



PLAIN LANGUAGE ANNUAL REPORT 2013-14

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE



INDEPENDENT
ENVIRONMENTAL
MONITORING AGENCY

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INDEPENDENT
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Message from the Chair 2014

This past year has been one of great change. The sale of the Ekati Mine was completed, and Dominion Diamond Ekati Corporation (DDEC) became the new owners. They quickly applied for a major expansion of the mine. The company wants to add the Lynx Pipe, and then the Jay and Cardinal Pipes. These changes would extend the mine life by many years. These additions also may cause more harm to the environment. That proposal will be the major focus for the Agency in the coming year.

On top of these changes, Devolution came to the NWT on April 1, 2014. This means changes to regulation of Ekati. Many tasks that were done by the Government of Canada are now done by the Government of the Northwest Territories. This meant the *Environmental Agreement* for the mine may need to be changed. Canada had signed the agreement, but now it is proposed that Canada stop being part of it. The Agency had a special meeting to help our Aboriginal Society Members better understand the proposed

changes. Based on that meeting, we asked for a delay that would give time for more input from Aboriginal Society Members. We also asked that the signers of the *Environmental Agreement* give full and serious thought to Canada staying as part of the Agreement. It is the view of Aboriginal Society Members that the *Environmental Agreement* is part of a broader "social contract" for the Ekati Mine. It is an arrangement that includes the Government of Canada. Changes to the *Environmental Agreement* have not been made at the time of writing this report.

Changes have been made to federal laws that will get rid of the Wek'ëezhii Land and Water Board. Its regulatory role would go to the Mackenzie Valley Land and Water Board. The loss of the very capable Wek'ëezhii Land and Water Board is unfortunate.

The financial security (money that DDEC has to leave with the governments in case of early mine closure or company bankruptcy) is not enough to close the mine using the approved Interim *Closure and Reclamation Plan*. This is unsatisfactory and should be quickly fixed.

I am pleased to report that most of

the staff at Ekati has stayed on even though the owners have changed. 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 go on for the life of the mine.

We have three major uncertainties before us:

- What changes will be made to the *Environmental Agreement* for Ekati?
- The financial security held for the mine is not enough (and parts of it have not been decided).
- How will the environmental assessment for the proposed Jay-Cardinal expansion project happen? ■

William A. Ross, Chairperson
March 31, 2014

Mining at Ekati

Dominion Diamond Ekati Corporation (DDEC) is mining diamonds using large open pits and underground tunnels to remove the *kimberlite* rock that contains the diamonds.



1 Long Lake Containment Facility

The Long Lake Containment Facility (*tailings* pond) holds the crushed wet *kimberlite* that remains after diamonds are removed. It is a lake divided into five sections (cells A to E) by dykes (rock walls) so the *processed kimberlite* can settle. Water is eventually released into lakes downstream when it is clean and pollutants are below the amounts set in the water licence.



2 Main Camp

This area includes an accommodation building for hundreds of workers, a power plant, a truck shop and a processing plant where the diamonds are removed from the *kimberlite*.



3 Waste Rock Piles

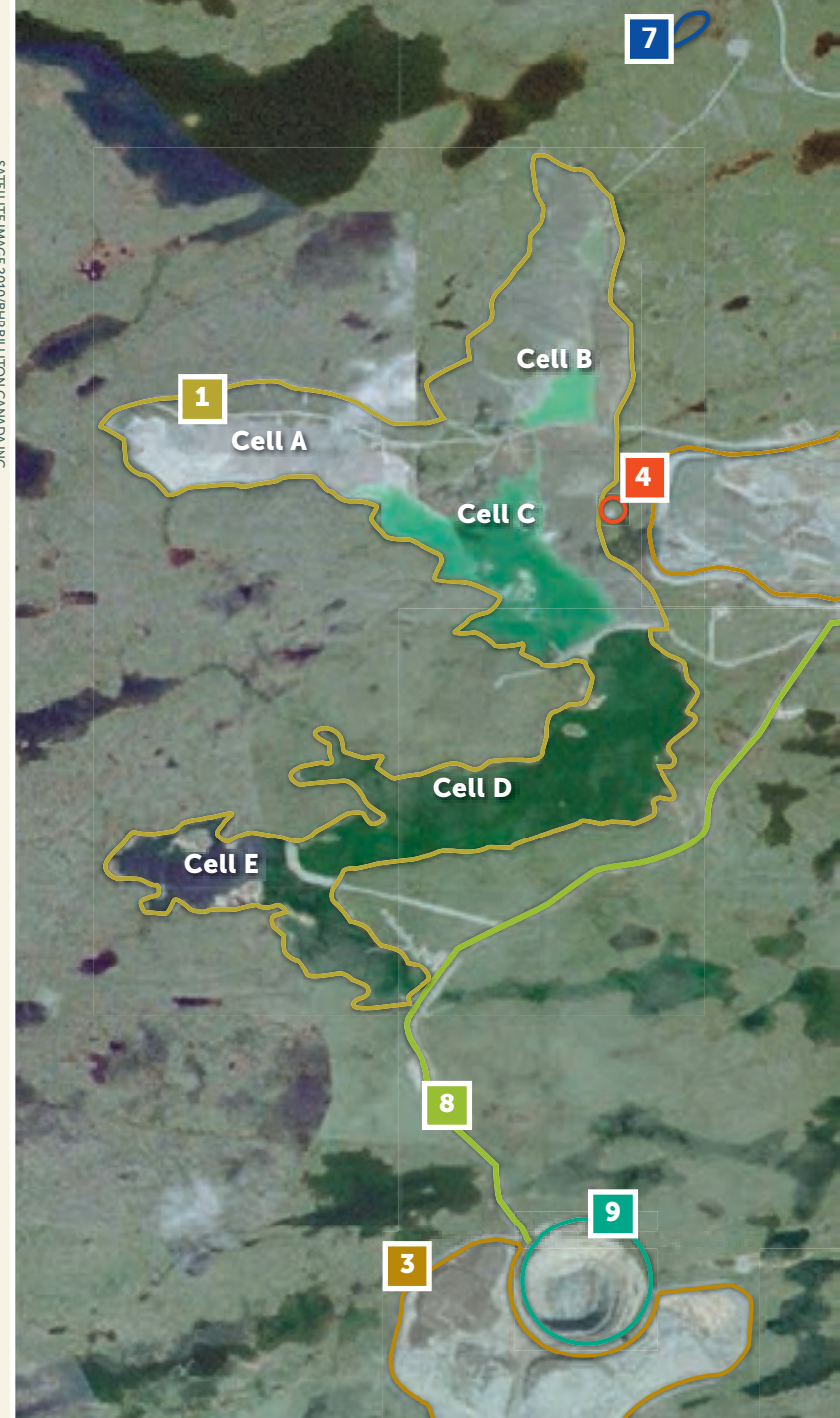
Rock that does not contain diamonds is piled in layers up to 50 metres high.



4 Incinerator

The building where garbage is taken to be burned.

SATELLITE IMAGE 2010/BHP BILLITON CANADA INC.





5 Beartooth Pit

DDEC has finished mining Beartooth Pit. The company currently stores water from underground mining in the pit. In late 2012, DDEC will start to store *processed kimberlite* in the pit.



6 Panda and Koala Pits

Open pit mining has finished here. Underground mining is finished at Panda, but is still happening at Koala. DDEC has built an underground tunnel (located between Panda and Koala pits) to provide access to the bottoms of the pits. A conveyor belt system takes the *kimberlite* rock to the processing plant.



7 Panda Diversion Channel and Pigeon Stream Diversion

The Panda Diversion Channel and Pigeon Stream Diversion are man-made streams diverting water that would otherwise flow into the pits. Fish, mostly grayling, use the new channels for travel and spawning. The Pigeon Stream Diversion will be opened in 2013.



8 Haul Roads

DDEC has built all-weather roads to connect the pits to the main camp. DDEC carefully applies chemicals to reduce dust on the roads to try to make sure that chemicals do not seep into the lakes and streams near the roads.



9 Fox Pit

This is the biggest pit at Ekati and most diamonds are found in here.



10 Misery Pit

DDEC stopped mining at Misery Pit in 2005. The company has begun work to push back the walls and mine deeper in the pit.



Agency 2013 Annual General Meeting

Highlights:

- Four board meetings, the annual general meeting, workshop on wildlife and a community visit to N'dilo and Dettah.
- Better internal communications and computer networking.
- Took part in the review of the Lynx and Jay-Cardinal expansion projects.
- Site visits to Ekati Mine.
- Took part in the Bathurst Caribou Range Planning Workshops.

How We Do Our Work

Activities 2013-14

This year, we had four board meetings in Yellowknife. We also had an environmental workshop and annual general meeting in December 2013. At our annual general meeting we talked about environmental concerns:

- The way used to fish out Desperation Pond;
- How fish are tested for toxins;
- How generators change air quality; and
- Burying garbage and its impact on the mine site after closure.

We also talked about Devolution and the *Environmental Agreement*. There was some talk about adequate financial security for mine closure.

On March 25, 2014, we held a special meeting of the Society Members to discuss proposed changes to the *Environmental Agreement*. The Government of Canada wants to drop

out of the agreement entirely.

