EKATI Diamond Mine

- Planning for Reclamation and Closure

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Presentation Overview

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Introduction

- Current Status
- Life of Mine Plan
- Mine Component Groups and Reclamation Plan

Interim Closure and Reclamation Plan (ICRP) Key Elements

- Risk-based Closure Plan
- Objectives-based Closure Plan
- Closure Criteria
- Post Closure Monitoring

Future Challenges

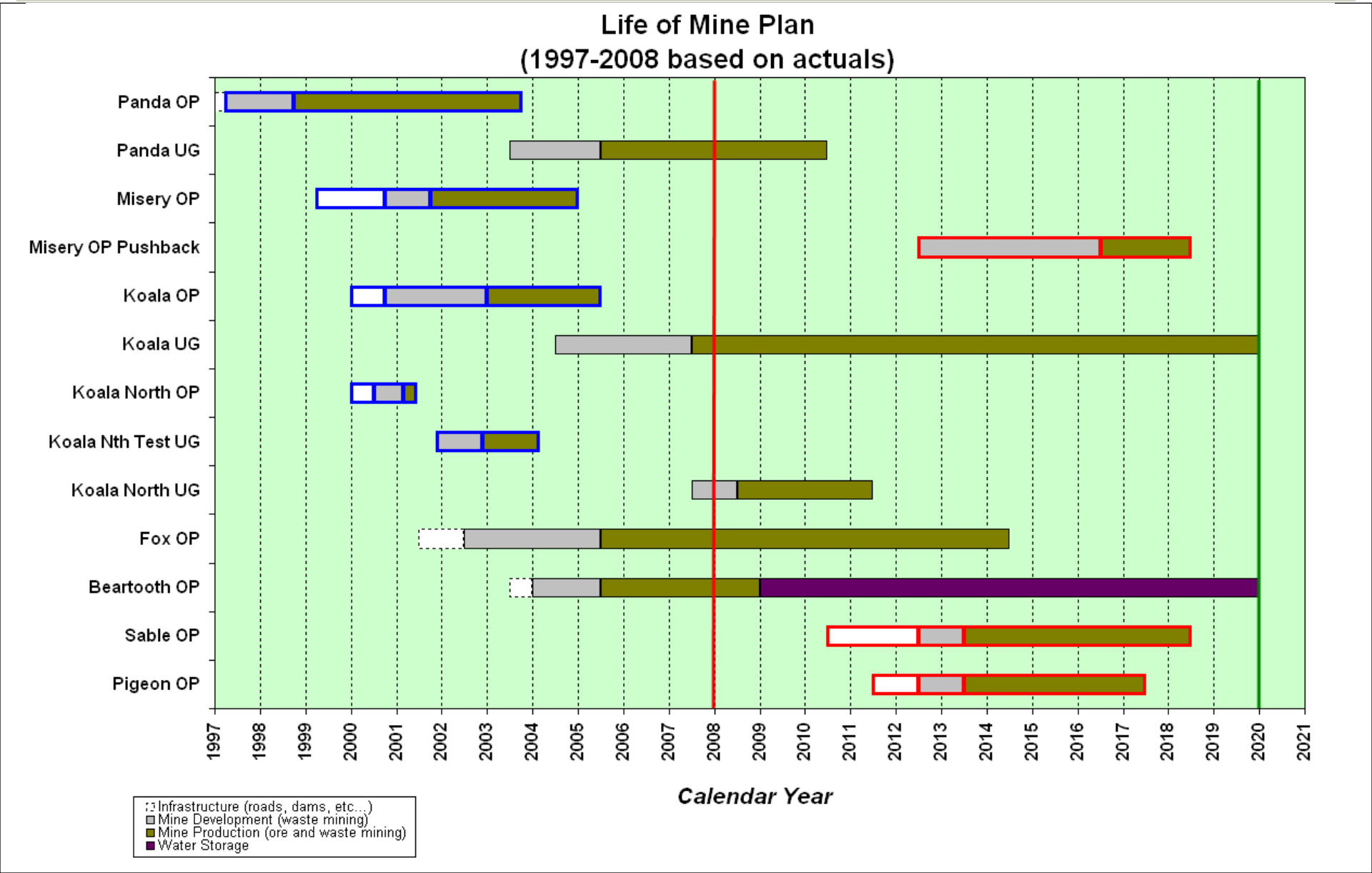
- Certification of Completion
- Securities Relinquishment

