



Independent
Environmental
Monitoring Agency

PUBLIC WATCHDOG OF EKATI DIAMOND MINE

2022-23 ANNUAL REPORT

Independent Environmental Monitoring Agency

A PUBLIC WATCHDOG FOR
ENVIRONMENTAL MANAGEMENT
AT EKATI DIAMOND MINE



Message from the Chair



I am pleased to present the 2022-23 annual report of the Independent Environmental Monitoring Agency. This report summarizes our activities over the past fiscal year and provides an assessment of how environmental management programs are being conducted at the Ekati Diamond Mine.

It has been 25 years since the Monitoring Agency was established and 25 years since Ekati began operations. Much has changed from the early years of open pit mining the centrally-located 60 million-year-old Panda and Koala kimberlite pipes. Over the ensuing years, operations have expanded to include six additional open pits and waste rock storage areas, two underground mines and over 140 kilometers of roads.

The current life of mine plan suggests that operations at the Ekati mine could end as early as 2029 unless new sources of kimberlite are found

and developed. In an effort to extend the life of the mine, over the next three years Arctic Canadian Diamond Company (Arctic Canadian) is planning to undertake Canada's first commercial-scale test of remote underwater mining to extract kimberlite from the deep extent of the completed Lynx pit. The Agency looks forward to learning more about this technology and working with the company and regulators as planning continues and on-site testing starts.

The recent completion of mining at the Pigeon Pit and anticipated completion of mining at the Sable Pit and Misery

Underground in 2025, leaves the new Point Lake Pit as the single source of kimberlite for the processing plant through to 2029. While underwater remote mining shows promise for extending operations, the current life of mine plan demonstrates the practical need for mine closure planning to proceed with a reasonable measure of haste.

Events last year also demonstrated what can be achieved when Arctic Canadian, regulators and Indigenous governments and organizations work together. Using this approach, a reasonable

compromise for the Point Lake waste rock storage area design was achieved that is expected to reduce the effect rock and overburden piles have on caribou movement along the Lac du Sauvage isthmus. Continuation of incorporating Traditional Knowledge into operational decision-making in this manner is strongly encouraged.

I welcome you to review this report and contact us if you have any questions, comments or concerns about Ekati, or if you wish for us to visit your community.



Emery Paquin
Chairperson



*Sable road leading to Sable pit and Two Rock Sedimentation Pond, 2018
- photo courtesy of Ekati Diamond Mine*

Executive Summary

Current activities, exploration, and future mining

Acronyms

URM = Underwater Remote Mining

CRMP = Caribou Road Mitigation Plan

WRSA = Waste Rock Storage Area

WLWB = Wèk'eezhii Land and Water Board

ARF = Aquatic Response Framework

LLCF = Long Lake Containment Facility

CRP = Closure and Reclamation Plan

GNWT = Government of the Northwest Territories

The Agency = Independent Environmental Monitoring Agency

Arctic Canadian = Arctic Canadian Diamond Company Ltd

For a full list of definitions and acronyms, please see Appendix C.

Ore production continued at Ekati mine with no COVID-19 related interruptions. In April 2022, Pigeon Pit completed open pit mining after 8 years of operation.

Ore continued to be mined from Sable Pit and Misery Underground for the remainder of the year. Mining at Sable and Misery pits is scheduled to be completed at the end of 2025. Point Lake dewatering began in 2022 and will be continued in 2023. Point Lake overburden excavation is scheduled to begin in 2023 with open pit

mining starting in 2025 and completing in 2029.

Exploration resumed in the summer of 2022 as Arctic Canadian drilled exploratory holes near the Sable Pit and west of the Misery Pit.

Arctic Canadian is testing the use of Underwater Remote Mining

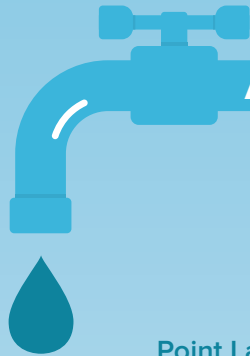
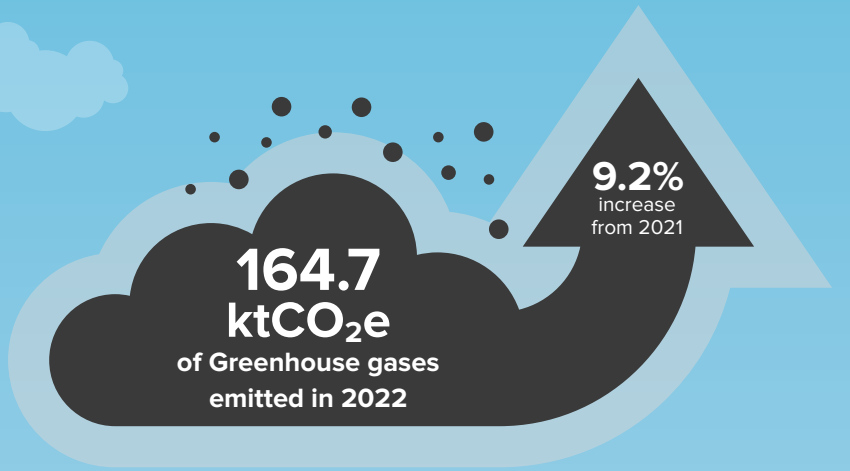
(URM) technology to extend Ekati's mine life. A test run of the URM crawler is scheduled for 2024 in the Lynx Pit. If successful, Arctic Canadian plans to use the technology to extract ore from existing open pits (Pigeon, Sable, and Fox pits). The trial run at Lynx Pit is expected to produce 300,000 tonnes of kimberlite ore over 100 days.



Fresh water

for Ekati accommodations comes from Grizzly Lake

67,000 m³
Used



AMOUNT WATER DISCHARGED IN 2022

Two Rock Sedimentation Pond to Horseshoe Lake



61,000 m³

Point Lake to Lac du Sauvage



4.2 million m³

Amount of **WASTE ROCK PRODUCED**



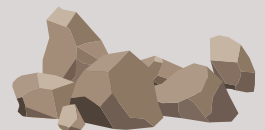
20.4 MILLION

wet metric tonnes in 2022



(Compared to 16.7 million wet metric tonnes in 2021)

Amount of **ORE PRODUCED**



3.8 MILLION

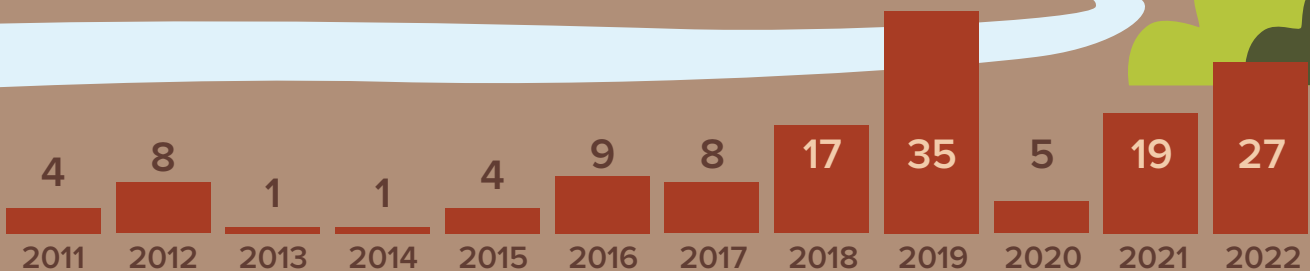
tonnes in 2022

(Compared to 3.5 million tonnes in 2021)



GRIZZLY BEAR INCIDENTS

interactions and observations of bears on site and near mine infrastructure





Caribou on road - photo courtesy of Ekati Diamond Mine

Wildlife

The WEMP, or Wildlife Effects Monitoring Program, documents wildlife presence and wildlife management responses at the Ekati mine. It includes information related to habitat use, incidental and systematic observations, and monitoring and management actions. Many of these activities are required under the Caribou Road Mitigation Plan (CRMP).

The Agency continues to be concerned with the lack of data integration. Combining datasets would provide a more complete picture of caribou distribution. This could help improve the effectiveness of current monitoring techniques.

Barriers to Wildlife Movement

An evaluation should be completed to determine the potential barrier effect of roads

due to sensory disturbance (traffic, noise, smell, dust) or other factors. To answer some of these questions, Arctic Canadian has started a telemetry study to examine collared caribou movements in relation to the mine's footprint and surrounding area. We are waiting on the initial results of this study.

The Agency believes one of the main sensory disturbances

to caribou movement is from vehicles on the roads. The Agency has repeatedly recommended to monitor traffic on the roads to help improve caribou monitoring and mitigation. In 2022, Arctic Canadian used remote cameras to capture traffic data. The Agency is glad this information is being collected and looks forward to the results.



Aquatics

Each year, monitoring programs are conducted at Ekati to determine if there are changes to the downstream aquatic environment and if they are caused by mining activities.

There are four watersheds which may be affected by mining operations: Koala, King-Cujo, Pigeon-Fay-Upper Exeter and Horseshoe. The Aquatic Effects Monitoring Program (AEMP) is an effective program for monitoring changes in the aquatic environment of lakes and streams downstream of the Ekati mine. Information collected through the AEMP helps detect changes and trends in:

- water and sediment quality,
- bugs, worms and snail communities living on lake bottom,
- tiny bugs and tiny one-celled plants in lake water,
- as well as fish populations and fish health.

Changes in water quality were detected in Ulu Lake in

the Horseshoe watershed, downstream from the Sable Pit and Waste Rock Storage Areas (WRSA). Water quality monitoring showed increases above the baseline in the past 3 years. It seems likely that the west Sable WRSA could be the source of these changes.

Exceedances

The Aquatic Response Framework (ARF) is a part of the AEMP. It is an “early warning system” that alerts Arctic Canadian and regulators of potential upcoming negative effects to lakes and streams downstream of the mine. The ARF establishes concentrations of water quality parameters that if reached need to be acted on to ensure they don’t increase to levels that can cause harm to aquatic life.

There were 3 water quality exceedances in 2022-23:

- chloride,
- potassium, and
- nitrite/nitrate.

There were also changes in lakewater bug and plant communities beyond pre-mining condition in the Koala and King-Cujo watersheds. Through the Fish Response Plan, Arctic Canadian is looking into the 2018 exceedance of Health Canada guidelines for mercury in fish in Kodiak Lake. The Agency is glad to see Arctic Canadian, through direction by the **WLWB** (Wèk’eezhì Land and Water Board), is now looking into this concerning exceedance.



Vegetation near the LLCF - 2022 site visit

Air Quality

The Air Quality Monitoring Program outlines how ambient air quality is monitored at the Ekati mine. The program includes monitoring meteorological conditions (temperature, wind and precipitation), air emissions and dustfall.

Overall, the ambient air quality remains good at Ekati and Arctic Canadian reports no air quality variables that exceeded standards. The Agency notes however, there continues to be very high dustfall levels near the Misery and Sable haul roads. A commercial dust suppressant called EnviroKleen was applied to areas near the camp and airport. Water was used to

suppress dustfall along the main haul roads. The Agency recommends Arctic Canadian use EnviroKleen or a similar commercial dust suppressant on all haul roads.

In April 2023, the GNWT adopted the Ambient Air Quality Monitoring Guideline. This guideline outlines best practices for monitoring air

quality that would be applied through all operational phases of diamond mines. Arctic Canadian's existing Air Quality Management and Monitoring Plan (AQMMP) was last updated in 2009. The Agency recommends the AQMMP should be updated to reflect the best practices outlined in the new Ambient Air Quality Monitoring Guideline.



Directors along Point Lake access road - 2022 site visit

Waste Rock Management

Rock that does not contain diamonds and has been mined from a pit to access kimberlite ore is classified as waste rock. This material is trucked from the pit to large piles called waste rock storage areas (WRSA). These rock piles will remain as permanent structures on the landscape after mining is completed.

There are currently six WRSA's at Ekati mine and one more, Point Lake, scheduled to begin development in 2023. In 2022, Arctic Canadian deposited 21.7 million tonnes of waste rock in four WRSA locations.

Geochemical testing

The Agency is pleased that after many years of encouragement,

progress is being made on the complex issue of waste rock management. Arctic Canadian has updated their testing methods to improve their ability to predict the potential long-term effects of acidic runoff containing metals draining from the Waste Rock Piles to the natural environment. These are positive steps. Sampling and

monitoring efforts must continue to improve to increase the accuracy of prediction models.

Point Lake WRSA Design

Planning for the development of the Point Lake WRSA started in 2022. There are 2 important differences with waste rock from Point Lake compared to other pits. It is almost all metasediment,

and it has a greater potential to produce acidic drainage and leach metals. It is predicted the seepage from this waste rock has a higher risk and must be collected and managed before entering the surrounding environment.

The Point Lake WRSA Design Plan and Seepage Prediction Report was submitted to the WLWB in August 2022. However, the plan was not approved. It was determined that the seepage from the rock pile would require ongoing collection and treatment long after closure is complete. Arctic

Canadian is required to resubmit a design that demonstrates the rock piles do not need long-term active care. An approved Plan is required before Arctic Canadian can start digging the pit and building the rock pile.

Seepage Management

Water that contacts waste rock or drains from WRSAs is referred to as seepage. When the quality of the seepage does not meet acceptable criteria, it must be managed. Mitigation measures are then taken to reduce any potential risks to the adjacent environment. There were 32 seeps collected and

analyzed in 2022 compared to 51 seeps in 2021. This year, Arctic Canadian did not scan for seeps of potential concern because updates are being made to the methodology.

A new conceptual approach – the Seepage Response Framework – is designed to use land-based quality objectives to better protect the surrounding environment that seeps may enter. The Agency believes this new approach is a positive step in managing waste rock seepage and looks forward to reviewing the Seepage Response Framework when it is submitted.



Tundra vegetation near the mine - 2022 site visit





Tundra road interface - 2022 site visit

Wastewater and Processed Kimberlite

Arctic Canadian is authorized to discharge water into lakes from specific locations at the Ekati mine only if the water meets its Water Licence's Effluent Quality Criteria.

In 2022 Arctic Canadian discharged water from two locations:

- 61,000 m³ from Two-Rock Settling Pond (associated with the Sable Pit mine-water) and
- 4.2 million m³ from Point Lake (for dewatering).

To begin development of the Point Lake Project, Arctic Canadian must first remove

the water from Point Lake. Arctic Canadian completed Stage 1 of dewatering from July-September 2022. The November water quality report (Surveillance Network Report) showed that Water Licence limits for sediment suspended in water was exceeded 3 times in September. Arctic Canadian did not immediately notify the WLWB and the Inspector following the exceedances as required in the Water Licence.

The Agency is concerned with Arctic Canadian's handling of the exceedances and expects that future incidences will be better communicated to the authorities (WLWB and Inspectors), communities and the Agency.

Water Use and Fine Processed Kimberlite Management

The process plant uses water from the Long Lake Containment Facility (LLCF) to process the diamonds. In recent years,



Directors walking along the Jay Esker, between Misery and Point Lake operations - 2022 site visit

most of the process plant slurry (contains both water and processed kimberlite ore) has been pumped to the mined-out pits (Panda and Koala pits). This is leading to a water shortage in the LLCF since the water being pumped out is not replaced. As a result, in their current Water Licence renewal application, Arctic Canadian has requested authorization to use fresh water from Upper Exeter Lake to meet future water demands on site. This will lead to more mine impacted water that will need to be managed onsite at closure. This also increases site liability. The Agency understands the importance of having water available for processing but

is concerned with the use of additional freshwater.

Management of Tailings Dams

The LLCF currently holds the majority of mine tailings and mine impacted water. There is a frozen core dam at the end of the facility and many internal dams that provide additional tailings containment. The current Water Licence renewal application is discussing the classification of these structures. Dams have a high level of studies and regulatory requirements to protect against dam failure.

Strict dam classification assessments, including

inundation studies, are used to determine risk of failure. Arctic Canadian has not completed these studies for the LLCF. According to the Canadian Dam Association guidelines, the LLCF and its internal containment structures should be classified as dams. The Agency is concerned that the current approach to management of the LLCF and its associated tailings dams is not consistent with current best practice for management of tailings dams. Without thorough dam classifications, such as inundation studies, we do not fully understand the risks associated with the tailings containment facility.



INUNDATION STUDY: An engineering analysis to evaluate the downstream consequences that could arise from dam failure.



Closure and Reclamation

Closure Planning Progress and Status

Closure planning is an important piece of mine planning. When mining is complete at Ekati, a well-developed and comprehensive Closure and Reclamation Plan (CRP) is required. This ensures closure and reclamation activities are implemented effectively. As mining progresses, it becomes more important to have a complete CRP in place. Based on the current life of mine plan, operations at the Ekati mine are expected to continue until 2029. Arctic Canadian's most recent CRP was submitted December 2022 but was rejected by the WLWB due to the lack of detail and progress on key closure plan components. The Agency is concerned with this

lack of progress but remains hopeful that with the WLWB's clear direction, the upcoming CRP submission will provide a meaningful step forward towards a comprehensive CRP.

Progressive Reclamation

Arctic Canadian did not undertake any significant progressive reclamation activities in 2022. The Agency notes there are inactive facilities at the site and progressive reclamation has not been undertaken.

In January 2023, Arctic Canadian submitted back-flooding plans for the Pigeon and Fox pits with the goal of making them lakes. This is a significant step in progressive reclamation at the Ekati mine. The

Agency supports progressive reclamation as an effective method to address environmental effects associated with mining activities, allows for lessons learned to be applied to future reclamation, and reduce closure liability. However, the Agency is concerned about starting major reclamation activities before a clear vision of what the mine site is to look like following closure. Without closure objectives and criteria, uncertainty will exist about whether the closure plans, such as the proposed back flooding plans, will achieve the final long-term vision for local land and water use.

Progressive reclamation was conducted at Old Camp from 2014 to 2018 under a separate Old Camp closure plan. Arctic

Canadian has stated however, that it does not intend to relocate all the processed kimberlite material as described in the plan. The Agency believes that if Arctic Canadian intends to leave the processed kimberlite in place, it has to seek approval for a revised closure plan for this site. A revised plan must include an evaluation of potential long-term effects of leaving processed kimberlite in place in the North Pond portion of Old Camp.

Financial Security

To manage public liability and risk, at any point in time the GNWT needs to hold financial security equal to the total estimated cost to close and reclaim the Ekati mine.

In November 2022, GNWT requested a security adjustment after completing a review of the existing liability. This was the first site-wide review since 2014. The Agency commends GNWT for initiating the review and request for security adjustment.

As of December 31, 2022, the security adjustment for the Ekati mine is approximately \$292.6 million held mostly under the Water Licence. This includes approximately \$20 million held for the Ekati Environmental Agreement.

A major outstanding issue is the cost to build and maintain a winter road to the mine. This cost is currently not included in the security estimate.

Traditional Knowledge and Community Engagement

Many concerns were raised for the Point Lake Project regarding impacts to caribou movement through the area.

In response, Arctic Canadian organized meetings and a site visit with Elders and community members to ensure that their concerns were heard and addressed. These meetings resulted in changes to the planned rock piles.

This is a significant example of the successful incorporation of Traditional Knowledge and

community input leading to real operational changes at the Ekati mine. The Agency commends Arctic Canadian for the meaningful engagement with Elders and community members and making changes based on feedback provided.

Ekati staff and community members completed a fish-out of Point Lake over the summer

of 2022. Fish fillets that were deemed favorable for human consumption were packaged, frozen, and shipped to communities. During the fish-out, community members assisted in collecting scientific data that will add valuable information on Arctic lake trout biology.



Berms along the Lac du Sauvage Road - 2022 site visit

Recommendations

The following are the Agency's recommendations to Arctic Canadian and the Government of the Northwest Territories.

- 1. Dust Suppression**
Arctic Canadian should expand the use of EnviroKleen or an alternate approved dust suppressant to all active haul roads and not rely solely on road watering to minimize fugitive dust levels.
- 2. Air Quality Management and Monitoring Plan**
Arctic Canadian should update the existing Air Quality Management and Monitoring Plan to ensure consistency with the new GNWT Ambient Air Quality Monitoring Guideline and confirm best practices are being followed.
- 3. Advancing the Closure and Reclamation Activities**
Arctic Canadian should acknowledge and address the urgency of advancing closure planning for the Ekati mine. Closure objectives and criteria should be finalized, reclamation research completed, and executable plans and designs developed that reflect the current stage of mining activities. Planning activities should initially focus on mine components that are no longer active

or nearing completion, and progress to include all mine components.

