Giant Mine Remediation Project

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Technical Overview

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Objective

• Provide an overview of the Giant Mine Remediation Project so businesses can identify opportunities for themselves within the Project.

Outline

• Care & Maintenance
• Risk Mitigation & Remediation Preparation
• Remediation Activities
Care & Maintenance (2018 – 2030)

Surface Management
- Dust control
- Surface water management
- Maintain essential mine infrastructure

Underground Management
- Maintain access (check scaling; ground support)
- Inspection of arsenic trioxide storage stopes & chambers

Mine Water Treatment
- Seasonal treatment of mine water to MDMER
Care & Maintenance (2018 – 2030)

Site Security
- Access control
- Patrolling site for trespassers

Emergency Medical Services
- Medical monitoring program
- Provision of an on-site emergency medical technician

Monitoring
- Site and community air monitoring programs
- Water License compliance monitoring
- Wildlife monitoring
Risk Mitigation & Remediation Preparation (2020-2022)

- **Activities to be initiated as soon as possible after Water License approval**
- **Activities include**
  - Building Deconstruction (Town site buildings)
  - Non-hazardous waste landfill construction
  - Underground stabilization
  - Contaminated soil excavation
  - Preparation for freeze drilling activities (pad construction)
Remediation Activities

(2022-2030)

- Infrastructure Deconstruction
- Surface Water Management
- Tailings Rehabilitation
- Openings to Surface
- Contaminated Soil
- Open Pits
- Borrow/Quarry Development
- Underground Stabilization
- Baker Creek

- Freeze Program
- New Effluent Treatment Plant
- Common Site Infrastructure
**Remediation Activities (2022-2030)**

**Underground Stabilization**

- Current estimated total volume of backfill - 175,000 m³
- Investigations on-going; confirming scope of stabilization activities (may extend beyond near-surface stopes), volumes and mitigation options
- Potential backfill types: paste backfill, concrete foam, cemented sandfill and lightly cemented rock fill
Remediation Activities

(2022-2030)

Freeze Program

- Four freeze areas for 13 arsenic containing stopes and chambers
- Approximately 70,000 meters of drilling to support thermosyphon installation
- Approximately 800 Thermosyphons
- Construction of freeze pads, including blasting and fill placement
Remediation Activities (2022-2030)

Freeze Program

- Drilling tolerance – Ranging from 0.5% to 5%
- Drilling Length – Ranging from 20 meters to 125 meters
- Includes instrumentation for monitoring
Remediation Activities (2022-2030)

New Water Treatment Plant

- Arsenic removed by iron co-precipitation and adsorptive technology; meets Canadian Drinking Water Quality guidelines
- Year-round operation; near-shore outfall into Yellowknife Bay
Remediation Activities

Tailing Rehabilitation

- 103 hectares of tailings: variable depth; quality
- Tailings will be covered by a liner overlain with ~1 m of coarse fill
- South pond tailings to be relocated into Central and North Ponds
- Graded to promote drainage of clean surface water
**Remediation Activities (2022-2030)**

**Baker Creek**

- Removal of contaminated sediments and replace with clean substrates
- Realign channel at select locations. Abandon/backfill/ restore existing channel, as required.
- Remove existing culverts, road embankments and re-contour as necessary
- Potential to include constructed wetland areas within Baker Creek alignment
Contaminated Soil

- Arsenic contaminated material remediation: 1,300,000 m³ (waste rock; developed areas; sediments; some undeveloped areas)

- Petroleum hydrocarbon-contaminated soil: 21,000 m³

- Construct physical barrier around core to restrict access to undeveloped areas
Remediation Activities (2022-2030)

Open Pits

• Eight open pits
• Open pit closure remediation options under review
• Closure options linked to other aspects of the site, such as underground stabilization, borrow source and water quality
Openings to Surface

- 25 mine openings to surface located outside the various open pits
- Adits, raises, shaft, portals, stope breakthroughs
- Capping achieved by engineered concrete caps or rock fill
Remediation Activities (2022-2030)

Infrastructure Deconstruction & Waste Disposal

On-site waste streams:
- 76,000 m$^3$ non-hazardous building waste and asbestos (total)
- 16,000 m$^3$ arsenic trioxide waste
- 400 m$^3$ hazardous (non-arsenic) waste

Waste Disposal:
- Non-hazardous waste and asbestos – on-site landfill or recycled (metal)
- Arsenic trioxide waste – underground within the freeze zone
- Hazardous Waste – off-site at licensed facility
Remediation Activities (2022-2030)

**Borrow & Quarry Development**

- Borrow material needed for contaminated soil covers, pit backfill, tailings covers, landfill construction/cover, other construction activities
- Borrow generated from other site closure activities and dedicated borrow sources.
- Estimated fine-grained soil needed: 620,000 m³ (170,000 m³ dedicated)
- Estimated coarse-grained needed: 3,590,000 m³ (1,010,000 m³ dedicated)
Surface Water Management

- Grading to restore surface natural drainage patterns, where possible.
- Construction of drainage channels, storage ponds and spillways to direct surface water to the receiving environment.
- Including synthetic and natural liner placement
- Potential to include wetland construction
Remediation Activities

**Common Site Infrastructure**

- Utility Upgrades
  - Power Supply
  - Water/Sewage
  - Data Management
- Services to Remediation Infrastructure
  - Road access
  - Parking
  - Security
  - Structures required for maintenance of equipment.