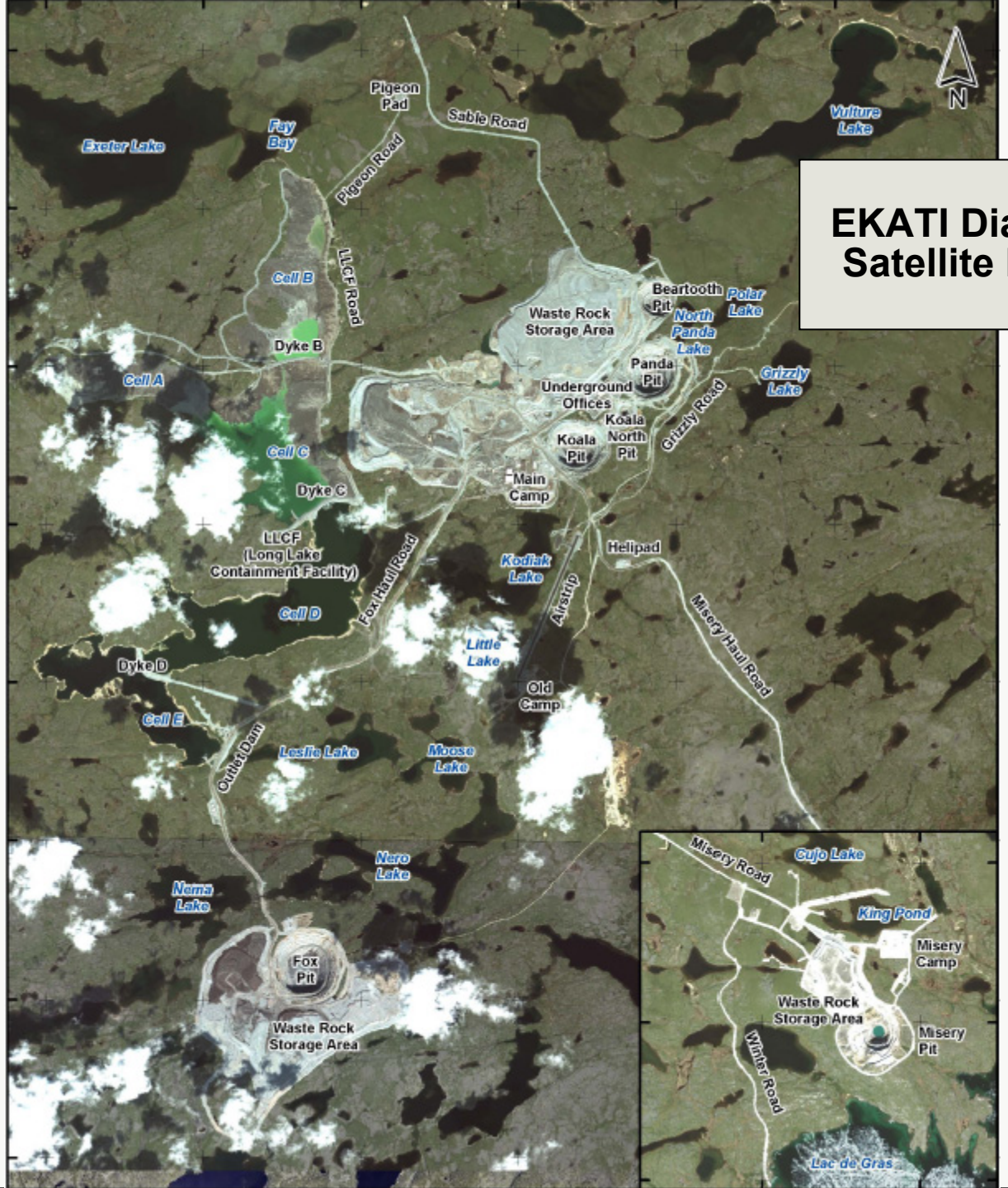
Introduction

Current Status:

- Last approved ICRP 2002 (Written in 1999)
- Two year process to develop and write
- Two and half years Wek'eezhii Land and Water Board (WLWB) ICRP Working Group Review
- Public Hearing Oct 22/23, 2009

Life of Mine Plan





EKATI Diamond Mine Satellite Image 2009

EKATI Mine Components

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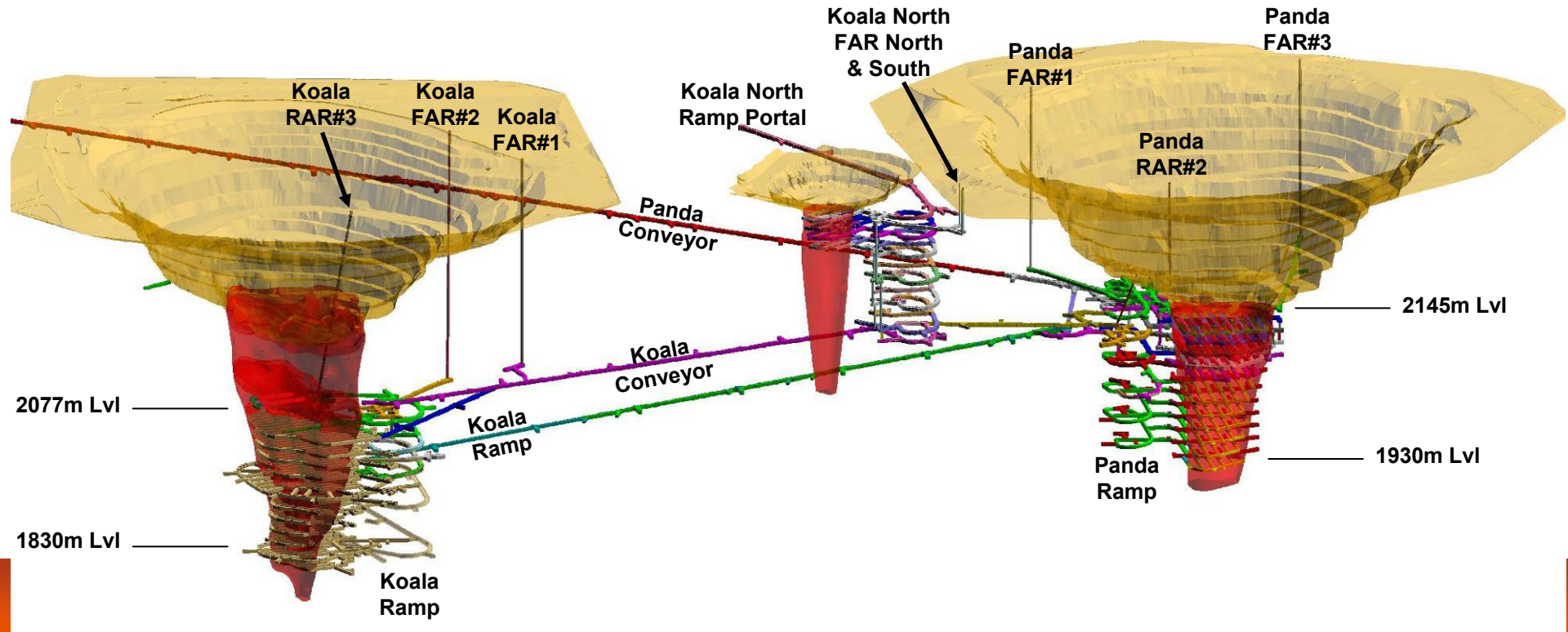
Six Major Mine Component Groups:

1. Open Pits
2. Underground Mines
3. Waste Rock Storage Areas
4. Processed Kimberlite Containment Areas
5. Dams, Dykes and Channels
6. Buildings and Infrastructure

Open Pits

- Flood underground mines and open pits with water from nearby source lakes.
- Flooding period:1 (Pigeon) to 17 years (Panda & Koala combined).
- Construct shallow zones around pit perimeters and reconnect pit lake with watershed.