We visited the mine site September 2013 to see the Pigeon Stream Diversion, the Panda Diversion Channel, Fox Pit, the pilot re-planting area, and Cell B of the Long Lake Containment Facility. We also took time to visit an area called The Narrows. It is between Lac du Sauvage and Lac de Gras. It is



Agency Directors at the Lynx Public Hearing February 2014

an area that means a lot to local people and is an important caribou crossing. Agency staff also visited the mine site in June 2013 as part of the Inter-Agency Coordinating Team.

Technical Reviews and Input

This year, we worked on the review of two DDEC expansion projects: For the Lynx Project, the Agency was an intervenor in the water licence process. We were also part of the Jay-Cardinal environmental assessment. We gave many comments during each of these reviews. We look forward to the final water licence, land use permit, and recommendations to the Minister on the Lynx Project.

We took part in the review of the *closure* progress report. We also looked at financial security for closure.

This year, we raised some questions about better fish monitoring. We would like to see a more flexible fish sampling program. This could ensure that fish sampling problems are worked out in the same sample season, rather than waiting three years or more.

This year, we hired Chris Burn, a specialist in permafrost (underground warming and freezing) to comment on the Pigeon Waste Rock Pile design.

We took part in several GNWT workshops about a Bathurst Caribou Range Plan. The Agency will be giving input to one of the working groups.

Agency Communications and Collaboration

On December 6, 2013, we hosted a workshop on wildlife, since the company did not carry out the

Environmental Impact Report this year. We talked about wildlife monitoring and the results. These people went to the workshop: staff from DDEC's environment department, GNWT Environment and Natural Resources, and our Society Members.

On March 12, 2014, we visited Dettah and N'dilo. We started with a board meeting in the Yellowknives Dene First Nation council chambers. In the evening, we held an Open House at the N'dilo gym. Most members of the Land and Environment Committee came to talk to us about their concerns with Ekati Mine. This included the size of the Jay-Cardinal project; how will Traditional Knowledge be recorded and how it will be used; and how much truck traffic the project will cause.

Environmental Agreement Implementation Meetings are held twice a year among the three signers of the agreement (Government of Canada, GNWT and DDEC) and the Agency. This year the meetings were in May 2013 and January 2014. These meetings improve working together and communication. They also give each group a chance to present an update. We report on expenses and future plans. The others have a chance to respond to recommendations in our latest annual report.

In October 2013 and January 2014, meetings were held by the Inter-Agency Coordinating Team. This team consists of the Agency and a group of government regulators. This year, these meetings helped us understand how Devolution will work.



Visit to the Incinerator Building

Assessing the Agency

One of our goals is that people should have the information they need. One tool we use is a library in our office. This year, we worked with Tamarack Computers to improve our internal communications. We now have a way to share documents over the Internet instead of using e-mail. Eventually we will put our library on the Internet for easy use.

We are trying out social media like Facebook: www.facebook.com/monitoringagency. This way, we can tell people about our events and plans and

reach youth in the communities.

We were happy to host a board meeting and Open House in the Yellowknives Dene First Nation. We could not arrange a school visit. We look forward to school visits in 2014-2015.

Last year, we reported concerns that *progressive reclamation* is slipping. We recommended the Old Camp be fixed up. We were pleased to see this is finally being done. DDEC plans to reclaim the Old Camp over the next three years.

We will continue to work on these items. We know they are important to our Society Members. ■



Haul Truck Returning from waste rock pile.

Highlights:

- New design for Pigeon Waste Rock Pile approved.
- No major problems with seepage.
- Some waste rock piles not freezing properly.

Waste Water and Waste Rock

Activities 2013

Mining at Ekati in 2013 produced 4.65 million tonnes of ore from the Misery and Fox Pits. There was also 0.9 million tonnes from underground. This led to about 13.6 million tonnes of *waste rock*.

About 4 million m³ (cubic metres) of *processed kimberlite tailings* (a volume equal to a 3 m thick layer covering a one square km space) were discharged into the Long Lake Containment Facility. Another 2 million m³ went into Beartooth Pit.

Tailings Management

The Wastewater and Processed Kimberlite Management Plan was updated to include the new Pigeon Pipe operation. It was sent to the Wek'èezhìi Land and Water Board in December 2013.

In mid-April 2014 the Wek'èezhìi Land and Water Board notified Dominion Diamond Ekati Corporation that the plan was not ready for approval. They said more information was needed. For example, how would existing and future water management be done? Would any in-pit minewater treatment be needed? How would sewage be managed? A new version of the plan had not been sent in when we went to press.

Waste Rock Management

Yearly testing of granite *waste rock* at Ekati has been cut back. No differences were being found and the rock was found to be safe.

The 2013 *waste rock* seepage results are about the same as past years. DDEC found no big environment issues. Six new seeps were found and added to the survey.

Ammonia in the *waste rock* is lower than it was before. This may be due to better blasting practices using up more of the ammonium *nitrate*. *Hydrocarbons* (oil products) are still found in some seeps.

In December 2013, DDEC sent to the Wek'èezhìi Land and Water Board an addition to its Waste Rock and Ore Storage Management Plan. It gave plans for mining the Pigeon Pipe. DDEC is proposing to manage all *waste rock* from Pigeon the same way. The company also proposed to use a 4 m thick cover of soil instead of the approved 5 m thick granite rock cover.

The change was sent out for comment. We, along with government agencies, answered. We asked for more information about the *waste rock* and the changes to the *closure cover*.



Pigeon Test Pit and Waste Rock Pile.

The Wek'èezhìi Land and Water Board approved the document in March 2014. They asked that the Waste Rock and Ore Management Plan be properly updated to show these changes.

In other years DDEC's consultants had recommended follow-up investigations on the annual seepage survey results. DDEC followed up on these suggestions in 2013.

Agency's Assessment

DDEC's regular monitoring and reporting on waste rock and ore storage management at Ekati are good. We were pleased that some of the recommended studies were started by the company in 2013.

We were mostly happy with the quality of DDEC's revised Waste Processed Kimberlite Management Plan. However, it did not have enough information on the Pigeon Pit waste rock management.

DDEC's answer to our request for a better look at the options for handling waste rock was not good enough. We had expected to see a strong analysis, but they gave only brief reasons with no support.

One example was to use more of the excess glacial till or soil in the closure cover for the Pigeon rock pile. DDEC's response was that the cost of double-handling would be more than the cost to haul glacial till directly to the

Koala waste rock pile. Maybe, but being cheaper is not a good reason not to look at other options.

The Wek'èezhìi Land and Water Board did not agree with our view on the need for analyzing various options for rock piles. We take comfort that the Wek'èezhìi Land and Water Board has hired an independent expert to look over the waste rock cover systems at both Ekati Mine and Diavik Diamond Mine.

On a final note, it is clear that two rock types pose possible drainage problems for the future. These will need to be monitored for good management in the years ahead.

First, there is no doubt that leaching of

kimberlite stored on the surface is having an effect on water quality.

Second, at Misery (and soon Pigeon Pipe), there are large amounts of rock being placed in the Waste Rock Storage Area. These are being managed so that permafrost can develop in the piles. However, so far parts of the Misery waste rock are not freezing reliably. This is serious for closure planning. We expect to see this issue dealt with in the next year.

The Agency recommends that DDEC investigate and report on the cause of the lack of freezing in the Fox and Misery Waste Rock Piles, identify how that can affect closure and develop appropriate plans to correct it. ■



Agency visit to revegetation test area.

Highlights:

- Limited *progressive reclamation* with continued slippage in *reclamation* research.
- Old Camp *Closure Plan* submitted.
- Very large gap in financial security still outstanding.

Closure Planning

DDEC's Activities

Reclamation Work in 2013-14

Monitoring of already reclaimed sites continued in 2013, including:

- Koala Topsoil Storage;
- Fred's Channel;
- South Airstrip Esker;
- Culvert Camp; and
- Pigeon Stream Diversion.

These sites were stable. Plant cover is growing. Soil samples were taken at all five sites. Grasses in the Pigeon Stream Diversion were growing well. Willows and cranberry seedlings were also doing well.

Four areas in the Koala underground were reclaimed in 2013. The Old Camp plan was sent to the Wek'èezhì Land and Water Board in December 2013. Work should start in summer 2014.

Research Planning Activities

DDEC reported that it did this work in 2013:

- Study of Panda and Koala pits. Decided the pits and underground should be allowed to flood.
- Predict water quality of future pit lakes while being filled with water and after filling.

- Review what water sources can be used for flooding if not Lac de Gras.
- Lowering depth of landfill cover to 1 m.
- Winter study of fine *processed kimberlite* and water in cell B of the Long Lake Containment Facility; and extra fine *processed kimberlite* in Cell E.
- Study and field tests of *processed kimberlite* changes.
- Put fertilizer on the *processed kimberlite* in the Pilot Study area.
- Review reports from the Wildlife Effects Monitoring Program to set targets for wildlife use of the mine site at *closure*.
- Community workshops on plants.

Long Lake Containment Facility Pilot Study

The plan for *kimberlite* beaches in the Long Lake Containment Facility is a cover of rock and plants to allow safe access by wildlife. The beaches will be around ponds that collect surface runoff. DDEC needs to find out how to grow plants on the beaches. The plants need to last a long time.

