipteran taxa</li> <li>Stream benthos EPT diversity</li> <li>Relative densities of EPT taxa</li> </ul>

<sup>1</sup>Pigeon-Fay and Upper Exeter Watershed only. <sup>2</sup>King-Cujo Watershed only. <sup>3</sup>Koala and King-Cujo watersheds only.

Adapted from ERM. 2015. Ekati Diamond Mine: 2014 Aquatic Effects Monitoring Program Part 1 – Evaluation of Effects. Prepared for Dominion Diamond Ekati Corporation by ERM Consultants Canada Ltd.: Yellowknife, Northwest Territories.

Molybdenum and strontium levels in sediments downstream of the LLCF have generally increased over time, and remain above reference lake levels but below CCME Sediment Quality Guidelines. In each case, concentrations for these two variables in sediments follow the same pattern as concentrations in water quality samples, suggesting that effluent from the LLCF is the source of changes in sediment quality.

Total nitrogen, total molybdenum and total strontium concentrations have also increased over time in Cujo Lake sediment.

DDEC's analysis indicates the increase in total strontium may be caused by mine activity. The cause of increases in total nitrogen and total molybdenum are unclear at this time.

### Biota Sampling and Results

Observed shifts in the phytoplankton communities from blue-green algae to diatoms and green algae suggest mine effects downstream of the LLCF all the way to Lac de Gras. This may benefit zooplankton as diatoms have a higher lipid content than blue-greens. Also, while reference lakes contain mostly species that are not edible for zooplankton,

lakes downstream of the LLCF contain larger proportions of edible species.

For years, the Agency has been tracking a decline in Cladocera, a formerly abundant class of zooplankton, in Moose Lake. This trend continues, but with rotifers also disappearing in the zooplankton community. Both are being replaced by copepods as the dominant taxa. We are also starting to see this phenomenon in the next downstream lake, Nema. Interestingly, a similar trend has been observed in the Diavik Mine water treatment impoundment area.

TABLE 7: MINING EFFECTS ON WATER QUALITY FLOWING THROUGH THE KOALA AND KING-CUJO WATERSHEDS

Parameters Monitored	Parameters elevated in Koala watershed									Parameters elevated in King-Cujo watershed			
	Long Lake Containment Facility → Lac de Gras									King Pond → Lac du Sauvage			
	Leslie	Leslie-Moose	Moose	Moose-Nero	Nema	Nema-Martine	Slipper	Slipper-Lac de Gras	Lac de Gras (S2)	Cujo	Cujo Outflow	Christine-Lac du Sauvage	Lac du Sauvage
pH	●	●	●	●	●	●	●	●	●	●	●	●	
Alkalinity	●	●	●	●	●	●	●	●	●	●	●	●	
Hardness	●		●	●	●	●	●	●	●	●	●	●	
Total Dissolved Solids	●	●	●	●	●	●	●	●	●	●	●	●	
Chloride	●	●	●	●	●	●	●	●	●	●	●		
Sulphate	●	●	●	●	●	●	●	●	●	●	●	●	
Potassium	●★	●	●★	●	●	●	●	●	●	●	●	●	
Total Ammonia	●		●	●	●	●	●						
Nitrite	●	●	●	●									
Nitrate	○	○	○	○	○	○	○						
Total Phosphate-P	●◆	●	●◆		◆		◆			◆			
Total Organic Carbon	○	○	○	○	○	○	○			○	○	○	
Antimony	●	●	●	●	●	●							
Arsenic	●	●	●	●	●	●	●			○			
Barium	●		●	●	●	●	●	●		●	●		
Boron	●	●	●	●	●	●	●			●	●		
Molybdenum	●	●	●	●	●	●	●	●		●	●	●	
Nickel	●	●	●	●	●	●	●						
Selenium	●	●	●										
Strontium	●	●	●	●	●	●	●	●		●	●	●	
Uranium	●	●	●	●	●	●	●						

This table is adopted from the AEMP report with additions resulting from the Agency's review of the monitoring results.



Pigeon Stream Diversion.

As mentioned earlier in this chapter, potassium has risen above Ekati's SSWQO under ice, but in 2014 it also exceeded the lowest chronic effect level for the most sensitive zooplankton species (a cladoceran, *Daphnia magna*) in Leslie and Moose lakes. All this points to a mine impact on zooplankton communities downstream of the LLCF.

## OTHER STUDIES AND PLANS

Three special effects studies (two continued from 2013) and two Response Plans were submitted in 2014:

- Lac de Gras Water Quality Monitoring Stations;
- Grizzly Lake Biological Communities;
- Characterization of Hydrocarbon Contaminants at Ekati;
- Nitrogen Response Plan; and
- Potassium Response Plan.

## Lac de Gras Water Quality Monitoring Stations

In 2012, mine effects were detected downstream of the LLCF as far as site S3 for eight water quality variables. As site S3 marked the downstream extent of the AEMP for the Koala watershed, a sampling program was undertaken in 2013 down the length of the north arm of Lac de Gras to determine if additional water quality monitoring stations were required. Analysis suggests the mine effects now extend beyond site S3 with pH, alkalinity, hardness, chloride, sulphate, total potassium, total molybdenum and total strontium concentrations at site S4 being comparable to those at site S3. Results also suggest that effects for chloride, hardness, sulphate, total potassium and total strontium may extend to sites S5 and S6, closest to the inlet mouth connecting to the main body of Lac de Gras.

Additional sampling for water quality and limnology was completed at sites S5 and S6 in 2014 in April (under-ice) and August (open water) alongside the regular AEMP lake sampling. DDEC has confirmed that water quality and limnology data obtained in 2014 will be incorporated into the 2015 AEMP Re-evaluation, which will include an investigation into the necessity of adding sites S5 and S6 to the annual AEMP program beginning in 2016.

## Grizzly Lake

Phytoplankton, zooplankton and benthic communities in Grizzly Lake were sampled in August 2013 to assess if biological communities have been altered. Sampling of phytoplankton and zooplankton in Grizzly Lake in 2014 confirms earlier results – an increase in rotifer density has reduced relative densities of other zooplankton groups. An additional year of phytoplankton and zooplankton monitoring will be conducted to determine whether these changes in rotifer density represent a real trend and an effect of mine activities or simply natural variability through time. No effects were identified on the phytoplankton community in Grizzly Lake.

## Hydrocarbon Study

DDEC funded a M.Sc. thesis to investigate possible sources of hydrocarbon contaminants at Ekati. The study found that the use of DL10 dust suppressant on mine roads is likely the main contributor of polycyclic aromatic hydrocarbons (PAHs) to waterways. The link between DL10 and hydrocarbons in streams was "Due to the high similarity of the types of PAH constituents found in the haul road sediment samples and the stream sites..." Ekati uses a 30 m buffer at road crossings of waterbodies but the study determined that this may not be large enough due to roadside groundwater seepages

beyond the 30 m of non-treated road which transport DL10 contaminants to the streams.

Also, PAHs were found in greater concentrations in the top 10 cm of undisturbed soil near the power plant than that near the incinerator. The author determined this was likely because of greater dispersion from the incinerator's smokestack and longer operational time of the power plant (14 years). There may be insignificant levels of PAHs coming out of those smokestacks and not at levels that can affect aquatic life. PAH profiles of the emissions do not match those in nearby streams. CCME has guidelines for 18 different PAHs. Levels of PAHs in streams and soil at Ekati do not reach these guidelines except in Cell B of the LLCF where phenanthrenes, chrysenes and naphthalenes were above CCME guidelines.

## Nitrogen Response Plan

A requirement of the water licence, the Nitrogen Response Plan is designed to minimize the amount of nitrogen, a major potential source of nutrients, entering the environment at the Ekati Mine. Version 1.1 of the plan, approved by the WLWB in 2014, commits DDEC to report on implementation of the Plan as part of the AEMP.

As a result of plan implementation, the company has changed explosive type from dry ammonium nitrate and fuel oil (ANFO) to a bulk liquid emulsion, which should result in reduced nitrogen residue dissolving in mine water.

A major source of nitrogen to the aquatic environment was reduced as the pumping of minewater from Misery Pit and Fox Pit ceased as of March 2014. During minewater pumping, total ammonia and nitrate concentrations in Fox Pit were comparable to those in underground minewater and were generally stable over time.



Lynx Lake.

Another source of nitrogen is the pumping of processed kimberlite slurry water to the LLCF and Beartooth Pit from the central Process Plant. Between 2012 and 2014, monthly loads of nitrate from the Process Plant to the LLCF averaged 6,334 kg. Samples from Cells D and E of the LLCF indicate that total ammonia concentrations have decreased over the past five years, while nitrate concentrations have remained relatively stable. Meanwhile, results from the 2014 AEMP suggest that, while total ammonia and nitrate concentrations have increased at all lake sites downstream as far as Slipper Lake as a result of discharges from the LLCF, these concentrations have begun to stabilize or decrease in recent years.

Efforts by DDEC to implement the nitrogen management and source control practices identified in the Nitrogen Response Plan are continuing and any future versions of the Plan are to be incorporated into the 'Aquatic Response Framework'.

### Potassium Response Plan

An Aquatic Response Plan for Potassium

was submitted to the WLWB for approval in March 2015. An updated version containing thresholds for actions for adaptive management will be submitted by November 30, 2015. DDEC is proposing to do potassium toxicity tests on two Cladocera species, one Amphipod species and a minnow in order to revise the SSWQO.

