

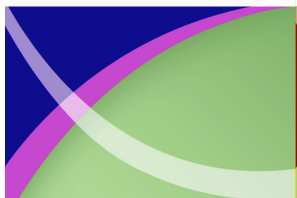


# Tundra Mine Phase 1 Remediation Lessons Learned

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Remediation Directorate, Indian and  
Northern Affairs Canada



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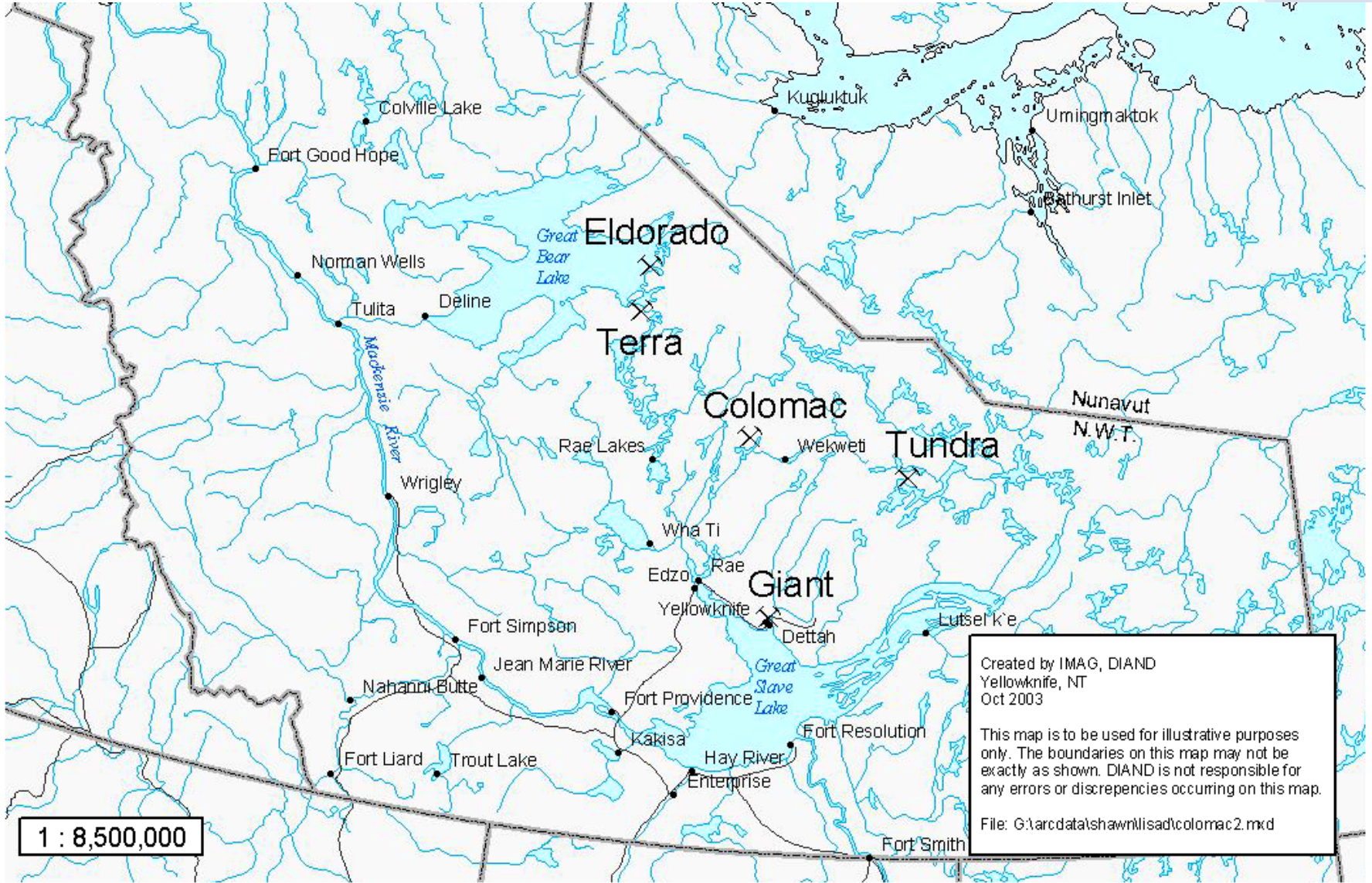