4. **Old Camp Reclamation**

Arctic Canadian should seek approval of a revised Old Camp Closure and Reclamation Plan if it does not intend to reclaim the North Pond in accordance with the existing approved plan. A revised plan must demonstrate that the approved closure objectives and criteria will be achieved, including an evaluation of potential effects of leaving processed kimberlite in place.

5. **Management of Tailings Dams**

Arctic Canadian should immediately take measures to manage the LLCF and all of the associated containment (including Filter Dikes) and conveyance structures as a Tailings Management Facility. Management of the LLCF should follow current best practices including those described in the:

- Mining Association

of Canada “Guide to the Management of Tailings Facilities” and “Developing and Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities”

- Canadian Dam Association “Dam Safety Guidelines” and “Application of Dam Safety Guidelines to Mining Dams”
- Findings of the Final Report of the Mount Polley Independent Expert Engineering Investigation and Review Panel

6. **Operation, Maintenance and Surveillance Manuals for the King Pond Settling Facility**

Arctic Canadian should prepare or update the Operation, Maintenance and Surveillance Manual for the King Pond Settling Facility prior to using the facility to store water from Point Lake dewatering. The OMS Manual needs to address management, maintenance and monitoring

actions and changes that are required before the King Pond Dam and Saddle Dam will experience higher water levels than considered in recent Geotechnical Inspection Reports.

7. **Frequency of Inspections**




In 2020 and 2021 COVID-19 health protection measures limited the ability of the Department of Lands to conduct on-site permit and licence compliance inspections. In 2022, with measures largely removed, there continued to be a reduced number of inspections being undertaken. The new GNWT department of Environment and Climate Change should re-implement an inspection frequency consistent with prior-to-2020 levels or provide a rationale for the apparent reduced frequency. ■

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Ekati Diamond Mine Site Map





- 1** Waste Rock Pile (Panda-Koala-Beartooth WRSA)
- 2** Waste Rock Pile (Fox WRSA)
- 3** Waste Rock Pile (Pigeon WRSA)
- 4** Waste Rock Pile (Sable WRSA - full extent of footprint)
- 5** Waste Rock Pile (Misery and Lynx WRSA)
-  Coarse Kimberlite rejects storage area
-  Proposed Footprint

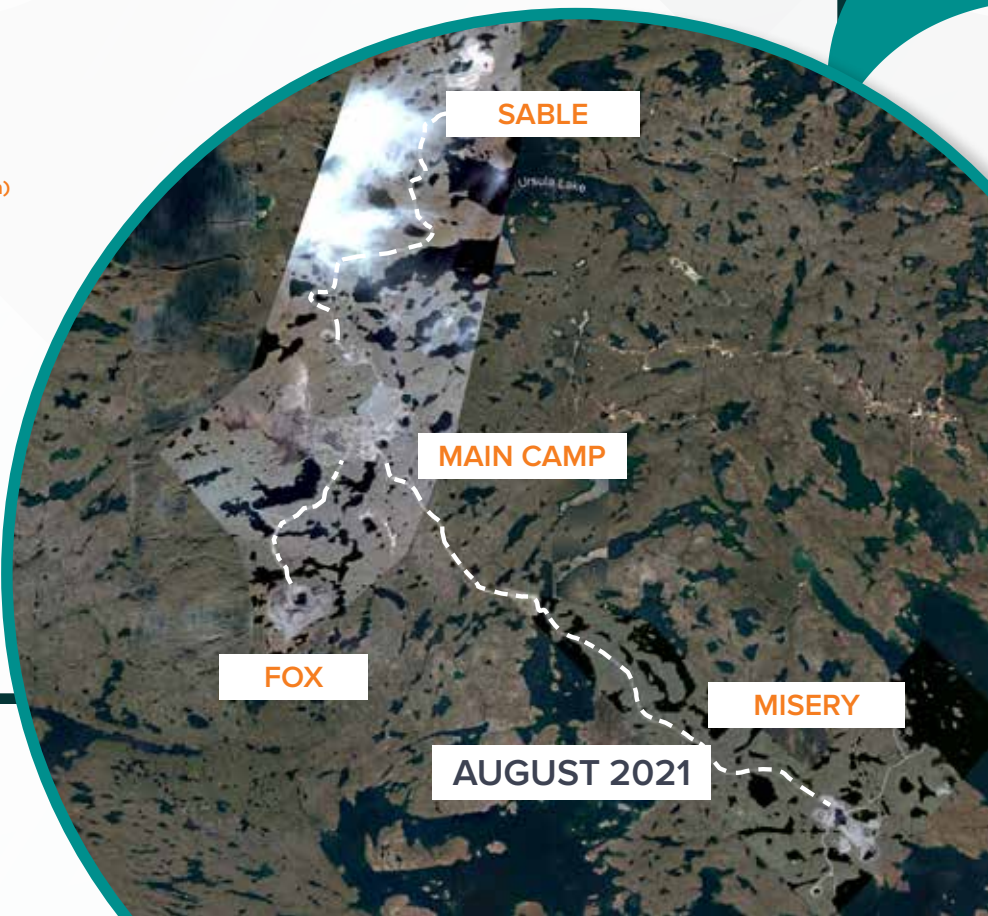
-  Long Lake Containment Facility (Cells A-E)
-  King Pond Settling Facility
-  Two-Rock Sedimentation Pond

- 1** Pigeon Pit
- 2** Beartooth Pit
- 3** Panda Pit
- 4** Koala and Koala North Pit
- 5** Fox Pit
- 6** Sable Pit
- 7** Misery Pit
- 8** Lynx Pit
- 9** Point Lake Project (approved location)

 Incinerators

- 1** Pigeon Stream Diversion
- 2** Panda Diversion Channel

-  Main Site
-  Old Camp
-  Misery Camp
-  Airstrip





PIGEON PIT

SABLE ROAD

BEARTOOTH PIT

PANDA PIT

KOALA PIT

MAIN SITE

MISERY ROAD

FOX ROAD

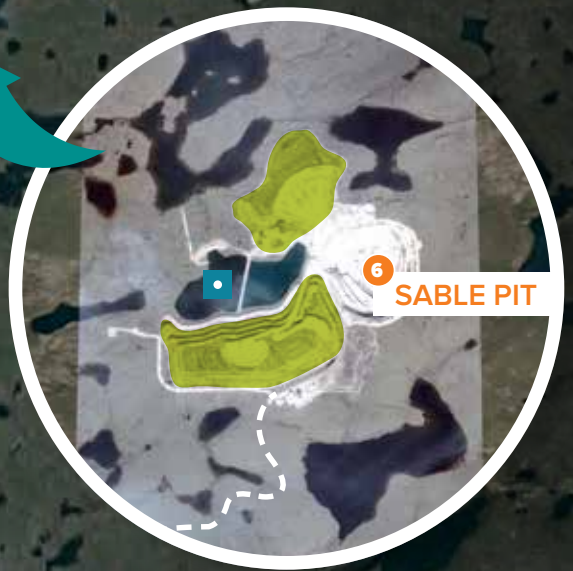
FOX PIT

LAC DU SAUVAGE ROAD

POINT LAKE PROJECT
(APPROVED LOCATION)

MISERY PIT

LYNX PIT



SABLE PIT



1

1

3

1

2

3

2

4

1

2

B

A

C

D

E

2

9

5

3

7

8

6

6

Land Disturbance and Road Length

The Ekati Diamond Mine has disturbed approximately 39km² of land since the project first started in 1997. The following is the total estimated footprint of near by communities in comparison to the amount of land disturbed by mining activities.





2.4km²
Behchoko
estimated footprint



2.5km²
Kugluktuk
estimated footprint

	APPROX LAND DISTURBANCE	HOW MUCH BIGGER IS THE EKATI MINE?
Yellowknife	30 km ²	x 1.3
Kugluktuk	2.5 km ²	x 15
Behchokò	2.4 km ²	x 16
Cambridge Bay	1.6 km ²	x 24
Lutselk'e	1.3 km ²	x 29
Whati	0.8 km ²	x 47
Gameti	0.8 km ²	x 47
Wekweètì	0.5 km ²	x 76



Underground mining - photo courtesy of Ekati Diamond Mine

Current Mining Activities, Future Mining, and Exploration

HIGHLIGHTS

- Exploration for new sources of kimberlite ore remain below pre-Covid levels with only a few initial exploratory drill holes being completed at two main Ekati claim block locations.
- Dewatering of Point Lake in preparation for open pit mining of the kimberlite deposit was partially completed in summer 2022, with the remaining dewatering scheduled for summer 2023.

Definitions

Kimberlite pipes – Kimberlite pipes found in the NWT formed tens of millions of years ago when molten rock at depths up to 100 kilometers below Earth’s surface was forced to the surface through fractures in the overlying rock. Diamonds are formed under conditions of extreme heat and pressure.

Exploratory drilling – Initial exploration drilling of a prospective kimberlite pipe is usually done at a single or a few locations using small diameter drilling equipment. Drill cores are then processed and analyzed for the presence of diamonds.

Final exploratory drilling – At this stage, large diameter (up to 24”) cores are drilled at multiple locations from land and frozen lake surfaces over kimberlite pipes known to contain diamonds. This drilling defines the spatial extent and dimensions of a pipe and provides the large bulk ore sample (often 100,000 tonnes or more) required to reach a decision on the economics of mining.

Current Mining Activities

Open pit and underground mining of kimberlite ore continued at Ekati through 2022. Open pit mining was completed at Pigeon Pit in April 2022 while Sable pit and Misery underground remain operational.

Future Mining

Mining of Sable Pit and Misery Underground is scheduled to continue until mid-2025. The final phase of dewatering of Point Lake to the King Pond Setting Facility and Lynx Pit remains to be done in summer 2023. Excavation of the

overburden and preparation of the access ramp for Point Lake Pit is planned for late 2023 and 2024, with mining of the kimberlite deposit scheduled to commence in early 2025.

The 2022 Ekati Environmental Assessment and Water Licence Annual Report life of mine plan (see page 100) shows that conventional open pit mining will end with closure of the Point Lake Pit in 2029, unless new economic sources of kimberlite ore are identified and developed. If the Underwater Remote Mining (URM) test at Lynx Pit is successful and URM can be carried out at existing

or future closed pits, mining at Ekati could be further extended.

Exploration

Unlike the pre COVID-19 period, when widespread exploration drilling occurred on dozens of targets spread across the large Glowworm Lake, Harry Winston/Lac de Gras, and main Ekati mine claim blocks, only a few small diameter initial exploratory drill holes were completed in 2022 on the main claim block. These included two of four areas on the main Ekati site which were postponed from 2021 drilling plans. These were located northwest of Sable Pit and West of Misery Pit.

UNDERWATER REMOTE MINING (URM)

The URM system being developed for Ekati by Arctic Canadian Diamond Company's partner Royal IHC, is based on existing deep-sea mining and trenching technology. Transport of the URM system to the mine site is currently planned to take place during the 2025 winter road season. Testing of the URM 'crawler' launching procedure is planned to take place in summer of 2025. Before URM testing can begin, the utility pad will need to be enlarged and the water levels in Lynx Pit will be adjusted as necessary to accommodate the crawler. Operational testing of the URM system and extraction of ore from Lynx Pit is planned for the 2025 open water season.

The planned URM trial is estimated to produce 300,000 tonnes of fine kimberlite ore over a duration of 100 days, with maximum daily production of 3,500 tonnes. The seasonal URM trial will produce about 7.5 % of the total Ekati mine ore production reported in 2022. The mined kimberlite ore will be transported to the surface as a slurry of fine kimberlite, dewatered at a facility beside Lynx Pit, and temporarily stored before being transported to the main Ekati processing plant. Since only kimberlite ore and no waste rock is mined using URM technology, the volume of waste material requiring transport and storage at waste rock storage areas is significantly reduced relative to open pit mining.



Caribou crossing sign - photo courtesy of Ekati Diamond Mine



Snowshoe Hare - photo courtesy of Ekati Diamond Mine

Wildlife Effects

HIGHLIGHTS

- Wildlife monitoring indicated lower numbers of incidental caribou and wolverine sightings and steadily increasing numbers of incidents involving grizzly bears.
- Collection of traffic data was tested in 2022 using remote cameras. Although “camera errors” resulted in missed data, the results are encouraging.
- The long-anticipated caribou collar movement study currently being conducted by Arctic Canadian is an urgently needed and welcome first step evaluating the effectiveness of the Caribou Road Management Plan.

Definitions

Adaptive management: a management system with continual monitoring. If a mitigating action does not work, additional actions are used to keep the impacts within accepted levels or below thresholds.

Incidental observations: records of observations of any wildlife by any persons and in all areas at the mine; also referred to as incidental sightings.

Mitigation, mitigating: an action that is intended to reduce the negative impacts of a condition or situation. To make something less harmful. In this case, to make sure environmental impacts from the mine are as minimal as possible.

Monitoring: collecting and analyzing repeated observations and measurements to evaluate change and impacts of change. Watching habitat and wildlife, and ‘keeping an eye’ on things all the time.

Systematic surveys: surveys conducted by the Ekati Environment Department using specific methods and covering an established area, such as all main roads and the Misery power line.

Wildlife incidence: an interaction between wildlife and human(s) that may compromise the safety of the wildlife and/or human(s).



Caribou near the Ekati mine - photo courtesy of Ekati Diamond Mine

Wildlife Effects Monitoring Program

Arctic Canadian Diamond Company Ltd.'s (Arctic Canadian) Wildlife Effects Monitoring Program (WEMP) documents wildlife presence and wildlife management responses at the Ekati mine.

The 2022 WEMP is the 25th annual program and report for the Ekati diamond mine, truly a milestone in wildlife monitoring programs. This annual report focused on wildlife habitat and caribou, grizzly bears, wolves, wolverines, foxes, raptors and breeding birds. The 2022

WEMP provided detailed reporting on direct habitat use, incidental sightings, wildlife survey monitoring programs, waste management, and wildlife incidents and management actions. Activities included systematic road surveys of the Misery Road and power line and the Long Lake Containment Facility (LLCF), behavioural monitoring and camera surveys along infrastructure and adjacent areas. Many of the activities are required for management of caribou under the Caribou Road Mitigation Plan (CRMP).

The data and observations were reported clearly, and the figures and tables – especially the trends

over time – were generally well presented. However, there is a lot of unhelpful text – e.g., the pages of 50% and 95% caribou collar distribution polygons contribute little, if any, to monitoring, and the four pages detailing the methods for the North American Breeding Bird Survey when it hasn't been conducted since 2019 and there is no indication it will be reinstated.

In regard to the WEMP, our main concerns are the lack of integration of observation and monitoring data. There is still no integration of datasets from incidental observations, Misery Road and power line survey data, LLCF monitoring surveys,



Grizzly bear - photo courtesy of Ekati Diamond Mine

or collar data. Integrating this information would lead to a more comprehensive picture of caribou distribution at the mine site and possibly make monitoring more efficient and help provide insight into the effectiveness of the CRMP (see below).

The Ekati Mine Footprint

The Ekati mine footprint currently covers over 39 km² of Arctic tundra, with minimal increases in size in recent years. As of 2018 (the last year of reporting), 141 km of roads have been constructed, with a 500 m long Point Lake access road added in 2022.



Caribou observed in the fall - photo courtesy of Ekati Diamond Mine

Wildlife sightings and incidents

Wildlife observations are summarized in several ways, primarily through incidental sightings, monitoring programs (Misery Road and power line, LLCF), wildlife incidents and management actions. Results showed no significant changes from previous years, except for a lower number of incidental sightings of caribou and wolverine and steadily increasing numbers of incidents involving grizzly bears. Most sightings involved caribou (with the majority during winter and spring migration in 2022), and most incidents and management were directed at grizzly bears and involved some form of

deterrent. Unfortunately, numbers and details are scattered throughout the WEMP with no integration of data. As mentioned above, better use and integration of wildlife data collected would improve the effectiveness of the WEMP.

Caribou Road Mitigation Plan

The CRMP is designed to use locations and movements of collared caribou and observations of caribou near mine infrastructure as Action Level triggers to initiate intensified levels of monitoring and mitigation. However, as the Agency has noted previously, how often and when collars and observations have been used as triggers have never been



Red fox - photo courtesy of Ekati Diamond Mine

provided. The WEMP stated that *“The locations of collared caribou were monitored to determine the proximity of caribou relative to the Ekati Diamond Mine. Weekly maps generated by the GNWT that show the location of satellite-collared individuals are used as tools to inform the required local monitoring and/or change in the mitigation levels defined by the CRMP”*, but there are no details on the specifics on how these tools were implemented during 2022. As an example, the WEMP indicates that the Red alert level (Level 3 – high risk) was in place for 310 days of the year (85%; continuously from 2 February to 14 December) *“based on collar data and observations”*.

Red alert level is triggered by *“0.25% of total cows in Bathurst herd within 200 m of roads, \geq 1 caribou group sighting within 500 m of roads during northern migration (May) and/or \geq 1 caribou crossing road”*. The Red alert results in changes in alert level on signage, resulting in speed reductions (continued from Orange alert level), and short-term or long-term road closures. The last incidental observation in 2022 occurred on October 30th, and the last caribou was observed during LLCF surveys on November 29th, but integration and details on these sightings were not provided. A better presentation of trigger changes or maintenance of alert levels would be useful for assessing

monitoring effectiveness. As it is, it is not possible to evaluate the effectiveness of monitoring methods to trigger increased mitigation and of the applied mitigation itself, thus limiting the ability to evaluate adaptive management.

During 2022, caribou presence triggered a short-term 2.5-hour closure of a short section of the Sable Road, as well as resulted in a total of 20 hours of traffic delays spread over 149 events when wildlife (presumably mostly caribou) was less than 100 m from roads. No details on the distance, numbers and composition of incidentally or systematically observed caribou groups were provided, rendering it impossible for the



Wolf - photo courtesy of Ekati Diamond Mine

reader to evaluate how caribou distribution related to these traffic delays.

Objectives of the CRMP include “avoid and reduce potential barrier effects of [roads] to caribou movement and migration; and limit the effect of sensory disturbance from roads and traffic on caribou behaviour”. The CRMP section concludes with:

“Documenting the mitigation and monitoring efforts related to CRMP will continue in future years and will enable ongoing evaluation of the program to determine its effectiveness in mitigating and reducing incidents at and along roads,

and provide information for adaptive management, as required. In particular, there has been a focus on improving the reporting of speed reductions and short-term road closures”

The Agency continues to be concerned that while the CRMP is effective at reducing risk of vehicle strikes, there is no evaluation to determine the potential (semi-permeable) barrier effect of roads from sensory disturbance to caribou movement. This includes primarily visual, auditory and olfactory disturbance from vehicles and human activity. The telemetry study currently being conducted by Arctic Canadian is a much delayed

but welcome first step to begin to examine the effectiveness of the CRMP, but there appears to be nothing internal to the WEMP that addresses the stated objectives of the program. Similarly, caribou crossing ramps continue to be reported as an effective mitigation strategy to facilitate caribou movement through the mine site, yet there has been no robust examination of the effectiveness of these structures. The evaluation of the effectiveness of the four crossing ramps over the Point Lake dewatering pipes in 2022 was a welcomed review¹, but suffered from acknowledged small sample size of observations.

¹ Paragon Wildlife. 2022. Point Lake Project 2022 stage one dewatering pipeline monitoring. Prepared for Arctic Canadian Diamond Company Ltd. by Paragon Wildlife Research and Analysis Ltd., Winnipeg, MB.

Finally, Arctic Canadian continues to insist that collared males from the Bathurst caribou (and presumably other) herds should not be included in analysis as they “*were not historically included in monitoring of the Bathurst herd, and as they use different ranges than females at some periods within the year*”. Given the large number of males collared since 2015 and the fact that a caribou is a caribou regardless of its sex from a disturbance, monitoring and mitigation standpoint, we reiterate that there is no ecological reason not to incorporate data from male collars into the program.