### PIGEON STREAM DIVERSION MONITORING REPORT

The Pigeon Stream Diversion appears to be providing functional fish habitat as shown in the first year of monitoring during the summer of 2014. Seven fish species (mostly grayling) migrated through the new stream and grayling spawned there (fry density is higher within the diversion stretch of Pigeon stream than in the natural upstream and downstream portions monitored). A two metre section in the diversion bank eroded into the water, exposing the geotech liner. Stream bank stability will have to be closely monitored over the next few years, including the viability of stream bank vegetation plantings.

## AQUATIC RESPONSE FRAMEWORK

In May 2014 the Agency submitted to the WLWB a number of comments on the Ekati 'Aquatic Response Framework'. These included:

- How "waste minimization" (rather than solely "use protection") is to be applied to Waste effluent at Ekati;
- Set the Action Levels such that an adequate lead time can be provided to actually implement the appropriate responses;
- Taking a precautionary approach to enacting Actions is preferable to deferring taking action until there is scientific certainty; and
- There needs to be medium Action Levels developed for fish and other biota.

The Agency recommended a workshop be held to compare and coordinate aquatic response frameworks for all of the NWT diamond mines. The WLWB will be leading a workshop in June 2015 to finalize outstanding issues on the 'Aquatic Response Framework'.

## AGENCY ASSESSMENT

The Agency supports DDEC investigations of new water quality sampling sites downstream of the LLCF in the north arm of Lac de Gras, as additional sites would increase the ability of the company to detect potential mine-related effects before they reach the main body of Lac de Gras.

The Agency is pleased with early indications that the Nitrogen Response Plan may be reducing nitrogen entering the LLCF system. The Agency will be interested in future results of monitoring nitrogen concentrations in lakes downstream of LLCF.

While phosphorus is increasing in lakes both downstream of LLCF and in reference lakes, the Agency is concerned that the rate of increase is greater in the impacted lakes downstream of LLCF.

The 2014 results related to total ammonia and total phosphate suggest that continued monitoring is required to ensure Ekati Mine operations do not affect the trophic levels of nearby lakes and streams in the long term.

The Agency is concerned that the high levels of potassium may impact Cladocera, an important fish food in lakes. Since the company has determined that there are significant changes in zooplankton community structure in lakes downstream of the LLCF, DDEC should conduct a special effects study to determine how these changes in zooplankton community structure may affect fish health.

Given the trend of potassium rising above the SSWQO, the Agency supports DDEC conducting toxicity tests that could provide evidence about aquatic biota impacts.

The Agency is concerned that, for the first time, another class of zooplankton besides Cladocera (rotifers) is declining in lakes downstream of the LLCF. We will continue monitoring that situation closely.

The importance of continued monitoring of water and sediments in the King Pond-Cujo Lake watershed and Lac du Sauvage will increase in future years as it will provide significant pre-development baseline data if the Jay Project is approved. ■



Water truck on Misery Road.

## HIGHLIGHTS

- 2014 Air Quality Monitoring Program Report (2012–2014) submitted.
- Agency concerned over lack of investigation of dust suppression methods.

“Ambient air quality is a valued ecosystem component at the Ekati mine because of its potential for effects on worker health and safety, and its importance for wildlife, vegetation and water quality” (BHP Diamonds Inc. and DIA MET Minerals Ltd. 1995).

The Ekati Air Quality Monitoring Program (AQMP) was initiated in 1998. The results are reported on every three years in concert with the snow and lichen sampling program. The 2014 AQMP report provides the results of the air quality around the Ekati Diamond Mine from 2012 to 2014.

## ACTIVITIES 2014–15

### Air Emissions

Every year Dominion Diamond Ekati Corporation (DDEC) calculates air emissions resulting from diesel fuel consumption, and reports them to the National Pollutant Release Inventory (NPRI) and the Greenhouse Gas (GHG) Emissions Reporting Program. From 2012 to 2014 the GHG emissions were 20% more than estimated during the previous 2009 to 2011 AQMP. DDEC has indicated this may be the result of increased fuel usage due to on-site activity, specifically motive diesel

# AIR QUALITY

used during hauling along the Misery Road and construction activities. The Ekati Mine represents approximately 12% of the total Carbon Dioxide Equivalent (CO<sub>2</sub>e) emissions in the NWT. Although GHG emissions were higher than previous years, DDEC reports that it is seeking new ways to make its operations more energy efficient and to reduce emissions (e.g., Energy Smart Program and “No-idle” campaigns, using low sulphur fuel, testing biofuels, and burning waste oil to heat underground).

### Meteorological Stations

Meteorological data at Ekati are collected on a daily basis from the Koala and Polar Lake (open water season only) meteorological stations, as well as from the airport when personnel are available. The stations monitor temperature, relative humidity, precipitation, and wind speed and direction. New instrumentation and power supplies have been installed to enhance data collection and reliability. The results from these two stations are reported annually as part of the Aquatic Effects Monitoring Program (AEMP). There are periods of missing wind data from the Koala meteorological station for 2012–2014 due to wind sensors freezing in the winter.

Winds at the Ekati Mine area range from 11 to 18 km/hr, and are primarily from the east or east-northeast, and secondarily from the northwest. Compared to the historical average, the Ekati mine experienced a warmer May to

September period in 2012 and 2013 (with the exception of July 2013) and a cooler November to April in 2013 and 2014. When compared to the 1948 to 2014 long-term regional temperatures, all three years were warmer than normal (ranging from 1 to 2°C higher). Like temperature, the annual precipitation is also increasing over time although in 2014, precipitation levels were below average.

### High Volume Air Samplers (HVAS) and Partisol Samplers

In the past the High Volume Air Samplers (HVAS) suffered from a range of issues and did not produce reliable data. In June 2012 Thermo Scientific Partisol samplers measuring total suspended particulate (TSP) were installed at the Grizzly Lake and Cell B locations to replace the HVAS units. One additional sampler measuring particulate matter with an average size less than 2.5 microns in diameter (PM<sub>2.5</sub>) was installed at the Continuous Air Monitoring Building. The HVAS were then decommissioned in June 2013.

The HVAS and Partisol samplers were run for 24 hours every 6 days. There were still some issues with invalid samples, usually the result of the station not being configured properly, pump failure, power failure, or filter paper sticking to a seal when the filter was removed. There were three days where TSP exceeded the 24hr Government of the Northwest Territories (GNWT) standard of 120 µg/m<sup>3</sup>. One day was likely due to fugitive dust (very windy),



Cornstarch cutlery at Ekati Main Camp cafeteria.

and two days were due to forest fire smoke from distant wildfires. The annual and maximum daily TSP concentrations were higher in 2014 compared to 2012 and 2013 due to the significant wildfires which occurred throughout the NWT during the summer of 2014. The monitoring data demonstrate that the Ekati mine operations produce suspended particulates; however, concentrations are generally within the guidelines.

### Continuous Air Monitoring (CAM)

A Continuous Air Monitoring (CAM) station is located at the Polar Explosives site. The CAM measures NO<sub>2</sub>, NO, NO<sub>x</sub>, SO<sub>2</sub> TSP and PM<sub>2.5</sub> as well as ambient temperature and wind over a 24 hour period.

The CAM results from 2012 to 2014 indicate that mean monthly NO<sub>2</sub>, NO, NO<sub>x</sub> and SO<sub>2</sub> concentrations have a slight decreasing trend, and that concentrations are higher in the winter compared to the summer in response to seasonal fuel usage for heating. All hourly, daily and annual average concentrations of SO<sub>2</sub> and NO<sub>2</sub> are below the GNWT ambient air quality standards.

CAM PM<sub>2.5</sub> and TSP results indicate that concentrations for both have increased over the reporting period. The monthly patterns also show an increase during the snow free months primarily due to vehicle movement on snow free ground. The daily GNWT standards for PM<sub>2.5</sub> (28 µg/m<sup>3</sup>) and TSP (120 µg/m<sup>3</sup>) were exceeded 28 and 15 times, respectively, during the monitoring period. All PM<sub>2.5</sub> and the majority of TSP exceedances occurred during days when smoke from wildfires was observed; however, there were six days when there were TSP exceedances without visible wildfire smoke present.

### Dustfall Monitoring Program

The Dustfall Monitoring Program was initiated in 2006 to determine the deposition patterns for fugitive dust from haul roads. There are 17 sampling locations (15 close to mine operations, 2 background sites). Samples are collected between June–September and each station has two canisters, one for measuring sulphate and nitrate and the other for total metals.

From July to September 2012, three temporary dustfall sampling stations were set

up downwind of the Fox Pit waste rock area to determine if the waste rock was a source of dustfall due to wind erosion and material handling. These dustfall stations collected low dustfall concentrations, and were comparable to background dustfall levels. Due to the low dustfall levels measured, monitoring was not continued in 2013 or 2014.

In response to comments received on the dustfall program, in August 2014, three additional permanent dust fall monitors were set up downwind of Misery Road 1 km closer to Main Camp to better align with the predominantly summer winds from the east–northeast.