# Presentation Overview

- Site Location
- Mine History
- Remedial Approach
- Phase 1 Remediation Overview
- Lessons Learned
  - Mobilization to Tundra
  - Landfill design and construction



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# Tundra Mine Chronology

- First staked in 1945 → Bulldog YK mines Ltd.
- Taurcanis Mines Ltd. 1957
- Tundra Gold Mines Ltd 1964-68
- Giant Yellowknife Mines (Salmita) 1974-1986
- Royal Oak Mines 1992-1999
- Reverted to Crown 1999



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# Remedial Approach

Crown obtained management of site  
Emergency Dam Repairs

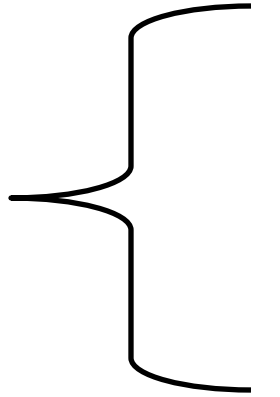
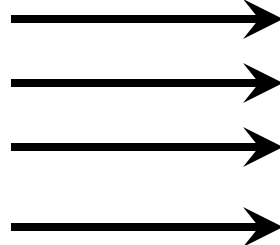
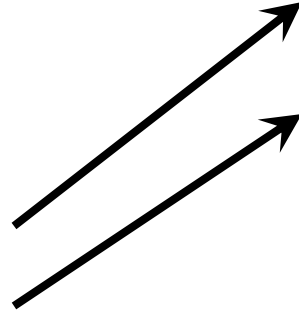
Permits and tendering for phase 1 remediation  
Phase 1 Remediation delay  
Phase 1 Remediation Complete

Phase 2 Remediation Action Plan Developed

Permits and tendering for phase 2 remediation

Phase 2 remediation

Phase 2 remediation complete



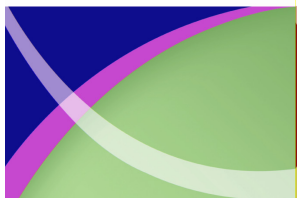
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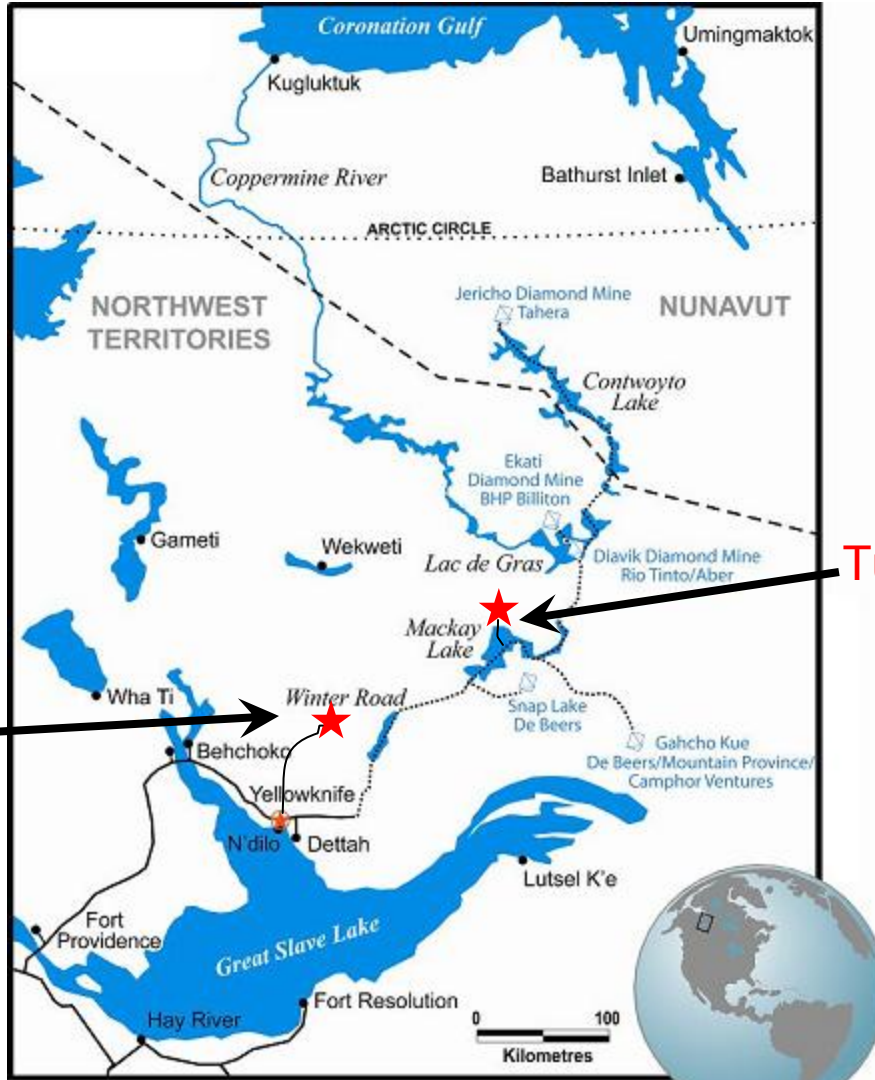
# Phase 1 Remediation Overview