In 2012 a pilot study began in the Long Lake Containment Facility. It is looking for a cover design for the *tailings* beaches that would work everywhere. A field study in Cell B since 2000 has looked at different plant covers.

In 2013 DDEC sent in a plan for more *reclamation* study about the Long Lake Containment Facility. The idea is to find ways to place rocks on the *tailings* beach to test plant growth between the rocks. Soil work, seeding and fertilizing in two plots was done in 2013. Different grasses were tried in parts of the study area.

Seven holes were drilled in Cell B to collect soil and water and rock data. Results are not in yet. It is now known that the *tailings* are frozen from top to bottom.

Rock cover placement was planned for winter of 2013-14. The pilot area will be checked in summer 2014.

Pit Lake Water Quality Predictions

DDEC did a study to predict water quality for each future pit lake during filling and after. Once filled, water from the top of the pit lakes will flow through channels and go downstream. The water from the pits must also meet water quality goals. One question was if layers of water in the pit lakes would mix.

The main conclusions were:

- Pumping of fresh water improves the quality of water in the pit lakes.
- Pit lakes with a larger upstream watershed are likely to have better surface water quality.
- Pits with more chemically reactive wall rock or underground water inflows should be filled as soon as possible. This would improve water quality.
- Only pits with underground water inflow are likely not to mix different water layers.
- Water that runs down the walls is the main source of contaminants when the pits are closed and full of water.

Financial Security

A *closure* and *reclamation* plan should ensure that a mine can be closed and the land fixed up. Figuring out the costs of this is a key part of the *closure* plan.

To be sure that proper *reclamation* can be done and that the public will not have to pay for it, governments often require the mine owner to set money aside for it. The amount is based on the estimates of costs. It is important to set the right amount so that the money is available when it is needed to ensure the mine *closure* is done properly.

For the Ekati Interim *Closure* and *Reclamation* Plan, financial security is held under the water licence.

The Wek'èezhii Land and Water Board sets the amount by figuring what it would cost another company to do the work in the Interim *Closure* and *Reclamation* Plan.

The *Environmental Agreement* says what things may also require financial security:

- Costs to respond to problems and to plan for final *closure*;
- Work of the Agency if there is a sudden *closure*;
- Costs to write and review the annual report and Environmental Impact Report. This includes public meetings;
- Management plans that may need to be updated;

- Extra studies, monitoring and research needed for *closure* but not covered by Wek'èezhii Land and Water Board financial security;
- Future serious threats to the environment if the worst things happen; and
- Cost and progress reviews of *closure*. These should be done every two years.

The *Environmental Agreement* also requires an extra \$20 million guarantee from the company. This is in addition to the financial security under the *Environmental Agreement*.



Reclamation work beside the Pigeon Stream Diversion.

Overall, the report says that surface water quality will likely be below current water quality goals. There should be ways to fix this for each lake.

Revegetation Workshops

The company held workshops on re-planting in 2013. People took part from Kitikmeot Inuit Association, Łutsel K'e Dene First Nation, Yellowknives Dene First Nation, North Slave Métis Alliance, and Tłı̨chǫ Government.

Financial Security

In our annual report last year, we said that a financial security amount had been proposed by the company. In July 2013, the Wek'èezhii Land and Water Board decided the amount to be at least \$263 million. The amount held by the government as financial security for *closure* at Ekati is about \$127 million. We are concerned about the large gap between these amounts. We wrote to the two ministers in January. The response was that the governments were looking at a proposal from DDEC.



Discharge jetty in the Long Lake Containment Facility

There were two meetings to try to solve the issue of financial security under the *Environmental Agreement*. This process was not completed by the time we wrote this report and progress has been very slow.

AGENCY'S ASSESSMENT

DDEC's main effort on *closure* planning is doing many research projects. Progress was mixed in 2013. We found a general lack of progress in 2013 on most of the research, as well as on *reclamation* work.

However, for some of the research, DDEC made good progress. These include the pilot planting study and the work on water quality at *closure*. The study design submitted in 2013 for the Long Lake Containment Facility pilot study looks good. We hope that a strong effort to do this work will give useful results.

Progressive Reclamation

Progressive reclamation is going better than before. A good plan for Old Camp was made to reclaim the area (as we recommended last year). We have recommended in past years about the need to get on with fixing up Old Camp. This area has not been used for a long time. It could serve as a good example of *progressive reclamation*. We look forward to some action on this in 2014.

We were also pleased that the company finished making the Panda Diversion Channel wider.

Modelling of Water Quality

In our view, 'Modeling Predictions of Water Quality for Pit Lakes' is a useful document. The model uses real data



Panda Diversion Channel 2014

from Ekati which is very important. The study makes good estimates of water quality in future pit lakes. That said, the report raises concerns about the future quality of these lakes.

Slippage in Reclamation Research

Much of the required research has been delayed. We wrote to the Wek'èezhii Land and Water Board in March 2014 about our concerns that this work will not be done on time. The expected *closure* of Ekati is in 2019, just five years away.

Financial Security

We think there should be a better way to set and put financial security in place. We are still disappointed that this work is so slow. There is a large gap between the financial security needed at closure and the actual amount held by government. This gap puts the public at risk of paying for *reclamation* of the mine

We do not know of any reason that financial security would be needed soon. We want to be able to reassure our Society Members and the public that there is enough money to properly close the mine, if needed. ■



Pigeon Stream Diversion

Highlights:

- Some contaminants, including nutrients and metals, were greater downstream of mine.
- Start of pumping Fine Processed Kimberlite into Beartooth Pit.
- Pigeon Stream Diversion inlet and outlet construction done.
- Water sampling of two new sites in Lac de Gras is recommended.

Water and Fish

Each year Dominion Diamond Ekati Corporation (DDEC) carries out a number of programs to find out if there are changes in the water downstream. Regulated mine outflow is sent into two watersheds (Koala-Lac de Gras and King-Cujo). Water bodies in these two systems are tested. The Aquatic Effects Monitoring Program collects information on changes in:

- Water and sediment quality;
- Bugs, worms and snails that live in the lake bottom;
- Tiny water bugs and plants; and
- Fish.

Four studies were done as part of the Special Effects Studies and Monitoring Programs.

Activities 2013-14

Processed kimberlite tailings, treated sewage and pit water are sent into the Long Lake Containment Facility. These are the main sources of any contaminants downstream. Water was released from the Long Lake Containment Facility from June to November 2013. Mine water was still pumped into Beartooth Pit.

The Beartooth Fine Processed Kimberlite slurry pipeline was finished in

early 2013. Process plant discharge was sent into the Long Lake Containment Facility in all months of 2013. Some was sent to Beartooth Pit.

A second source of contamination is outflow from the Misery site. Water from the Waste Rock Dam was sent into King Pond Settling Facility in July 2013. No water was pumped from Misery Pit in 2013. From May to September, water was released from the King Pond Settling Facility to Cujo Lake which flows into Lac du Sauvage.

Water from Desperation Pond was pumped to Carrie Pond in June 2013. Fish were taken out of Desperation Pond in July and August and transferred into Mossing Lake downstream from Desperation. This happened before half



Pigeon Stream Diversion



Pigeon Stream Diversion

the pond was filled with waste rock.

The in and out sections and fish habitat of the Pigeon Stream Diversion channel were built in winter 2013.

The original Pigeon Stream was kept flowing in 2013, and the finished Pigeon Stream Diversion was flushed to remove extra sediment. The channel was opened at the end of September. The Pigeon Stream Diversion is expected to be operating in 2014.

Changes to Evaluation of Effects following the 2012 AEMP Re-evaluation

Changes were made to how DDEC looks at impacts, starting in 2013:

1. The water quality items measured were changed. Some were added. Others were removed.
2. Now that the company has four years of data for the stream connecting Leslie and Moose lakes, this data was included in analysis to determine impacts.

3. Some steps were taken to better tell the difference between changes that occur naturally and those occurring because of mine effects.
4. The data for tiny plants, tiny bugs, and lake bottom life were combined into a single biology section in the monitoring report.

AEMP Monitoring Results Water Quality Sampling and Results

Each year DDEC reports the results of its Aquatic Effects Monitoring Program to the Wek'ëezhii Land and Water Board. It gives the highlights in its *Environmental Agreement* and Water Licence Annual Report.

This is the 16th year of monitoring for the Koala – Lac de Gras system. Carbon amounts in lakes downstream of the Long Lake Containment Facility have changed over time. The meaning of the changes is complicated. Carbon is also higher in Cujo Lake, Cujo outflow and the Christine - Lac du Sauvage stream. Amounts get smaller as you go farther downstream, so they are probably caused by the mine.

As before, oxygen levels in Cujo Lake were a little less than what fish need to breathe. This problem was partly helped by clearing snow on the lake so that sunlight could penetrate into the water, creating conditions for more water plants that produce oxygen to grow. DDEC suggests that more organic carbon (from decaying plant and animal life in the water or from organic matter swept from the land into a lake during spring melt) may be causing the lower under-ice oxygen levels in Cujo.

DDEC said that water quality is now

stable in the Cujo system. This is likely because open pit mining in Misery Pit stopped in April 2005. This system will need to be watched now that mining has resumed in Misery Pit.