Traffic Monitoring

Since the sensory disturbance from vehicles on roads is likely one of the main semi-permeable barrier effects to caribou passage through mine infrastructure, the Agency has repeatedly called for traffic monitoring to improve analysis of caribou monitoring and mitigation. After a request from the Department of Environment and Natural Resources in late 2021, Arctic Canadian conducted a pilot study in 2022 on the Misery and Sable roads with traffic counters (quickly deemed unreliable at capturing vehicle passage across the entire span of the wide haul roads) and, beginning in July, remote cameras. Despite “camera errors” resulting in

1.5-to-2-month gaps in data on the respective roads, photo-processing of the camera images was able to categorize the vehicles into classes (e.g., light, medium, graders, haul trucks and road trains). The highest numbers of vehicle passages were in August, averaging 46 passages per day (a passage every 31 minutes) on the Misery Road and 133 passages per day (a passage every 11 minutes) on the Sable Road. The Agency is encouraged that traffic data are finally being collected, and hope that the camera error issues can be resolved.

» FOLLOW-UP FROM 2021 WILDLIFE RECOMMENDATION

In our 2021-22 annual report, the Agency recommended that Arctic Canadian assess the effectiveness of mitigation measures currently used under the Caribou Road Mitigation Plan. The caribou movement analysis from telemetry data initiated by Arctic Canadian in 2022 is a welcome step to begin to examine this issue.



Sable operations with waste rock pile, two-rock sedimentation pond and pit in distance
- photo courtesy of Ekati Diamond Mine.



Point Lake dewatering pumps - 2022 site visit

Aquatic Effects

HIGHLIGHTS

- Arctic Canadian will investigate the cause of elevated mercury in fish of Kodiak Lake.
- Ulu Lake is experiencing increasing concentrations of various water quality variables.
- Two reports dealing with effluent entering the Receiving Environment from the TRSP contain errors that call into question the predictions of effluent quality when mixing with lake water.

Definitions

Action Level: when the concentration of a substance exceeds a level defined in the Aquatic Response Framework, where the company must take action in order to reduce or remove the potential for harm.

Benchmark: a standard against which to compare or assess a monitored parameter.

Benthic macroinvertebrate: all life forms without bones living on lake and stream bottoms (i.e. clams, snails, crustaceans, insect larvae and worms).

Discharge: to allow wastewater to flow out or be pumped out from where it was held.

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

Zooplankton: 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 fish.



Directors overlooking Thinner Lake - 2022 site visit

Background

Each year, monitoring programs are conducted at the Ekati mine to determine if changes are occurring in the aquatic environment downstream of operations as a result of mining activities.

There are four watersheds which may be affected by mining operations: Koala, King-Cujo, Pigeon-Fay-Upper Exeter and Horseshoe. Figure A-1 in Appendix A illustrates the locations of these watersheds. Lakes and streams in these systems, as well as background sites, are sampled each year under the Aquatic Effects Monitoring Program (AEMP). Using information collected through the AEMP, changes and trends in water

and sediment quality, benthic macroinvertebrate communities, phytoplankton and zooplankton, as well as fish populations and fish health, can be identified.

Water Quality

Aquatic Effects Monitoring Program

2022 was the 25th consecutive year of aquatic effects monitoring in the Koala Watershed, the 21st year in the King-Cujo Watershed, and the 4th year in the Horseshoe Watershed.

The AEMP continues to be an effective program for monitoring changes in the aquatic environment of lakes and streams downstream of the Ekati mine. Likewise, the Response Plans for various water quality variables and biological

measurements within the Aquatic Response Framework show improvements with each new iteration of the plans.

Sources of effluent to the Receiving Environment

There was effluent discharge from the Long Lake Containment Facility (LLCF) to Leslie Lake in fall 2021 but no discharge throughout the 2022 open-water season. There was no discharge from the King Pond Settling Facility (KPSF) to Cujo Lake in the 2022 open water season. Discharge from the Two Rock Sedimentation Pond (TRSP) to Horseshoe Lake took place between July 5 and August 23, 2022.

pH

Just like 2021 AEMP results, the 2022 mean pH levels were below Aquatic Response Framework benchmark of pH 6.5 in all reference lakes, three locations in the Koala watershed and in Lac du Sauvage downstream of Cujo Lake, meaning the waters were slightly more acidic than normal. This period of 3 consecutive years

of below-normal pH had never been recorded downstream of the LLCF throughout the history of mining at Ekati, nor since 2012 in Lac du Sauvage. The cause is unknown and Arctic Canadian is investigating whether a laboratory error occurred as the commercial water laboratory used for Ekati was changed in 2020.

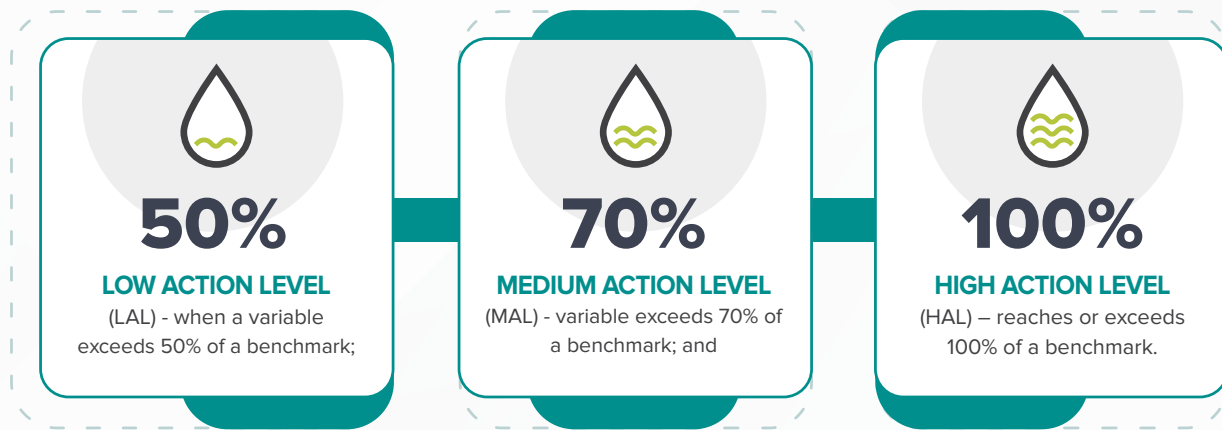
Water quality changes in Ulu Lake

Ulu Lake which is upstream of Horseshoe Lake and therefore not directly influenced by effluent from the TRSP, had several water quality variable increases above baseline in the past 3 years. These variables include water hardness, sulphate, nitrate, potassium, barium, nickel and strontium. These



Photo courtesy of Ekati Diamond Mine

THERE ARE THREE TIERS OF ACTION LEVELS, EACH WITH ASSOCIATED TRIGGERS, FOR WATER QUALITY VARIABLES OTHER THAN DISSOLVED OXYGEN:



increases suggest Ulu Lake is being impacted by a contaminant source other than TRSP, possibly seepage from the Sable West waste rock storage area (WRSa) although no seepage has been observed entering the lake or its outflow stream. In the absence of observable seepage, the company suggests that dust from the construction and operation of the Sable development may be responsible. These changes in Ulu Lake are important since Ulu Lake's outflow stream flows into Horseshoe Lake close to their reference site. This could impact the ability of the reference site to accurately represent unimpacted conditions.

Aquatic Response Framework (ARF)

The ARF is an early warning adaptive management program that alerts the company and regulators to potential impacts to the aquatic environment in lakes downstream of the mine. The ARF establishes benchmarks for water quality variables that, when reached, require mitigative actions to be taken so that harm to aquatic life is avoided.

The same early warning approach applies to changes in biological measurements in AEMP lakes that may indicate harmful impacts to aquatic life from water or sediment quality changes.

There are action levels for aquatic life as well. Changes in phytoplankton, zooplankton and benthic macroinvertebrates are measured at the community level (total biomass and density). Benchmarks are set as a range rather than a single number, meaning that if a measured variable is less than the lower limit or greater than the upper limit of the normal historical range the benchmark is exceeded. This normal historical range is determined by baseline conditions and reference lakes. The benchmark exceedance must be seen for 3 consecutive AEMP years for an action level to be triggered.

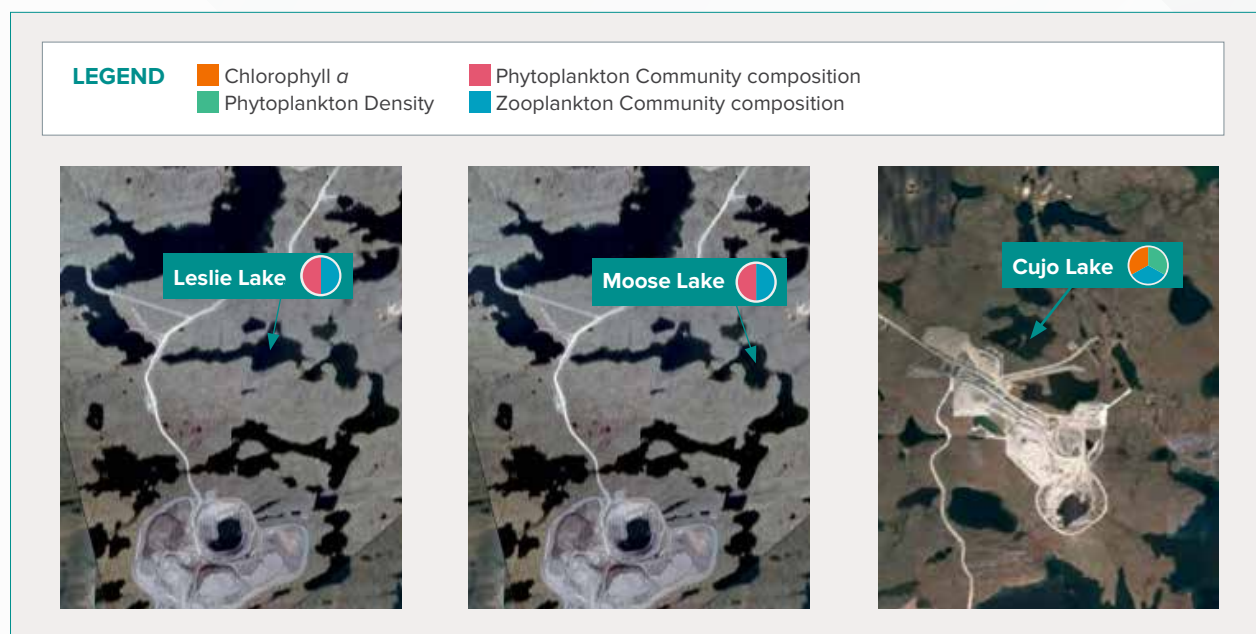
Action Level Exceedances for Water Quality

- Chloride Leslie Lake’s exceedance was first seen in 2015, and 2022 marks the 6th consecutive year of under-ice exceedances; Moose Lake exceedances began in 2018, repeating in 2021 and 2022.
- Potassium It was the 5th consecutive year for under-ice exceedance of action levels in Leslie, of which the last 2 years have been MAL exceedances. Chloride and potassium exceedances are due to discharge from the LLCF.
- Nitrite and Nitrate exceedance is attributable to the fall 2021 discharge from TRSP.
- For the previous 10 years Dissolved Oxygen (DO) levels in Cujo Lake have been below minimum levels needed by fish. Thanks to mitigative action taken to install an under-ice aeration pump in the lake, 2022 is the first year in over a decade that DO levels were not exceeded.

Table 1: Locations of Action Level exceedances for water quality variables observed in 2022

Water quality variable	Affected Lakes		
	Leslie Lake	Moose Lake	Horseshoe
Chloride	LAL under-ice	LAL under-ice	
Potassium	MAL under-ice LAL open water	LAL under-ice	
Nitrite and Nitrate			HAL under-ice

FIGURE 1: LOCATIONS OF ACTION LEVELS EXCEEDANCES FOR PLANKTON METRICS OBSERVED IN 2022



Action Level Exceedances for Plankton (phytoplankton and zooplankton)

There were a number of Action Level exceedances in plankton community measurements in the Koala and King-Cujo watersheds (Figure 1).

The latest update to the Plankton and Benthic Communities Response Plan (version 3.1) was submitted for review and approval in January 2023.

The Agency made recommendations to improve the AEMP through the 2022 AEMP Re-evaluation process. These recommendations covered statistical analysis of water quality data, clarification of which benthic macroinvertebrate species are to be removed from analysis, and the need for measuring contaminants in zooplankton and benthic macroinvertebrates that fish eat. With the exception of the Agency's recommendations on benthic macroinvertebrates, Arctic Canadian disagreed with all of our recommendations.

Arctic Canadian's 2016 *Study of Drivers of Benthic Community Composition* concluded that benthic community composition is not being influenced by mine activities but rather by the silt content of lake sediments. The Agency believes that including data from the past 2 post-2016 years of sediment quality monitoring could yield different, more accurate conclusions. Incorporating the past 2 sediment monitoring years (representing 6 years of deposition after 2015) into the analysis would strengthen the findings of the special study and more accurately represent current conditions. The company maintains that no update to the 2016 special study is warranted because the 2022 AEMP concluded there were no mine-related effects on lake benthos composition.

Mercury in Kodiak Lake Fish

As part of its approval of the latest version of the Fish Response Plan, the Wek'èezhii Land and Water Board (WLWB) directed Arctic Canadian to evaluate a past High Action

Level (HAL) exceedance for fish in Kodiak Lake.

A major finding of the last harvestable fish monitoring year (2018) was that mercury in round whitefish from Kodiak Lake (a mean of 0.325 mg/kg wet weight) had exceeded a HAL and mercury in lake trout (a mean of 0.518 mg/kg) from the same lake had exceeded a site-specific human consumption guideline. Kodiak Lake is not downstream of any tailings containment, but is downstream of the Panda Diversion Channel and beside the airstrip. It also received deposition of aerial borne contaminants from the incinerator prior to the incinerator's 2012 upgrade. Water and sediment quality measurements from 1994 – 2022 show mercury was never elevated in the lake except for a significant spike in open water in 2000 (over 0.05 µg/L), the year after treated sewage deposit into the lake was ended.

While the high concentration of mercury in Kodiak Lake fish may be a cause for concern for land users if it persists, the Agency is



Point Lake at the end of Stage 1 dewatering - 2022 site visit

pleased to see Arctic Canadian is taking steps to investigate the source in accordance with the Fish Response Plan. The first steps in this investigation will be an analysis of all monitoring data as well as possible additional sampling of water and sediments of Kodiak Lake. If results of this analysis are inconclusive then additional studies are proposed by Arctic Canadian which would include “mercury fingerprinting” to determine sources of mercury (mine, atmosphere or naturally occurring).

Two Rock Outfall Report and Plume Delineation Study

The Two Rock Outfall Report describes the proposed design of the outfall of effluent flowing into the receiving environment (Horseshoe Lake) from the TRSP downstream of the Sable Pit. The Plume Delineation Study describes the mixing and dispersion of effluent as it flows through Horseshoe Lake. This study is designed to determine the best location for the Surveillance Network Program (SNP) station.

The Two Rock Outfall Report and the Plume Delineation Study are requirements of the Water Licence. The Agency agrees with the WLWB that any errors and inconsistencies in these reports should be addressed in the future to assure reviewers of the validity of report conclusions. The Agency identified a couple of problems in these reports, as did the WLWB. These problems are as follows:

1. The Agency found a discrepancy between two tables within the Outfall Report. One shows increasing nitrate levels as



a proportion of benchmark when using mitigation methods for discharge to Horseshoe Lake, and the other shows a decrease. This has ramifications for calculating the target effluent dilution needed to assure there are no adverse effects to aquatic life beyond the mixing zone in Horseshoe Lake. The WLWB directed Arctic Canadian to correct the nitrate numbers and validate its target dilution of 20:1 in the next update to the Plume Delineation Study report.

2. Water sampling station TS11 in the northeast part of Horseshoe Lake is meant to be an indicator of baseline water quality unaffected by the effluent entering the southernmost basin of Horseshoe Lake. But as mentioned above, Ulu Lake, which flows into northeast Horseshoe Lake, has experienced changes in its water quality, likely attributable to mine infrastructure (possibly WRSA seepage or dust deposition from construction).

New Fish-out Methods at Point Lake

Arctic Canadian states in the 2023 Environmental Agreement and Water License Annual Report that a new system of data collection called the Broad Scale Monitoring methods, was implemented for the fish-out of Point Lake (ontario.ca/page/broad-scale-monitoring-program). The Agency is keen to find out the details of this methodology and how it was applied at Point Lake. ■

Air Quality

HIGHLIGHTS

- Ambient air quality remains good at the Ekati mine except for the significant summertime dustfall levels found within 90 m of the Misery and Sable haul roads.



Dust generated by land train and pick-up truck, Sable haul road - 2022 site visit

Definitions

Ambient Air Quality: the concentration of pollutant in the surrounding air.

Concentration: the amount of a substance in the defined space; the amount of different pollutants in the surrounding air.

Dust Suppressant: products that prevent or reduce the amount of dust spreading into the air.

Greenhouse Gases: gases in the atmosphere that trap heat. They allow sunlight to pass through and warm the earth, but prevent the warmth from leaving. Most common GHGs are water vapour, carbon dioxide, methane, ozone, nitrous oxide and chlorofluorocarbons.

Meteorology: the science of weather and climate; the conditions of the atmosphere in an area.

Monitoring: collecting and analyzing repeated observations and measurements to evaluate change and impacts of change. Watching and 'keeping an eye' on things all the time.

Particulates/Particulate Matter: Very tiny pieces of dust, smoke, and other harmful materials in the air. Some are big enough to see with your eyes; others are so small you need a microscope. Particulate matter is a mix of particulates and liquid droplets.



Dustfall Collection Site - photo courtesy of Ekati Diamond Mine

Air Quality Monitoring at the Ekati Mine

The Air Quality Monitoring Program (AQMP) was started in 1998 as a requirement under the Environmental Agreement and is comprised of:

- meteorological monitoring;
- greenhouse gas (GHG) emission calculations;
- ambient air quality monitoring of airborne particulate, sulphur dioxide (SO₂), nitrogen dioxide (NO₂), nitric oxide (NO), and oxides of nitrogen (NO_x);
- dustfall monitoring; and
- snow chemistry and lichen tissue monitoring.

Meteorological Monitoring

Meteorological data are collected year-round from the Koala station near the Ekati airport and, until recently, at the Polar Lake station during the open water season. The Polar Lake station has been used to collect data to estimate open-water evaporation but has not operated since 2020 due to disruptions caused by COVID-19, the resources required to establish and operate the remote station, and frequent bear activity in the area causing personnel safety concerns.

The average annual air temperature at the Koala station in 2022 was -8.9°C, which is the same as the annual average temperature for the

period of 1995 to 2022. Closer examination of monthly trends indicates that the average monthly temperatures during spring, summer and fall were higher than the historical average for these same periods, while the average monthly temperatures during winter was lower. The total precipitation in 2022 was 170 mm, which is a little more than half of the 1994 to 2021 average of 320 mm. Overall, 2022 was the second driest year at Ekati since precipitation began to be measured in 1994.

In 2022, Arctic Canadian proposed to discontinue operation of the Polar Lake station and monitoring of factors that enable the estimation of local open-water evaporation



Director Kim Poole standing on a caribou crossing ramp with fugitive dust in the background - 2022 site visit

rates. These rates are important as they help to define the amount of water available for runoff and its timing, wastewater management and the closure of wastewater facilities, and understanding potential impacts of climate change. Arctic Canadian argues there has been no significant change in average annual evaporation rates over the period of record making the estimation of open-water evaporation rates unnecessary and, if an increasing or decreasing trend was to be observed, adjustments could be made through the predictive modelling process.

Based on the data provided during the Water Licence

renewal process, the Agency is comfortable with the approach Arctic Canadian is proposing.

Greenhouse Gas Emissions

Diesel fuel used to operate mine vehicles, heat buildings and generate electricity are major sources of GHG emissions at Ekati with smaller sources being the combustion of Jet fuel, open pit blasting, waste incineration, composting and sewage. GHG emissions are estimated to be 164.7 ktCO₂e (kilotonnes of carbon dioxide equivalent) in 2022. This is an increase of 9.2% over 2021 emissions. Arctic Canadian attributes this to increased mining activity in 2022.