There are no specific guidelines for fugitive dust deposition in the NWT, with the result that DDEC has adopted the BC Pollution Objective for dustfall for evaluating monitoring results. Within 90 m downwind of the Misery and Fox roads, dustfall concentrations were generally higher than the BC Pollution Objective goal of 2.9 mg/dm<sup>2</sup>/d. At a distance of 300 m downwind of the road, all measured dustfall concentrations were below this goal except for August/September of 2013 at the Fox road (3.4 mg/dm<sup>2</sup>/d). At 1,000 m downwind, all dustfall concentrations were comparable to levels measured by background dustfall stations.

Dustfall concentrations measured from the three airport stations and two Long Lake Containment Facility (LLCF) stations showed that average dustfall levels were higher in 2013 and 2014 compared to 2012. There were several exceedances at the LLCF stations: LLCF–PB (3.5 mg/dm<sup>2</sup>/d) during July/August 2012; LLCF–PB (5.3 mg/dm<sup>2</sup>/d) during June/July 2014; LLCF–PA (7.0 mg/dm<sup>2</sup>/d) during July/August 2014, and at one airport station AIR–P280 (4.1 mg/dm<sup>2</sup>/d) during June/July 2014. These results indicate a significant

amount of dust is being blown from the LLCF and from the airstrip.

DDEC also calculated acid deposition from nitrate and sulphate concentrations, and the non–background samples had a median value of 173 eq/ha/yr (based on 3 months of data) that is below the relevant Canada–Wide Standard of 250 eq/ha/yr. The maximum acid deposition value was calculated to be 836 eq/ha/yr at the LLCF–PA station.

In general, the metal deposition levels are proportional to the amount of total dustfall. Dustfall monitoring locations close to Fox and roads had higher metal deposition amounts for the majority of metals compared to the other stations. All metal deposition values were below 0.5 mg/dm<sup>2</sup>/d, which is below the two background monitoring stations at 0.03 mg/dm<sup>2</sup>/d.

### Snow Chemistry Sampling

The Snow Chemistry Sampling Program has been conducted every three years since 1998. The program was revised in 2008 based on a review in 2005 in consultation with Environment Canada, GNWT and the Agency. There are 33 snow chemistry sampling sites in a generally radial pattern away from the mine site, representing a variety of terrain types and distances from mine operations. Most snow core sites are co–located with lichen sampling collection plots, 12 of these also co–located with soil samples to allow for comparisons. At each site, three separate snow samples were collected and analyzed for those parameters used in the AEMP for water quality.

The 2014 snow chemistry data suggest there is a winter loading of TSS with a number of metals likely associated with fugitive dust and fine particles being elevated in a zone directly surrounding the mine footprint and decreasing with distance from mine. There

were limited spatial trends observed for nitrate, ammonia and sulphate loadings with distance (up to 50 km) from mining activity, all approximating background levels. Notable exceptions were observed at AQ-108 (24 km from Fox Pit) and AQ-110 (31 km from Fox Pit) for all three variables, as well as AQ-43 (17 km from Pigeon Pit) for sulphate.

### Lichen Sampling

Lichens are important indicators of air quality and are commonly used as monitors for dust and metal accumulation. Two lichen indicator species (*Peltigera*, mainly *rufescens*, and *Flavocetraria cucullata*) are sampled every three years in conjunction with snow core sampling. Thirty-nine lichen plots were sampled using helicopter access in August 2014. To compare elemental content of lichens with source material, soil samples were collected at 19 random AQ sites adjacent to at least one of the lichen sample subpopulations at the AQ site. Road dust was also sampled from three road locations: two from the Misery Road and one from the Dyke B road.

Data collected at dustfall, snow core and soil sample sites were compared to element concentrations in lichens. Analysis of lichen tissue data indicate results are generally consistent with snow chemistry data. Dustfall element concentrations seldom correlated to lichen element concentrations due to a high variance in 2014 dustfall samples. Distances from the two correlated features may be important and dustfall monitors were co-located with lichen samples in only five locations. Lichens are not as responsive to soil sources as they are to atmospheric sources of elements, and unless known to contribute to lichen concentrations through uptake from soil (e.g. nitrogen), soil metal concentrations did not always correlate with the lichen concentrations.

Elemental concentrations in the two indicator lichens collected in the study area show that mine influence of dust is confined to within 10 to 30 km from the mine, and tends to decline with distance from the mine site. Many of the highest concentrations occurred within 1 km of roads.

### Agency Activities

At our community visits and meetings the Agency continues to hear concerns about dust, and it being the cause of the observed Zone of Influence (ZOI) on caribou at the Ekati minesite.

The Agency met with DDEC, GNWT and EC in April to discuss the incinerator stack testing, and again in May (to discuss dust suppression) in preparation for the 2014 Air Quality Monitoring Program report. In July the Agency wrote a letter to DDEC encouraging further study of dust suppression methods at the Ekati Mine besides the use of water and DL10.

In December we held a workshop and made a presentation on dust suppression and best management practices. Our presentation focused on the current dust suppression practices at the Ekati mine, including the use of water, DL10 and EK35. Other potential options to consider for dust management including reduced traffic, reduced speeds, improved road design (puddles, gravel, appropriate substrate for DL10), and windbreaks were presented. A discussion also took place on other dust suppressant options that were approved and available.

### AGENCY ASSESSMENT

In our previous annual reports the Agency identified some issues with the AQMP at the Ekati Diamond Mine. In this reporting period DDEC has made significant improvements to its AQMP, including updating its Standard

## 2 RECOMMENDATION

The Agency recommends that DDEC investigate and test different dust suppression methods and review their effectiveness at the Ekati mine. The Agency encourages DDEC to consult with GNWT–Environment and Natural Resources, GNWT Department of Transportation, Environment Canada, and others in the design of the testing and evaluation.

Operating Procedures, ensuring staff and operators undertake adequate quality assurance and quality control checks of the equipment, and that there are regular maintenance schedules for recalibration.

There are many new activities being proposed in the southern half of the Ekati claim block including the Misery pushback, the Lynx Pipe and the proposed development of Jay Pipe. The Agency is concerned with the generation of dust during construction (blasting, deposition of rock for roads and pads) and operation (blasting during mining and increased use of haul roads) for all of these activities. Any updates to the Air Quality Monitoring and Management Plan (AQMMP) should be done prior to these activities commencing to ensure that monitoring of these new dust sources is considered and managed as part of site-wide programs. DDEC has indicated that it intends to prepare an update to address these new projects.

Dust continues to be a concern for the Agency, particularly with regards to its

potential effects on caribou such as the avoidance of key habitat. We and others suspect that dust may be a cause of caribou avoidance of the mine.

We have encouraged DDEC to further study and work on the cause of the Zone of Influence or avoidance of the Ekati Mine footprint by caribou as shown through the compilation of data from the former aerial survey program and collaring.

In a January 2014 letter to the Agency, DDEC committed to conducting an analysis of the effectiveness of dust suppression efforts and presenting the results in the next AQMP report. Additionally, on several other occasions in the past year when DDEC has met with the Agency, GNWT and EC to discuss the AQMP, there were discussions around dust suppression methods. The Agency is disappointed that there has been little progress to date on dust suppression investigation and reporting. ■



Caribou crossing ramp on Misery Road.

## HIGHLIGHTS

- Jay Project assessment highlighted concerns over roads and caribou.
- Compilation report on the use of remote cameras to document caribou numbers, movements and behaviours.
- Summary report on the 2012–13 Lac de Gras grizzly bear DNA survey.
- Additional monitoring because of construction of the Misery power line.

## ACTIVITIES 2014–15

Dominion Diamond Ekati Corporation's (DDEC) Wildlife Effects Monitoring Program (WEMP) documents wildlife effects resulting from mining activities, and assesses the effectiveness of wildlife mitigation and management efforts. The WEMP is in its 17<sup>th</sup> year. As in previous years, the 2014 WEMP focused on wildlife habitat and species of greatest interest: caribou, grizzly bear, and

wolverine. Monitoring techniques included compilation of incident reports and visual observations, ground-based surveys, behaviour observations, and DNA sampling. Additional monitoring was conducted because of the initiation of construction of the power line along the Misery Road. A major thrust of the caribou monitoring program has shifted to use of remote cameras to document caribou numbers, movements and behaviours; a three

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year summary report on the camera study was released in fall 2014. DDEC and Diavik conducted an extensive grizzly bear DNA study in 2011 and 2012, the results of which were released in summer 2014.

Government of the Northwest Territories' (GNWT's) Environment and Natural Resources (ENR) sponsored additional meetings on development of a Bathurst Caribou Range Plan. The Range Plan will provide for monitoring and management of disturbance on the landscape as it relates to habitat and range, and will ultimately be considered in concert with an overall management plan for caribou. The Range Plan process is proceeding slowly and may take an additional two years to complete, using technical working groups and a steering committee. IEMA is participating in this process as needed to lend expertise.

In light of the new *Wildlife Act* that came into force in November 2014, GNWT is beginning work on regulations and policy guidance. Draft guidelines for 'Wildlife and Wildlife Habitat Protection Plans' and Wildlife Effects Monitoring Programs were distributed for comment in December 2014. The Agency and others provided comments in January 2015.

## Ekati Mine Footprint

The physical footprint of the mine increased by 52 ha during 2014. The total footprint of the mine site now covers 3,294 ha (33 km<sup>2</sup>).

## Wildlife Incidents

DDEC continues its efforts to improve its waste management practices and reduce attractants at landfills, to reduce wildlife incidents and to exclude wildlife from areas of danger (e.g., airstrip, high traffic areas). Adherence by employees to proper waste disposal practices is an ongoing challenge for the company. Compliance in 2014 improved over 2012 and 2013, but was still far worse than levels observed during the mid- to late 2000s. Wildlife sightings and sign (tracks and scat) at the landfill decreased compared with 2013.