Under ice temperature seems to be cooling in all lakes downstream of the Long Lake Containment Facility as far as Nema Lake. The cause is not clear. There is also a cooling trend in two of the regular lakes, so this may be a natural climate change. A warming trend was found in Kodiak Lake along with less oxygen. Grizzly Lake is showing some temperature layers, cooler on the surface. The cause is not clear.

Other notable changes include:

- Potassium exceeded the standard in Leslie and Moose lakes during the ice covered season;
- Arsenic levels are still high in Leslie and Moose lakes but not high enough yet to be harmful to fish; and
- Total ammonia-N amounts are back to normal. No mine effects have been found since 2012.

Biota Sampling and Results Plankton

As reported last year, mining activity is causing changes in the tiny plants in lakes downstream of the mine. Blue-green algae is replacing regular algae in lakes below the Long Lake Containment Facility as far as Lac de Gras.

The communities of tiny water bugs still show signs of change downstream from the Long Lake Containment Facility as far as Nema Lake. Some species are increasing, and some are decreasing. The cause is not yet known.



Fish Sampling

Fish

The 2012 Aquatic Effects Monitoring Program failed to address a possible fish impact from *dioxins and furans* due to poor sampling. We made a recommendation to prevent this type of failure in the future:

- The method could be improved by stating what should happen when a minimum amount of fish is not caught.
- Another attempt at sampling should be tried later the same season or the following year.
- Fish species to be sampled should be carefully chosen. For example, sculpins (little lakebottom minnows) should be the preferred species in testing sediment.

A fish removal program was carried out in Desperation Pond in July and August 2013. The fish-out was done using nets and traps. All gill nets were watched during the average 43 minutes they were set. None were in the water overnight. Eighty-two percent of 693 Arctic Grayling from Desperation Pond were released alive into Mossing Lake. It was not reported if other types of fish were caught.

Special Effects Studies Lac de Gras Water Quality Monitoring Stations

In 2012, mine effects in water quality were detected downstream of the Long Lake Containment Facility. A sampling program was done to see if a new

station is needed. Study of water quality suggests that effects may have gone as far as the mouth of the north arm, into the main body of Lac de Gras.

Since there is another mine on Lac de Gras, it is possible that the changes may not be entirely due to Ekati. The company suggests that two more sites should be included in future DDEC sampling of Lac de Gras.

Nero-Nema Stream Water Quality

In 2012, the Wek'èezhìi Land and Water Board asked for a study of differences in dilution among water quality chemicals. This was done during the 2013 open water season. Weekly water quality sampling was done at Nero-Nema Stream.

Results showed that most metals were diluted (at about the same rate as salts) as contaminated water flows farther from the Long Lake Containment Facility, but the results may not be right. It was not easy to monitor salt dilution as the mine was sending water from the Long Lake Containment Facility during the study.

Grizzly Lake Biological Communities

Small plants and animals were sampled in Grizzly Lake in August. This was to see if the numbers have changed. Only tiny water bugs seem to have been affected. The change may be due to warmer lake water.

Hydrocarbon Exposure to Fish

As reported last year, an enzyme in fish was found in higher levels in fish closer to the Long Lake Containment Facility. This enzyme is a natural chemical produced in an animal when it is exposed to *hydrocarbons* or organochlorines.

DDEC is looking for a link between mining activity and hydrocarbon releases, since the source is unknown. This study is ongoing. Results will be given in a separate report by the company.

Other Reports Submitted to the Wek'èezhìi Land and Water Board for Review

Aquatic Response Framework

The Aquatic Response Framework is meant to be part of the Aquatic Effects Monitoring Program design. The idea is to link the results of the monitoring with actions needed to ensure the effects stay in a good range that will not harm life in the lakes. The results of the Aquatic Effects Monitoring will be used in an early warning system. Action steps will allow the company to monitor and respond to the changes quickly. The response framework includes:

- Definitions of things that will trigger actions;
- Action level will include;
 - The reason for it;
 - How the amount of excess pollutants will be judged; and
 - Actions that may be taken if pollution levels are exceeded;
- Guidelines for how fast to report; and
- Timing to develop, review, update, and change a response plan.

Nitrogen Response Plan

The Nitrogen Response Plan is required by the water licence. The goal is to have as little as possible nitrogen entering the water at Ekati so it doesn't cause too much algae to grow or become a

problem for baby fish. The plan includes:

- Current nitrogen sources and management. This includes storage and transport of ammonium *nitrate*;
- Expert look at current blasting practices; and
- A plan to address the recommendations.

Agency Assessment

Our review of the 2013 reports shows that the company is mostly doing a good job of protecting the water at the mine. There are still a few challenges. The Aquatic Effect Monitoring Program still has a wide scope. It can detect small changes that can alert managers to emerging problems. We still have concerns with some metals that are

increasing downstream from the mine

It is not yet known if the changes to the communities of tiny bugs downstream will have a bad impact on fish that eat them. We will be keeping track of how the changes proceed until the next trout and whitefish monitoring year 2018.

Four special effects studies were done in 2013. We support the result from the Lac de Gras study that two new sites be added to the Aquatic Effect Monitoring Program. We have some concerns about the results of the Nero-Nema stream monitoring.

It seems okay that water quality variables are being diluted at the same rate or faster than water hardness downstream of the Long Lake

Containment Facility. The warnings to be cautious in reading this result suggest that more work may be needed.

In the Agency's view, the Aquatic Response Framework, is okay. It has designed action steps that allow the company to monitor and respond to changes quickly, addresses changes to water chemistry. We think more work is needed develop the right action steps for sediments, small insects in the water, and the health of fish. We would also like the company to make further considerations about when action is necessary and what actions will be taken if the good range is surpassed.

In our view, the Nitrogen Response Plan shows improved blasting practices from 2008 to 2013. There are still

areas that could be better. We gave our comments to the Wek'èezhii Land and Water Board. In general, the plan tends to focus on the use-protection approach. This means current nitrogen levels in lakes downstream of the mine, although they are higher than before the mine was started, are felt to have no bad effects on the environment. We support a more balanced approach of preventing pollution to minimize waste. This approach is found in the Mackenzie Valley Land and Water Board Policy on Water and *Effluent* Quality. We recommend that the Nitrogen Response Plan deal more clearly with looking for chances for less waste. The plan also needs more details, including monitoring and public reports. ■



Outlet of Lac du Sauvage



Incinerator building

Highlights:

- DDEC improving and fixing problems with air quality sampling.
- Incinerators operating. Stack testing done.

Air Quality

The Ekati Air Quality Monitoring Program has these parts:

- Weather monitoring (every day);
- Air emissions and greenhouse gas figures (once a year);
- Measure Total Suspended Particulate through High Volume Air Sampling (every six days);
- Air monitoring (all the time);
- Dustfall monitoring (in the summer);
- Snow samples (every three years); and
- Lichen samples (every three years).

Activities 2013-14

The Ekati Mine manages its food and paper waste by burning in an incinerator. Right now, Dominion Diamond Ekati Corporation burns 1000 kg each day. Two new waste incinerators were installed in 2012. They are easier and safer to use. They also burn waste completely and have lower emissions. In 2013 DDEC started to measure incinerator emissions. This included testing the incinerator smoke. Testing was done from June 19 to 27, 2013

to see how well the incinerators were running. The company sent the results to the Wek'èezhii Land and Water Board in March 2014. Results show both incinerators are working well.

DDEC also changed the Waste Management Plan and sent it to the Wek'èezhii Land and Water Board in January 2014. Changes include better waste sorting over the entire mine site. This is to try to prevent problem materials from getting into the incinerator. Oily rags, absorbent pads and aerosol cans are collected and shipped away from the mine instead of being burned. Items like batteries and plastics are also collected and shipped away. There has been a shift to stop using plastics, too. For example, plastic garbage bags have been replaced with corn oil products and plastic forks replaced with ones made from plants.

Weather Stations

In 2011 power failures at the weather stations caused a loss of four months of data. DDEC reports that they have upgraded the Polar Lake and Koala weather stations for better data collection and reliability.

High Volume Air Samplers

In the past the High Volume Air Sampling had some problems:

- Motors often needed repair especially in winter;
- Filters were giving incorrect results;
- There was no way to ensure the filters were collected and weighed correctly; and
- 24-hour sampling was being run from noon to noon rather midnight to midnight.

The company has now replaced the High Volume Air Sampling with Partisol 2000i air samplers. The *Total Suspended Particulates* air samplers now run from midnight to midnight. *Total Suspended Particulates* filters are weighed before and after use to ensure quality control.

Continuous Air Monitoring

During 2009-2011, over 75% of the data were not valid due to equipment trouble. When excesses were found, there was no investigation. DDEC has now added a wind speed and direction sensor. They will also do a detailed review of problems within one month of being found. The company will update its procedures to make sure workers do checks more often.

Dustfall Monitoring Program

In a review of the Air Quality Monitoring Program, it was found that the upwind sites of some dustfall monitoring stations were not truly upwind. DDEC has checked and more stations are planned for 2014.

In the past, we found helicopter landings during sampling could spoil samples. The company has now changed helicopter procedures to fix this problem.

Last year we asked that the company look at new ways to keep dust down. We asked them to report weather data, use of the road, what type of dust suppressant was used and when the dust suppressant was last used. DDEC reports that they are checking on how well dust suppression is working. We will report on the results in 2014.

