







Presentation Objectives

- Provide an overview and history of the Giant Mine Site
- Overview of the GMRP
- Describe the "Long Road" and current project status
- Outline the Remedial Options on the table
- Identify next steps in moving forward











Site Location

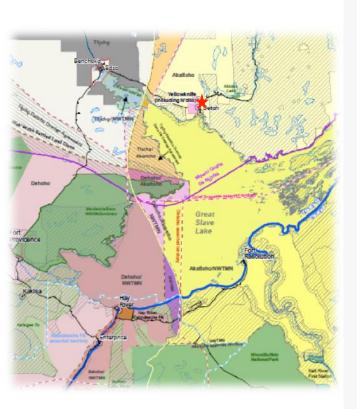
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- Site is approximately 900 hectares in size
- Larger than several small towns in Nova Scotia
- Located 5 km from urban centre of the City of Yellowknife, Northwest Territories









Jurisdiction

- Lies on Commissioners Land, jurisdiction of the Government of the Northwest Territories
- Site under Federal care as an abandoned mine site
- Municipal involvement
- Several overlapping established and asserted Indigenous land claims





Site Features

Highway 4 (Ingraham Trail)

Baker Creek

B-2 Pit

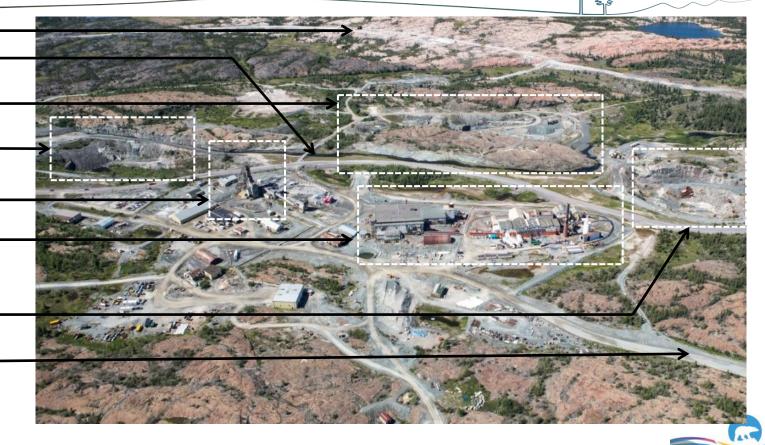
C-1 Pit

C-Shaft Headframe

Former Roaster Complex

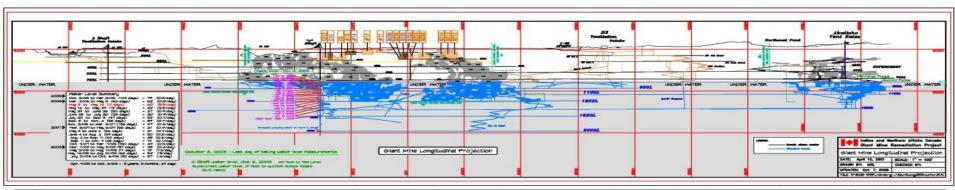
B-1 Pit

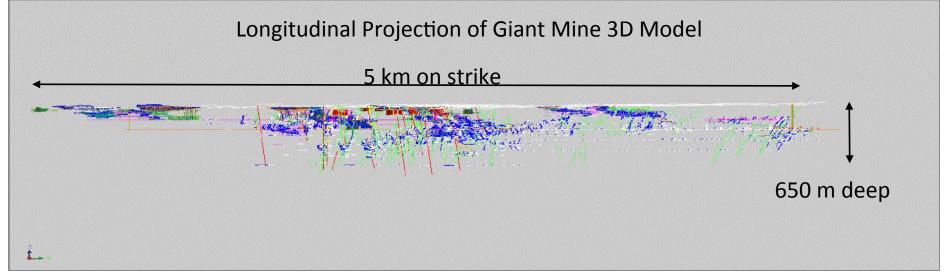
To tailings ponds & water treatment plant