DDEC began recording wildlife management activities in 2013, and there were 53 activities recorded in 2014. There were seven instances of site wide notifications related to caribou, one which resulted in a one hour work stoppage on the Misery power line construction, and another which resulted in a 45-minute road closure to enable caribou to cross. Thirty-one management activities related to grizzly bears were recorded, all site wide notifications, only one of which required bear bangers to deter a bear near the Misery camp gate.

Nineteen vehicle-related animal mortalities were recorded in 2014. None of the mortalities were of Valued Ecosystem Component species (e.g., caribou, grizzly bear). Two foxes suspected of having rabies were killed in late August; results from lab tests were not available.

## Misery Power Line Interactions Monitoring

Monitoring by DDEC occurred during power line construction in fall 2014. Construction was suspended if more than 12 caribou were observed within 100 m of the work area and were exhibiting signs of stress. The only incidents recorded were a delay in drilling for an hour during caribou behaviour surveys and a delay in drilling during the approach of four wolves. During the review of the land use permit for the power line the company committed to a post-construction monitoring program, as recommended by the Agency.

## Caribou Monitoring

In the past, DDEC 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 except for 2012 (led and reported by Diavik). In 2014, ground-based incidental observations recorded 1,508 caribou within the Ekati study area, the second lowest number since record keeping began in 2006. Most incidental sightings of caribou occurred



Caribou.

along the western half of Misery Road, where caribou habitat is less than optimal (mainly rock and heath-boulder). Approximately 60% and 25% of caribou were observed during the northern and southern migration periods, respectively, and 15% of observations occurred during November. Ekati staff conducted three behavioural surveys in 2014, all within 1 km of infrastructure.

The main objectives for the remote camera program are to document caribou abundance and behaviour, and to determine if the structure of tundra roads deters caribou from crossing. Approximately 60 cameras were deployed on the property in 2014 to monitor the interaction of caribou with mine infrastructure. No analyses of the 2014 data were reported in the 2014 WEMP. A three-year (2011-13) summary report on the camera study was released in fall 2014 which showed that counts of caribou groups and individuals were consistently lowest along the Misery Road, and highest in the northern areas (i.e., Sable, Pigeon and Access Roads, and Waste Rock Storage Facility). The report also concluded that the verge interface between the adjacent habitat and the road (steepness and material – large boulders) largely determines whether caribou will attempt to cross. The report concluded that caribou were deflected from crossing roads in 1% of instances.

## Grizzly Bear Monitoring

Grizzly bears are a top carnivore and Valued Ecosystem Component species that occur at low densities within the barrens. In 2012 and 2013, DDEC and Diavik collaborated to conduct a large-scale DNA-based mark-recapture study to estimate the population of grizzly bears in a 16,000 km<sup>2</sup> study area surrounding the two mining operations. During 2012 and 2013, 114 and 136 grizzly bears were identified,

respectively. The results suggest a density (uncorrected for edge effect) of approximately 9–11 grizzly bears/1,000 km<sup>2</sup>. The southern portion of this joint study, led by DeBeers and run by the University of Calgary, was completed in 2014 but results are not available.

## Other Wildlife

Annual surveys of wolf den sites are the main monitoring method used to assess the potential mine-related effects on movements and presence within the Ekati study area. Collared wolf surveys showed that of the seven dens surveyed by ENR, two were occupied in June with pups present in August. Five pups were successfully raised at a den located 250 m from the Misery Road. This represents the highest output of pups since 2006.

Wolverine DNA sampling was conducted at Ekati, Diavik and Daring Lake in April 2005 and 2006, and in April 2010 and 2011. To continue long-term monitoring, DNA sampling at Ekati was conducted in April 2015 since efforts in April 2014 were unsuccessful due to logistical constraints. No results were available.

While rough-legged hawks, peregrine falcons and ravens nested successfully in several of the pits, nesting at Misery Pit was actively deterred because of active mining and pushback. Deterrents (bear bangers, cannon, call playback devices, and netting) were used over 100 times in a successful effort to prevent nesting on the Misery Pit walls.

The North American Breeding Bird Survey was conducted for the 12<sup>th</sup> year, with the numbers of species and individuals comparable to previous years.



Red Fox.

## AGENCY ASSESSMENT

### Review of the 2014 WEMP and Associated Reports

Results of the 2014 WEMP programs conducted are well presented, although some of the writing remains dated. For example, the introduction to the caribou section still does not acknowledge the results of the 2011 Ahiaik/Beverly survey which were released in April 2014.

We commend DDEC for its leadership on the grizzly bear DNA study. The bear and wolverine DNA studies contribute to cumulative effects monitoring at the regional scale. The Agency suggests that the grizzly bear density estimate is likely too high, as the estimate does not account for closure and edge effect. Adjusting for an edge effect corrected density will allow more effective tracking of density over time, and better comparison with other studies.

The Agency believes that the 1% deflection rate of caribou on roads reported in the 2014 camera summary report is vastly negatively



Wildlife cameras with geese in background.

biased because of the limited camera trigger distance (30–35 m) and field of view, and the inability of the remote cameras to follow the fate of individual groups of caribou. We appreciate that DDEC acknowledged during the Jay technical sessions in April 2015 that the cameras were only able to sample deflection rates right at the road, and that caribou may have been deflected at greater distances. Spring snow track surveys from 2002 to 2011 indicated that caribou deflected from crossing the Misery Road about 57% of the time, suggesting the road was an important partial barrier to caribou movement.

DDEC has not yet clarified details or triggers used to adequately monitor and mitigate effects of roads to caribou movement and behaviour. The current “*site-specific road safety protocols*” are focussed on

physical injury to caribou. These protocols are inadequate to reduce effects to caribou behaviour and minimize the partial barrier / filter effect of roads at Ekati, which affect the ability of caribou to conduct daily and seasonal movements and to access and use habitat. Current monitoring is inadequate to detect groups unless they are immediately adjacent to the road. Mitigation triggers proposed for the Misery power line construction (more than 12 caribou observed within 100 m of the work area and exhibiting signs of stress) are arbitrary (why 12 caribou and why the 100 m distance?) and left to interpretation (how is stress determined?), and do not acknowledge the increased risk of disturbance to nursery groups during post-calving when Bathurst caribou numbers are critically low and herd resilience is reduced. Permeability of the

## ZONE OF INFLUENCE MONITORING

In March 2015 the Caribou Zone of Influence Technical Task Group released a draft guidance document for approaches to monitoring caribou Zone of Influence (ZOI) that will maximize the quality of monitoring data, when such monitoring is appropriate. This small group of representatives from ENR, industry (including DDEC), consultants, and the Agency met three times to develop guidelines for when and where ZOI monitoring is appropriate, study design considerations, and alternative means of estimating the caribou

ZOI to augment or replace aerial surveys. The Group developed an annotated bibliography of reports and studies to date where ZOI calculations have been conducted, and produced a summary of research on potential causative mechanisms. Of particular interest was new analyses which enabled efficient, annual calculation of ZOI from a far smaller number of surveys. The draft document has been released for comment, and the Agency looks forward to further progress on this important task.

Misery Road, of great concern now, will be of even greater concern if the Jay Project is approved, with vehicle passages averaging 160–210 per day (averaging every 7–9 minutes) during normal operations, rising to 290–340 per day (every 4–5 minutes) during operation of the Tibbitt–Contwoyto Winter Road in February and March. The Jay assessment process will hopefully expand and refine monitoring, mitigation and adaptive management details for the mine site; a Traffic Management Plan (Wildlife and Roads Mitigation Plan) has been promised by May 2015, which the Agency eagerly awaits.

## Wildlife Monitoring and Management

The Ekati Wildlife Management Plan (WMP) was last updated in 2001, and the Agency has been unsuccessfully pushing for an updated document for some time. Jay-related discussions during spring 2015 indicated that DDEC will produce a ‘Wildlife and Wildlife Habitat Protection Plan’ (WWHPP) and updated WEMP to accommodate the proposed mine expansion, with delivery of drafts by June 2015. These documents will essentially replace the WMP, and the Agency looks forward to the opportunity to review these important documents. We await further direction from GNWT on WWHPP and WEMP the draft guidance documents distributed in December 2014, which would be helpful in the context of the Jay Project. ■



Lynx Lake covered in ice.

## HIGHLIGHTS

- Lynx Project approved and Jay Project under review.
- Concern over contingencies for water management and caribou.

### LYNX PROJECT

The Lynx kimberlite pipe is a small satellite deposit about 5 km southwest of the Misery pipe. It is located under Lynx Lake and will provide approximately 4–5 months of ore supply. Regulatory approval to mine Lynx was granted by including it under the existing water licence. Site preparation is planned for 2015, including dewatering and fish-out along with an all-weather road that connects to the Misery Road.

Dominion Diamond Ekati Corporation (DDEC) proposed that no changes were necessary to the Aquatic Effects Monitoring Program as a result of the Lynx Project. The Wek'èezhii Land and Water Board (WLWB) directed DDEC to develop an adaptive management trigger for dustfall to prevent adverse effects on Lac de Gras from blasting and road traffic.