Ambient Air Quality Monitoring

Total Suspended Particulate (TSP) levels are monitored at the Grizzly Lake station while TSP, fine particulate (PM_{2.5}), SO₂, NO₂, NO and NO_x levels are monitored at the Continuous Air Monitoring Building (CAMB) located near the main camp. Results are compared to air quality standards and guidelines established by the Government of the Northwest Territories (GNWT) and Canadian Council of Ministers of the Environment (CCME).

There were no exceedances of the TSP standards in 2022 while PM_{2.5} levels were higher than the 24-Hour GNWT standard on four occasions. Levels of total and



Land train driving along the Sable haul road - 2022 site visit

fine particulates were generally higher during the drier summer months than during the winter months.

The hourly, daily and annual concentrations of SO₂ and NO₂ measured at the CAMB station were well below the applicable standards in 2022. There are no GNWT standards for NO and NO_x. Ambient levels for each of these variables are generally higher during the colder winter months as they are emitted through the burning of fossil fuels and cold air inversions can 'trap' the gases.

Dustfall Monitoring

Dustfall is monitored at stations located in the vicinity of the Long Lake Containment Facility (LLCF), haul roads and

the airport. Along haul roads, stations are established on transects perpendicular to the road at 30 m predominantly upwind and 30, 90, 300 and 1,000 m downwind of the road to measure dustfall levels at varying distances (see Figure A-2 for sample locations).

Dustfall levels are highest close to roads because of vehicle traffic and decrease with distance. All seasonal averages of dustfall levels at 300 m from the road, the distance at which the GNWT interim dustfall objective of 1.53 mg/dm³/day is measured, were below the objective. However, as in previous years, dustfall levels measured 30 m and 90 m from the Misery and Sable roads were significantly higher than

the GNWT numerical objective (by as much as 24 times) while only slightly exceeding the numerical objective at locations near the airport and LLCF. These high dustfall levels, although not directly comparable to the GNWT interim objective, demonstrate the need for an effective dust suppression program on haul roads and the airport runway, particularly during exceedingly dry years as was experienced in 2022.

Arctic Canadian reported that the commercial dust suppressant EnviroKleen was applied to areas surrounding the camp infrastructure and airport in 2022, while water was used as a dust suppressant on the Fox, Misery, and Sable roads. Given the significantly elevated

dustfall levels measured at stations within 90 m of the Misery and Sable haul roads, it is recommended that Arctic Canadian expand the use of EnviroKleen, or another approved dust suppressant, to all active haul roads and not rely solely on road watering.

Ambient Air Quality Planning

In April 2023, the GNWT adopted the Ambient Air Quality Monitoring Guideline. This guideline formalizes best practices and establishes minimum monitoring requirements to ensure consistent air quality monitoring programs are implemented throughout the construction, operation and closure phases of diamond mines.

Arctic Canadian has used the existing Air Quality Management and Monitoring Plan (AQMMP)

to guide ambient air quality programming since 1995. The AQMMP was last formally revised and updated in 2009, although some components of the recently withdrawn air quality and emissions management plan for the Jay Project have been carried over.

The Agency recommends a review of the existing AQMMP be undertaken. This review would help to ensure consistency with the new GNWT guideline and ambient air quality monitoring and management best practices are being followed. ■

» RECOMMENDATION

Arctic Canadian should expand the use of EnviroKleen or an alternate approved dust suppressant to all active haul roads and not rely solely on road watering to minimize fugitive dust levels.

Arctic Canadian should update the existing Air Quality Management and Monitoring Plan to ensure consistency with the new GNWT Ambient Air Quality Monitoring Guideline and confirm best practices are being followed.

Right: Dust suppression - photo courtesy of Ekati Diamond Mine



Waste Rock Management

HIGHLIGHTS

- A better procedure for measuring the mineralization neutralization potential of waste rock has been adopted for routine use at Ekati.
- The proposed design of the Point Lake waste rock storage area and seepage management system has been rejected, and Arctic Canadian has been directed to re-submit a plan that conforms to the fundamental principle of 'no long-term active care'.
- Arctic Canadian has outlined a new ecologically-based approach to seepage management.

Definitions

Acid-Based Accounting:

Laboratory measurements and calculations that provide an indication of the potential for Acid Rock Drainage.

Acid Neutralizing Potential: The ability of rock waste to buffer against changes in acidity.

Acid [rock] Drainage: Outflow of water that has become acidic due to exposure to exposed rock surfaces in waste rock piles, open pits and underground workings.

Effective Neutralization

Potential: Acid neutralization capacity of rock occurring under conditions that closely resemble natural weathering processes.

Mitigation, Mitigating: An action that is taken to reduce the negative impacts of a condition or situation. To make something less harmful. In this case, to make sure environmental impacts from the mine are as minimal as possible.

Metasediment: A type of metamorphic rock; rock transformed by heat, pressure, other natural actions.

Neutralize: To make something ineffective or harmless. In this case, to make an acidic or alkaline substance chemically neutral.

Overburden: Rock or soil covering a mineral deposit. It is removed to get to the ore or rock that contains the desired mineral(s).

Seepage: The slow escape of liquid through a porous material or small holes. In this case, liquids escaping from waste rock piles that may contain contaminants.

Seeps of Potential Concern:

Seeps where the concentration of a contaminant exceeds the regulated maximum concentration or where the 95th percentile value of the WRSAs historical dataset is exceeded more than once during a two-year sampling period.



Misery WRSA - 2022 site visit

Waste Rock Storage Areas

Large quantities of overburden material and adjacent rock must be removed to access kimberlite ore. This waste material is transported from the open pits and underground by truck and deposited in large areas referred to as Waste Rock Storage Areas (WRSA).

There are six WRSAs at the Ekati mine containing waste rock from

the Panda/Koala/Beartooth, Fox, Misery, Lynx, Pigeon and Sable pits. A seventh WRSA is planned for the Point Lake development. Another large pile of waste rock, known as the Coarse Kimberlite Reject Storage Area (CKRSA) contains kimberlite ore rejected from the process plant. These storage areas require careful planning and management as they will be permanent landscape structures that remain in place following closure of the mine site.

A description of each storage area is provided in Table 3.

Waste Rock Management

There were 21.7 million wet metric tonnes (wmt) of waste rock and rejected coarse kimberlite deposited at four locations in 2022. This compares to 17.0 million wmt deposited in 2021.

Table 2 – Waste Rock and Coarse Kimberlite Reject Material Deposited in 2022.

Waste Produced	Deposit Location	Quantity (wmt)
Sable Pit	Sable WRSA	20,072,203
Pigeon Pit	Pigeon WRSA	314,913
Misery Underground	Misery/Lynx WRSA	29,325
Central Mill Processing Facility	CKRSA	1,342,155

Table 3 – Waste Rock Storage Area (WRSA) Physical Characteristics ¹

WRSA	Panda/ Koala/ Beartooth	Fox	Sable	Pigeon	Misery/ Lynx	Coarse Kimberlite Reject ²
Operational Status	Complete	Complete	Active	Active	Active	Active
Rock Types	Granite Diabase Till	Granite Diabase Kimberlite Till	Granite Diabase	Granite Meta- sediment Till	Granite Diabase Meta- sediment	Kimberlite
Planned Footprint (square kilometers)	3.4	3.2	1.8	0.8	1.5	1.2
Planned Height (m)	50	50	65	70	65	50
Internal Facilities³	Overburden Stockpile Waste Rock Quarry Landfill Landfarm	Overburden Stockpile HC Impacted Material ⁴	None	None	Overburden Stockpile Landfill HC Impacted Material ⁴	None

Notes

1 Source – Interim Closure and Reclamation Plan v3.0.

2 The Coarse Kimberlite Storage Area is located within the Panda/Koala/Beartooth WRSA and is managed separately.

3 'Internal Facilities' refers to other types of materials stored within the footprint of the WRSA.

4 Hydrocarbon Impacted Material is rock and soil greater than 4 cm in diameter that contains spilled hydrocarbons.

Samples of waste rock are periodically collected from blasted muck (wet broken rock) for physical and chemical testing including acid-base accounting (ABA) and identification of major

and trace elements, including metals. This testing is necessary to determine the best way to manage and store the waste rock, use it as a construction material, and develop closure

and reclamation plans and strategies.

The Pigeon Pit was sampled at a rate of three samples per rock type, per bench, in 2022



Wasterock pile in the back and overburden stockpile in the front - 2022 site visit

while waste rock from Misery Underground was sampled three times over the year. Waste rock from the Sable Pit was last sampled in 2019. At that time, the Wek'èezhìi Land and Water Board (WLWB) agreed with Arctic Canadian that further testing of Sable waste rock was not required as the likelihood of acid rock drainage and metal leaching was low. The Agency does not agree with this approach and suggests the practice of not sampling rock from the Sable Pit is not consistent with modern mining practices and good closure planning.

Waste Rock Geochemical Testing

The Agency is pleased that, after many years of encouragement, progress is being made on the complex issue of waste rock management and how best to approximate the long-term potential for waste rock piles to produce acid rock drainage and metal leaching.

During this reporting period, the testing procedure used for acid-base accounting and metal leaching characterisation has changed from the previously used Standard Sobek procedure to the Modified Sobek procedure. This change reduces the likelihood of over-

estimating the acid neutralizing potential of rock by accounting for the carbonate minerals and only the most reactive of the silicate minerals. It remains unclear however, whether the results accurately reflect the natural physical and chemical weathering processes (heating and cooling, wetting, breakage of rock pieces by movement, chemical oxidation and other natural processes) that occur in rock piles over the long-term.

While the Modified Sobek procedure is a more reasonable predictor of neutralization potential, the humidity cell test procedure (kinetic testing) remains necessary

for confirming the Effective Neutralization Potential and anticipated seepage quality of waste rock.

The change in testing methods, from using the Standard Sobek procedure to the Modified Sobek procedure, also means caution must be taken when comparing the 2022 waste rock testing results with the broader historical Ekati geology database. Arctic Canadian needs to complete their on-going study into factors influencing neutralizing potential in waste rock before direct comparisons can be made.

Point Lake Waste Rock Storage Area Design

Planning the design, construction and operation of the Point Lake WRSA began in 2022. Waste rock from the Point Lake Pit is different than other waste rock at Ekati in two important ways: it is almost all metasediments; and geochemical testing has confirmed it has a greater potential to generate acid than other waste rock at the Ekati mine. As a result, seepage from

the WRSA is predicted to contain higher concentrations of metals and other contaminants and must be collected and managed before being released to the receiving environment.

The Point Lake WRSA design plan and seepage prediction report was submitted to the WLWB for approval in August 2022. The design proposed a separate waste rock pile and overburden stockpile located next to the open pit. Seepage from the waste rock pile will be collected in channels that drain to a sump and then pumped to the existing King Pond Settling Facility (KPSF) for management. Any seepage from the overburden pile will not be collected by the Point Lake seepage collection system, some of pile will drain towards the Lac du Sauvage Road and the rest will drain towards Thinner Lake and Lac du Gras.

The design plan was not approved by the WLWB as collection and treatment of seepage from the rock pile was predicted to be required well into the closure period, which is not

consistent with the fundamental principle of ‘no long-term active care’. Arctic Canadian was directed to re-submit a design plan and seepage prediction report that is consistent with this principle and parties’ specific concerns and questions.

The Agency will engage with Arctic Canadian on Point Lake waste rock and seepage management once a revised design plan is submitted.

Seepage Management

Water that contacts waste rock or drains from WRSAs is referred to as seepage. Where the quality of the seepage does not meet acceptable criteria, it must be managed and mitigation measures taken to reduce any potential risks to the adjacent environment.

Seepage Water Quality Survey and Testing

Samples from 32 identifiable seeps were collected during the freshet (June) and fall (September) seepage surveys in 2022 near the Panda/Koala/Beartooth, Fox, Misery, Lynx,



Panda/Koala/Beartooth WRSA and Cell B of the LLCF - 2022 site visit

Pigeon and Sable WRSAs, including three new seeps. This compares to 51 identifiable seeps sampled in 2021.

Arctic Canadian reports that, for those seeps where historical data exists, the seepage quality across the WRSAs generally showed similar concentrations and fluctuating seasonal trends (freshet to fall) when compared to previous years. However, unlike previous years, Arctic Canadian has not completed screening for ‘Seeps of Potential Concern’ as the methodology is being updated to better align with a revised interpretation of seepage compliance with the Water Licence.

In the absence of screening, it is not possible to draw independent conclusions on whether the increasing trends and concentrations of total and dissolved metals and

other variables in some seeps reported in 2021 are continuing. The Agency expects the screening will re-commence in 2023 once the methodology has been updated.

Seepage Response Framework

Seepages fundamentally differ from large points of controlled discharges, such as the Long Lake Containment Facility, because of their inconsistent and intermittent occurrence, short surface flow through terrestrial environments and multiple flows into a single receiving waterbody. For this reason, it is widely recognized that the current surface water criteria alone as outlined in the Water Licence are not suitable for managing the ecological risks associated with seepage.

Arctic Canadian outlined a new, conceptual approach for screening seepage quality in 2022. The approach is based on establishing terrestrial quality objectives to protect the immediate terrestrial environment into which the seep enters and use of the existing Water Licence criteria to protect adjacent waterbodies (lakes and streams) and aquatic life (fish, invertebrates, aquatic plants and algae).

The Agency believes this ecological-based approach holds promise for better managing seepage and looks forward to Arctic Canadian expanding upon the current conceptual framework document. ■

Wastewater and Processed Kimberlite Management

HIGHLIGHTS

- Arctic Canadian exceeded Effluent Quality Criteria (EQC) for Total Suspended Solids during its dewatering program at Point Lake.
- The deposit of Fine Processed Kimberlite (FPK) in pits while still relying on the Long Lake Containment Facility (LLCF) for process plant water has led to a deficit of process plant water and accumulation of mine-affected water in pits. Arctic Canadian wants to address the deficit by using fresh lake water instead of continuing to rely on recycled water for plant operations.
- Management of tailings dams at Ekati is not consistent with current best-practice for management of mining dams in Canada.

Definitions

Receiving Water: waters in the Receiving Environment that receive any direct or indirect deposit of waste from the Project.

Receiving Environment: the natural environment that, directly or indirectly, receives any waste from the project.

Effluent: a wastewater discharge.

Effluent Quality Criteria (EQC): numerical or written limits on the quality or quantity of Effluent authorized for deposit to the Receiving Waters.

Fine Processed Kimberlite (FPK): very small particles (sand, silt clay) sized less than 0.5 mm in diameter, leftover as waste from the process of removing diamonds from the kimberlite ore.

Wastewater: water that is impacted by mining activities and facilities, either by contact with mine wastes (e.g., waste rock, processed kimberlite) or mine disturbances (e.g., roads), or through use in mine-related processes. Also referred to as 'Mine impacted water'.

Inundation Study: An engineering analysis to evaluate the downstream consequences that could arise from dam failure.



Directors observing Point Lake discharge pipe - 2022 site visit

Wastewater Discharge and Containment

Arctic Canadian is authorized to discharge water from specific locations at the Ekati mine provided that the water meets EQC. In 2022 Arctic Canadian discharged water from two locations:

- Approximately 61,000 m³ from Two-Rock Settling Pond (TRSP) (at the Sable site) to Horseshoe Lake.
- Approximately 4.2 million m³ of water from Point Lake to Lac du Sauvage as part of the Point Lake dewatering program.

Point Lake Dewatering Program

Data provided in the November SNP Report and GNWT comments on the Point Lake Dewatering Program Interim Update confirm that discharge from Point Lake during dewatering sometimes exceeded EQC for Total Suspended Solids (TSS). For example, the one-time maximum allowable concentration of 25 mg/L was exceeded three times, with temporary shut downs between each exceedance before the dewatering program was shut down for the year. The Point Lake Dewatering Plan describes Arctic Canadian's planned approach to avoiding

exceedance of the EQC, stating that pumping would cease before exceeding either the maximum average (4 samples) or maximum one-time EQC. In contrast, the Interim Update on Point Lake dewatering describes the approach that Arctic Canadian applied "*Stage 1 pumping must cease after Total Suspended Solids (TSS) exceedances of 25 mg/L grab samples and 15 mg/L averages over four consecutive weekly samples.*" With this approach, Arctic Canadian continued pumping until non-compliance had already occurred for both maximum average and maximum one-time EQC.

Arctic Canadian chose to rely on exceedance of both average and one-time EQC before taking action. The Agency disagrees with Arctic Canadian's interpretation and application of EQC and recommends that proactive action levels must be established to avoid exceedance

of EQC for any future water discharges. Enforcement action should be taken for similar future exceedances.

Discharge of wastewater on site

Arctic Canadian did not discharge any water in 2022

from the LLCF to Leslie Lake or from King Pond Settling Facility (KPSF) to Cujo Lake.

The total volume of water discharged from the site was much lower in 2022 than in 2021. This is likely due to lower precipitation in 2022



Long Lake Containment Facility - Cell B with Waste Rock Pile in background

as well as water management decisions. The current disposal of processed kimberlite in the Panda and Koala pits and continued reliance on the LLCF for process plant water means the site is accumulating mine impacted water. The Agency is concerned about how this ongoing accumulation of water affects the requirements and costs for closure.

Arctic Canadian is also authorized to use mine impacted water and fresh water for dust suppression on roads. Arctic Canadian used 85,000 m³ of water for road watering in 2022; 17,000 m³ of mine impacted water from TRSP and 68,000 m³ of fresh water from Lac de Gras and Falcon Lake, more than 3 ½ times greater than in 2021 (approximately 22,000 m³). This increase in use for road watering

appears to correlate with reduced reliance on commercial dust control products. Refer to the Air Quality chapter of this report for additional discussion about the implications of the different dust control methods.

As part of ongoing operations, Arctic Canadian also collects and transfers mine impacted water in and among facilities at the site. The management of open pit and underground water during 2022 is summarized in Table 4.

All sewage wastewater from the site is treated in the sanitary sewage treatment plant located at the main camp. Sewage from washroom facilities outside of the main camp complex is trucked to the sewage treatment plant. Treated effluent from the sewage treatment plant

flows through a pipeline to the process plant, where it is mixed with FPK and then discharged. At the Water Licence technical session in March 2023, Arctic Canadian stated that all sewage is discharged to the LLCF. The Annual Report states that in 2022, a “total of 62,989 m³ of liquid sewage effluent was deposited into containment facilities through the Process Plant.” The Agency is concerned that the final disposal location(s) for sewage effluent remains unclear: is it all deposited in the LLCF, or is it distributed among the FPK disposal facilities? Arctic Canadian should clarify this in future reports because the water quality constituents associated with sewage are different from those associated with FPK.