Snow Core Sampling

In other annual reports, we questioned the way snow samples were sent to the lab. Frozen or melted? The company did a test, but the sample size was too small. We asked that the study be done again. In 2013 the company did the study again using frozen and unfrozen snow core samples from the same location. The results show there is no difference.

Agency Assessment

We recognize that the company's air quality and waste handling procedures have improved a lot.

In September 2013 we visited the new incinerator building. DDEC showed us how the incinerators work. We were pleased that DDEC has detailed operating procedures. These include waste streams and waste batching for best incinerator use.

We are pleased that smokestack testing results show the incinerators are working well. We do have concerns with the results for some of the

contaminants sampled. One of the units had levels of cadmium and lead above the Canada-Wide Standards in one of the tests. The report did not explain how this happened. Some important information was missing from the report: What materials were being burned during the stack tests? When in the burn cycle were the samples taken?

We recommend that DDEC write detailed operating procedures for the incinerators. They should include recording of data, audits and smokestack testing, and public reports.

Dust is still a concern. How does it affect caribou? Do they avoid favourite

places because of dust? New mining is proposed in the southeastern part of the Ekati Mine. This includes a pushback of the existing Misery Pit, the new Lynx pipe project and the Jay Pipe. New activities mean a likely increase in air quality problems. DDEC has said it intends to update the Air Quality Monitoring Program in 2014. Any updates to the Air Quality Monitoring Program should be done before new mine activities start. This can ensure that monitoring of new dust sources is extended. We look forward to reviewing the more complete study of dust control that is now under way. ■



Inside the Incinerator building



Red Fox

Highlights:

- Year Two of Lac de Gras grizzly bear DNA study.
- **Wolverine DNA monitoring to be done in April 2014.**
- Planning began for the Bathurst caribou range.
- **Used remote cameras to watch caribou.**
- Lynx and Jay-Cardinal Projects bring up concerns about roads and caribou.

Wildlife

Activities 2013-14

Dominion Diamond Mine Corp. (DDEC) has a Wildlife Effects Monitoring Program that tells us about how mining impacts wildlife. It also helps us to understand if wildlife management is working. The Wildlife Effects Monitoring Program is in its 17th year. As before, the 2013 Wildlife Effects Monitoring Program focused on wildlife habitat and on caribou, grizzly bears, and wolverines. To monitor, DDEC:

- Put together reports of accidents and what has been seen;
- Count wildlife on the ground;
- Watch behaviour;
- Sample DNA of some animals (bears and wolverines); and
- A major part of caribou monitoring is use of remote cameras to do the work.

The GNWT's Environment and Natural Resources held two meetings about a Bathurst caribou range plan. They invited industry, communities, monitoring agencies, and other interested partners. The plan will

monitor and manage disturbance of the land as it relates to caribou. Someday, the plan will be part of a larger caribou plan for the Tłıchǫ settlement region. That is being developed with the Wek'èezhìi Renewable Resources Board (Figure 1). The range plan process is slow. It may take up to two years to complete. The Agency is participating in this process to help set direction and to lend expertise.

Ekati Mine Footprint

The mine footprint increased by 27 ha during 2013. The total footprint of the mine site now covers 3,242 ha (32 km²) which is about the size of Yellowknife.

Wildlife Incidents

DDEC still is trying to improve the way it manages waste. This includes:

- Keep food out of the dump;
- Have fewer wildlife accidents; and
- Keep wildlife away from danger.

One problem is to get workers to follow the rules for waste disposal. The amount of food thrown in the Ekati dump has been going up since 2008. In fact, 2013 had the highest rate since



Wolverine

2005. Of course, then, wildlife sightings and sign at the dump were also the highest in years. DDEC should work harder to get staff to follow the rules.

Twenty-six animals killed by trucks were reported. This is the highest in nine years. None of the deaths were of caribou or grizzly bear. One short-eared owl was struck and killed by a truck antenna. In July 2013 a caribou got on the runway, delaying planes.

Grizzly Bear Monitoring

There are few grizzly bears in the Barrenlands. In 2012 and 2013, DDEC and Diavik Diamond Mine worked together on a large-scale DNA-based study. The goal was to find how many grizzly bears live in the area around the two mines. During 2012, 112 grizzly bears were identified. DNA results for 2013 will be reported in June 2014.

Wolf Monitoring

Each year wolf dens are checked to see if changes have been caused by the mine. Of 19 dens checked in 2013, three were occupied in June with pups present in August. These were the first successful dens in the Ekati area since 2008.

Wolverine Monitoring

Wolverine DNA was sampled in 2005 and 2006. Then in April 2010 and 2011, studies were done together at Ekati, Diavik Diamond Mine and Daring Lake. It seems like there are not so many wolverines now. The tests done in 2011, however, were poor as few hair samples were taken. To go on with long-term monitoring, DNA sampling at Ekati was planned for in April 2014.

Bird Monitoring

Tundra breeding bird monitoring is no longer done at Ekati. The North American Breeding Bird Survey,

however, was done for the 11th year. As recommended at 2010 workshops, regional raptor surveys (hawks, falcons and ravens) will be done every 5 years. Rough-legged hawks, peregrine falcons, gyrfalcons, and common ravens nested successfully in pits during 2013.

Caribou Monitoring

In the past, DDEC has counted the caribou using helicopters and ground surveys. No air counts have been done since 2009. In 2013, the number of caribou seen by workers gives an estimate of 2,653 caribou in the Ekati area. Most were seen during northern migration, late summer and southern migration.

Caribou actions can be changed by industrial development. DDEC and Diavik Diamond Mine are working together to record how caribou behave close to the mines and far from them. During 2013, DDEC collected behaviour data on 40 caribou within 300 m of the mine.

In the Wildlife Effects Monitoring

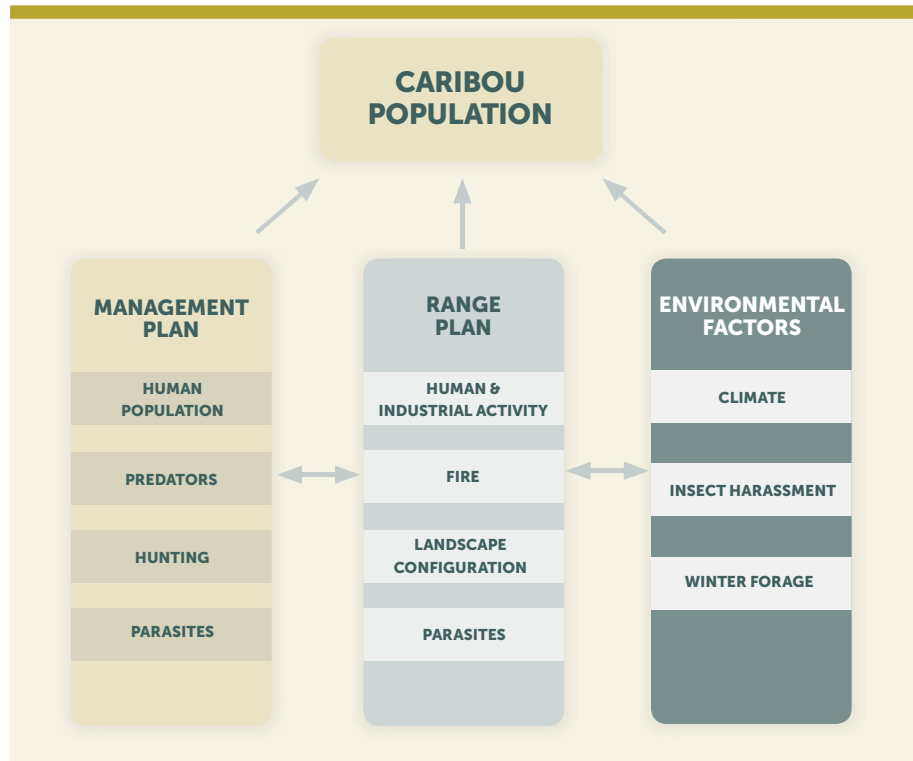
Program report, behaviour data from both mines was analyzed. Vehicles and people caused stress for less than an average of 40 seconds. The companies say that changes in how caribou act due to mine activities "may be small in magnitude and perhaps might rapidly become inconsequential beyond 2 km from the nearest mine infrastructure." The authors admit there were few samples close to or at medium distances from mine structures.

Remote cameras were placed on the mine property in 2012 to watch how wildlife act near the mine. More cameras were used in 2013. The total is now 90 cameras. The main goal of the camera program is to find trends in numbers and actions. Do tundra roads stop caribou from crossing? Results from 2012 show that 8% of caribou groups who came to a road turned away. Results from 2013 will be given in a three-year summary report in June 2014.



White-fronted goose

Figure 1: Simplified relationship of Caribou plans



Agency Assessment Review of the 2013 Wildlife Effects Monitoring Program Report

We commend DDEC for their leadership on the grizzly bear DNA study, and for taking part in the wolverine DNA monitoring. These two studies are important to understanding how many animals are in the region and what the effects of mining may be.

Results in the 2013 Wildlife Effects Monitoring Program report look okay, but some of the writing is out of date.

For example, the start to the caribou section does not mention the results of the 2011 survey of the Ahiak caribou herd. Also, some goals are misleading and results overstated. For example, the claim of 8% deflection rate away from roads based on the 2012 camera data is most likely too low. The camera has a small field of view. If caribou turn away before they get very close to the road, the camera would not see them.