The company was also required to submit caribou road crossing designs for the Lynx access road. DDEC used Traditional

# LYNX AND JAY EXPANSION PROJECTS

Knowledge and collaring and aerial survey data on caribou movements in the area to determine appropriate placement of proposed crossings.

### JAY PROJECT

DDEC dropped the Cardinal pipe from the previously proposed Jay–Cardinal Project in May 2014. The company concluded that mineral resources at Cardinal were not as large as expected and, also, there were community concerns over the scale of the infrastructure footprint and potential impacts.

The Mackenzie Valley Review Board amended the Terms of Reference for the ongoing environmental assessment in July 2014. The Agency provided comments on the changes to the Terms of Reference; virtually all were accepted by the Review Board.

DDEC submitted the 'Developer's Assessment Report' (DAR) in October 2014. The Review Board conducted an adequacy review and requested additional information from the company. The adequacy review was a new step in the review as previous processes had used a conformity review. The adequacy review examined not just the



Jay Project meeting in Yellowknife.

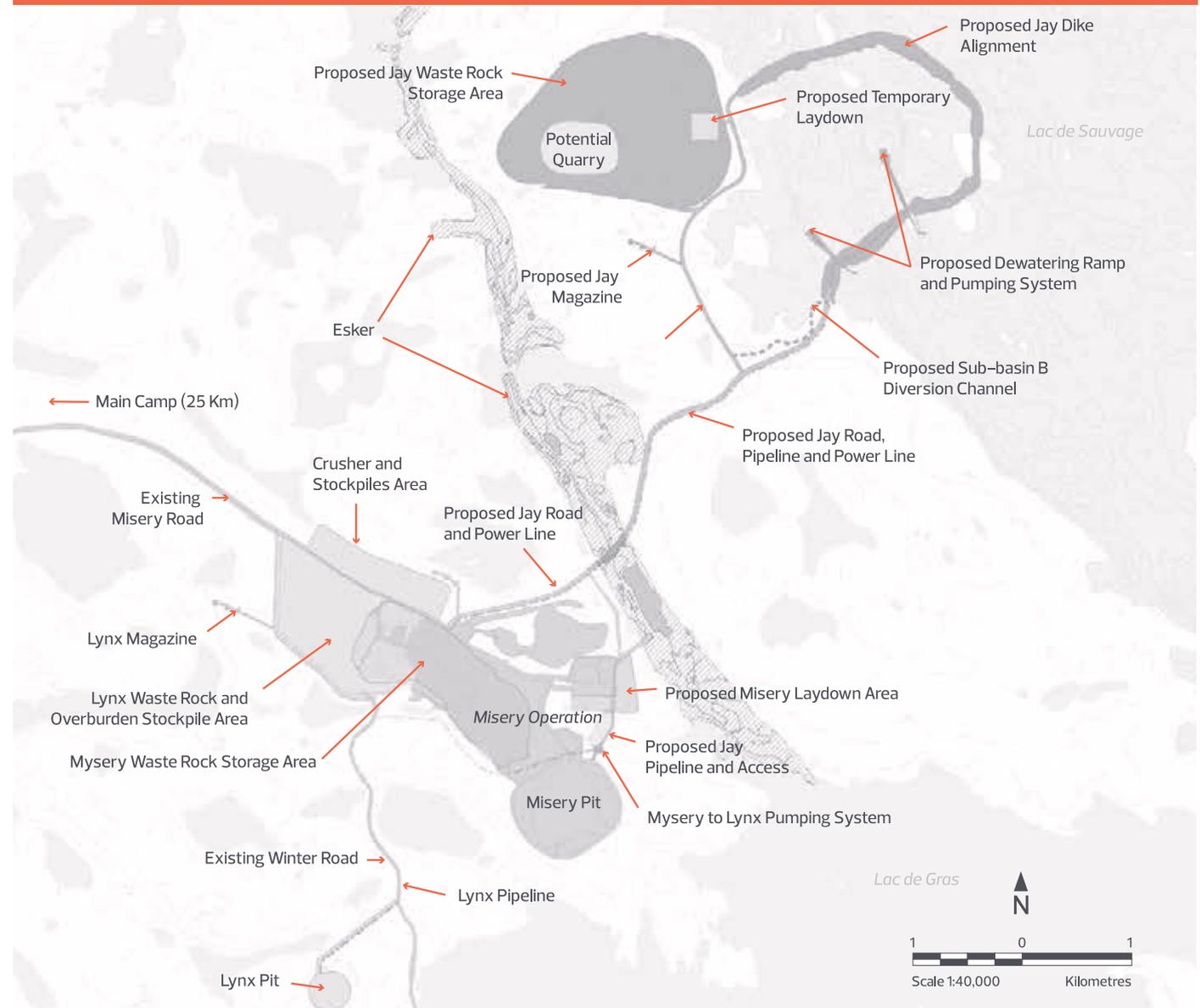
presence or absence of information but the quality of that information in relation to the Terms of Reference. The intention was to expedite the environmental assessment while providing better information for the technical review phase. The company held a very helpful information session on the DAR in Yellowknife in December 2014 that included community and technical meetings.

After the additional information was submitted and assessed by the Review Board, other review parties were invited to submit Information Requests. Over 500 Information Requests were made to DDEC, government agencies and others. The Agency submitted 52 Information Requests. At the time of writing, Technical Sessions have been scheduled for April 2015 to discuss the company's responses and to assist in narrowing down the issues to be addressed in the remaining parts of the environmental assessment. We will continue to participate in the environmental assessment and report on the outcomes in our next Annual Report.

To date the Agency's major concerns with the Jay Project include:

- effects on caribou (impediments to migration, habitat loss);
- water quality and aquatic life (potential impacts on Lac du Sauvage, water management contingencies);
- air quality (road and blasting dust);
- cumulative effects (proposed mitigation does not recognize the current status of the Bathurst herd); and
- the company's determination that there will be no significant adverse impacts. ■

FIGURE 4: EKATI EXPANSION PROJECTS



Adapted from DDEC and Golder Associates Jay Project Developer's Assessment Report.



Grizzly Bear.

## HIGHLIGHTS

- Agency encourages better collaboration on grizzly bear hair snagging for cumulative effects management.
- GNWT is making progress on cumulative effects management for caribou through a population model and better monitoring guidance.

### ACTIVITIES 2014-15

In this section, we review progress with regard to regional monitoring and cumulative effects. Regional monitoring can be a useful tool for cumulative effects monitoring and management.

The Government of the Northwest Territories (GNWT), Department of Environment and Natural Resources (ENR) hosted a Slave Geological Province Regional Wildlife Monitoring Workshop in March 2014. The

Agency participated as did representatives of the diamond mines including DDEC.

DDEC reported on its two-year regional grizzly bear hair snagging program in October 2014. The Agency encourages DDEC to collaborate with Diavik and De Beers to conduct an overall analysis of the combined Lac de Gras and southern study areas. This analysis will provide an excellent opportunity to clarify grizzly bear distribution and abundance across much of the central NWT and lead to better management.

# REGIONAL MONITORING AND CUMULATIVE EFFECTS

GNWT has made some progress on cumulative effects assessment by coordinating a task group to study and develop guidance on Zone of Influence monitoring of caribou avoidance around diamond mines. This work can provide useful data for cumulative effects assessment and management and was supported through the participation of the Agency Director Kim Poole. GNWT has also hired a consultant to develop a population model for the Bathurst caribou herd which should be a useful planning tool.

The Agency is not aware of any progress on the Wek'èezhii Renewable Resources Board

recommendation from October 2010 that Aboriginal Affairs and Northern Development Canada (AANDC) and ENR collaboratively develop best practices for mitigating effects on caribou during calving and post-calving.

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. As part of devolution, CIMP is now managed by GNWT-ENR. We await a study on aquatic cumulative effects on the Lac de Gras and Coppermine River areas. ■



Exploration camp.



Agency visit to Łutsel K'e.

## HIGHLIGHTS

- Both elders and youth have been engaged in environmental monitoring initiatives.
- DDEC needs to improve its reporting of concerns raised at community meetings.
- Greater use of TK in developing and implementing reclamation planning is needed.

## ACTIVITIES 2014-15

### Community-Based Traditional Knowledge Projects

**Wolverine DNA Program.** To provide an estimation of wolverine abundance and distribution in the study area over time, and familiarize Aboriginal youth with the Ekati environmental monitoring programs. The program was cancelled due to safety and logistical issues but has been rescheduled for 2015.

#### *Misery Pit Raptor Surveillance Team.*

Aboriginal people watched for raptors trying to build nests close to the Misery Pit expansion project. This also provided an opportunity for Aboriginal youth to become familiar with the Ekati environmental monitoring programs.

#### *Tłıchų What'aa Project-Jay Project.*

Tłıchų elders contributed their knowledge about properties of natural eskers close to Mesa Lake, NWT that may be used for planning, construction and reclamation of waste rock piles. Elders were also to travel

# TRADITIONAL KNOWLEDGE AND COMMUNITY ENGAGEMENTS

to Ekati mine to visit and observe and provide information to be used towards the reclamation and development of the Ekati mine site including the Jay Project.

**Yellowknives Dene First Nation (YKDFN) Archaeological Tour-Jay Project.** YKDFN elders learned how the Jay pipe Archaeological Baseline Work has been done over the last two years in the Lac de Sauvage region.