Underground Mines



Waste Rock Storage Areas

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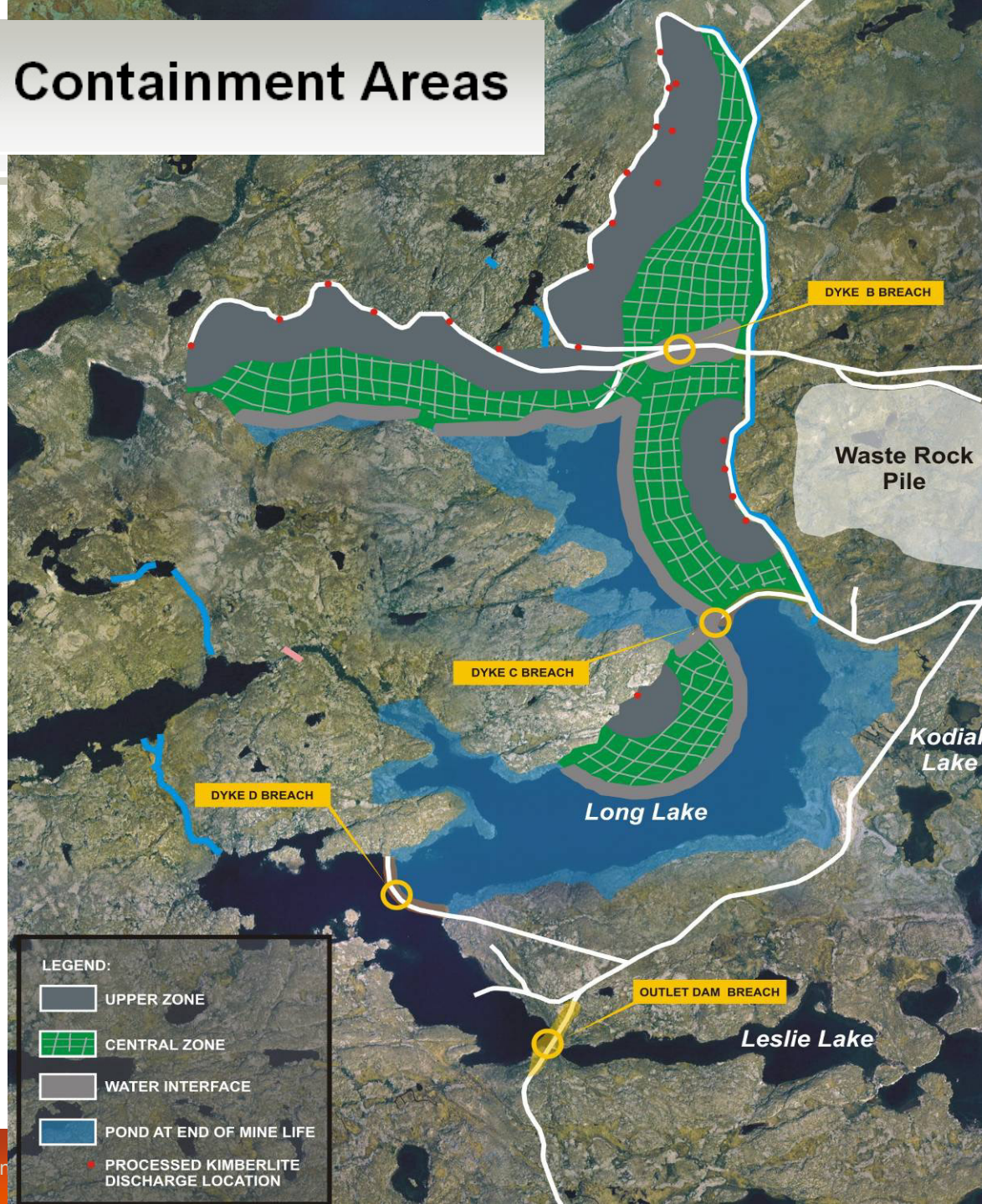
- Waste rock piles will remain in place.
- Permafrost growing into piles.
- Vegetation will gradually colonize.
- Flat surfaces on top, ramps for wildlife safety.

