

EKATI Diamond Mine – Reclamation and Closure

Mine Reclamation and Closure Workshop
February 1-3, 2005



EKATI Diamond Mine

- EKATI Diamond Mine is operated by BHP Billiton Diamonds Inc (BHPB),
- BHP Billiton's and Canada's first surface and underground diamond mine,
- Located 300 km NE of Yellowknife, 200 km S of Arctic Circle,
- Closest community = Wekweti (200 km NW),
- Sub Arctic, barrenlands environment,
- Claim Block size 860,000 acres
- 800 BHP Billiton employees. (including 313 -39% Northern Aboriginals); and 1000 contractors.



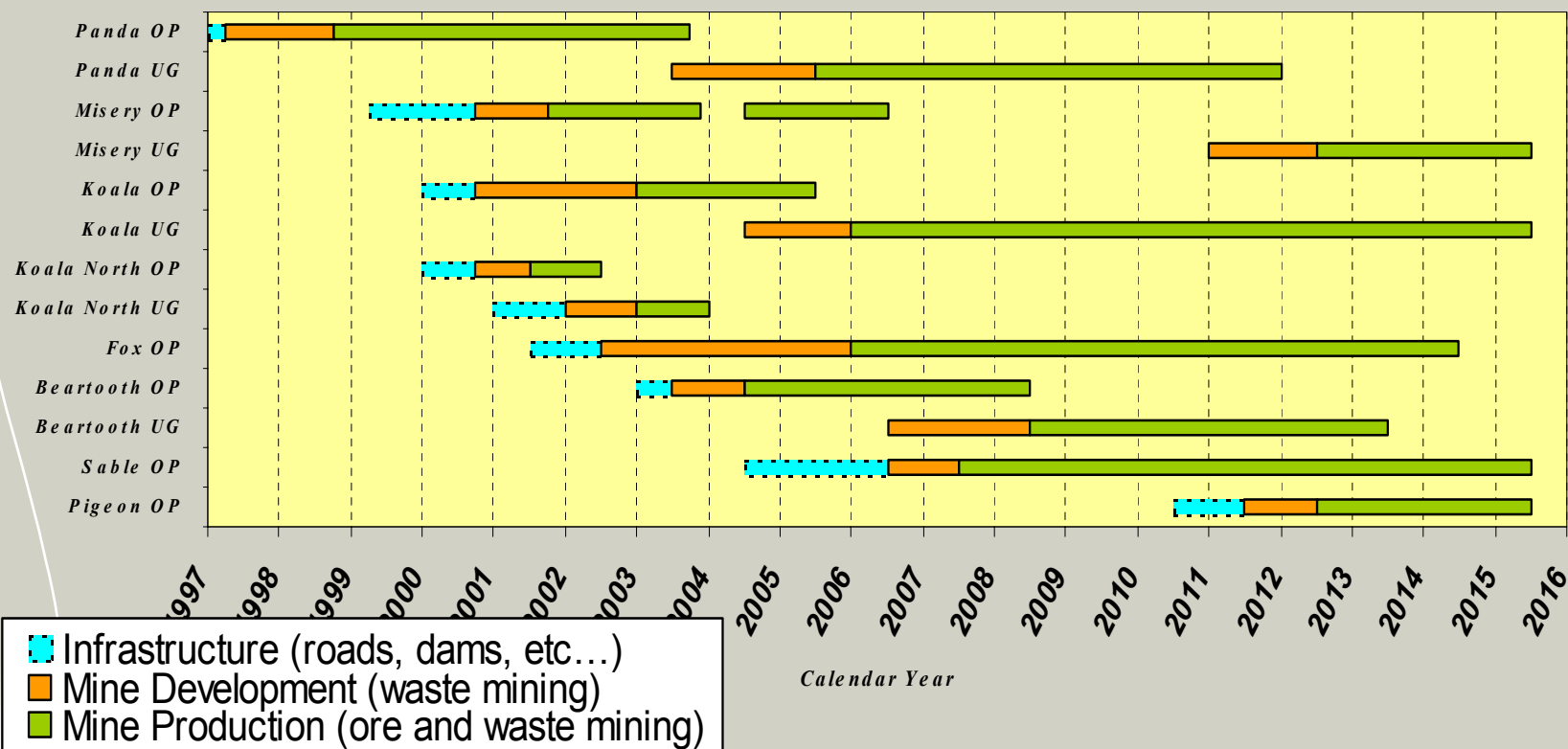
EKATI Diamond Mine

- First diamonds in the area were discovered by Chuck Fipke and Stewart Blusson in 1991,
- Processing of diamonds commenced in October 1998,
- Produces 4.5 to 5 million carats of rough diamonds per year