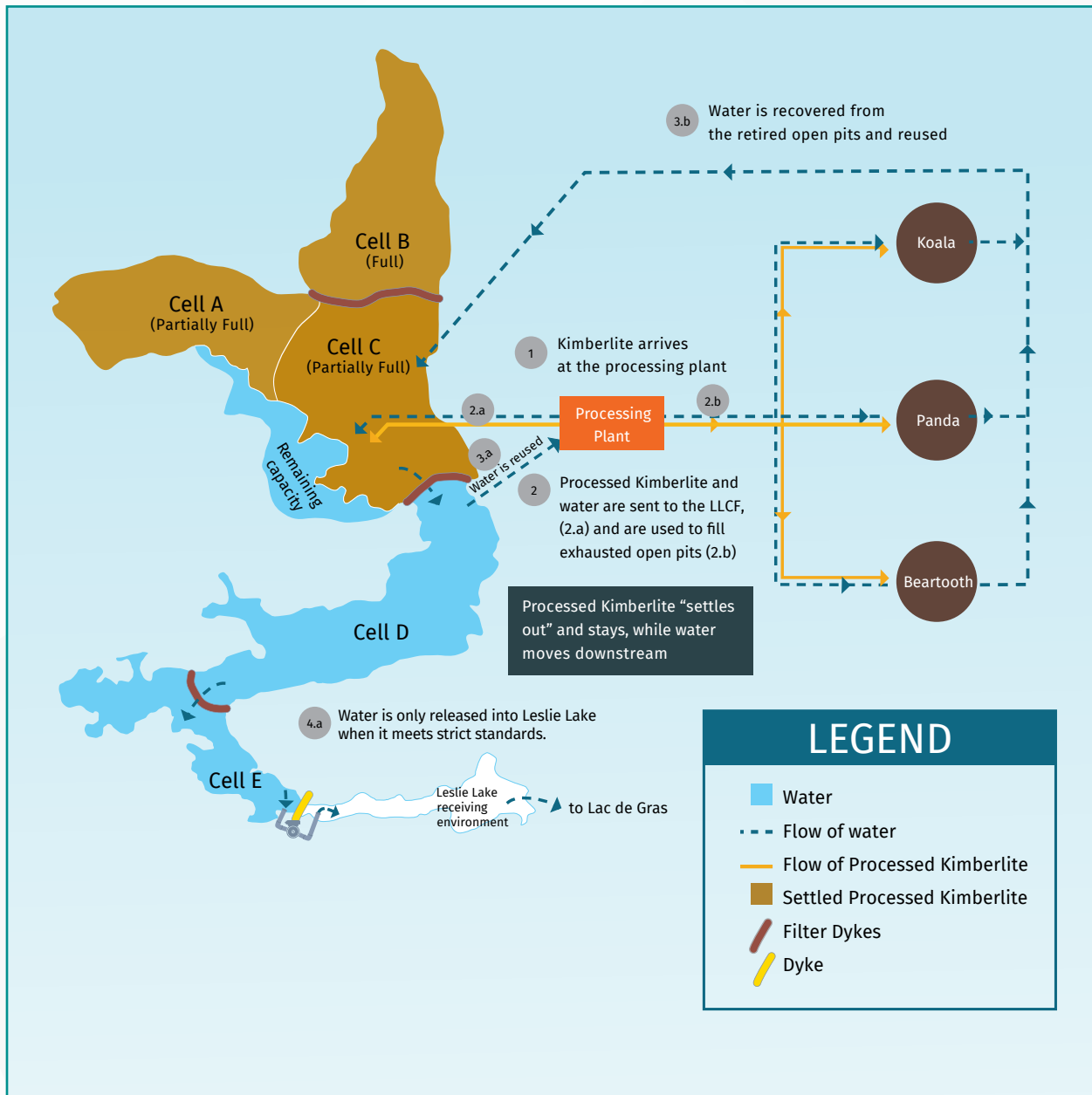
Table 4 – 2022 Open Pit and Underground Water Management

Mine Area	Source	Water Management Action	2022 Volumes (m ³)
Panda-Koala	Open Pit	Pumped to LLCF or Process Plant.	0 to LLCF or Process Plant
Beartooth	Open Pit	Pumped to LLCF.	980,000 to LLCF
Fox	Open Pit	Pumped to LLCF during operation. Currently accumulating in pit.	0 to LLCF
Pigeon	Open Pit	Pumped or trucked to LLCF or Beartooth PKCA.	0 to LLCF or Beartooth PKCA
Sable	Open Pit	Pumped or trucked to TRSP.	24,000
Lynx	Open Pit	Pumped or trucked to KPSF.	0 to KPSF
Misery	Mine Sumps	Pumped to KPSF.	8,000
	Underground	Pumped to KPSF.	67,000
	Desperation Sump and Waste Rock Dam	Pumped to Lynx Pit.	62,000
	KPSF	Pumped to Lynx Pit.	179,000

Table 5 – FPK and water volumes deposited into PK Containment Facilities in 2022

Facility	Process Plant Solids – FPK (m ³)	Process Plant Liquids (m ³)
LLCF	155,000	1,299,000
Panda Pit	43,000	327,000
Koala Pit	808,000	4,620,000
Beartooth PKCA	0	0

WATER INPUTS AND FLOWS THROUGH THE LLCF



Fine Processed Kimberlite Management

In 2022, approximately 85% of FPK and 79% of process plant liquids were placed in the Panda and Koala pits, with the LLCF receiving the remaining portions. Table 5 lists volumes of FPK and process plant water deposited in each storage facility in 2022.

The LLCF remained as the sole source of water for the process plant, with approximately 6 million m³ of water withdrawn from the LLCF in 2022 and only approximately 1.3 million m³ of water returned to the

LLCF with FPK. This created a deficit of approximately 4.7 million m³ of water in the LLCF. This approach, which has been taken in 2020, 2021 and 2022, is fundamentally different from the ongoing recycle of process water that occurred prior to 2020 when FPK was only deposited in the LLCF.

The ongoing water deficit in the LLCF created by use of water in the Process Plant led Arctic Canadian, as part of its Water Licence renewal application, to request authorization to use fresh water from Upper Exeter Lake to meet water demands on site. Arctic Canadian has

proposed to pump fresh water from Upper Exeter Lake into the LLCF so that water supply in the LLCF will be sufficient to supply the Process Plant.

The water balance deficit in LLCF is not surprising given the new approach for FPK management. The proposal to use fresh water for the Process Plant represents a fundamental shift in the water management approach at the site. It will result in less reliance on the use of recycled process water and more reliance on fresh water. This will lead to an ongoing accumulation of mine impacted water on the

RECOMMENDATION

Arctic Canadian should immediately take measures to manage the LLCF and all of the associated containment (including Filter Dikes) and conveyance structures as a Tailings Management Facility. Management of the LLCF should follow current best practices, including those described in the:

- Mining Association of Canada “Guide to the Management of Tailings Facilities” and “Developing and Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities”
- Canadian Dam Association “Dam Safety Guidelines” and “Application of Dam Safety Guidelines to Mining Dams”
- Findings of the Final Report of the Mount Polley Independent Expert Engineering Investigation and Review Panel

site, mostly in the Panda and Koala pits. All of this water will require active management as part of closure and reclamation. As a result, the accumulation of water has an associated accumulation of closure liability. The Agency believes that more comprehensive consideration of water recycle options is required, including options for recycle of water from pits that are used for storing FPK (Panda, Koala, Beartooth). If water continues to accumulate on site, closure liability estimates and associated security, must be adjusted to account for greater volumes of mine impacted water.

Management of Tailings Dams

The Mining Association of Canada (MAC) “A Guide to the Management of Tailings Facilities” (MAC, 2021), a best-practice guide for tailings management in Canada, defines tailings as “a byproduct of mining, consisting of the processed rock or soil left over from the separation of the commodities of value from the rock or soil within which they occur.” There is no doubt that Processed Kimberlite is tailings within the MAC definition.

Several structures in the LLCF provide containment for the FPK, the fine portion of “tailings” from Arctic Canadian’s mining process and mine impacted

water. According to the Canadian Dam Association, all of the containment structures, including internal structures, in the LLCF should be managed as dams:

“The dam is considered to be the perimeter containment structure(s) around the tailings facility. Within a tailings facility, there can also be internal structures that should be treated as dams if they provide containment of solids and/or fluids. The terms “dyke” or “dike” are used by some mining operators. In this Bulletin, these are all treated as dams.”

(Canadian Dam Association. 2014. Technical Bulletin, Application of CDA Dam Safety Guidelines to Mining Dams.)

RECOMMENDATION

Arctic Canadian should prepare or update the Operation, Maintenance and Surveillance Manual for the King Pond Settling Facility prior to using the facility to store water from Point Lake dewatering. The OMS Manual needs to address management, maintenance and monitoring actions and changes that are required before the King Pond Dam and Saddle Dam will experience higher water levels than considered in recent Geotechnical Inspection Reports.

The Dam Safety Guidelines and the Technical Bulletin: Application of the Dam Safety Guidelines to Mining Dams (both from Canadian Dam Association) describe rigorous processes for prudent management of tailings dams. In accordance with the Dam Safety Guidelines, the management regimes for dams are to be founded on dam classification – a process for evaluating the risks of failure for each dam.

The 2022 Annual Geotechnical Inspection Report (the “2022 Geotechnical Report”, TetraTech, 2022) completed for Ekati states *“Dam classifications have been assigned based on a high-level review of site conditions and available design data. Inundation studies have not been completed for the site dams.”*

Arctic Canadian confirmed at the technical session for the Water Licence renewal that inundation studies have not been conducted for LLCF dams. The high-level approach and lack of inundation studies is not consistent with the methods described in the Dam Safety Guidelines for dam classification.

In the absence of rigorous and defensible dam classification, the dam management regime at the site cannot be adequately developed or evaluated.

The Agency is concerned that the current approach for management of the LLCF and its associated tailings dams is not consistent with current best-practice for management of mining dams. The lack of rigorous dam classifications, including inundation studies, means that we do not fully understand the risks associated with the tailings containment facility.

King Pond Settling Facility

The 2022 Geotechnical Report identified deficiencies with the King Pond Dam and Saddle Dam that provide containment for the KPSF. The Report concluded that monitoring, recommendations and deficiencies would need to be addressed in scenarios where the dams will contain higher water levels than those experienced in recent operations. The water elevation at the time of the inspection was 443.7 m and the maximum water level in 2022

was 445.0 m, well below the design maximum elevation for King Pond Dam of 446.6 m.

Some relevant findings of the Inspection Report include the following:

- Maximum water level should be 446 m
- Ground temperatures should be monitored biweekly once water levels increase above 445 m.
- *“Settlement monitoring was reduced to include only the vertical direction and should be measured at least once per year (in July). Until the dam impounds a significant head of water, horizontal movement is unlikely.”*
- *“The liner sloughing at the Saddle Dam is isolated to a single location near the shoreline. Significant seepage through the Saddle Dam Upgrade is not expected so long as water levels remain near the current elevation.”*
- *“Increased sliding and sloughing can be expected as water is impounded in the facility and water*

elevations rise. The dam conditions should be monitored as water levels rise and remedial measures implemented as required.”

- *“Rip rap along the toe of the affected areas could be considered to improve the overall stability of the cover material but is not an immediate requirement.”*

In 2023, the KPSF will experience higher water levels because it will receive water from Point Lake dewatering. As a result, the issues and recommendations provided in the Geotechnical Inspection Report will need to be actioned before dewatering and as it progresses. Appropriate up-to-date management and operational tools must be in place to ensure safe operation of the KPSF and the associated dams. ■



Dyke C separating Cell C with Processed Kimberlite on left from Cell D with open water on right



Dewatering pipe along Point Lake Road - 2022 site visit

Closure and Reclamation

HIGHLIGHTS

- Arctic Canadian submitted the Interim Closure and Reclamation Plan (ICRP) Version 3.1 in December 2022. However, the submission did not meet conformity requirements for previous Wek'eezhii Land and Water Board (WLWB) directions. It appears that Arctic Canadian made little overall progress on closure and reclamation planning in 2022.
- Arctic Canadian indicated that it does not intend to complete the approved measures for closure of the North Pond at Old Camp. A revised closure and reclamation plan for this area is needed.
- Financial security increased by approximately \$9.5 million in 2022 to account for activities at Point Lake, and ongoing mining at Sable Pit. Further adjustments have been approved for 2023 following GNWT's comprehensive review of liability.
- Costs for construction and maintenance of the winter road during closure and reclamation are a substantial gap in the current estimate of liability and security bond.

Definitions

Progressive Reclamation:

Reclamation activities undertaken before the end of commercial mining activities, generally used for areas and site components where mining activities are complete.

Surety Bond:

A financial guarantee from an insurance company to cover closure and reclamation costs if the mine operator defaults on its obligations to complete closure and reclamation.

Irrevocable Letter of Credit

(ILOC): A financial guarantee from a bank to cover closure and reclamation costs if the mine operator lacks financial capacity to fulfil its closure and reclamation obligations.



Revegetation webbing on the LLCF - 2016 site visit



Revegetation webbing on the LLCF - 2022 site visit

Closure Planning Progress and Status

When mining is complete at the Ekati mine, effective implementation of closure and reclamation activities will require a well-developed, comprehensive Closure and Reclamation Plan (CRP). As mining progresses, the importance of having a comprehensive, executable plan for closure and reclamation of the site increases. Arctic Canadian expects that the currently approved mining activities will provide ore for the process plant through to

approximately the end of 2029². The Water Licence requires Arctic Canadian to submit a Final CRP no later than 24 months before planned completion of commercial operations – i.e., end of 2027. Despite the approaching completion of approved mining activities, Arctic Canadian made little progress in closure planning in 2022.

In February 2020, the WLWB conditionally approved the August 2018 Interim Closure and Reclamation Plan (ICRP) v3.0 and set out requirements and timing for Arctic Canadian to develop and submit ICRP v3.1. The WLWB directed Arctic

Canadian to provide additional detail, especially with respect to closure objectives and criteria, and to submit the revised plan no later than March 2021. However, progress took longer than planned, primarily because of the level of effort required to develop and refine closure objectives and criteria, as well as delays caused by COVID-19 health protection measures.

In April 2022, following workshops on closure objectives and criteria in 2021, Arctic Canadian submitted additional closure planning information, including: revised closure criteria, criteria work plan, and

² Arctic Canadian Diamond Company Ltd. April 2023. Ekati Diamond Mine Environmental Agreement and Water Licence Annual Report 2022.



Revegetation plots on the LLCF - 2018 site visit

reclamation research plans, and an outline for an end land use plan (now referred to as a Returning Land Use Plan). In its July 2022 decision, the WLWB did not approve any of the documents submitted and rejected Arctic Canadian's proposal to use the Returning Land Use Plan as a metric for closure criteria related to land use. Instead, the WLWB directed Arctic Canadian to provide additional detail in ICRP v3.1 to demonstrate progress on development of an executable

CRP. The WLWB requirements focused on refining and finalizing closure criteria, and developing detailed plans for closure and reclamation of mine components that are no longer in use. Final closure criteria are required for any mine component associated with an area of the mine where mining has ended or will be completed by December 2024 (e.g., completed pits and waste rock storage areas). Reclamation research for these same components must be

completed by December 2024. The WLWB July 2022 decision is consistent with the Agency's 2022 recommendation that numerical closure criteria must be developed before the Final CRP to support the upcoming stages of closure planning.

Arctic Canadian submitted ICRP v3.1 in December 2022, 21 months after the initial deadline. Unfortunately, an April 19, 2023 letter from the WLWB confirms that the submission does not conform with the WLWB's previous directions regarding final closure criteria and required level of detail.

The Agency has not had an opportunity to review ICRP v3.1 as it has not been released for review. Based on the WLWB's letter however, the Agency agrees that the level of detail in closure plans and the status of closure planning do not meet expectations for the Ekati mine's stage of mine life. As the Agency has stated in previous reports, closure and reclamation planning is an iterative process and ICRPs are expected to evolve, develop and increase



Revegetation webbing on the LLCF - 2022 site visit

in detail as mining progresses, with each version providing increased certainty and understanding about the closure and reclamation. The WLWB's April 2023 letter indicates that there was little overall progress on closure planning in 2022, with the exception of planning for back-flooding of Fox and Pigeon pits. At this stage of mine life, the Agency suggests closure planning should include most final closure objectives and criteria, as well as detailed closure designs for many mine components.

The lack of progress towards this level of detail in 2022 does not demonstrate a responsible

commitment to effective closure planning for the mine. Given the approaching end of authorized mining activities and the level of effort required to finalize an executable CRP, substantial progress on closure planning is now urgent.

Progressive Reclamation

In January 2023, Arctic Canadian submitted Back Flooding Plans for Fox and Pigeon pits. These Plans describe the proposed approaches for filling the pits with fresh water, including proposed sources of water, pumping and piping systems,

and filling rates. If Arctic Canadian receives approval for the plans, it intends to start pumping water into Fox Pit in 2023 and Pigeon Pit in 2024.

In principle, the Agency supports progressive reclamation as an effective method to address environmental effects associated with mining activities and reduce closure liability. Therefore, the Agency is pleased that planning has begun for progressive reclamation of Fox and Pigeon Pits. However, the Agency is concerned about undertaking reclamation activities when the closure criteria that will define whether the closure activities are successful have not been

» RECOMMENDATION

Arctic Canadian should seek approval of a revised Old Camp Closure and Reclamation Plan if it does not intend to reclaim the North Pond in accordance with the existing approved plan. A revised plan must demonstrate that the approved closure objectives and criteria will be achieved, including an evaluation of potential effects of leaving processed kimberlite in place.

finalized. This leaves uncertainty about whether the closure plans, in this case the proposed back flooding plans, will achieve the final closure criteria and objectives.

Arctic Canadian did not undertake any progressive reclamation activities in 2022. The Agency notes there are inactive facilities at the site and progressive reclamation has not been undertaken.

Progressive reclamation completed at Old Camp between 2014 and 2018 did not include removal of all processed kimberlite as described in the approved 2013 Old Camp Closure and Reclamation Plan. During the Water Licence renewal process, Arctic Canadian stated that it does not

intend to relocate the processed kimberlite material. If Arctic Canadian intends to leave the processed kimberlite in place, it needs to seek approval for a revised closure plan for this site. A revised plan must include an evaluation of potential long-term effects of leaving processed kimberlite in place in the North Pond.

In 2022, Arctic Canadian continued to monitor the success of progressive reclamation completed at Old Camp between 2014 and 2018. Water quality results were similar to previous years, with one exceedance for dissolved aluminum (similar to 2019, 2020 and 2021) and one exceedance for total arsenic (similar to 2018 and 2019). At the Technical Session for the 2022-23

Water Licence renewal, Arctic Canadian stated that it intends to cease monitoring at Old Camp in 2024, because it will have completed the planned 5-years of monitoring. The Agency does not support the proposed cessation of monitoring until it has been demonstrated that all closure criteria are being consistently achieved.

Financial Security

To manage public liability and risk, at any point in time the GNWT needs to hold financial security equal to the total anticipated cost of closure and reclamation of the Ekati mine at that time. Based on a review of security held under licences and permits, the total reclamation security held by the GNWT as of December 31, 2022 was



approximately \$292.6 million, held predominantly under the Water Licence as indicated in Table 6. The total security at the end of 2022 represents

an increase of approximately \$10.5 million from December 2021. The increase includes approximately \$7.6 million for the Point Lake project, and

approximately \$2.9 million required prior to completion of 60% of mining at Sable Pit.

Table 6 - Ekati Mine Reclamation Security Held (December 31, 2022)

Security Item	Amount Held
Water Licence Security W2012L2-0001	\$269,521,012
Ekati Environmental Agreement	\$19,991,424
Misery Underground Land Use Permit W2017D0004	\$1,397,982
Jay Early Works Land Use Permit W2013D0007	\$659,280
Point Lake Early Works Land Use Permit W2021X0004	\$57,720
Point Lake Land Use Permit W2021D0005	\$986,852
Total:	\$292,614,270

GNWT holds over 95% of the Water Licence security in the form of surety bonds, with the remainder held as irrevocable letters of credit and cash. GNWT’s acknowledgements of security deposits confirm that security for Misery Underground is also held as a surety bond, but do not identify the form of security for the Point Lake permits.

In November 2022, GNWT requested a security adjustment after completing a review of the existing liability, the first site-wide review since 2014. The Agency commends GNWT for initiating the review and request for adjustment.

Inflation

GNWT’s estimate adjusted costs for inflation, considering cost escalation up to 2021.

The Agency supports the adjustments to account for inflation, but is concerned that inflation rates have been high through 2022 and 2023 and therefore the liability has continued to escalate. The post-2021 increases are not addressed in the GNWT estimate.



Revegetation plots on the LLCF - 2022 site visit

Fuel during closure and reclamation

GNWT's estimate proposed increased costs for fuel during closure and reclamation. Arctic Canadian argued that there would be a substantial fuel inventory on site under all circumstances and proposed a credit for this fuel. In a March 2023 decision, the WLWB concluded that there is uncertainty about the amount and useability of fuel inventory and therefore accepted the GNWT's estimate. The Agency agrees with this adjustment.

The Agency is concerned that the unit costs for fuel (i.e., cost per litre) may not reflect the actual costs that will be incurred by GNWT if it has to undertake closure and reclamation

activities. Fuel costs are a considerable component of the overall security estimate and are particularly prone to changes in value given the volatility of fuel prices. It is important that the fuel costs in the liability estimate reflect the rates that would be available to government and its contractors, which may be different than rates available to the mining company. GNWT's review noted that it did not have the expertise to forecast fuel costs. The Agency agrees with the WLWB's recommendation that GNWT seek additional expertise in this area.

