

Financially Material Environmental Exposure in the Mining Sector



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Outline

- Life cycle of a mine
- Contributors to cost and liability at a mine
- Approaches to determining liability
- Methods of estimating costs and liability
- Disclosure practices

Life Cycle of a Mine

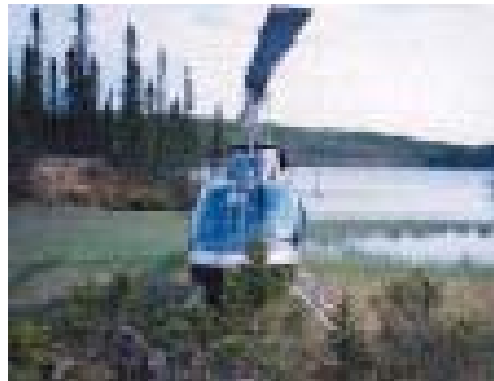
- Exploration
- Advanced Exploration/Feasibility/
Design/Construction
- Operation
- Closure/Reclamation
- Post Closure

Exploration

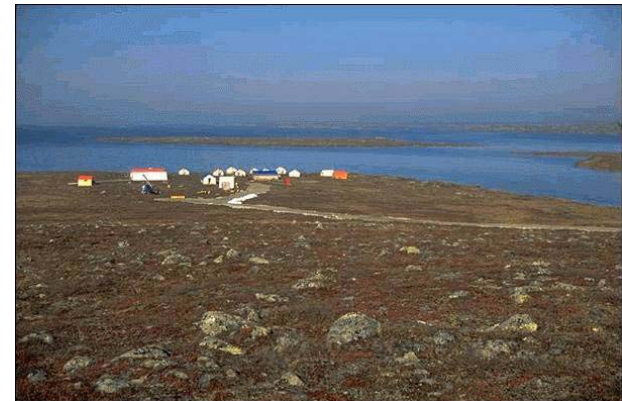


Photograph by Gerald Harper
Geologists collect and log auger samples of kaolin-rich sediments for analysis for their industrial mineral potential

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Photograph by Gerald Harper
Helicopters are ideal for supporting exploration in remote areas like Lake Boiteau in central Labrador
MAC 2002 EPR



Diavik – Early Exploration
http://www.diavik.ca/html/body_photo_gallery.html

Advanced Exploration/Feasibility/ Design/Construction



Ashton Mining – Exploration Camp (Quebec)
http://www.ashton.ca/projects/photo_gallery.html



Anaktalak Bay Exploration Camp – Inco Ltd.
<http://www.incoltd.com/exploration/canada/voisey.asp>

Operation



Brunswick Mine, Noranda

Mont-Wright mining operation – Quebec Cartier
http://www.qcmines.com/pc/www_en/default.html



Photograph by Gerald Harper

The David Bell Mine at Hemlo, near Pukaskwa National Park

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“Headframe among the pines in the Porcupine District, Ontario”

<http://www.portergeo.com.au/tours/superiorgold2002/superiorgold2002prev.asp>”

Closure/Reclamation



Detour Mine - Foreground – open pit safety berm; Background – resloped and revegetated waste rock piles

<http://www.placerdome.com/sustainability/downloads/reports/2000/detour.pdf>



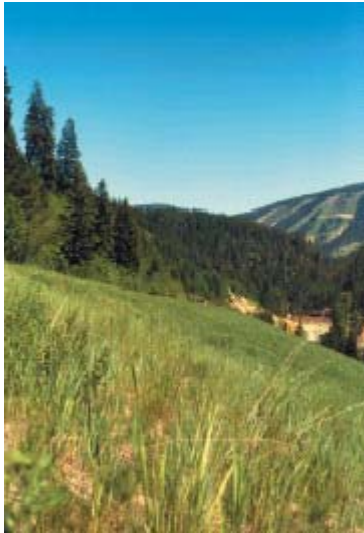
Cover soil is replaced from a stockpile or a new location about to be mined

<http://spans.gsc.nrcan.gc.ca/~ren/coal/reclaim.html>



PPA Number: YK2003-01

Post Closure



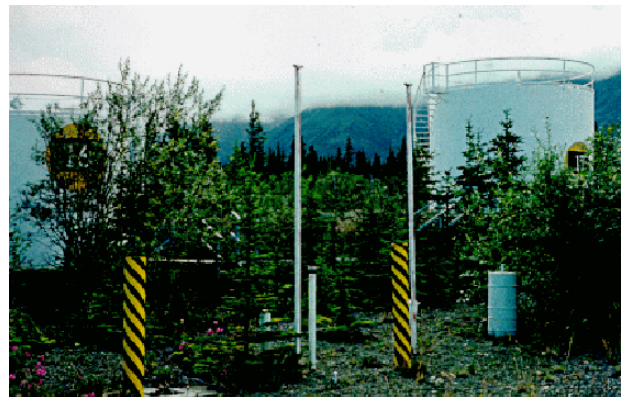
Photograph by Gerald Harper

Old mine area successfully reclaimed by Teck Cominco

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http://www.robertsongeoconsultants.com/RGC_Images/imagelib2.asp



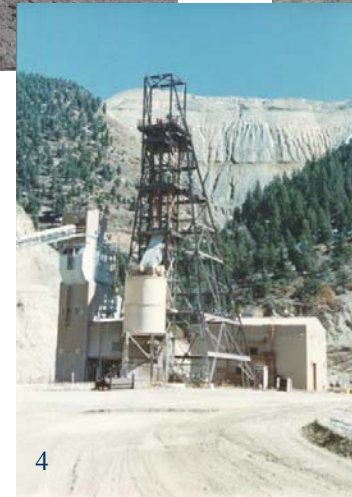
PPA Number: YK2003-04



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Contributors to Costs and Liability at a Mine

- Waste rock/ tailings
- Acid mine drainage
- Waste water
- Infrastructure
- Air emissions



Approaches to Determining Liability

- Due diligence prior to mergers and acquisitions
- Bankable feasibility studies
 - Concerned with payback period – closure costs typically well beyond
 - Rarely anticipate interim or early closures
 - Dependent on expertise of consultants
- Updating closure plans and cost estimates for filings with regulatory agencies
 - Historically affected by political/economic development factors

Methods for Estimating Costs and Liability

- Environmental and regulatory requirements accrued using unit of production method over the life of the mine when a reasonably defined estimate can be made
- ASTM2001 Standard Guide for Estimating Monetary Costs and Liability for Environmental Matters [E 2137-01]
 - Expected value
 - Most Likely value
 - Range of values
 - Known minimum value
- ASTM2001 Standard Guide for Disclosure of Environmental Liabilities [E 2173-01]

Disclosure Practices

- Current best practice
 - Open, transparent and on-going closure planning and updating of security instruments or accruals to cover full cost of closure
- Most common practice
 - Company has made best estimate of full closure costs
 - Varying gaps between posted security and full closure liability accrued as a cost of production over the life of the mine
- Bad practice
 - Deliberate effort to underestimate closure costs
 - Willful blindness

Trends

- Expectations for closure requirements and reclamation standards have changed and are continuing to change significantly
- Jurisdictions are moving towards requiring security to cover full cost of closure
- Internal risk management processes in some companies evolving to reflect changes
- Changes impacting negatively on junior mining companies
- Ongoing reputational issues for the mining sector due to the legacy of past practices