EKATI Diamond Mine – Current Mine Plan

Mine Plan
(1997-2003 based on actuals)



EKATI Diamond Mine - Present

- Mining of seven kimberlite pipes in the current mine plan (Sable, Pigeon, Beartooth, Panda, Koala, Fox and Misery pipes),
- Present mine operations: Panda open pit complete, Koala, Misery, Beartooth, Fox open pits; and developing two underground mines (Koala and Panda)



EKATI Diamond Mine – Landscape

- Located in continuous permafrost
- Approx 150 km above treeline
- Multiple glaciations – 8,000 lakes within Claim Block
- Short growing season – daily temperatures in winter below -30°C and up to 25°C in summer
- Vegetation low in stature – ranges from lichen/shrub communities to sedge/grass marshes
- Little to no topsoil development
- Local wildlife: Barrenland grizzly, caribou, wolf, wolverine, fox and Arctic hare.



EKATI Diamond Mine – Summer Caribou Migration



Caribou grazing on the shores of Kodiak Lake 2001

EKATI Diamond Mine - Stakeholder Agreements

- Two Class A, and three Class B Water Licenses (Mackenzie Valley Land and Water Board)
- Environmental Agreement (BHP Billiton Diamonds Inc, Government of Canada, and Government of the NT) (Independent Environmental Monitoring Agency)
- Land Use Permits (3)
- Land Leases (7)
- Fisheries Authorizations (Department of Fisheries and Oceans) (5)
- Socio-Economic Agreement (Government of the NT)
- Impact and Benefit Agreement - four, voluntary and confidential IBAs (4) with:
 - Dogrib Treaty 11
 - Akaitcho Treaty 8
 - North Slave Metis Alliance
 - Inuit of Kugluktuk & Kitikmeot Inuit Association.
- Many Federal and Territorial Statutes and Regulations

BHP Billiton Closure Standards/ Requirements

- BHP Billiton Closure Standards,
- Introduced Company Wide, July 2004
 - 7 Closure Requirements:
 - 1. Closure Plans for all Investment Opportunities
 - 2. Closure Plans for all Operations – Annual reviews and updates every 3 years.
 - 3. Identification of Risks and Potential Outcomes
 - 4. Estimating the Expected Cost of Closure
 - 5. Timely and Efficient Execution of Closure Plans
 - 6. Reporting, Audit and Governance Procedures
 - 7. Application of Project Management Practices
- Signoff of Reclamation Plan by BHPB Board on Closures estimated over \$100 Million USD
- Internal Peer Review of Reclamation Plan at each stage of development

BHP Billiton Closure Standards/ Requirements

Key Considerations from the New Closure Standards

- Closure Pre-feasibility Phase ... Once closure options & risks assessed
- Closure Feasibility Phase ... for project areas closing in shorter term (progressive reclamation)
- Closure Projects > US \$100M ... requires formal independent review at Closure Pre-feasibility phase (EKATI)
- Closure Standards Compliance for EKATI ... June 2007

EKATI Diamond Mine – Reclamation Units

- Presently working under approved Interim Abandonment and Reclamation Plan, February 2000
- Expected Mine Close 2015
- Main Reclamation Units
 - Open Pits and Underground
 - Waste Rock Storage Areas
 - Processed Kimberlite Containment Facility
 - Camp Pads/Roads/Airstrip
 - Water Management Structures/Diversions/Sedimentation Ponds
 - Quarry Sites
 - Fuel Facilities