Winter Road

The costs for constructing and maintaining the winter road that provides access to the Ekati mine is a substantial gap

in the estimate of liability for closure and reclamation, and in the current financial security held by GNWT. Winter road access will be required for transporting equipment and supplies to and from the site during closure and reclamation. In the absence of security to cover these costs, there is a substantial liability currently held by public government if it is required to carry out closure and reclamation activities. The Agency believes that the liability estimate and security bonding must be adjusted to include costs for construction and maintenance of the winter road. ■



» RECOMMENDATION

Arctic Canadian should acknowledge and address the urgency of advancing closure planning for the Ekati mine. Closure objectives and criteria should be finalized, reclamation research completed, and executable plans and designs developed that reflect the current stage of mining activities. Planning activities should initially focus on mine components that are no longer active or nearing completion, and progress to include all mine components.

Traditional Knowledge and Community Engagement

HIGHLIGHTS

- Point Lake Waste Rock Storage Area design review process was an example of valuable community engagement resulting in significant modifications to the original design.

Definitions

Knowledge Holders: Indigenous people recognized within their own communities for their expertise, depth of knowledge and experience, and preservation of traditions.

Traditional Knowledge (TK) / Indigenous Knowledge: The entire, interconnected knowledge system of a group of Indigenous people — their spirituality, values and beliefs, environmental knowledge, transmission of knowledge and codes of practice.

Use of Traditional Knowledge and Community Input

Traditional Knowledge Elders Group

The Ekati Traditional Knowledge Elders Group (TKEG) was originally established in 2016 to provide Traditional Knowledge (TK) input for operational designs and closure plans of the since-cancelled Jay Project. The scope of the TKEG was subsequently expanded and applied to the entire Ekati mine site. The TKEG last met in 2018 and has been inactive for several years. Arctic

Canadian has committed to work collaboratively with interested parties in 2023 to determine the future of the TKEG and discuss how the TKEG can contribute to operational and closure activities at Ekati.

Community based Traditional Knowledge Projects

Fish Consumption in Communities

Arctic Canadian developed a Fish Consumption Rate Engagement Questionnaire to



determine a fish consumption rate for northern communities. Information on the topic was first presented and discussed in a workshop sponsored by Arctic Canadian in November 2022. This information was used to improve the Fish Response Plan that was being updated by Arctic Canadian to meet the requirements of the Water Licence. The questionnaire objective was to determine the optimal amount of metals in fish species that can be eaten by community members without endangering their health.

Point Lake Project Engagement

There were many concerns raised during the Point Lake review process regarding the

location of the waste rock storage area (WRSA) and overburden pile and their impact on the caribou movement corridor. Arctic Canadian set up additional meetings and a site visit with Elders and community members to ensure that their concerns were heard and addressed. These meetings resulted in the relocation of the WRSA and overburden pile to address the concerns raised. This is a significant example of the successful incorporation of Traditional Knowledge and community input leading to real operational changes at the Ekati mine. The Agency commends the company for the meaningful engagement and their willingness to change and also to the Elders and community

members who shared their concerns and were able to find workable solutions.

The company also solicited the insights and recommendations of community participants on the Point Lake Project Addendum to the Wildlife Effects Monitoring Program (WEMP), and caribou research in February 2022.



Point Lake Fish-out

Ekati staff and community members completed a fish-out of Point Lake over the summer of 2022. Fish fillets that were deemed favorable for human consumption were packaged, frozen, and shipped to communities. During the fish-out, community members assisted in collecting scientific data that will provide valuable information on lake trout ecology in the North. Arctic Canadian reports this was the first time the specific data collection methods (the Broad Scale Monitoring methods) have been used in the North, and that combined efforts of community fishers and staff have demonstrated these methods to be more efficient and effective

than what has been used in past fish-outs. The Agency looks forward to receiving the results of the data collection.

Fish Habitat Improvement for Fisheries Act Authorization

Remedial work for the Pike Creek Monitoring Program was completed in 2018. This work was designed to enhance habitat for spawning and migration of northern pike and other fish species in the Pike Creek system, a tributary to Great Slave Lake located near the community of Łutsel K'e. The first year of the post-remediation monitoring program occurred successfully in 2022. This work

was a habitat offsetting measure mandated by a *Fisheries Act* Authorization for the 2015 dewatering of Lynx Lake.

Tłı̨chų Boots on the Ground Program – Community-based Caribou Monitoring

Arctic Canadian supports various community-based Traditional Knowledge projects and programs including the Ekwo Naxoede K'e (Tłı̨chų Boots on the Ground), the Łutsel K'e Dene First Nation's Moccasins on the Ground and the Yellowknife Dene First Nation's On-the-Land Caribou Monitoring. These



Directors site visit with Ekati Staff - 2022 site visit

programs are Indigenous driven and monitor the caribou herds, habitat and impacts on caribou.

For two weeks in late August 2022, the Tłı̨ch̨ Boots on the Ground team observed caribou near to the Ekati mine. They

made important observations on the caribou's movements, habitat, health, and behaviours. As well, interesting observations were made to the south and east of the mine regarding the state of old caribou trails that are

now overgrown by vegetation due to the lack of use of these trails. Significant fugitive dust generated on the Misery Road and near the airport was also noted by the observers. ■

Assessment of the Regulators

The Regulators and Our Mandate

As the public watchdog for environmental management at the Ekati mine, the Agency monitors the performance of the operator as well as the government agencies that regulate the mine.

Agency's Overall Assessment

As in previous years, the regulators generally remain effective in ensuring that the company operates the Ekati mine in an environmentally sound manner. Some of the

key submissions reviewed for the past year include the Water Licence Renewal, the Interim Closure and Reclamation Plan v3.1 updated criteria package, Point Lake Waste Rock Storage

Area Design Plan, the Wildlife Monitoring and Management Plan and the study design for the associated Caribou Telemetry Analysis.

Government of the Northwest Territories

On April 1, 2023 the Department of Lands and the Department of Environment and Natural Resources were consolidated into the Department of Environment and Climate Change. Since this report covers the period of April 1, 2022 to March 31, 2023 it will remain consistent with the previous organizational structure.

Department of Lands

Typical pre-COVID inspection frequency ranged from 10 to

14 Water Licence inspections annually. In 2021, when some COVID-19 health protection measures remained in place, Inspectors conducted five Water Licence inspections and two Land Use Permit Inspections. For the review period of April 1, 2022 to March 31, 2023, two Water Licence and three Land Use Permit inspection reports were completed with no inspections being completed between May and December 2022.

Considering there was a relaxing of COVID-19 health protection measures in 2022, it is unclear what has led to the limited number of on-site inspections completed. The Agency is concerned with this apparent reduced frequency of inspections, especially if it continues into future years.

During the dewatering of Point Lake in the summer of 2022, there were three exceedances of their Effluent Quality Criteria



Koala Pit - 2022 site visit

for Total Suspended Solids (TSS) as established in the Water Licence. Arctic Canadian did not immediately inform the WLWB and Inspectors

of the exceedances and the Department of Lands has provided no acknowledgement or follow-up. The Agency believes that the Department

of Lands follow-up and communication with respect to these TSS exceedances should have been better.

RECOMMENDATION

In 2020 and 2021 COVID-19 health protection measures limited the ability of the Department of Lands to conduct on-site permit and licence compliance inspections. In 2022, with health protection measures largely removed, there continued to be a reduced number of inspections being undertaken. The Department of Environment and Climate Change should re-implement an inspection frequency consistent with prior-to-2020 levels or provide a rationale for the apparent reduced frequency.

Department of Environment and Natural Resources (ENR): Water Management and Monitoring Division

The Water Management and Monitoring Division (WMMD) effectively participated in all major reviews. Staff participation and the use of technical consultants provided great value during the various technical sessions, workshops and comment submissions.

In November 2022 the WMMD requested a site-wide security update for the Ekati mine. The Agency views this as a positive proactive step to ensure the environmental liabilities associated with the mine are fully covered by the posted financial security.

Environmental Stewardship and Climate Change Division

Environmental Stewardship and Climate Change Division (ESCC) is responsible for administering Ekati's Environmental Agreement. The 2019 Environmental Impact Report (EIR; an Environmental Agreement requirement) review process was eventually completed in 2022. The current 2022 EIR report has yet to be submitted and is behind schedule. ESCC is aware of this and has followed up with Arctic Canadian encouraging them to continue meeting their obligations under the Environmental Agreement.

Wildlife and Fish Division

The Wildlife and Fish Division (WFD) has the responsibility to protect and manage wildlife in the NWT. While 2021-22 saw an increase in the general level of participation by WFD, the Agency is disappointed by the lack of participation in the Point Lake Project review.

In August 2022, WFD advised Arctic Canadian of their expectations for the upcoming Wildlife Management and Monitoring Plan (WMMP) renewal submission, highlighting the concerns raised by the Agency and other reviewers during the Point Lake Project process. As a result, Arctic Canadian agreed to conduct a Caribou Telemetry Analysis. The Agency is pleased to note that WFD has been an active participant in discussions on design of the Telemetry study.

Environmental Protection and Waste Management Division

The Environmental Protection and Waste Management Division (EPWMD) developed and circulated the Ambient Air Quality Monitoring Guidelines for review which were approved to be distributed in early 2023. Together with the Ambient Air Quality Standard Guideline, which sets numerical thresholds for common air pollutants, these will provide a basic air quality framework for the NWT. The Agency commends EPWMD for this progress.



Fisheries and Oceans Canada

There has been a notable improvement in Fisheries and Oceans Canada's (DFO) involvement in the regulatory review process. However, while there was an increase in the number of reviews DFO participated in, the depth and thoroughness of comments remains low. The Agency is encouraged by the increase in regulatory input by DFO and looks forward to this continuing. The regulatory system can only benefit from an increase in the local and national technical expertise available through DFO.

Arctic Canadian conducted a fish out of Point Lake during the open water season of 2022, to allow for dewatering to begin. The fish out was authorized by DFO and completed in accordance

with the Broad-scale Monitoring Program. Unfortunately, little information has been provided on the actual fish out and the results or data collected as part of this program. The Agency expects greater transparency of the process and public access to findings and results.

Environment and Climate Change Canada

Environment and Climate Change Canada's (ECCC) involvement in the regulatory processes for the Ekati mine continued to be helpful. While comments were provided on a number of important regulatory submissions, the Agency was disappointed ECCC's input into reviews of the aquatic response plans was minimal.

Wèk'eezhì Land and Water Board

The Wèk'eezhì Land and Water Board (WLWB) continues to do an excellent job ensuring timely reviews of the many reports and monitoring programs required under the Water Licence. In particular, the Water Licence Renewal process has been clear and well organized. The WLWB has also worked to move the ICRP closure criteria process forward despite delays from Arctic Canadian on the full ICRP v3.1. The Agency is pleased that the WLWB sees the urgency in progressing the ICRP and the closure criteria forward much faster than the company proposes. ■



Ekati main camp

Assessment of Arctic Canadian

In March 2023, Arctic Canadian reported that Burgundy Diamond Mines (Burgundy) was attempting to purchase Arctic Canadian.

Both companies agreed to terms in-principle, although it still required shareholder approval, which was finalized in June 2023. Burgundy is an Australian company that focuses on the cutting, polishing and sale of diamonds.

In general, Arctic Canadian continues to operate the Ekati mine in compliance with its Water Licence and Land Use Permits. However, there were several notable exceptions this year that are outlined in the text below. The Agency has also noted an increasing trend of submitting

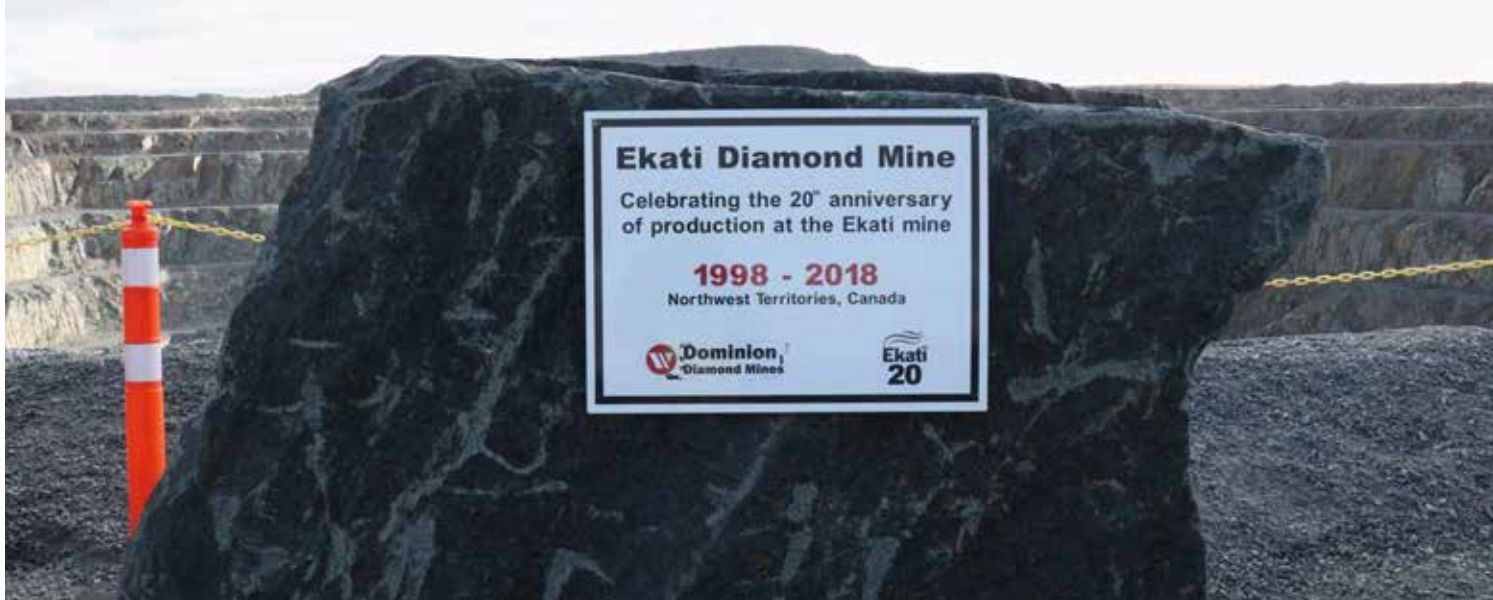
deadline extension requests, lack of detail and errors in reports and requests for reduced monitoring. This trend is troubling.

Communications

Arctic Canadian and the Agency continue to meet monthly. The Agency believes that there is a need and great value in routine and topic-specific communications.

Site Visit

The Agency visited the Ekati mine in October 2022. These site visits are critically important in the Agency's role as the oversight board since it allows Directors and staff to see first-hand what site conditions are and not have to rely solely on reports and photos. Despite the value of this recent site visit, the Agency maintains that one day site visits are not sufficient to review the entire site. An overnight stay or two separate visits are needed.



Point Lake Dewatering Plan*

During the site visit the Agency noted that the dewatering of Point Lake was not completed before freeze up as planned. While the Agency is not particularly concerned with the delay in completing the dewatering to 2023, we are concerned that Arctic Canadian did not inform the Wek'èezhii Land and Water Board (WLWB), Inspectors, communities or the Agency of the delay. It was not until the Agency requested an update on the dewatering plan that Arctic Canadian acknowledged the delay.

In addition to the dewatering delay, there were three Water Licence exceedances of Total Suspended Solids (TSS) in Point

Lake water pumped to Lac du Sauvage. Again, Arctic Canadian failed to provide the required notification and explanation of non-compliance until it was reported in the February 2023 Interim Update on the Point Lake Dewatering Program.

The Agency is very concerned with Arctic Canadian's handling of both the dewatering delay and Water Licence exceedances. The Agency fully expects that future incidences will be better communicated to the authorities (WLWB and Inspectors), communities and the Agency.

Closure Planning**

The Interim Closure and Reclamation Plan (ICRP) is a critically important plan that

details how the mine will be closed and reclaimed and what environmental criteria it will have to meet post-closure. The current version, ICRP 3.0, submitted in August 2018 required many changes due to a lack of detail. The Agency is concerned by the continuing lack of detail and delays in updating this critical plan as the mine is nearing its current end-of-life in 2029. These concerns are shared by the WLWB in their April 2023 letter to Arctic Canadian expressing concern with the lack of progress, stating *"it appears that Version 3.1 does not propose significant advancement to that previously considered by the Board."*

***Note:** For a complete summary of the dewatering plan please see the Wastewater Discharge and Containment section in the Wastewater and Processed Kimberlite chapter.

****Note:** for greater detail regarding closure at the Ekati mine please refer to the Closure and Reclamation Chapter.

Water Licence Renewal Application

In November 2022, Arctic Canadian submitted a Water Licence Renewal Application to the WLWB as their existing Water Licence is expiring in October 2023. The application was generally informative and well organized. Arctic Canadian's responses to reviewers' initial comments were informative and good discussion took place during the Technical Sessions on many topics which lead to some resolutions. The Agency commends Arctic Canadian for their openness to reviewer's comments and questions. This cooperative approach greatly enhances the regulatory Water Licence renewal process. It is the Agency's expectation that a similar approach will be adopted for other more technical reviews, such as the ICRP v3.1 and the Point Lake Waste Rock Storage Area Design Plan.

Environmental Impact Report

The Environmental Impact Report (EIR) is required under the Environmental Agreement to be submitted every three years. It is a single report that looks at monitoring plans and results, focusing on trends and comparisons to initial environmental impact predictions. The 2019 EIR was finally approved in 2022 and the next version is already behind schedule.

Caribou Telemetry Analysis

As part of the Point Lake Project regulatory process and stemming from the Agency's Caribou Collar Data Analysis Report, concerns were raised by the Agency regarding the effectiveness of the current caribou mitigations used at Ekati and their lack of effectiveness testing. Arctic Canadian accepted the criticism and agreed to a more inclusive approach which included the development and design of a new Caribou Telemetry Analysis study. The Agency sees the

inclusion of reviewers' input in the design stage of the study as a very positive step as it will ultimately lead to greater acceptance of the study's findings. Initial results of the analysis are anticipated in early summer 2023.

Wildlife Effects and Monitoring Program (WEMP) and Annual Report

As in previous years, the WEMP annual report continues to provide the same information and discussion despite repeated comments suggesting much needed improvements. Despite Arctic Canadian agreeing during the Point Lake Project regulatory process to making improvements in wildlife and caribou monitoring, the Agency is disappointed to see that the 2022 WEMP did not include some of the changes discussed in previous years and as part of the Point Lake regulatory process. The Agency remains hopeful that the revision and renewal of the Wildlife Management and Monitoring Plan (the next iteration of the



Main camp with accommodations, process plant, main tank farm, and workshops

Wildlife Effects and Monitoring Plan) combined with results of the Caribou Telemetry analysis study will help improve the

annual monitoring and reporting of wildlife in general and caribou in particular. ■

Note: For greater detail regarding the WEMP please refer to the Wildlife Chapter.



Directors and staff - 2022 site visit

Agency Activities 2023

Over the past year, the Agency has participated in multiple document reviews, visited the Ekati mine and has showcased the site model at various meetings and venues. As the constraints related to COVID-19 have eased, the Agency is gradually getting back to their usual activities.

Meetings

Each year the Agency hosts multiple Board Meetings with all Directors. This year, there were 3 Board Meetings in Yellowknife that Directors attended in person. During these meetings, Directors discussed documents currently in review, recent events and workshops and shared their interactions with Society Members. We also received a presentation by the organizers of

the Tłıchǫ Government's Boots on the Ground Program during which they shared the results from the program and what they aim to achieve.

In the fall, the Agency hosted their Annual General Meeting. Like the previous year, this was a hybrid meeting. However, we were excited to have representatives from the Łutsel K'e Dene First Nation, Kitikmeot

Inuit Association, Yellowknives Dene First Nation, North Slave Métis Alliance, the Government of the NWT and Arctic Canadian all join us in person. Other participants, such as the Tłıchǫ Government, and some representatives from Arctic Canadian joined the meeting virtually through Zoom.

Ekati Site Visit

The Agency visited the Ekati mine in October 2022 – 3 years after our last visit before the pandemic. This was a single day trip and Directors visited multiples areas including:

- The Koala Pit to see the deposition of processed kimberlite
- Caribou ramps along the Sable Road
- The recently completed Pigeon Pit
- The Lac du Sauvage Road (formerly the Jay Road) which connects the Misery Road to Lac du Sauvage and the Point Lake Project
- The Point Lake access road and Point Lake
- The esker that runs parallel to Thinner Lake
- The King Pond Settling Facility
- The Long Lake Containment Facility (LLCF) and the revegetation experimentation plots

While visiting the Point Lake development area, Directors noticed Point Lake was only partially dewatered, which was contrary to the approved schedule in the Point Lake Dewatering Plan. The Plan stated the lake was to be completely drained by the end of September 2022.