**Wildlife Monitoring Misery Road Power Line Project.** Community wildlife monitoring during the installation of power line poles along the length of the Misery Road, providing an opportunity for Aboriginal youth to become familiarized with the Ekati environmental monitoring programs.

It has been noted that for reasons unknown to the Agency, the ongoing community (TK) database project of Łutsel K'e (*Traditional Knowledge Archive Project*) was not renewed by Dominion Diamond Ekati Corporation (DDEC) in 2014. Łutsel K'e has again applied for funding in 2015 to complete that project.

### Ekati-Based Community Engagement Programs

**Caribou Monitoring Community Engagement Program.** TK holders from the Tłıchų and the YKDFN were invited to view caribou in their natural habitat and to bring community



Open house in Łutsel K'e.

information and TK about caribou in parallel with scientific monitoring.

In preparation for submission of the Jay Project Developer's Assessment Report (DAR), DDEC carried out a series of Community Engagement Workshops with the Kitikmeot Inuit Association, Łutsel K'e Dene First Nation, North Slave Métis Alliance, Tłıchų Government, and Yellowknives Dene First Nation in March, June, and July 2014.

The 'Traditional Land Use and Traditional Knowledge Baseline Report' in the (DAR) for the Jay Project provides a good summary of existing, publicly available information shared by affected communities concerning land use and knowledge of resources near the Ekati Mine and the proposed Jay Project.

An Agency Director and staff participated in the J̄àà kati Traditional Knowledge Festival held in Yellowknife September 20–21, sponsored by the Tł̄ch̄ Government, Canadian Polar Commission and the Prince of Wales Northern Heritage Center. The event discussed primarily Northern Canadian perspectives on TK, its value and uses by government and industry.

### Agency's Assessment

DDEC's current practice of having its senior managers meet with the communities to inform them of the mine operations, particularly with regards to proposed Jay Project is a positive initiative that the Agency would like to encourage to continue. In the records of community engagement, there is good coverage of the topics discussed but not as much on concerns raised or lessons

learned in discussion of those topics. Greater transparency is needed in reporting of communities' concerns and which of those have been incorporated into or changed the company's current practices and future plans and initiatives.

The Agency would also like to encourage DDEC to continue to engage community members by providing workshops and hands-on experience for community

representatives to observe and participate in monitoring programs and provide their knowledge and expertise to determine whether mine activities are having effects on the environment, wildlife, or their habitats, and if so, how best to mitigate these effects.

DDEC has been attempting to address Aboriginal requests for input and participation in reclamation research programs for closure, but needs to move ahead with a TK working group to further that objective. ■

*Photo: Dettah.*





IACT site visit.

## HIGHLIGHTS

- GNWT responded to Agency recommendation on posting of water licence security but has yet to finalize Environmental Agreement security deposit.
- Following devolution, inspections and water resources staff have moved over to GNWT and continue to do a good job.
- Wek'èezhì Land and Water Board is regulating Ekati effectively.
- Mackenzie Valley Environmental Impact Review Board has performed well to date in coordinating an effective review of Jay Project.

## THE REGULATORS AND OUR MANDATE

As the public watchdog for environmental management at Ekati, we monitor not only the performance of the operator but also the federal and territorial government agencies that regulate the mine. The following are our comments regarding the regulators' performance in 2014–15.

## AGENCY ASSESSMENT

As in previous years, the regulators remain effective in ensuring that Dominion Diamond Ekati Corporation (DDEC) operates an environmentally sound mine. Over the course of 2014–15, we identified some instances where we felt that government agencies and regulators performed well and some instances where their involvement could have been

# ASSESSMENT OF THE REGULATORS

improved. We were pleased to observe the willingness among all regulators to collaborate and share resources. For example, this year the Government of the Northwest Territories (GNWT) played a lead role in coordinating discussions of wildlife monitoring guidelines and better coordination moving towards cumulative effects management. We also noted that the staff of the land and water Boards assisted the Review Board in the Jay Project Environmental Assessment.

## Aboriginal Affairs and Northern Development Canada (AANDC)

The AANDC inspector joined GNWT upon devolution on April 1, 2014 and continues to be responsible for Ekati. Water resources staff were similarly transferred. In early 2014, AANDC, GNWT and DDEC proposed changes to the Environmental Agreement in light of devolution. No progress has been made on these proposed changes. Following devolution, AANDC has not engaged the Agency other than at the Agency's Annual General Meeting in December 2014. AANDC has not shown leadership in coordinating federal involvement in the implementation of the Environmental Agreement. It is not clear to the Agency which federal entity is now responsible for the federal government in the Environmental Agreement.

## Department of Fisheries and Oceans (DFO)

Further guidance in implementing the changes to the *Fisheries Act* is still under way. DFO has in the past provided useful input on some of the regulatory submissions made by DDEC although there has been less done over the last year. This may be attributable to the reduction in staff at DFO in Yellowknife. We hope the level of DFO involvement in Ekati will increase especially with the proposed Jay Project with its effects on Lac du Sauvage and Lac de Gras.

## Government of the Northwest Territories (GNWT)

The Agency is pleased to report that a regular inspections routine has been maintained (nine in 2010–11, six in 2011–12, five in 2012–13, ten in 2013–14, ten site visits for 2014–15 including the water licence and land use permits). The GNWT inspector for Ekati has been thorough and effective, as in past years.

Environment and Natural Resources (ENR) has made more substantive comments on DDEC's regulatory submissions. This is helpful given that GNWT is largely responsible for managing land and water as a result of devolution.



IACT visit to Pigeon Stream Diversion.

ENR work on wildlife policy and guidance has been promising. Progress has been made with wildlife monitoring guidelines, the Zone of Influence task group, and a meeting is to be held on Misery power line post-construction monitoring.

GNWT Lands is now responsible for holding financial security. The review of security under the Environmental Agreement is still outstanding. The Agency was told it would have an opportunity to review the position of GNWT on this security but the process was changed. GNWT is now negotiating directly with DDEC. The Agency is concerned with

this decrease in transparency. We await the outcome and will provide a report on the final decision next year.

There has been no further discussion of changes to the Environmental Agreement although there may be some consultations with Aboriginal governments in the future.

Finally, the changes in Directors for the Agency came as a surprise with no prior notice or discussion. In the future, it would be more helpful if the Agency was to be consulted about potential skill sets of individuals that might prove helpful in fulfilling our mandate.

### Environment Canada (EC)

EC technical advice over the last year was less than in previous years, though EC input into air quality was very helpful. The Agency expected EC input into the 'Aquatic Response Framework' submissions from DDEC. The Agency is not aware of any further developments on regulations for effluent from diamond mines, a commitment made previously by EC. We look forward to continued involvement from EC to reviewing air and water quality matters including incinerator operations.

### Wek'èezhii Land and Water Board (WLWB)

The Agency was satisfied with the water licence and land use permit issued by the WLWB for the Lynx Project. While we believe there could have been further work required for a traffic management plan, this issue will likely resurface during the Jay Project environmental assessment.

The Agency was pleased with WLWB's review of the company's two drafts of the 'Aquatic Response Framework' to date. As we suggested, there is to be a meeting in June 2015 to discuss further improvements before a final review of this important document. The Agency encourages further work and development of supporting documentation required to implement the Water and Effluent Quality Management Policy of the WLWB.

As noted last year, the WLWB was to be abolished effective April 1, 2015. The Tłı̨chǫ Government successfully challenged those changes at the Supreme Court of the NWT and secured an interim injunction on February 27, 2015. The WLWB continues to exist. We will report any further developments in our next Annual Report.

### Mackenzie Valley Environmental Impact Review Board (Review Board)

In the view of the Agency, the Review Board has done a good job in managing the Jay Project Environmental Assessment. The Review Board conducted a thorough adequacy review and retained outside experts. We look forward to the conclusion of the public process in September 2015 when the hearing is expected to be held. ■



Spill remediation on Misery Road.

## HIGHLIGHTS

- DDEC continues to operate Ekati in an environmentally sound manner.
- Progressive reclamation under way at Old Camp and Panda Diversion Channel.
- Dust suppression needs work.

The most important observation we can make is that Dominion Diamond Ekati Corporation (DDEC) continues to operate Ekati in an environmentally sound manner – the same message as we have delivered for years. The Agency maintains a good working relationship with the DDEC staff.

The company continues to do good work in investigating changing plankton community compositions in Ekati lakes. A DDEC-partnered university study looking at sources of hydrocarbons in soil and waterways at

Ekati is also most welcome, helping DDEC to pinpoint and mitigate possible entry of hydrocarbons into the receiving environment.

The Agency certainly has some concerns about the work being done to ensure good performance into the future. We are even more concerned than last year with continued slippage in reclamation research. However, the Agency is pleased to report there was substantive progressive reclamation at Ekati over the last year at Old Camp and the widening of the Panda Diversion Channel was completed.

# ASSESSMENT OF DOMINION DIAMOND EKATI CORPORATION

The Wek'èezhii Land and Water Board (WLWB) process for the Misery power line land use permit application twice required additional information from DDEC. The Agency notes the importance of supplying good quality information as part of regulatory and environmental assessment processes for timely and effective decisions. This will be especially important for the Jay Project review if the company's proposed timelines are to be achieved. The Jay Project 'Developer's Assessment Report' information session held by DDEC in December 2014 was very helpful.

The Agency and other parties have for some years expressed concern with the lack of progress in investigating dust prevention and suppression methods at Ekati. The recommendation in the Air Quality section of this annual report deals with this matter.