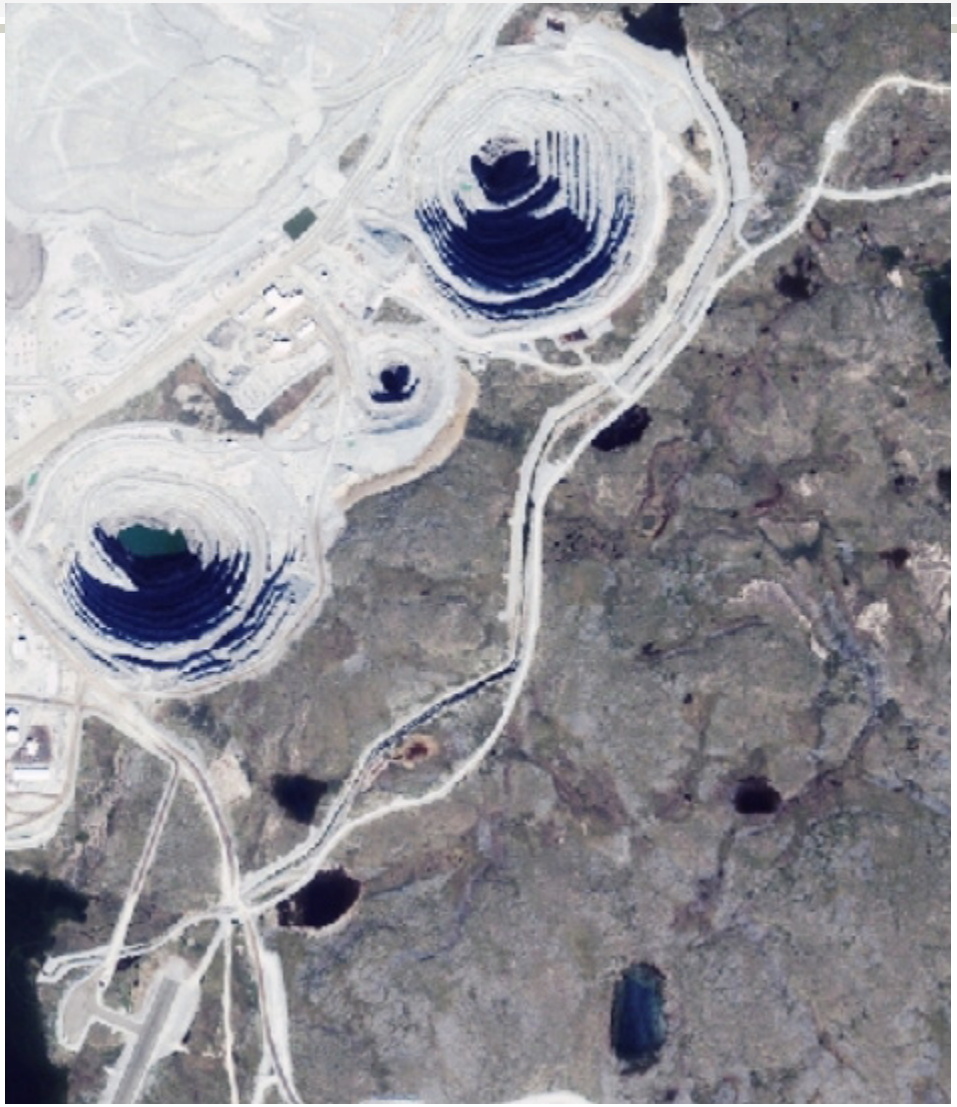
Processed Kimberlite Containment Areas

- Combination of vegetation and rock cover.
- Sedimentation Ponds.
- Water control structures in dykes.
- Outlet Dam breached.