EKATI Diamond Mine Reclamation Units - Open Pits

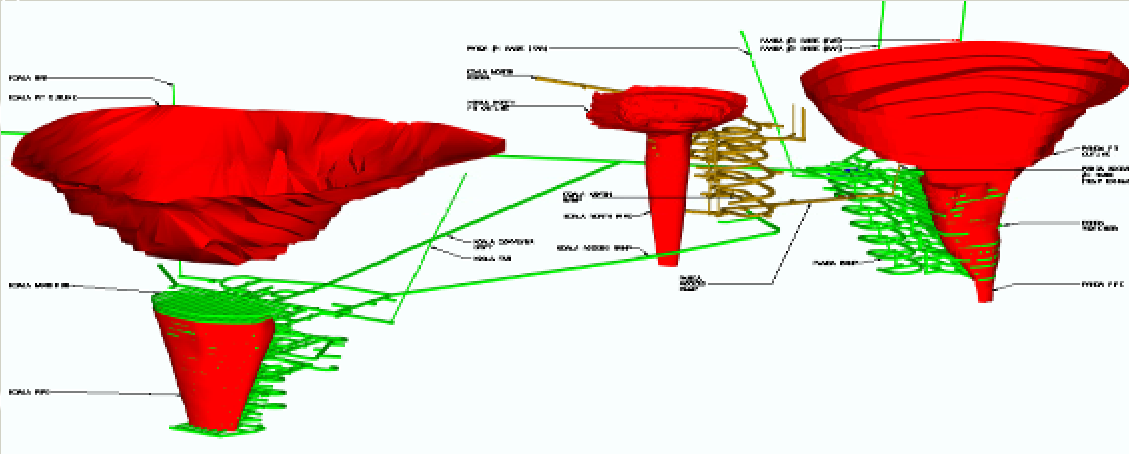


Panda and Koala Pits

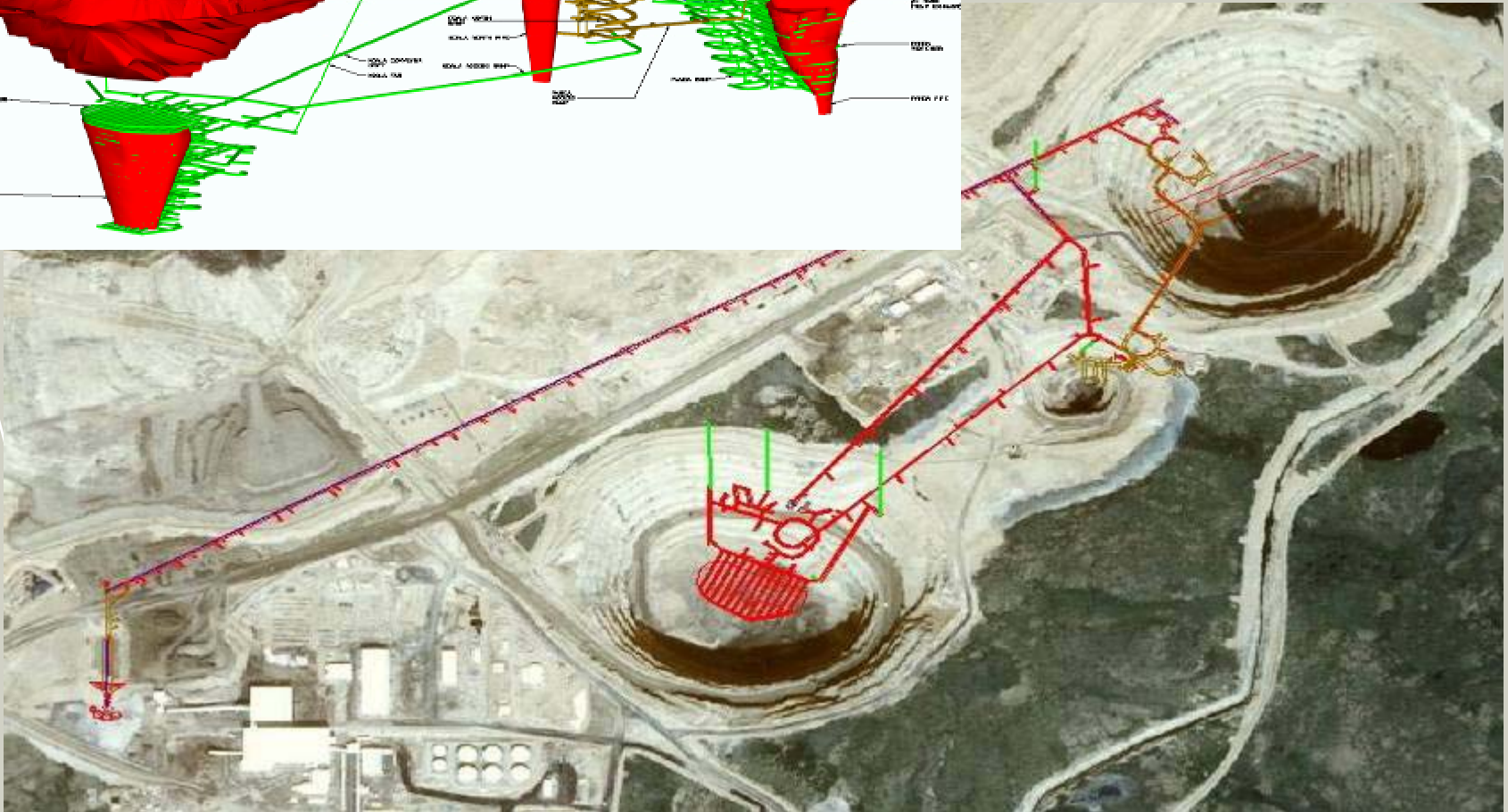


Misery Pit

EKATI Diamond Mine Reclamation Units – Underground Mines



Koala, Koala Nth & Panda Underground Complex



EKATI Diamond Mine Reclamation Units – Waste Rock Storage Areas



Panda/Koala/Beartooth Waste Rock Storage Area

EKATI Diamond Mine - Reclamation Units Processed Kimberlite Containment Facilities