Progress has been slow in finding other ways to check on caribou and the mines.



Grizzly Bear

Camera and behaviour studies may not be doing a good job of finding out about movements across the mine area.

Recent land use work shows that a road traffic plan is needed for less wildlife disturbance. We agree that the Ekati Mine has a good record for avoiding vehicle-caribou crashes. We think, however, that the current driving rules worry only about physical injury to caribou. These rules do not help with caribou behaviour. They do not help make roads seem less like barriers. This changes the way caribou move around and may limit access to their usual spaces. Wildlife policies and DDEC rules about caribou and roads are unclear at best. We look forward to development of a full road traffic management plan.

Wildlife Monitoring and Management

Workshops held by Environment and Natural Resources in 2013 talked over rules for monitoring programs:

- Standard ways to sample. Include the time when it should be done;
- Develop exact ways to test and judge mitigation methods;
- Decide what should trigger a new look at zones for monitoring. New road? Large fire? Change in operations?;
- Share data and study details; and
- Data from one study must work with other data. This can give a larger picture.

The job of setting monitoring rules rests with Environment and Natural Resources. ■



Esker near Jay Pipe

Highlights:

- **Lynx Project to add five months of mine production using mostly existing facilities.**
- **Jay-Cardinal Project to add about 15-20 years of life to the mine but Cardinal Pipe dropped from original proposal.**
- **Concerns with impacts to caribou, water, and fish.**

Lynx Project

The Lynx kimberlite pipe will be the eighth open pit mine on the property. It is close to the existing Misery Pit (Figure 1). Mining of Lynx will use much of the existing Misery roads and infrastructure. Lynx will also need:

- New 1 km access road plus improvement of the winter access road.
- A bigger Misery Waste Rock Storage Area.

- fish out and empty water from Lynx Lake.
- Minewater pipeline to King Pond.
- Possible run-off water structures around the open pit

DDEC thinks the Lynx expansion will take two years to build. It will provide about five months of ore for the existing processing plant.

The Wek'ëezhii Land and Water Board prepared a combined water licence and a separate land use permit for the project.

Lynx and Jay-Cardinal Expansion Projects

Jay-Cardinal Project

The proposed Jay-Cardinal expansion would be much larger than any earlier expansions. The Jay and Cardinal Pipes are under the water of Lac du Sauvage. This is a large lake that flows into Lac de Gras, east of the Misery Pit. The first proposal called for:

- A large dyke;
- Handling large volumes of water;
- Lowering the lake surface by about 10 m;
- Altering the natural flow of water; and
- Building over 40 km of new roads.

The project has been referred to the Mackenzie Valley Environmental Impact Review Board for an environmental assessment.

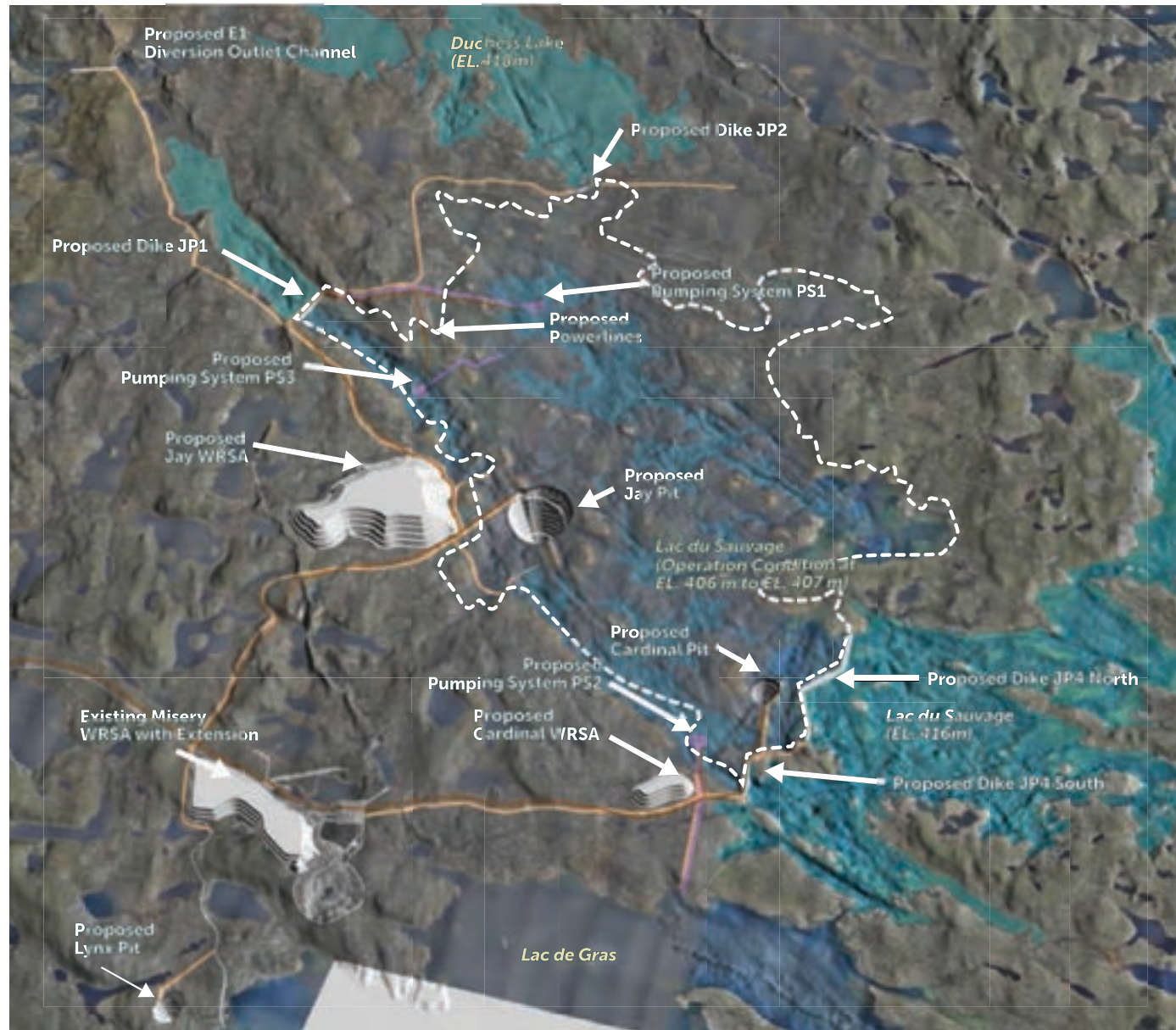
As of early May 2014, DDEC has proposed to withdraw the Cardinal Pipe from the expansion plan. This greatly reduces the area of lake involved. It also means fewer dykes are needed. The number and length of roads would also be reduced.

The Jay Pipe is located in shallow water near the western shore of Lac du Sauvage. It would need a 5 km horseshoe-shaped dyke to separate the pipe from the main body of water. The dyked area will then be fished out. The water would be removed, and the space would be prepared for open pit mining. The life of the mine will be about 18 years. This means 10 years of open pit, then 8 years of underground mining. DDEC states it will submit the Developer's Assessment Report in the fall of 2014.

Agency Assessment

During the Lynx Project hearing, we raised concerns about caribou and roads, and water. Lynx will add a lot of traffic to the roads. This will increase noise and dust. We noticed that much wildlife data from the past 16 years of monitoring was not used in the review material. For example the caribou and grizzly bear collar data was left out. The Jay Project also will add a lot of traffic to the Misery Road for a long time. The wildlife policies and DDEC

Figure 2: Ekati Expansion Project



Note: Dotted line shows the original outline of the lake before being drained by 5-7m

site rules about caribou and roads are not clear. Different responses are needed according to caribou group size, location, and behaviour. Are road design and traffic management good enough to protect caribou behaviour and movement? Monitoring data should be fed back into *adaptive management*.

Our greatest concern about water was the proposed pumping of sump water from Lynx Pit to Desperation Pond. Then it would be sent to Carrie Pond and beyond into Lac de Gras. We felt that this type of discharge would need new *Effluent Quality Criteria*. In the end, DDEC decided to pump sump water directly to the King Pond, an existing settling facility for the Misery Pit, instead of Desperation Pond.

Many of the concerns raised during the Lynx hearings will be greater in the proposed Jay Project. Main areas of concern are caribou, water, aquatic life and alternatives for development. The Jay Project would extend the Ekati Mine footprint farther to the east. This would make more possible barriers to north-south moves of caribou and other animals. The proposed Jay waste rock pile would be next to the main north-south esker in the area. This esker is an obvious route for wildlife movements through the Lac du Sauvage – Lac de Gras region.

Taking the Cardinal Pit out of the proposal should greatly reduce some negative impacts from the development. We will review the revised project in the months to come. We will continue to take part in the environmental assessment. ■



Bathurst caribou herd workshop

Highlights:

- ENR has begun a range plan for the Bathurst caribou herd. ENR also held a regional wildlife monitoring workshop for the Slave Geological Province.
- Little progress from AANDC and GNWT on best practices for caribou protection. This was recommended by the WRRB in 2010.
- Cumulative Impact Monitoring Program is focused on caribou, fish and water. Purpose and use of information not clear.