Sub Surface





Giant Mine Site 101



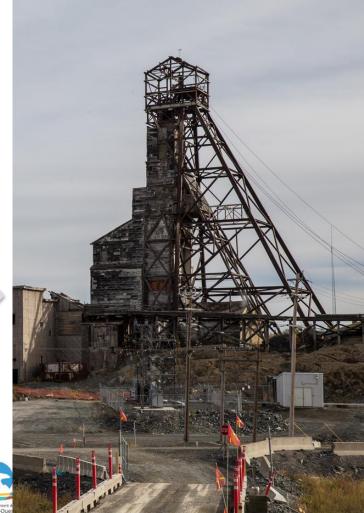
- One of Canada's longest operating gold mines
- Produced its 10,000th brick in 1984
- Generated 7 million ounces of gold during its operation

Former gold mine, started operation in 1944

Lies within city limits and overlapping Aboriginal land claims

Operated continuously until 1999

Roasting of ore produced
Arsenic Trioxide dust, a toxic contaminant







Canada's Role



- Indigenous and Northern Affairs Canada is responsible for the management of Crown lands in the north (Department of Indian Affairs and Northern Development Act)
- INAC was assigned responsibility to deal with the environmental legacy at the site, through closure and reclamation of the Giant Mine
- For Giant, INAC is both the proponent and the regulator, since the Minister of INAC is also the Responsible Minister under the Mackenzie Valley Resource Management Act
- The Giant Mine Remediation
 Project was created, with the
 Government of the Northwest
 Territories a co-proponent in the
 regulatory approvals process





Arsenic Trioxide



- Arsenic trioxide dust created during roasting process (as a result of minimizing arsenic emissions in air discharge)
- 237,000 tonnes of arsenic trioxide dust generated during mine operation
- A dry powder, the consistency of fine flour
- On average contains 60% arsenic trioxide
- Highly toxic and dissolves in water







Arsenic Trioxide Storage





- Dust was pumped pneumatically into the underground
- Used 3 mined out stopes (irregular shapes)
- Also 11 purpose-built chambers (rectangular shapes), one of which is empty
- 30 100 m below surface



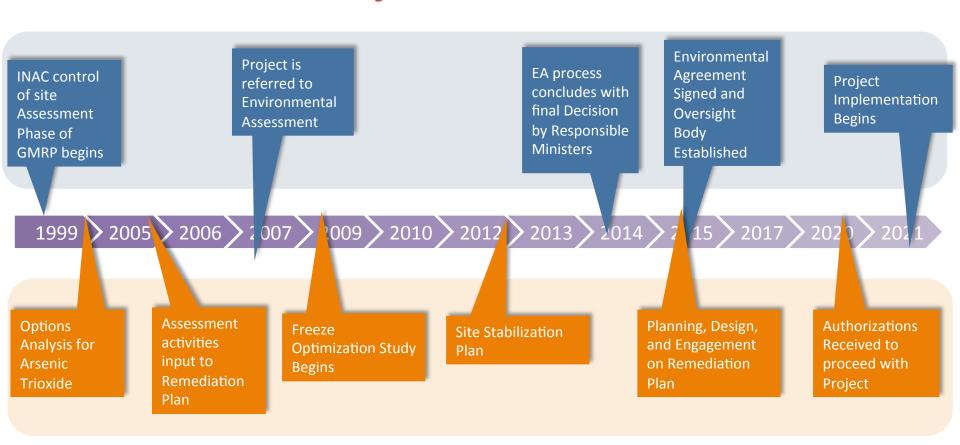








Project Timeline



Environmental Assessment



Timeline to a Decision:

2009: Mackenzie Valley Environmental Review Board releases Terms of Reference for Environmental Assessment

2010: A series of public meetings were held to discuss the components of the Remediation Plan and their possible impacts on the environment; Project Team submits Developer's Assessment Report to Review Board

2011: First Round of Information Requests were completed as part of Environmental Assessment; Review Board holds technical sessions as part of Environmental Assessment

2012: Second round of Information Requests completed as part of Environmental Assessment; Review Board holds public hearings as part of Environmental Assessment; Review Board public registry closes

2013: Report of Environmental Assessment issued by Review Board, with 26 proposed Measures

2014: Responsible Ministers approval Final Report of Environmental Assessment, accepting all 26 Measures, 9 with modifications





Moving Forward



- Environmental Assessment Measures have a significant impact on the project scope
- Freeze program will not change much
- Engagement and planning requirements for surface features are current focus







1a. Preparation

- AANDC and GNWT want to maximize participation by involving stakeholders, interested organizations and the public in the surface remediation at Giant Mine
- Develop timeline and specific dates for meetings

2. Identify Objectives (half day)

- Individual groups meet within their own organizations to define their objectives and how they see the site being used at the end of remediation
- "What do we want/don't want for the future of Giant
- "How will our children use the site?"