Dams, Dykes and Channels

- All dams (except Panda Diversion Dam) breached.
- All dykes breached.
- Panda Diversion Channel and Pigeon Stream Diversion remain in place.



Buildings and Infrastructure

- All buildings, fuel tanks, pipelines removed.
- Roads and airstrip decommissioned and scarified.
- Laydown pads, and remaining camp pads landscaped and areas of disturbance protected with native plants.

ICRP – Key Elements
Risk-Based Closure Plan

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A risk-based closure plan is a closure plan which has identified environmental risks, rated risk levels, identified current controls and further actions to mitigate/remove risks, and identified those residual risks that are likely to remain after reclamation activities are completed.

ICRP – Key Elements
Risk-Based Closure Plan

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EKATI's Risk Assessment Process:

- Plan development and completion risk assessment
- Initial closure options screening
- Risk assessment of initial options
- Stakeholder closure options workshop
- Internal review of closure options
- Closure option selection
- Environmental risk assessment of selected options
- Valuation of risks and residual risks
- ICRP development and submittal.

ICRP – Key Elements
Objectives-Based Closure Plan

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An objectives-based closure plan outlines a clear set of objectives that must be met in order to certify that reclamation has been completed.

Types of Reclamation Objectives:

- Environmental – E.g VEC's (Air, Land, Water and Wildlife).
- Safety – Compliance with Mines Health and Safety Act/Regulations.
- Community – Continuing engagement through reclamation period.
- Operations – Company standards, legal requirements.

ICRP – Key Elements
Closure Criteria

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- Conceptual → Measurable
- Focus on simple, do-able.
- Linkages to closure objectives, research and post closure monitoring.

Table 5.1-1A
Closure Objectives and Criteria – Open Pits

Open Pit Closure Objectives	Closure Criteria	Actions/ Measurements	Research Reference	Monitoring Reference
AIR				
1. Fugitive dust levels meet Canadian Ambient Air Quality Objectives.	Mean TSP concentrations do not exceed 60 ug/m^3 annual objective, and the 24 hr maximum acceptable concentration does not exceed 120 ug/m^3 for the Canada Ambient Air Quality Objectives (NAAQO), and the NWT Ambient Air Quality Standards.	Routine AQM monitoring and sampling.	N/A	Appendix 5.1-5, Table 5.1-5A. AIR 1. Table 5.1-5M
LAND				
1. Pit wall slopes are stabilized.	No significant slumping or erosion occurring. (*Engineering research in place to address appropriate measurable closure criteria*)	Physical inspection by qualified engineer.	Appendix 5.1-4B, Section 1.	Appendix 5.1-5, Table 5.1-5A. LAND 1. Table 5.1-5B
2. Removal/remediation of hydrocarbon contamination.	Remediation complies with Canada Wide CCME Guidelines (Industrial) for Contaminated Site Remediation.	Environmental Site Assessment.	N/A	N/A
3. Native vegetation used for rehabilitation work.	Record of species types used for revegetation work.	Sampling and Inspection	Appendix 5.1-4A, Section 4.	Appendix 5.1-5, Table 5.1-5B.
4. Sites rehabilitated with plant cover have sufficient plant cover to stabilize land surfaces.	Vegetation cover (%) (*Reclamation research in place to address appropriate measurable closure criteria*)	Routine monitoring and sampling	Appendix 5.1-4A, Section 5.	Appendix 5.1-5, Table 5.1-5A LAND 2, Table 5.1-5B.

ICRP – Key Elements
Post Closure Monitoring

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- Chemical, physical, biological stability measured.
- 10 - year schedule (duration may change with adaptive management).
- Linked to operations monitoring programs (eg. AEMP, WEMP).
- Monitoring program key to demonstrating site stability and closure criteria.