Regional Monitoring and Cumulative Effects

Activities 2013-14

Looking at a whole region helps you to see how impacts are adding up.

GNWT Department of Environment and Natural Resources hosted a Slave Geological Province Regional Wildlife Monitoring Workshop in November 2013. We took part as did people from the diamond mines. We talked about rules for wildlife monitoring. With standards, data collected can be used better.

Environment and Natural Resources also held two workshops on developing a Bathurst Caribou Range Plan. From these workshops, a steering committee was formed. The committee will oversee working groups and ensure communications. We will check on this work and help when we can (Figure 1).

The Wek'ëezhii Renewable Resource Board recommended in October 2010 that Aboriginal Affairs and Northern Development Canada and Environment and Natural Resources work together to set rules for not bothering caribou during and after calving. No progress was made on this work in 2013-14.



Agency site visit

The Cumulative Impact Monitoring Program should give information on the overall state of the Mackenzie Valley. Cumulative Impact Monitoring Program staff moved over to the new GNWT Lands Department on April 1, 2014. Caribou, fish and water were set as priorities for Cumulative Impact Monitoring Program. We are not sure if the goals of Cumulative Impact Monitoring Program are being met. Does the work have any relevance to cumulative effects for the Ekati Mine? ■



Willow Catkin

Highlights:

- Company senior management has been visiting Aboriginal communities.
- Community-based Traditional projects are still funded by the company.
- Details of a Traditional Knowledge workshop on re-planting for reclamation was reported.
- No reports of how Traditional Knowledge is being used at Ekati were received in 2013-14.

Traditional Knowledge and Community Engagement

Activities 2013-14

Community-Based Traditional Knowledge Projects

Kitikmeot Inuit Association: *Content Development for the Naonayaotit Traditional Knowledge Project Publication*. This was completed in June 2013. Written materials were developed using Naonayaotit Traditional Knowledge for community groups, elders, visitor centres and schools.

Tłı̨chų Government: *Tłı̨chų Digitizing Tapes & Database Project*. This was completed in June 2013. Harvesters and elders' stories were recorded. The Traditional Knowledge data base is managed with new technologies. Important Traditional Knowledge data are kept on a computer in the Tłı̨chų Land Protection Department.

Yellowknives Dene First Nation: *Goyatiko Language Society Proposal for Digitization of Elders Stories*. This was completed in November 2013. Traditional Knowledge was recorded and kept on a computer.

Lutsel K'e Dene First Nation: *Traditional Knowledge Archive Project-Phase 3*.

The project makes a full and useful collection of traditional knowledge.

North Slave Métis Alliance: *Community Heritage Project*. This project is ongoing. It is about family trees. It also includes sorting the North Slave Métis Alliance archives. Workshops were also held to develop a definition of 'Métis community.'

Ekati-based Community Engagement Programs

Air Quality Community Engagement Program. June. Communities were shown how mine staff check the air each day. There was some hands-on learning. They also heard about keeping road dust down.

2013 Grizzly Bear DNA Community Engagement Program. June – August. About grizzly bears – how many and where? Also, to teach youth about Ekati programs that check on the environment. North Slave Métis Alliance members helped find good places for the grizzly bear DNA plots.

Caribou Monitoring Community Engagement Program. July, September. People from Kitikmeot Inuit Association and Yellowknives Dene First Nation told DDEC about how they view caribou on the land. They worked to develop ways for Aboriginal knowledge and science to work together in monitoring caribou.

Jay Pipe Archaeological Baseline. September. Community people helped in the archaeological assessment of the north area of Lac de Sauvage. Are there any more special or old community places in the proposed Jay Pipe area?

Reclamation Research Planning

A Reclamation Research Plan for mine *closure* was put together to try to include Traditional Knowledge. The goals are to find places where Traditional Knowledge can be part of the plan and to find ways to get Traditional Knowledge input from communities.

In 2013 DDEC hosted a two-part plants workshop. It was to find plants that:

- Will grow best near the mine;
- Will cover the land well;
- Are safe for wildlife and humans; and
- Will grow back again every year.

This information would then be used in future *reclamation* research.

Part one was a Community Vegetation Advisors Workshop. Local organizations picked people who knew a lot about plants. They helped plan the Reclamation Vegetation Workshop held at the Ekati Mine in August.

The second workshop brought together the Community Vegetation Advisors, elders, youth, DDEC *reclamation* staff, and other experts. Topics included:

- How to identify plants;
- Using plants for medicine and other things;
- How to harvest plants;
- Plants used by Aboriginal communities and
- Plants eaten by birds and animals.

Traditional Knowledge advisors gave these talks:

- Johanne Black, Yellowknives Dene First Nation on the Colomac Mine *reclamation*;
- Terri Enzo, Łutsel K'e Dene First Nation on how to collect and use spruce gum as medicine; and
- Kate Inuktalik, Kitikmeot Inuit Association showed how Inuit collect plants and how to build a fire on the tundra using local plants.

The workshop also included site visits to:

- Local tundra areas. People walked on the land. They talked about the plants and their spiritual importance. Locations included Polar Lake, shore of Lac de Gras and Thinner Esker;
- The Fox open pit. They talked about ideas for flooding pits and building shore zones;
- The Long Lake Containment Facility. They talked about the natural growth of salt-loving grass on *tailings*;
- The Cell B *reclamation* Pilot Study; and

- The Pigeon Stream Diversion channel planting site.

DDEC Literature Reviews

In December 2013, DDEC delivered to the Wek'ëezhii Land and Water Board a report called 'Review of Past and Current Traditional Knowledge Projects'. It told about all of Ekati's TK and community activities relating to *closure*. It promises to use Traditional Knowledge methods to keep caribou from danger. However, it does not explain what Traditional Knowledge has been or will be used in mine activities and *closure* planning.

DDEC also hired a consultant to look at reports from other *reclamation* projects in Northern Canada that have used Traditional Knowledge. 33 remediation projects were looked at. They found these best ways to use Traditional Knowledge in *closure*:

- Set up an Aboriginal Advisory Group. They will use Traditional Knowledge, get community input, check on remediation actions, and tell people about the project. Define roles clearly;
- Work with the Aboriginal communities;
- Provide money and resources (a) to fill Traditional Knowledge data gaps and (b) for people taking part in *closure* planning;
- Provide regular site visits for community people;
- Set Traditional Knowledge limits early in remediation planning;
- Provide ways for the Aboriginal community to take part in choosing remediation plans; and

- Community work should happen openly during the whole *closure* planning process.

Agency Assessment

DDEC has its senior managers meet in communities to tell people about the mine and monitoring. This is a good approach. It lets the top managers hear directly from community people.

We commend DDEC for holding a good plant workshop with the Aboriginal Society Members. Information that is still lacking is how plants grow in disturbed areas, the names of plants in the Aboriginal languages, and how we know that revegetation of a disturbed area has been a success.

The Agency recently received community engagement reports on some of the site visits by community people.

DDEC did a good job reporting on specific Traditional Knowledge gathered during the workshops and community visits, but the company also needs to report on:

- How the information was gathered during these events;
- How this information will be incorporated into monitoring and management programs at the Mine; and
- How this information will be incorporated into the *closure* plan for the Mine.

We encourage the company to continue finding ways to better use Traditional Knowledge in its work. ■



Main Camp at Ekati Mine

Highlights:

- DDEC continues to operate Ekati in an environmentally sound manner.
- Incinerator works and works well.
- Agency concerned with poor quality of information on the Lynx and Jay-Cardinal applications.

How is Dominion Diamond Ekati Corporation Doing?

The most important thing we can say is that Dominion Diamond Ekati Corporation (DDEC) still runs Ekati in an environmentally sound manner. This is the same message as we have given for years. Most staff are the same as before the sale of the mine. Our working relationship with them and with new staff at DDEC remains very positive.

We still have some concerns about the work being done. We are still concerned with the slow work on *reclamation* research. However, some of that research seems very helpful (like the water quality model).

We talked with DDEC about needing very good work on applications for Lynx and Jay Pipes. We found, however, that the quality of work was less than suitable. We really hope the quality will improve on future submissions. If it does not, the regulatory process will take a long time.

We are worried that some *waste rock* piles are not freezing. We have urged DDEC to study what is happening. Then a plan could be made to fix the problem.

We have urged that financial security be posted for the water licence and DDEC to submit a proposal for financial security to be posted under the

Environmental Agreement. This action is long overdue.

We had spoken about slow *progressive reclamation*. Last year the Panda Diversion Channel was made wider. A good plan for fixing up Old Camp was made and is being acted on. We are very pleased.

We wrote a strong letter of support for DDEC's application for a Mining Association of Canada award. We praised the grizzly bear research being carried out. Last year we also mentioned the strong leadership of DDEC in doing this work.

One of our long term complaints was that the new incinerator was not working well at Ekati. We are pleased to report that it is now working. Based on tests, it seems to be working very well. This good performance is, in part, due to the use of fewer plastics.

One of the most important improvements was the greater level of DDEC's work with communities. Senior managers have been visiting the communities every few months to talk about the proposed expansion projects. There have also been Traditional Knowledge workshops. This is a very positive sign from the company. ■



Regulator Site Visit

Highlights:

- Financial security required by the water licence has still not been posted.
- Consultations on the proposed changes to the *Environmental Agreement* were not well conducted.
- Inspections and water resources staff have moved over to GNWT.
- WLWB did a good job on Lynx Project, but will be closed down in 2015 due to changes in federal laws.