- Proposed activities (1 year program):
  - Mobilize crown owned equipment, fuel and supplies from Tundra in March 2006 (crown equipment at the time was at Discovery mine)
  - Complete building and tank demolition
  - Remove hazard materials
  - Build landfill for non-hazardous material
  - Cap mine openings
  - Demobilize from site



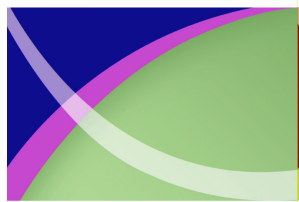


# Mobilization to Tundra



Discovery Mine

Tundra Mine





# Challenges

- Tundra phase 1 awarded in early February
- Crown owned equipment located at Discovery needed to be demobilized to Yellowknife and serviced before the contractor can take the equipment to Tundra Mine
- Tibbitt to Contwoyto winter road open ~7 weeks Feb 5<sup>th</sup> to March 26<sup>th</sup> 2006 due to warm weather conditions
- High demand on Tibbitt to Contwoyto winter road by Diamond mines



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# Challenges Resulted in:

- Inability for Contractor to move crown equipment to Tundra in 2006; therefore, phase 1 remediation was reschedule for 2007.
- Contractor loss in revenue to hold supplies already purchased and keep some key staff employed until 2007 remediation work.
- Issues resulted because of late award, commitment that crown equipment was available for use, high economic activity and weather restrains



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# Lesson Learned

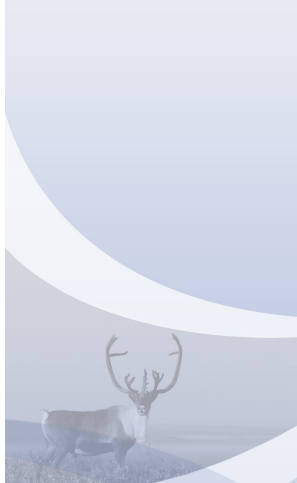
- Policy developed on use and purchase of Crown owned equipment for remediation projects
- INAC need to find other methods for Northern capacity development (i.e. training, joint ventures, subcontracting, smaller contract opportunities)
- Earlier awards to meet winter road mobilization requirements and allow for enough planning time
- Better risk planning for weather constraints



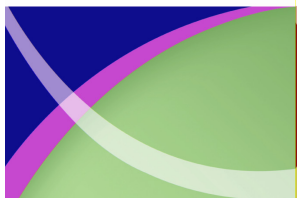
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# Phase 1 Remediation: Building Demolition