Directors observed natural revegetation over a greater area of Cell B of the LLCF. What used to be kilometers of dark grey processed kimberlite, now looks like long stretches of grassy fields.

Another notable observation was the large amount of dust generated on the Sable Haul Road as the land trains drove past.

Agency Workshop

Although the Agency was looking forward to visiting communities this year, we were unable to successfully organize a visit or workshop due to staffing changes and/or prior commitments. The Agency was invited to the Tłıchǫ Government's Annual

General Meeting held in Whati to showcase the Ekati site model and the caribou movement animations to inform community members about the mine.

Other initiatives

The site-wide model

The site model was presented to various interested parties and was a useful tool to help supplement discussions. This typically occurred within the Agency's office or during meetings and workshops (to see the site model on display, see page 85).

The Agency continued to work with Selkirk College to develop and refine site maps and caribou collar data animations. This year we updated the caribou collar data animation to show animal pathways before the Sable Road and Sable Pit were constructed (pre-2016) and a second animation that shows the pathways after the Sable Road was constructed (post 2016). Animation development is still in progress and will be available to share with Society members and on our website in 2023-24.



Agency Annual General Meeting November 2022

Development of the Agency’s Resource Room

The Agency continues to build the Resource Room to allow historical information about the Ekati mine to be more accessible to the public. The documents stored in the office are scanned and saved on a computer which will soon be a searchable online resource.

Caribou Telemetry Analysis design

As part of Arctic Canadian’s research into understanding the movements of the Bathurst and Beverly-Ahiak caribou herds in

relation to mine infrastructure and activities, the Agency participated in three study design workshops hosted by the company.

Workshops

The Agency had the opportunity to participate in 10 workshops this past year. Many of these workshops took place online, however there were a few that were in person. Here are some of the workshops the Agency participated in during 2022-23:

- Diavik Closure Workshop Series (Sessions #2 and #4)
- EIR 2019 workshop (May-June)
- MVLWB workshop series – Closure and Reclamation (June), Engagement and Consultation (September), Climate Change (December)
- Geoscience forum (November)
- Wildlife Management and Monitoring Plan (WMMP) technical workshop (February)
- Water Licence renewal technical session (March)
- Point Lake WRSA Technical Meeting (March)
- DFO – National Fisheries Act workshops – Species at Risk Act (June)

Technical Review and Input

The Agency participated in 23 document reviews over the past year, including:

- Point Lake Dewatering Plan (May 2022)
- Proposed Reclamation Security Phasing Request (May 2022)
- Caribou Telemetry Analysis Methodology (May, June and September 2022)
- 2021 Environmental Agreement and Water Licence Annual Report (April & May 2022)
- Fish Response Plan v3.0 (May 2022)
- Waste Rock Ore Management Plan v11.1 (May 2022)
- Environmental Impact Report 2019 (June 2022)
- Waste Management Plan v8.1 and Spill Contingency Plan v15.1 (July 2022)
- Plankton and Benthos Response Plan v3.0 (July 2022)
- Draft Waste and Wastewater Management Policy (August 2022)
- Point Lake WRSA Design Plan and Seepage Prediction Report (August 2022)
- Nitrogen Response Plan v3.0 (September 2022)
- Water Licence Renewal Application (November 2022)
- GNWT Request for Security Review (November 2022)
- Two Rock Outfall Report and Plume Delineation Report (November 2022)
- WMMP Renewal (November 2022)
- AEMP Re-evaluation and Point Lake AEMP Design Plan (December 2022)
- Plankton and Benthos Response Plan v3.1 (January 2023)
- Pigeon and Fox Pit Back Flooding Plans (January 2023)
- Point Lake Dewatering Program Interim Update (February 2023)
- Mackenzie Valley Land and Water Board Closure Cost Estimator for Land Use Permits Policy and Support Manual (February 2023)
- WEMP Annual report (March 2023)
- AEMP Annual Report (March 2023)

Water Licence Renewal Application

In November 2022, Arctic Canadian submitted an application to renew its Type A Water Licence. This process involves the review of Arctic Canadian's proposed changes to the Water Licence, followed by a Technical Workshop (held March 2023) and a Public Hearing (June 2023). The updated Water Licence is sent to the Minister for approval before the current licence expires in October 2023.

Some of the main topics raised by the Agency during the Technical Workshop include the term of the licence, updating the monitoring programs, adjusting water use allowances and the identification of Dam and Containment structures based on current Standards.

Agency Communications

In addition to this Annual report, the Agency communicates with our Society Members and the public using our website, social media and our biannual newsletter, the Ekati Monitor.

The Agency website is a resource that houses information for all things related to environmental management at the Ekati mine. Resources are added as they become available, and our latest news is easily accessible on our website homepage. The Agency is always looking for ways to make the website more accessible and up-to-date ensuring transparency in the work we do.

The Agency presence on social media includes a Facebook page and a Twitter account. Our followers on both platforms are slowly growing as we strive to increase our online presence. ■

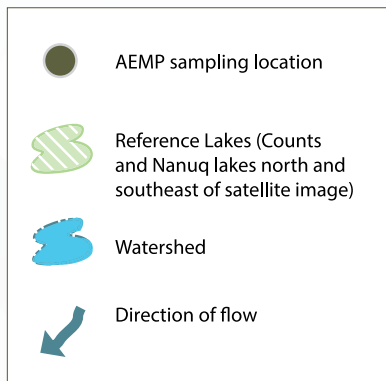
Right: Directors discussion site model to Kitikmeot Inuit Association representative at 2022 Annual General Meeting



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Appendix A - Tables and Figures

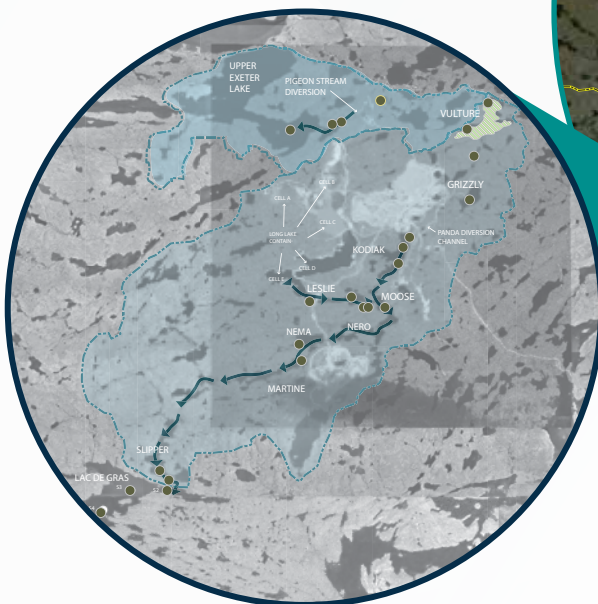
FIGURE A-1: EKATI MINE WATERSHED MAP WITH FLOWS AND SAMPLING SITES



Horseshoe Watershed



Koala Watershed
& Pigeon Watershed








King Kujo & Carrie Pond Watershed



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

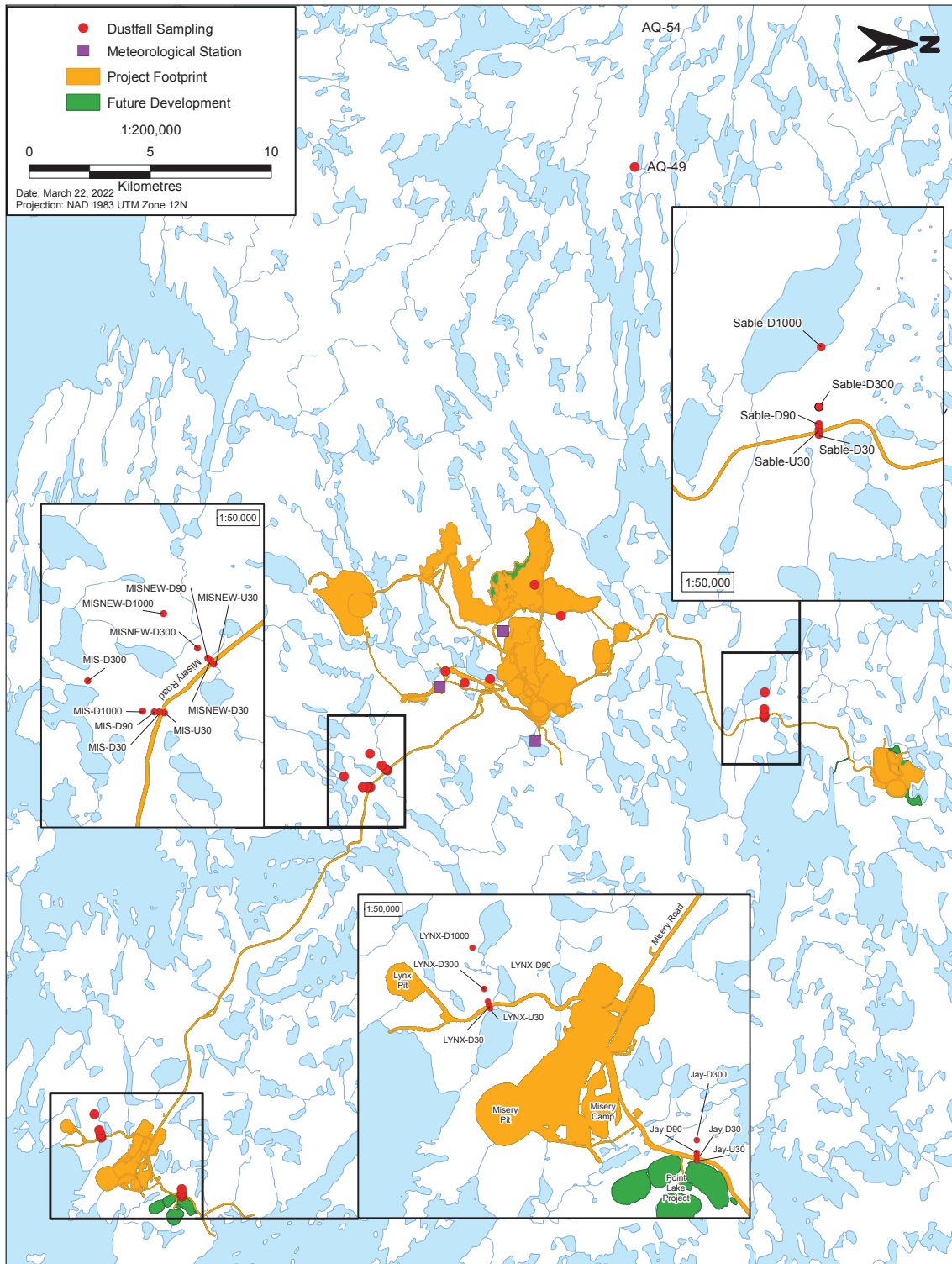
Reading the table from left to right, water flows in the Koala watershed from Leslie Lake to Lac de Gras and in the King-Cujo watershed from Cujo Lake to Lac de Sauvage. The solid dot represents water quality variables that continue to increase over time in comparison to their reference sites.

 Flow from effluent source to ultimate receiving lake in watershed  Increased over time in comparison to reference lake/stream or different from a constant  Elevated but not changing through time  Upper bound of 95% exceeded the SSWQO, water quality benchmark, or CCME guideline during ice-covered or open water season  Indicates observed mean exceeded the SSWQO, water quality benchmark or CCME guideline during ice-covered or open water season	VARIABLES ELEVATED IN KOALA WATERSHED LONG LAKE CONTAINMENT FACILITY → LAC DE GRAS									VARIABLES ELEVATED IN KING-CUJO WATERSHED 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
PARAMETERS MONITORED													
pH	○	○	○	○	○		★	★	★	○	○	★	★
Alkalinity	○	○	○	○	○	○	○	○	○	○	○	○	
Hardness	●	●	○	○	○	○	○	○	○	○	○	○	○
Chloride	○	○	○	○	○	○	○	○	○	●	●		
Sulphate	●	○	○	○	○	○	○	○	○	○	○	○	○
Potassium	●	○	○	○	○	○	○	○	○	○	○	○	
Total Ammonia	●	●	○	●	○					○	○	●	○
Nitrite	○	○	○										
Nitrate	○	○	○	○						○	○		
Total Phosphate-P													
Total Organic Carbon	●	○	●	○	○	○	○	○	○	○	○	○	○
Antimony	○	○	○	○	○	○	○	○					
Arsenic	○	○	○	○	○	○	○	●	○	○	○	●	○
Barium	○	○	○	○	○	○	○	○		○	○	○	
Boron	○	○	○	○	○	○				●	●		
Molybdenum	●	○	○	○	○	○	○	○	○	○	○	○	
Nickel	○	○	●	○	○	○	○	○	○	○	○		
Selenium	○	○	○	○	○	○				○	○		
Strontium	●	○	○	○	○	○	○	○	○	○	○	○	○
Uranium	○	○	○	○	○	○	○	○	○	○	○		

MINING EFFECTS ON WATER QUALITY FLOWING THROUGH THE HORSESHOE WATERSHED

<p>→ Flow from effluent source to ultimate receiving lake in watershed</p> <p>● Increased over time in comparison to reference lake/stream or different from a constant</p> <p>○ Elevated but not changing through time</p> <p>◆ Upper bound of 95% exceeded the SSWQO, water quality benchmark, or CCME guideline during ice-covered or open water season</p> <p>★ Indicates observed mean exceeded the SSWQO, water quality benchmark or CCME guideline during ice-covered or open water season</p>	VARIABLES ELEVATED IN HORSESHOE WATERSHED LONG LAKE CONTAINMENT FACILITY → LAC DE GRAS								
	HORSESHOE	HORSESHOE OVERFLOW	HWL2	HWL2 OVERFLOW	ROSS	ROSS OVERFLOW	LOGAN	LOGAN OVERFLOW	LOWER EXETER
PARAMETERS MONITORED									
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									

FIGURE A-2: MAP OF DUST SAMPLING LOCATIONS, PROVIDED BY ARCTIC CANADIAN DIAMOND COMPANY



Appendix B - Responses to Recommendations

Arctic Canadian's responses to recommendations

Air Quality

1) DUST SUPPRESSION

IEMA Recommendation: Arctic Canadian should expand the use of Envirokleen, or an alternative approved dust suppressant, to all active haul roads and not rely solely on road watering to minimize fugitive dust levels.

Arctic Canadian Response:

In 2017, the Department of Natural Resources of the Government of the Northwest Territories (GNWT) assigned Measure 6-4 by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) for the Ekati Diamond Mine's (Ekati) Jay project that is consistent with other requirements for dustfall for the operation. At this time, the recommendation included an interim dustfall objective of 1.53mg/dm²/day based on a seasonal average of dust deposition applicable at 300 m from a dust source. IEMA's measurements which are 30 and 90 meters (m) from the road and the suggestion that the numerical objective has been exceeded by as much as 24 times is an inappropriate conclusion. The comparison of dustfall data against an objective that was developed to compare dustfall levels at 300m from the source does not reflect Arctic Canadian's actual performance at reducing the deposition of dust. Arctic Canadian directs IEMA to the dustfall data from the stations 300m from the dust source, which represent the results against which the standard is supposed to be compared. These results demonstrate that Ekati has met or exceeded the interim dustfall objective at all stations. Use of dust suppressants are implemented on an annual basis and will continue to be considered in the future.

For further consideration, in recent years some parties have expressed concerns related to the tradeoff between the potential impacts of annual application of chemical suppressants versus the potential effects of dust being transported a relatively short distance from the road.

2) AIR QUALITY MANAGEMENT AND MONITORING PLAN

IEMA Recommendation: Arctic Canadian should update the existing Air Quality Management and Monitoring Plan to ensure consistency with the new GNWT Ambient Air Quality Monitoring Guideline and confirm best practices are being followed.

Arctic Canadian Response:

The existing AQMMP has been in use since 1995 and has been updated and expanded over time with the permitting of new projects. The AQMMP was developed to monitor for potential impacts specific to the operation of the Ekati and should not be amended solely because a general guideline was published, particularly in the absence of an identified deficiency in the program's ability to monitor for potential environmental effect of the operation. This fact is recognized within the GNWT Ambient Air Quality Monitoring Guideline (AAQMG) itself:

*“The intent of the guideline is to complement and supplement the existing monitoring approaches of each mine, lay out clear expectations, clarify the minimum requirements for monitoring, add context to the requirements set out in the EAs and the MOU, and to formalize best practices. **The guideline is not intended to change the design of a currently accepted air monitoring plan, affect data continuity, or create a negative impact.** Discussions with ECC are allowed under the guideline for alternative methods to those presented in the guideline (see Section 1.5).”*

Arctic Canadian believes that not only is the AQMMP appropriately designed to account for site specific conditions, it is also consistent with the GNWT AAQMG. Arctic Canadian engaged regularly with the GNWT during the development of these guidelines and is committed to continue discussions with ECC regarding the AQMMP as and when appropriate. The existing Arctic Canadian AQMMP does not require updating currently since the subsequent reporting and the guideline itself is consistent with the current GNWT AAQMP.

Closure and Reclamation

3) ADVANCING THE CLOSURE AND RECLAMATION ACTIVITIES

IEMA Recommendation: Arctic Canadian should address the urgency of advancing closure planning for the Ekati mine. Closure objectives and criteria should be finalized, reclamation research completed, and executable plans and designs developed that reflect the current stage of mining activities. Planning activities should initially focus on mine components that are no longer active or nearing completion, and progress to include all mine components.

Arctic Canadian Response:

The ICRP v3.1 includes a complete set of approved closure objectives and closure criteria have been refined to clearly detail what aspects will be evaluated to determine successful achievement of those objectives including the temporal components of monitoring and where final signoff will be documented. The criteria work plan details the steps required to develop final numerical criteria for all mine components.

Progressive reclamation will continue throughout the life of the mine. Arctic Canadian will continue to pursue reclamation opportunities when areas are no longer needed for mining operations and there is no potential for future mining. Mine operation schedules will determine which mine components are candidates for progressive reclamation and when the work can occur. Progressive reclamation submissions for the Pigeon Pit Flooding Plan, Fox Pit Flooding Plan, and the Panda, Koala, and Koala North Underground Final Closure and Reclamation Plan were submitted to the Board for review in January 2023. Arctic Canadian awaits a decision from the Wek'èezhii Land and Water Board (WLWB) before further certainty can be established and progressive reclamation activities can commence. It is unclear to Arctic Canadian how the work detailed above does not demonstrate a commitment to completing progressive reclamation and advancing closure related planning. Additionally, the urgency expressed by IEMA in their recommendation is unwarranted since Arctic Canadian is 6 years from the end of its operational mine life and the status of version 3.1 of the ICRP is in line with expectations described in closure guidelines.

Reclamation Research at Ekati has been underway since the beginning of mine operations. The Research Plans continue to evolve to accommodate ongoing updates in research findings, mine operating schedule, Environmental Management Plans, and changes in the ICRP. Updates to reclamation research progress

are provided through the Annual Closure and Reclamation Progress Report. Detailed timelines for how research timelines fit into the development of final closure criteria are outlined within the Criteria Workplan.

4) OLD CAMP RECLAMATION

IEMA Recommendation: Arctic Canadian should seek approval of a revised Old Camp Closure and Reclamation Plan if it does not intend to reclaim the North Pond in accordance with the existing approved plan. A revised plan must demonstrate that the approved closure objectives and criteria will be achieved, including an evaluation of potential effects of leaving processed kimberlite in place.

Arctic Canadian Response:

At present, Arctic Canadian is completing monitoring as described in Appendix C of the 2020 Annual Reclamation and Closure Progress Report. The results of which will dictate the need for an update to the Old Camp Closure and Reclamation Plan specific to the Phase 1 North Pond. The North Pond is currently covered with waste rock, and it is Arctic Canadian's view that as it poses no risk to the environment, there is no urgency in completing the approved reclamation work or submitting an updated closure plan for the Phase 1 pond until we have sufficient results to inform that decision. Should Arctic Canadian then find it necessary to make a change to the Old Camp Closure and Reclamation Plan, there is an established regulatory approach in place for making changes to monitoring plans and that process would be followed as required.