4. Develop Options

- Engineers and scientist develop each option into a complete plan that could be used during remediation.
- Previous studies will be used where possible, but this might take a few months if new options are identified during this process and need a lot of additional assessment and work

1b. Information Sharing (1 or 2 half days)

AANDC and GNWT will provide information sessions for any group that needs to get more background about the process or about conditions at Giant Mine



3. Options Definition Workshop (3 days)

- People from all groups meet together to generate ideas and identify a range of options for Baker Creek, tailings, pits, soils, etc.
- Then they pick five or six options to take into further



5. Risk Review Meeting (2-3 days)

- Representatives of each group meet to review the plans for each option
- They use a risk assessment method that tells the engineers how to improve the options before they're ready for the next step.



6. Options Evaluation Workshop (multi-day)

- Groups meet together again, but this time at separate tables, so each group can do its own assessment of
- Each group says "What options do we like best and why do we like them?"



- A draft report on the evaluation workshop will be prepared and each group will review it and provide
- AANDC & GNWT will use the final report to decide what options best meet everybody's objectives
- They will then take the selected options into Water Licensing, where everybody gets another chance to review them.

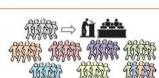
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Surface Design Engagement

- Give stakeholders the best possible opportunity to have input into remediation decisions
- Analyze a wide range of options
- Get feedback about those options from all stakeholders
- Give decision-makers an effective opportunity to understand the views and preferences of stakeholders
- Results will become inputs to decisions by the Project Team





Water Licensing

 Following completion of the Environmental Assessment, the Mackenzie Valley Land and Water Board requires a Post-EA Information Package

An updated Closure and Reclamation Plan that informs the water

licence

 Intent is to receive a water licence based on preliminary designs and management plans

 As individual management plans are finalized, they will be submitted for approval under the overall water licence











Project Components



Remediation & Reclamation Activities in Project Scope

- Infrastructure deconstruction and disposal
- Surface water management
- Tailings rehabilitation
- Borrow/Quarry development
- Underground stabilization
- Freeze Program

- Closing mine openings to surface
- Open pits
- Contaminated soil
- Baker Creek realignment
- New effluent treatment plant
- Optimize site infrastructure





Open Pits



- Eight open pits on site, with a total volume of 2.2 Million m³
- B1 Pit will be backfilled to support freeze solution
- Possible backfill materials will be contaminated soils, tailings, other on-site material
- Approach for other pits being evaluated following Report of Environmental Assessment







Tailings Management



95 hectares of tailings of variable depth and quality

Tailings cap requirements will be informed by engagement

process

 Graded to promote drainage of clean surface water

 Ongoing monitoring and maintenance of caps and dams will be required









Contaminated Soils

- Approximately 900,000 m³ of arsenicimpacted material in the form of waste rock and disturbed soils
- Minor amounts of petroleum hydrocarboncontaminated soil (primary diesel from storage tanks supplying generators)
- Remedial approach for soils will be based on results of a Human and Health and Ecological Risk Assessment









Baker Creek

- Current channel has poor hydraulic capacity; high seasonal flow variability
- Provides fish habitat
- Historic tailings and contaminated sediments
- Potential risk of flooding underground workings
- Realignment being reviewed after Report of Environmental Assessment





Interdependencies





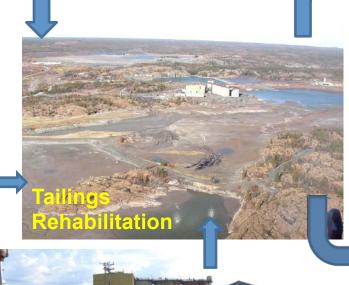




Interdependencies

















Next Steps to Remediation

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- Project Approval Authority for rest of Design Phase (2017)
- Project Approval Authority for Implementation Phase (2018)
- Finalize Closure and Reclamation Plan (2019)
- Approved Water License (2020)
- Commence Final Remediation (2021)







In Retrospect

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- Giant produced 7 million ounces of gold during its operation
- Contributed to economic prosperity in Yellowknife and Canada
- Had mixed social consequences on different groups, such as Indigenous people
- Left behind a massive environmental and human health legacy
- Full price tag to clean up is not yet known, but will be several hundred million dollars