Long Lake Containment Facility.



Misery Pit.

We are pleased DDEC responded to an Agency recommendation last year by submitting a proposal for the Environmental Agreement security deposit in the summer of 2014.

We wrote a strong letter of support for DDEC's application for a "Towards Sustainable Mining" award offered by the Mining Association of Canada. We congratulate DDEC and Diavik for winning this award for the joint grizzly bear program.

We understand that DDEC's engagement with communities is continuing but there is a clear need for the company to better document the issues and concerns (including Traditional Knowledge) raised at these meetings and how DDEC has addressed these. ■

# FINANCIAL STATEMENTS

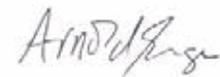
## MANAGEMENT RESPONSIBILITY STATEMENT

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 report.

Management prepares the financial statements in accordance with Canadian accounting standards for not for profit organizations. 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 Crowe MacKay LLP, Chartered Accountants, the Agency's auditors. Their report outlines the scope of their examination and their opinion on the financial statements.



**Arnold Enge, Secretary – Treasurer**  
June 28, 2015

# INDEPENDENT AUDITORS' REPORT

## To the Members 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, 2015, 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 accounting standards for not for profit organizations, 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 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 Agency'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 Agency'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 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, 2015, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not for profit organizations.



**Chartered Accountants**  
Yellowknife, Canada  
June 28, 2015

# STATEMENT OF OPERATIONS

For the year ended March 31  
See accompanying notes.

	2015	2014
<b>Revenues</b>		
Core funding – Dominion Diamond Ekati Corporation	\$ 621,193	\$ 611,422
Separate funding – Dominion Diamond Ekati Corporation	40,000	40,000
Separate fund – Contribution repayable	(5,516)	–
Interest income	2,214	2,483
	<b>657,891</b>	653,905
<b>Expenditures</b>		
Advertising and promotion	–	3,500
Amortization	2,682	2,857
Insurance	5,124	5,270
Board support		
– honoraria	152,942	146,367
– travel, meals and accommodations	46,940	47,713
Professional development	1,010	4,778
Community consultation		
– annual general meeting	16,922	16,401
– annual report	40,779	51,343
– community visits	31,566	16,231
Acquisition of assets	–	3,271
Staff recruitment	–	253
Staff travel	3,063	5,207
Postage and courier	1,089	1,117
Consultants	1,595	9,692
Auditing and bookkeeping fees	21,127	16,415
Rent – office and maintenance	31,500	31,500
Rent – facility rental	4,480	2,707
Separate fund		
– honoraria	31,705	47,401
– travel and administration	2,778	3,857
Office supplies	15,457	13,838
Telephone and fax	6,199	4,999
Wages and benefits	241,532	222,459
	<b>658,490</b>	657,176
<b>Deficiency of revenues over expenditures before other item</b>	<b>(599)</b>	(3,271)
<b>Other items</b>		
Acquisition of assets	–	3,271
<b>Deficiency of revenues over expenditures</b>	<b>\$ (599)</b>	\$ –

## STATEMENT OF CHANGES IN NET ASSETS

For the year ended March 31  
See accompanying notes.

	Unrestricted Fund	Tangible Capital Asset Fund	Total 2015	Total 2014
Balance, beginning of year	\$ 5,627	\$ 7,058	\$ 12,685	\$ 12,685
Deficiency of revenues over expenditures	(599)	-	(599)	-
Amortization	2,682	(2,682)	-	-
<b>Balance, end of year</b>	<b>\$ 7,710</b>	<b>\$ 4,376</b>	<b>\$ 12,086</b>	<b>\$ 12,685</b>

## STATEMENT OF FINANCIAL POSITION

For the year ended March 31  
See accompanying notes.

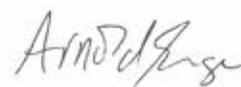
	2015	2014
<b>Assets</b>		
<b>Current</b>		
Cash	\$ 423,852	\$ 427,829
Term deposits (note 3)	15,259	15,136
Prepaid expenses	4,197	3,951
	<b>443,308</b>	<b>446,916</b>
<b>Tangible capital assets (note 4)</b>	<b>4,376</b>	<b>7,058</b>
	<b>\$ 447,684</b>	<b>\$ 453,974</b>
<b>Liabilities</b>		
<b>Current</b>		
Accounts payable and accrued liabilities (note 5)	\$ 100,574	\$ 115,088
Deferred revenue (note 6)	333,903	318,336
Contributions repayable (note 7)	1,121	7,865
	<b>435,598</b>	<b>441,289</b>
<b>Fund balances</b>		
<b>Unrestricted Fund</b>	<b>7,710</b>	<b>5,627</b>
<b>Tangible Capital Asset Fund</b>	<b>4,376</b>	<b>7,058</b>
	<b>12,086</b>	<b>12,685</b>
	<b>\$ 447,684</b>	<b>\$ 453,974</b>

### Commitments (note 8)

Approved on behalf of the board:



William A. Ross, Director



Arnold Enge, Director

# STATEMENT OF CASH FLOWS

For the year ended March 31  
See accompanying notes.

Cash provided by (used for)	2015	2014
<b>Operating activities</b>		
Deficiency of revenues over expenditures	\$ (599)	\$ -
Item not affecting cash		
Amortization	2,682	2,857
	2,083	2,857
Change in non-cash working capital items		
Accounts receivable	-	4,395
Prepaid expenses	(246)	1,367
Accounts payable and accrued liabilities	(14,514)	(9,563)
Deferred revenue	15,567	318,336
Contributions repayable	(6,744)	(39,103)
	(3,854)	278,289
<b>Investing activity</b>		
Purchase of tangible capital assets	-	(3,271)
<b>Increase (decrease) in cash and cash equivalents</b>	<b>(3,854)</b>	<b>275,018</b>
<b>Cash and cash equivalents, beginning of year</b>	<b>442,965</b>	<b>167,947</b>
<b>Cash and cash equivalents, end of year</b>	<b>\$ 439,111</b>	<b>\$ 442,965</b>
<b>Cash and cash equivalents consist of:</b>		
Cash	\$ 423,852	\$ 427,829
Term deposits	15,259	15,136
	<b>\$ 439,111</b>	<b>\$ 442,965</b>

# NOTES TO THE FINANCIAL STATEMENTS

March 31, 2015

## 1. Nature of operations

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 Diamond mine site in the Northwest Territories.

## 2. Significant accounting policies

These financial statements are prepared in accordance with Canadian accounting standards for not-for-profit organizations. The significant policies are detailed as follows:

### (a) Cash equivalents

Cash and cash equivalents consist of cash and term deposits.

### (b) Tangible capital assets

Tangible 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 assets over their estimated useful lives, as set out in note 4.

When tangible capital assets are sold or retired, the related cost and accumulated amortization are removed from the accounts and any gain or loss is charged against earnings in the period.

Tangible capital assets acquired or constructed during the year are not amortized until they are put into use.

### (c) Deferred revenue

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

### (d) Revenue recognition

The Agency follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Investment income includes interest income. Interest income is recognized when earned.

### (e) Financial instruments – Recognition and Measurement

#### Initial measurement

Financial assets originated or acquired or financial liabilities issued or assumed in an arm's length transaction are initially measured at their fair value. In the case of a financial asset or financial liability not subsequently measured at its fair value, the initial fair value is adjusted for financing fees and transaction costs that are directly related to its origination, acquisition, issuance or assumption. Such fees and costs in respect of financial assets and liabilities subsequently measured at fair value are expensed.

The Agency subsequently measures the following financial assets and financial liabilities at amortized costs:

Financial assets measured at amortized cost include cash, and term deposits.

Financial liabilities measured at amortized cost include accounts payable, accrued liabilities and contributions repayable.

#### Impairment

At the end of each reporting period, management assesses whether there are any indications that financial assets measured at cost or amortized cost may be impaired. If there is an indication of impairment, management determines whether a significant adverse change has occurred in the expected timing or the amount of future cash flows from the asset, in which case the asset's carrying amount is reduced to the highest expected value that is recoverable by either holding the asset, selling the asset or by exercising the right to any collateral. The carrying amount of the asset is reduced directly or through the use of an allowance account and the amount of the reduction is recognized as an impairment loss in net income. Previously recognized impairment losses may be reversed to the extent of any improvement. The amount of the reversal is recognized in operations.

# NOTES TO THE FINANCIAL STATEMENTS

March 31, 2015

## (f) Use of estimates

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amount of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. These estimates are reviewed periodically, and, as adjustments become necessary, they are reported in operations in the period in which they become known.

## 3. Term deposits

Short-term investments consist of guaranteed investment certificates maturing on November 28, 2015 and earning interest at 1.10% per year. The certificates are transferable on demand to the Agency's bank account.

## 4. Tangible capital assets

	Rate	Cost	Accumulated amortization	2015 Net book value	2014 Net book value
Equipment	20%	\$ 12,180	\$ 11,958	\$ 222	\$ 278
Computer equipment	30-55%	10,578	9,510	1,068	2,372
Computer software	100%	2,543	2,543	-	-
Website	30%	15,120	12,034	3,086	4,408
		\$ 40,421	\$ 36,045	\$ 4,376	\$ 7,058

## 5. Accounts payable and accrued liabilities

	2015	2014
Accounts payable	\$ 70,767	\$ 90,958
Government remittances - Payroll deductions	26,052	17,312
Salaries and benefits payable	10,755	6,818
	\$ 100,574	\$ 115,088

## 6. Deferred revenue

Deferred revenue consists of payments received in advance for the 2015/2016 fiscal year.