ICRP – Key Elements
Post Closure Monitoring

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Table 5.1-5A
Closure Monitoring and Performance – Open Pits

Parameter(s)	Method(s)	Location	Evaluation	Response Thresholds
AIR				
1. Fugitive Dust	Total suspended particulate sampling	TSP 2 (Grizzly Lake), and TSP 3 (Cell B LLCF)	Comparison with Canadian Ambient Air Quality Standards.	Exceedence of Canadian Ambient Air Quality Standards.
LAND				
1. Slope stability	Geotechnical Inspections	High walls, berms and channel banks. Sable, Pigeon, Beartooth, Panda, Koala, Fox, and Misery	Check for slope stability (*e.g.*, Signs of significant erosion, subsidence, slope failures, surface instability)	Evidence of significant highwall movement and or potential inter-bench failure, or channel bank slumping which has the potential to dam stream flow.
2. Percent vegetation cover	Inspections and monitoring of transects at reference and reclamation sites	Pads, pit lake perimeter and channel banks. Reference sites.	Identify plant types, and cover percentage. Record temporal and spatial cover growth/decline.	Increasing trend toward loss of vegetation cover.

Table 5.1-5B
Closure Monitoring Frequency – Open Pits

Monitoring Program	Closure Monitoring Period Years									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Geotechnical Inspections (Land)	A	A	A	A	A	A	A	A	A	A
Vegetation Sampling and Inspection (Land)	A	A	A	A	A	A	A	A	A	A
SNP (Water)	BA	BA	BA	BA	BA	A	A	A	A	A
AEMP (Water)	S	S	S	S	S	S	S	S	S	S
Health & Safety	C	C	C	C	C	C	C	C	C	C
Traditional Knowledge Monitoring (Community)	A	A	A	A	A	A	A	A	A	A
Archaeological Sites (Community)	C	C	C	C	C	C	C	C	C	C
Operations	C	C	C	C	C	C	C	C	C	C

BA = Bi-Annual, A = Annual, S= Seasonally (3 times in open water season & 1 time in winter), C = Continuous.
[1] Pit Lake 10 year water quality monitoring period commences in individual pit lakes with verification of acceptable water quality.

Future Challenges
- Completion Certification

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A certificate from a relevant authority accepting responsibility for the reclaimed area.

- Currently no sign-off mechanism in place for EKATI.
- EKATI's reclamation completion must satisfy:
  - Water Licence (WLWB)
  - Environmental Agreement (INAC & GNWT)
  - Fisheries Authorizations (DFO)
  - Land Leases (INAC)
  - Land Use Permits (WLWB)
  - Communities
- Sign-Off Options:
  - A whole-of-government approach to sign-off.
  - A single government authority with responsibility for close-out.
  - Individual government agencies sign-off.

Future Challenges
- Securities Reduction Mechanism

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Return of securities to the proponent based on completion of reclamation activities and reduction of liabilities.

- Currently no securities reduction mechanism in place for EKATI.
- Securities currently posted:
  - Wek'eezhii Land and Water Board – Water Licence and Land Use Permits
  - INAC – Environmental Agreement and Land Leases
  - DFO
- Securities Reduction Considerations:
  - A collaborative and standardized approach by government.
  - Based on agreed schedule and annual review.
  - Based on physical work completed, by area/component with consideration of remaining risk.

Summary

- EKATI's ICRP development was a positive learning process for BHP Billiton, communities and regulators.
- Reviewer input through the WLWB Working Group process has assisted in developing a high level closure and reclamation plan.
- ICRP is a comprehensive working document – for the purpose of all users.
- Lessons learned from review process can be used to make it more effective for future reviews – (Lesson e.gs. lengthy review periods, minimal community involvement, and multiple guidelines).
- EKATI's Closure Plan format and review process used as a template for other mines and WLWB reclamation guidelines.


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