Wastewater and Processed Kimberlite Management

5) MANAGEMENT OF TAILINGS DAMS

IEMA Recommendation: Arctic Canadian should immediately take measures to manage the LLCF and all of the associated containment (including Filter Dikes) and conveyance structures as a Tailings Management Facility. Management of the LLCF should follow current best practices including those described in the:

- Mining Association of Canada “Guide to the Management of Tailings Facilities” and “Developing and Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities”
- Canadian Dam Association “Dam Safety Guidelines” and “Application of Dam Safety Guidelines to Mining Dams”
- Findings of the Final Report of the Mount Polley Independent Expert Engineering Investigation and Review Panel

Arctic Canadian Response:

Firstly, Arctic Canadian would like to clarify that the Long Lake Containment Facility (LLCF) has always been managed as a processed kimberlite containment facility and that the intermediate dikes have gone through various repairs and upgrades to ensure their integrity and that sufficient capacity is available to responsibly manage waste and wastewater associated with mine operations. Through the Water Licence renewal process, Arctic Canadian has made the commitment to adhere to the Canadian Dam Association (2019) definition of dams, which would include the intermediate dikes of the LLCF that contain solids. All containment structures, including Dike D, can be added to the dams list provided in Schedule 5, Condition 3. As such, the intermediate dikes of the LLCF will be included in future annual geotechnical inspections. The annual inspections completed at Ekati are consistent with “Engineering Inspections” referenced in Section 3.6.2 of the 2007 Dam Safety Guidelines (2013 Edition). The annual inspections are completed by a professional engineer, and annual performance is monitored against design parameters including water elevations, impoundment time, and ground temperatures.

6) OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL FOR THE KING POND SETTLING FACILITY

IEMA Recommendation: Arctic Canadian should prepare or update the Operation, Maintenance and Surveillance (OMS) Manual for the King Pond Settling Facility prior to using the facility to store water from Point Lake dewatering. The OMS Manual needs to address management, maintenance and monitoring actions and changes that are required before the King Pond Dam and Saddle Dam will experience higher water levels than considered in recent Geotechnical Inspection Reports.

Arctic Canadian Response:

Since 2001, King Pond has been modified into the KPSF for use as a sedimentation pond and containment facility for mine water and other runoff associated with Misery and Lynx open pits, Misery Underground and the Misery Waste Rock Storage Area. The KPSF is currently being used to manage mine water for the Point Lake Project. The functionality and monitoring procedures for the KPSF will remain the same regardless of the source of water entering the facility. The maximum operating water level of the King Pond Dam remains at 446.6 m. The liner crest elevation of the dam is 447.54 m which equates to a freeboard of 0.94 m. The annual inspections completed at Ekati are consistent with “Engineering Inspections” referenced in Section 3.6.2 of the 2007 Dam Safety Guidelines (2013 Edition). The annual inspections are completed by a professional engineer, and annual performance is monitored against design parameters including water elevations, impoundment time, and ground temperatures. These limits remain unchanged and no updates to OMS procedures are warranted at this time.

Government of Northwest Territories' response to recommendations

Frequency of Inspections

IEMA Recommendation: In 2020 and 2021 COVID-19 health protection measures limited the ability of the Department of Lands to conduct on-site permit and licence compliance inspections. In 2022, with health protection measures largely removed, there continued to be a reduced number of inspections being undertaken. The Department of Environment and Climate Change should re-implement an inspection frequency consistent with prior-to-2020 levels or provide a rationale for the apparent reduced frequency.

Government of Northwest Territories' response:

GNWT ECC acknowledges receipt of your annual report recommendation. As noted, land and water inspections have decreased since 2019 primarily resulting from staffing issues, pandemic related restrictions, and health measures. Reduction in services is a phenomenon affecting organizations globally, and GNWT ECC is not immune.

GNWT has noted and agrees with IEMA's recommendation to implement an inspection frequency consistent with prior-to-2020 levels. With reductions in pandemic restrictions, access to the Ekati site and aircraft availability are now more conducive to an increased inspection frequency. The GNWT commits to an increased inspection frequency going forward. ■

Right: Directors and Ekati staff walking along tundra - 2022 site visit



Appendix C - Acronyms and Glossary

Acronyms

AEMP = Aquatic Effects Monitoring Program

AQMP = Air Quality Monitoring Program

CKRSA = coarse kimberlite rejects storage area

DFO = Federal Department of Fisheries and Oceans

ECCC = Environment and Climate Change Canada

EQC = Effluent Quality Criteria

FAA = Fisheries Act Authorization

GNWT-ENR = Government of the Northwest Territories-Environment and Natural Resources

ICRP = Interim Closure and Reclamation Plan

IEMA = Independent Environmental Monitoring Agency OR 'the Agency'

KPSF = King Pond Settling Facility

LLCF = Long Lake Containment Facility

MVRMA = Mackenzie Valley Resource Management Act

PLP = Point Lake Project

TK = Traditional Knowledge

TRSP = Two Rock Sedimentation Pond

WEMP = Wildlife Effects Monitoring Program

WLWB = Wek'èezhii Land and Water Board

WMT = wet metric tonnes (of waste rock)

WRSA = Waste Rock Storage Area

Definitions

Acid [rock] drainage: Outflow of water that has become acidic due to exposure to exposed rock surfaces in waste rock piles, open pits and underground workings

Action level: when the concentration of a substance exceeds a level defined in the Aquatic Response Framework, where the company must take precautionary action in order to reduce or remove the potential for impending harm

Adaptive management: a management system with continual monitoring. If a mitigating action does not work, additional actions are used to keep the impacts within accepted levels or below thresholds.

Ambient air quality: the concentration of pollutant in the surrounding air

Benchmark: a standard against which to compare or assess a monitored parameter

Benthic macroinvertebrate: all life forms without bones living on lake and stream bottoms (i.e. clams, snails, crustaceans, insect larvae and worms).

Benthos: animals and plants that live at the bottom of a lake, wetland or stream

Concentration: the amount of a substance in the defined space; the amount of different pollutants in the surrounding air

Contingencies: methods to fix future events or situations that are possible but not certain

Discharge: to allow wastewater to flow out or be pumped out from where it was held

Dust suppression (or suppressants): actions that prevent or reduce the amount of dust spreading into the air

Financial security: funds accessible by government to cover the total expected cost of closing and reclaiming a mine site if a proponent is unable or unwilling to complete the reclamation.

Fine processed kimberlite: very small particles (sand, silt, clay-sized) less than 0.5mm diameter, leftover as waste from the process to remove diamonds from the kimberlite ore

Focal surveys: documenting observations of a single animal and the proportion of time it spends doing different behaviours, i.e., feeding, bedding, alert, etc.

Gonadosomatic index (GSI): represents the energy allocated to reproduction and is calculated as gonad weight/body weight x 100

Greenhouse gases: gases in the atmosphere that trap heat. They allow sunlight to pass through and warm the earth, but prevent the warmth from leaving. Most common GHGs are water vapour, carbon dioxide, methane, ozone, nitrous oxide and chlorofluorocarbons.

Incidental observations: records of observations of any wildlife by any persons and in all areas at the mine.

Knowledge holders: Indigenous people recognized within their own communities for their expertise and depth of knowledge and experience.

Landfarm: a place to treat contaminated soil

Liver Somatic Index (LSI): a metric tied to healthy metabolism, calculated as liver weight/body weight x 100

Metasediment: a type of metamorphic rock-rock transformed by heat, pressure, other natural actions.

Meteorological: the science of weather and climate; the conditions of the atmosphere in an area.

Mitigation, mitigating: an action that is taken to reduce the negative impacts of a condition or situation. To make something less harmful. In this case, to make sure environmental impacts from the mine are as minimal as possible.

Monitoring: collecting and analyzing repeated observations and measurements to evaluate change and impacts of change. Watching habitat and wildlife, and 'keeping an eye' on things all the time.

Neutralize: to make something ineffective or harmless. In this case, to make an acid or alkaline substance chemically neutral.

Overburden: rock or soil covering a mineral deposit. It is removed to get to the ore or rock that contains the desired mineral(s)

Particulates/particulate matter: Very tiny bits of dust, smoke, and other harmful materials in the air. Some are big enough to see with your eyes; others are so small you need a microscope. Particulate matter is a mix of particulates and liquid droplets.

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

Reclamation: the process of returning areas of land and water-disturbed by mining operations-to conditions that are consistent with closure objectives

Scan surveys: observations of the behaviours of a group of animals for quantifying the frequencies of dominant behaviours in a group over a period of time.

Seepage: the slow escape of liquid or gas through a porous material or small holes. In this case, liquids escaping from waste rock piles that may contain contaminants.

Slurry: fine processed kimberlite mixed with water

Surface minewater: water that is pumped or flows from open pits, underground workings or other mine areas

Systematic surveys: surveys conducted by the Ekati Environment Department using specific methods and covering an established area, such as all main roads and the Misery power line.

Threshold: a defined point, level or condition where, if things change beyond that point, further change can cause lasting harm.

Till: a coarse collection of clay, sand, gravel and boulders mixed together and deposited by glaciers

Traditional knowledge;

Indigenous knowledge:

The entire, interconnected knowledge system of a group of indigenous people: spirituality, values and beliefs, environmental knowledge, transmission of knowledge and the codes of practice.

Indigenous people:

spirituality, values and beliefs, environmental knowledge, transmission of knowledge and the codes of practice.

Wastewater: water that has been affected by mining processes, activities or wastes

Zone of influence (ZOI): is the area around a development where caribou distribution and abundance are less than what

would be expected based on the habitat alone.

Zooplankton: 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 fish.



Board of Directors



Emery Paquin | Chairperson

Appointed jointly by the Government of the NWT, the Government of Canada, and Arctic Canadian in 2015.

Emery Paquin (Chairperson) was appointed jointly by the Government of the NWT, the Government of Canada, and Arctic Canadian in 2015.

Emery is an independent environmental consultant living in Yellowknife. He has more than 40 years of environmental management experience with the northern mining industry and territorial government, and served six years as a Member on the Inuvialuit Water Board prior to being appointed to the Monitoring Agency.



Ronald Allen | Vice-Chairperson

Appointed jointly by the Government of the NWT, the Government of Canada, and Arctic Canadian in 2017

Ron has been living and working in a variety of Arctic communities since the 1970's, and has worked with community groups and organizations on local cultural values, concerns and aspirations related to renewable resources. Ron moved to the NWT as a Renewable Resources Officer and transferred to Fisheries and Oceans Canada in the 1980's where he worked as a Fishery Officer and Habitat Inspector. Later he worked as Area Manager and Area Director, delivering and managing multiple-sector operational programs including Habitat Assessment, Fisheries Management, Conservation and Protection, Science, and Administrative Services.



Kim Poole | Secretary/Treasurer

Appointed by the Governments of Canada and NWT, and BHP Billiton in 2006, and was reappointed by the Tłı̨cho Government in 2015

Kim is an independent wildlife biologist with over 40 years of experience in the Northwest Territories, Nunavut and British Columbia in the areas of wildlife and wildlife habitat research, and assessment and mitigation of environmental impacts related to the mining, forestry, and tourism industries.



Tim Byers

Appointed by Akaitcho Treaty 8 First Nations (YKDFN and LKDFN) in 2001

Tim Byers is an independent consultant living in Manitoba. He has been working on projects in the Canadian Arctic since 1980. He specializes in studies of fish, Arctic seabirds and marine invertebrates and has assisted Aboriginal communities in documenting their indigenous environmental knowledge. He would like to see more Aboriginal youth engaged in environmental sciences and Traditional Knowledge used more effectively in environmental monitoring, research and impact assessments.



Jesse Jasper

Appointed jointly by the Government of the NWT, the Government of Canada, and Arctic Canadian in 2016

He retired from the federal government in 2011 after 39 years with Indigenous and Northern Affairs Canada and Environment Canada. He has worked in northern Canada since 1972, focusing on a variety of water monitoring and environmental studies to support the design and evaluation of northern development projects, and the characterization and monitoring of environmental conditions. He contributed to and coordinated a number of major project reviews, technical presentations to northern environmental assessment panels, and follow-up licencing of northern development projects by the NWT Water Board. This included Norman Wells Oilfield Expansion and the NWT Diamond Project (now the Ekati Diamond Mine). Jesse ended his career with a two year term as Executive Director of the Mackenzie River Basin Board.

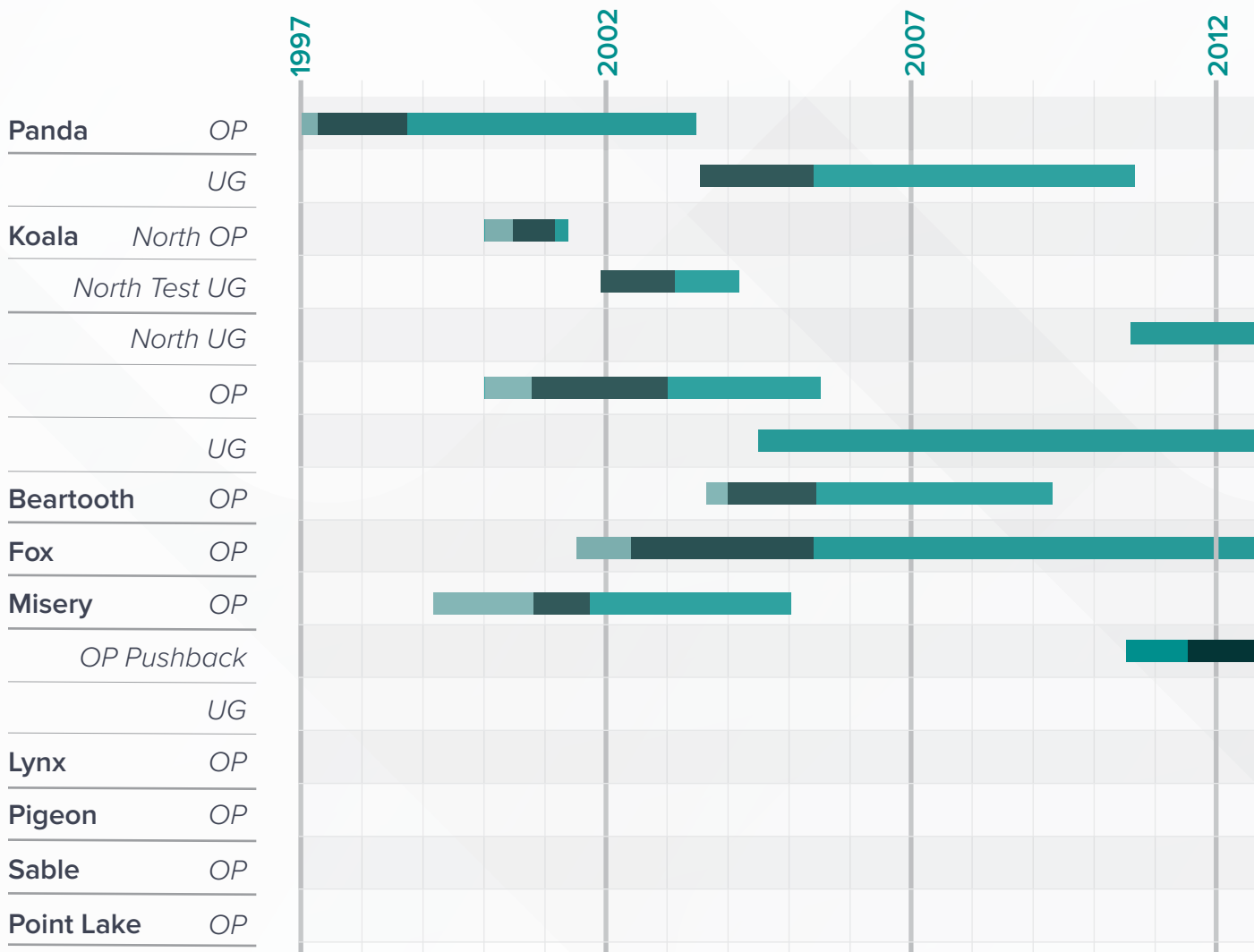


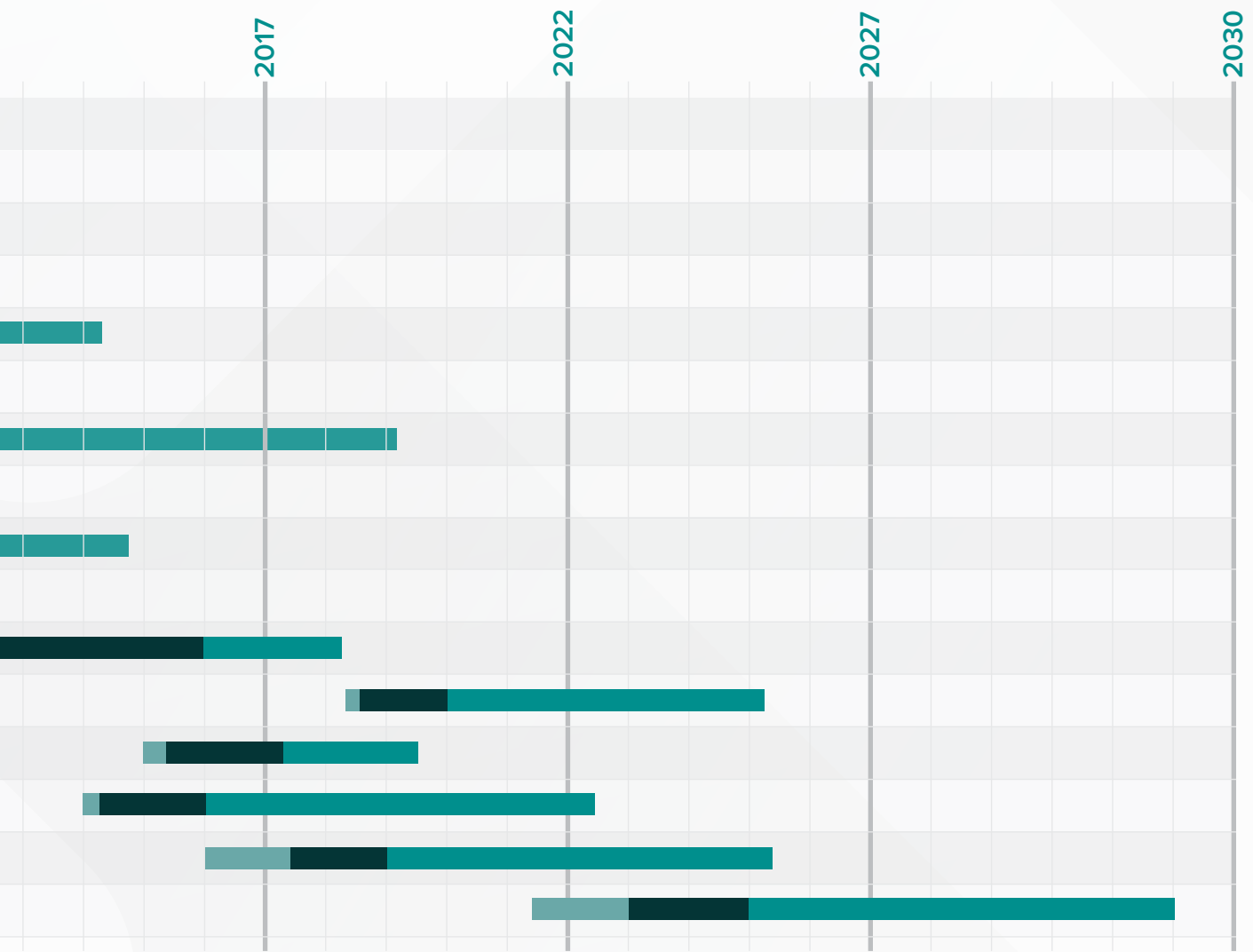
Bill Slater

Appointed by the North Slave Métis Alliance in 2018

Bill is an independent environmental consultant with an engineering education. He is based in Whitehorse, where he has lived and worked for over 25 years. Most of his work is for First Nation governments, as a technical advisor on mining and mine closure projects. His technical focus areas include environmental effects assessment, mine closure, water quality and water management.

Life of Mine Plan







Independent
Environmental
Monitoring Agency

PUBLIC WATCHDOG OF EKATI DIAMOND MINE