How are the Government Regulators Doing?

The Regulators and Our Mandate

As the public watchdog for environment management at Ekati, we watch not only the mine operator, but also the government agencies that regulate the mine. Here are our comments on how the regulators did in 2013-14.

Agency Assessment

The regulators are still good at making sure that the company runs an environmentally sound mine. During 2013-14, we found some times where we felt that regulators did well and some where they could have done better. We were happy they were willing to work together.

Aboriginal Affairs and Northern Development Canada

We welcomed a new inspector for the Ekati Mine. We are pleased to report that regular inspections are back. The

AANDC inspector for Ekati has been thorough and effective, as in past years.

AANDC staff were busy with the Lynx water licence process, Pigeon Waste Rock Pile design review and other reviews. They gave good technical advice to the Wek'èezhii Land and Water Board on water issues. We commend the staff.

A couple of areas of disappointment with Aboriginal Affairs and Northern



Regulators visit Fox Pit



Regulator Site Visit

Development Canada need to be raised. The problem of the large gap between financial security held and that required has not been solved. The proposed changes to the *Environmental Agreement* as a result of Devolution went well beyond what we expected. These changes may be bad for the Agency's mandate. We believe AANDC can and should have done more to consult the Agency and our Aboriginal Society Members about the proposed changes.

Department of Fisheries and Oceans

There has been a complete change of Yellowknife Fisheries and Ocean staff who are responsible for Ekati. We have met the new staff. It's good

that they are willing to talk about Fisheries and Oceans new and smaller role as well as how changes to the *Fisheries Act* will be handled in NWT.

Fisheries and Oceans has given some useful comments on some of the papers sent in by DDEC. We hope this will continue.

Government of the Northwest Territories, Department of Environment and Natural Resources

In the last year Environment and Natural Resources has started to make stronger comments on some of DDEC's reports. This is good news as changes are made as a result of Devolution. We expect to make a more full report in

next year's annual report on how GNWT is doing with its new responsibility.

Environment Canada

Environment Canada still gives technical advice on air and water quality. Its input over the last year was less than it was before. We have not been told of any change to rules for waste water from diamond mines. Environment Canada is reviewing the incinerator smokestack tests. We look forward to their advice.

Wek'ëezhii Land and Water Board

We were satisfied with the water licence and land use permit process that the Wek'ëezhii Land and Water Board put in place for the Lynx Project. We were pleased that the Wek'ëezhii Land and Water Board staff did a careful review of the data from the company. They found some problems that were later explained or corrected. We will report on the final outcome next year.

We are still waiting for clear rules about the level of detail in management plans. We urge more work on what supporting documents are needed for the Water and Effluent Quality Management Policy.

We are sorry that the issue of financial security under the water licence has still not been resolved. We understand that land and water boards may have new tools to ensure rules are followed in the future.

We are very sorry to report that the Wek'ëezhii Land and Water Board will be closed down as of April 1, 2015. The Mackenzie Valley Land and Water Board will take on its responsibilities. ■

Acronyms

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

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

DDEC – Dominion Diamond Ekati Corporation

DNA – deoxyribonucleic acid

ENR – Department of Environment and Natural Resources (NWT), previously known as "Department of Resources, Wildlife and Economic Development (RWED)"

GNWT – Government of the Northwest Territories

MVLWB – Mackenzie Valley Land and Water Board

WLWB – Wek'ëezhii Land and Water Board

WRRB – Wek'ëezhii Renewable Resources Board

Agency Recommendations 2013-14

Recommendation 1

The Agency recommends that the Government of the Northwest Territories ensure that the security posted by DDEC meets the requirements of the Water Licence no later than July 1, 2014.

Response: The GNWT is currently reviewing the security being proposed by DDEC to meet the requirements under the water licence. It is anticipated

that the review and formal security documentation will not be finalized until end of summer 2014.

Recommendation 3

The Agency recommends that DDEC develop a comprehensive road traffic management plan to reduce wildlife impacts (mortalities and sensory disturbance). The plan should include road design, speed limits, traffic volume caps, triggers for action, driver education, and monitoring and reporting.

Response: A new land use permit was issued in April 2014 by the WLWB for the upcoming Lynx Project, and this Permit provides for WLWB approval of road design for caribou crossings and reporting to the WLWB on road traffic

related to speed limits and other wildlife protection measures. This work for the Lynx Project can subsequently be used when considering road design and traffic reporting for other areas of the Ekati Mine.

Recommendation 2

The Agency recommends that DDEC submit a proposal for the financial security review under the Environmental Agreement no later than July 1, 2014.

Response: DDEC has been working closely with the GNWT and AANDC to identify a process and timeline to review the security held under the

Environmental Agreement. DDEC and the governments will work in *consultation* with the Agency as described in the *Environmental Agreement*.

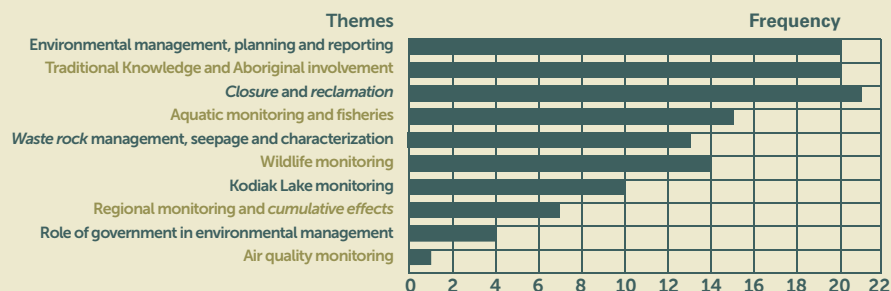
Recommendation 4

The Agency recommends that DDEC investigate and report on the cause of the lack of freezing in the Fox and Misery Waste Rock Piles, identify any closure implications and develop appropriate contingency plans.

Response: In March 2014, the WLWB approved the Ekati Mine's 2012 'Waste Rock and Waste Rock Storage Area Seepage Survey Report'. In its approval, the WLWB required that DDEC provide more information to the WLWB about permafrost growth in the Ekati Mine waste rock storage areas and plans

for the post-closure period. DDEC intends to provide this information to the WLWB by the end of September 2014 along with other related and requested information. All of that information will be available through the WLWB's public registry and from DDEC directly.

Figure 1: Agency Recommendation Themes 1997-2014



Recommendation Recipient	Recommendations
DDEC (formerly BHPB)	91
Government (GNWT, Government of Nunavut, Government of Canada)	16
Water Boards (NWT Water Board, MVLWB, WLWB)	9
Environmental Agreement signatories	3
Aboriginal Society Members and DDEC	3
Aboriginal Society Members	1
All Agency Society Members	1
Total	124

Glossary

Adaptive Management – Learning from environmental monitoring results and using the results to change and improve operations and monitoring.

Closure – Act of ceasing mining, processing and other production activities (final closure of the mining operation).

Consultation – (i) The party to be consulted has enough notice on a matter to allow for the party to prepare its view on the matter. (ii) Opportunity to present these views to the decision making body. (iii) Full and fair consideration be given to any party that presents their views to the decision making body.

Contaminant – A substance not naturally present in the environment or present in amounts that can negatively affect the environment.

Cumulative Effects – Environmental changes or impacts from past, present and future human land use activities (e.g., exploration and mining) combined with natural factors (e.g., fires, climate change).

Devolution – A transfer of responsibility from the federal government to a provincial or territorial government.

Dioxins and furans – A type of organochlorine that can cause cancer and other health problems. A group of chemicals that mainly come from the burning of waste.

Effluent – Wastewater that flows into a receiving body of water.

Environmental Agreement – Signed by BHPB and the federal and territorial governments in 1997 to provide environmental monitoring for the Ekati Mine not covered by other licences and permits. The Tłıchǫ Government, Akaikcho Treaty 8 First

Nations (LKDFN and YKDFN), KIA and NSMA were involved in the negotiations.

Financial Security – Money that is required for the reclamation of the mine.

Hydrocarbons – Elements made of only hydrogen and carbon. Hydrocarbons are found in oil products.

Kimberlite – A rare type of rock rich in iron and magnesium that sometimes contains diamonds. Created deep below the earth's surface, kimberlites are usually found in long pipe-shaped forms.

Nitrate – A nutrient formed from nitrogen. Nitrate can affect the growth of baby fish.

Processed Kimberlite – The crushed rock and water mixture that is left over after kimberlite ore has been processed by the mill to collect diamonds. Also called "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). See also "Reclamation".

Reclamation – The process of returning areas of land and water to healthy ecosystems after being disturbed by mining or other human activities.

Tailings – See "Processed Kimberlite".

Total Suspended Particulates – Portion of dust released into the air that remains in the air.

Waste Rock – Rock that must be removed to access kimberlite pipes, or rock that contains diamonds but that is not worth mining or processing.

Wastewater – Water that contains wastes from the mining process (e.g., sewage and chemicals from explosives).



Jay Pipe—o

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Pipe

PLAIN LANGUAGE ANNUAL REPORT 2013-14

A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE



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