Old Camp Phase 1



Long Lake Containment Facility

EKATI Diamond Mine Reclamation Units – Camp pads, Roads, Airstrip



EKATI Diamond Mine Reclamation Units – Water Management Structures, Dams, Diversion Channels



Panda Diversion Channel



Outlet Dam

EKATI Diamond Mine Reclamation Units – Quarry Sites



Airstrip Esker

EKATI Diamond Mine Reclamation Units – Fuel Facilities

Main Camp Fuel Farm



EKATI Diamond Mine – Reclamation Goals/Objectives

- Reclamation Goal: to prevent progressive degradation, and to enhance natural recovery of areas affected by mining.
- Objectives (Adapted from NT Reclamation Guidelines, 1990)
 1. Re-establish stable landforms
 - Through proper engineering practices
 2. Protect water resources in the local area
 - Minimizes the impact of mining activities on aquatic ecosystems and habitats
 3. Facilitate natural recovery of areas affected by mining
 - Allows natural successional processes, and integrates affected areas with adjacent, undisturbed areas
 4. To re-establish productive use of the land (Aboriginal and wildlife)
 - Through use of native plants, and final landscape features which encourage wildlife use

EKATI Diamond Mine

Proposed Reclamation Method (2000 Approved Interim A&R Plan)

- Open Pits
 - Sable, Pigeon and Beartooth Pits – Options under assessment by BHPB
 - Panda, Koala, Fox and Misery Pits – Options under assessment by BHPB
- Underground Mines
 - Removal of hazardous materials, capping of vent raises and plugging of portals
- Waste Rock Storage Areas
 - Permafrost Development, monitoring & management of low level metal leaching
 - Wildlife Access Ramps
 - Nesting for birds and open areas for insect relief for caribou
- Processed Kimberlite Containment Facilities
 - Permafrost Development, Drainage Channels, Catchment Ponds, Rock Cap Cover (Present research focused on Vegetation Cover)

EKATI Diamond Mine

Proposed Reclamation Method (2000 Approved Interim A&R Plan)

- Camp Pads/Roads/Airstrip
 - Demolition and Landfill of Camp Infrastructure, Contaminant Assessment/Remediated, Culverts, Bridges, & Road Berms removed and drainage re-established, Landscaping & Scarifying to encourage natural colonization
- Water Management Structures
 - Most Dams & Dykes left in as-built condition. Outlet Dam and Panda Frozen Core Dam Breached, thermistors removed. Water management pipelines and PK pipelines removed. Panda Diversion Channel – culverts removed and streamflow re-established
- Quarry Sites
 - Landscaping to prevent erosion and encourage plant colonization
- Fuel Facilities
 - Fuel tanks removed, and surplus fuel backhauled for proper disposal

Stakeholder Involvement in Reclamation Process

- Inclusion of stakeholders in the Reclamation Process
 - Community Visits (ongoing)
 - Northern Aboriginal Reclamation Glossary (Updated 2003 Plan)
 - Social Reclamation (Updated 2003 Plan)
- Northern Aboriginal and Northern Business participation in reclamation research and monitoring
 - Plant Identification and Collection
 - Northern Research – Nurseries (Hay River)

EKATI Diamond Mine – Aboriginal Involvement in Reclamation

Aboriginal Students & Technicians
Working on Reclamation Projects



Visitors to Site - Discussing
LLCF Vegetation Research



Stakeholder Meetings
– Discussion of LLCF Operations
and Closure Issues

EKATI Diamond Mine – Reclamation Issues

- Inconsistent terminology amongst users. (Reclamation/restoration, Goals/objectives/criteria) **BHPB is reclaiming, not restoring**
- Reclamation Guidelines outdated
- Criteria and Standards of Measure not in place
 - Reclamation Plans built without mutually agreed closure criteria
 - Progressive reclamation required, but no benchmark and method of Security Credit in place -
- Changing mine plans during the period of mining operations means conceptual reclamation planning. Interim Plan updated with Life of Mine Plan – **Conceptual and Prefeasibility Stage during Interim Plan**
- Regulatory desire for executable standard documents now – **this is not practical for BHPB**

Questions?