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# Building Demolition

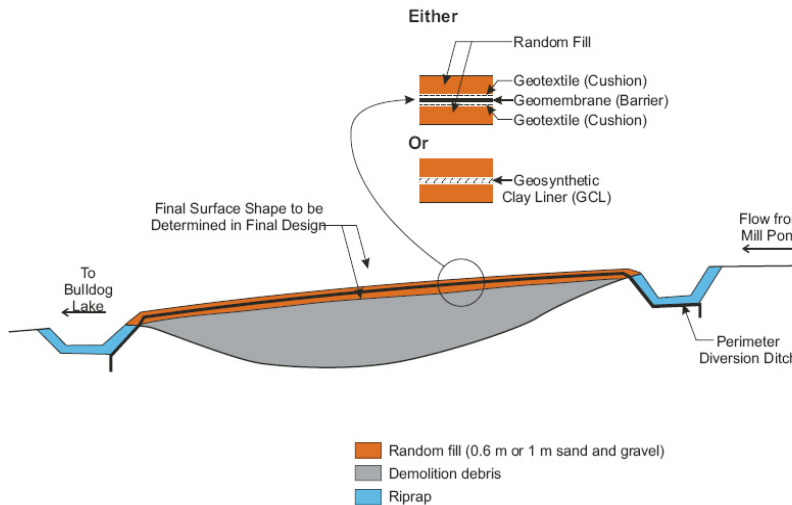
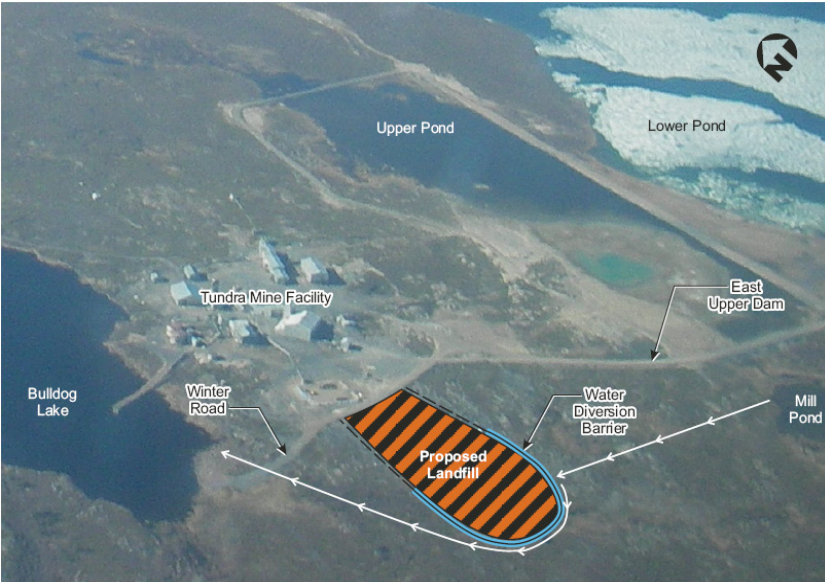
- Hazardous material – removal offsite to disposal facility
- Non-hazardous materials – combustibles can be burnt. Ash and other debris (non-combustibles) landfill on site



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# Landfill Construction



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# Current Landfill Condition



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# Landfill Challenges

- Redesign of Landfill due to burning combustibles (additional costs and time)
- Limited time to place borrow materials on top of liner and ensure all liner materials are properly covered and tied into the design features
- Crown engineer signed off of work completion
- Contractor demobilized personal from site and subsequently demobilized equipment on the winter road



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# Lessons Learned

- Specify burn requirements in contract and design for most appropriate sized landfill
- If redesign is required, ensure design engineer is present during construction and will sign-off on completion
- More planning requirements for to end of season work and holding contractor responsible for remaining work in the following season



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# Phase 2: Remediation

- Remediate hydrocarbon soil ~ 2 years
- Treat 1.2 million cubic meters of tailings water ~2 years
- Construct a cover over the tailings and acid generating waste rock ~2 years
- Dismantle Tailings Dams



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