# NOTES TO THE FINANCIAL STATEMENTS

March 31, 2015

## 7. Contributions repayable

	2015	2014
Dominion Diamond Ekati Corporation		
Core funding 2014 (receivable)	\$ (4,395)	\$ 7,865
Separate fund 2015	5,516	-
	\$ 1,121	\$ 7,865

Contributions repayable arising from one fiscal year are normally deducted from contributions provided by Dominion Diamond Ekati Corporation in the following fiscal year. Due to Dominion Diamond Ekati Corporation deducting \$12,261 from March 2014 contribution, it left the Agency with \$4,395 receivable from Dominion Diamond Ekati Corporation. In 2014 - 2015 the separate fund had a contribution repayable of \$5,516 which has resulted in the Agency with a net contribution repayable of \$1,121 at balance date.

## 8. Commitments

As at March 31, 2015 the Agency has an operating lease (month-to-month) for office space; there are no immediate plans for changes in rental agreements nor location. The payment for the next year is based on the existing month-to-month contract \$31,500 (2014 - \$31,500).

## 9. Economic dependence

The Agency receives 99% (2014 - 99%) of its revenue from Dominion Diamond Ekati Corporation. Management is of the opinion that operations would be significantly affected if the funding was substantially curtailed or ceased. The funding arrangement with the owners of the mine is governed by legislation.

## 10. Comparative figures

The financial statements have been reclassified, where applicable, to conform to the presentation used in the current year.

## 11. Financial instruments

Transactions in financial instruments may result in an entity assuming or transferring to another party one or more of the financial risks described below. The required disclosures provide information that assists users of financial statements in assessing the extent of risk related to financial instruments.

### (a) Credit risk

Credit risk is the risk that one party to a transaction will fail to discharge an obligation and cause the other party to incur a financial loss. The Agency does have credit risk in cash of \$423,852 (2014 - \$ 427,829) as a result of having funds with a chartered bank in excess of the insurable limit. Furthermore, the Agency has a concentration risk as full balance of cash is held at one financial institution. This risk has not changed from the prior year.

### (b) Liquidity risk

The Agency does have a liquidity risk in the accounts payable and accrued liabilities of \$100,574 (2014 - \$115,088). Liquidity risk is the risk that the Agency cannot repay its obligations when they become due to its creditors. The Agency reduces its exposure to liquidity risk by ensuring that it documents when authorized payments become due; maintains an adequate cash balance to repay trade creditors and repays long term debt interest and principal as they become due. In the opinion of management the liquidity risk exposure to the Agency is low and is not material.



Agency environmental workshop.

The work plan is based upon the direction and feedback received from our Society Members at our Annual General Meeting in December 2014 and the Agency's own initiatives.

With the Resolution Agreement from January 2006, the Agency's core budget is now fixed at \$560,000 per year as of April 1, 2005 with automatic increases tied to the Consumer Price Index (CPI) for Canada. For 2015–16 Dominion Diamond Ekati Corporation (DDEC), as the owner of the Ekati Mine, will contribute approximately \$668k to the Agency, and in 2016–17 approximately \$681k (assuming a 2.0% 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, and any changes or modifications to the project.

## MAJOR ACTIVITIES

### Board Meetings, Conference Calls

The major means of fulfilling our mandate is through Board meetings that are held approximately every three months. Board meetings provide an opportunity for Directors to discuss, review and make recommendations on recent, ongoing and anticipated initiatives. Guests are invited to meetings to provide updates and receive input on their specific activities. The company, Wek'èezhii Land and Water Board staff and the Government of the Northwest Territories (GNWT) (effective April 1, 2014) inspector are regular guests.

**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

# SUMMARY OF WORK PLAN AND CORE BUDGET 2015–16 TO 2016–17

the Environmental Agreement, water licences and other regulatory approvals.

**Proposed Activities:** The Agency expects to deal with the following in 2015–16:

- The regular environmental monitoring reports for 2015 if received in time (AEMP, WEMP, and Air Quality Monitoring Program);
- Various management plans and updates including the Waste Rock and Ore Storage Management Plan, Wastewater and Processed Kimberlite Management Plan, Wildlife Management Plan, and Waste Management Plan;
- ICRP Annual Progress report and revegetation studies;
- Reclamation Security Review;
- Aquatic Response Framework and Potassium Response Plan; and
- DDEC's Ekati Annual Environmental Report.

There are also two meetings for DDEC, GNWT, Aboriginal Affairs and Northern Development Canada (AANDC) and the

Agency to better coordinate implementation of the Environmental Agreement.

The same workload is expected in 2016–17, 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 2015–16, the Agency expects the following:

- Participation in the Jay Project Technical Sessions;
- Preparation of Information Requests (round two);
- Preparation and submission of Agency Technical Report; and
- Public hearing preparation and participation.

TABLE 8: CORE BUDGETS 2014-15 AND 2015-16

Activity	Forecasted 2014-2015	Proposed 2015-2016	Proposed 2016-2017
Board Meetings	64,155	76,500	78,043
Review of Documents	44,038	50,625	40,928
Separate Fund	29,512	40,000	40,000
Communications	176,761	181,250	169,575
Outside Contracts	0	10,000	10,000
Mgmt and Admin	330,231	320,075	308,116
<b>TOTAL</b>	<b>659,396</b>	<b>667,700</b>	<b>665,984</b>
(approved)	661,933	667,805	681,161

Note: Figures based on actual expenses as audited statements use a different breakdown.



Agency Directors and staff. Absent: Doug Doan.



Grizzly Lake.

For 2016-17, the Agency expects the following:

- Jay Project water licence and land use permit applications review and Technical Sessions;
- Preparation and submission of Agency intervention; and
- Public hearing preparation and participation.

### 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 timeline project covering development of the mine, regulatory events and environmental issues) and resource centre. The Agency will continue to produce two

Annual Reports, one in plain language and one technical. The Agency will also be implementing other parts of our Communications Plan including printed material and possibly video files in Aboriginal languages.

The same activities are anticipated in 2016-17.

### 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 manages its own office space and equipment.

**Proposed Activities:** Maintain current staff and benefit levels. ■



Panda Pit.

- AANDC** – Aboriginal Affairs and Northern Development Canada
- AEMP** – Aquatic Effects Monitoring Program
- AQMP** – Air Quality Monitoring Program

- CAM** – Continuous Air Monitoring
- CCME** – Canadian Council of Ministers of the Environment
- CIMP** – Cumulative Impact Monitoring Program

## ACRONYMS

- CPI** – Consumer Price Index
- DAR** – Developers Assessment Report
- DDEC** – Dominion Diamond Ekati Corporation (“the company”)
- DOF** – Fisheries and Oceans Canada (also known as “Department of Fisheries and Oceans”)
- DNA** – deoxyribonucleic acid
- EC** – Environment Canada
- EIR** – Environmental Impact Report
- ENR** – Department of Environment and Natural Resources (NWT)
- FPK** – Fine processed kimberlite
- GNWT** – Government of the Northwest Territories
- HVAS** – High Volume Air Samplers
- IAC** – Inter-Agency Coordinating Team
- ICRP** – Interim Closure and Reclamation Plan
- KIA** – Kitikmeot Inuit Association
- KPSF** – King Pond Settling Facility
- LKDFN** – Łutsel K'e Dene First Nation
- LLCF** – Long Lake Containment Facility
- MVEIRB** – Mackenzie Valley Environmental Impact Review Board
- PAG** – Potential Acid Generating
- PDC** – Panda Diversion Channel
- PK** – processed kimberlite
- PM** – particulate matter
- PSD** – Pigeon Stream Diversion
- QA/QC** – Quality Assurance/Quality Control
- SNP** – Surveillance Network Program
- SSWQO** – Site-Specific Water Quality Objective
- TK** – Traditional Knowledge
- TSP** – total suspended particulates
- WEMP** – Wildlife Effects Monitoring Program
- WLWB** – Wek'èezhii Land and Water Board
- WPKMP** – Wastewater and Processed Kimberlite Management Plan
- WROMP** – Waste Rock and Ore Storage Management Plan
- WRRB** – Wek'èezhii Renewable Resources Board
- WRSA** – Waste Rock Storage Area
- YKDFN** – Yellowknives Dene First Nation
- ZOI** – Zone of Influence

# GLOSSARY

**Action Levels** – A predetermined change, to a monitored variable or other qualitative or quantitative measure that requires the Licensee to take appropriate actions that may include, but that are not limited to: further investigations, changes to operations, or enhanced mitigation measures.

**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. 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 water with 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.

**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 Tłı̨chǫ Government were involved in the negotiations.

**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.

**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.

**Schist** – A large group of coarse-grained metamorphic rocks which readily split into thin plates or slabs as a result of alignment of lamellar or prismatic minerals.

**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.

**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 through 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.



Beartooth Pit.





# INDEPENDENT ENVIRONMENTAL MONITORING AGENCY

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE

## TECHNICAL ANNUAL REPORT 2014-15

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

### OFFICE STAFF

**KEVIN O'REILLY**

Executive Director

**TEE LIM**

Communications and  
Environmental Specialist



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