CLEANS – Gunnar Uranium Mine

Presentation by:
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Saskatchewan Research Council

- Environmental Remediation Consulting
  - Environmental Analysis Testing
  - Ecological Risk Assessment
- Groundwater & Surface Water Quality Assessment
  - Water treatment
  - Organic & Inorganic Radiochemical Analysis
    - Toxicity Testing
- Carbon Accounting & Life Cycle Assessments
  - Process Improvements
    - Revegetation
  - Ecological Surveying
Quantum Murray LP

- Environmental Contractor
- HazMat Abatement Services
  - Demolition Services
  - Metal Recycling
  - Waste Management
  - Remediation Services
- Emergency Response Services
Project CLEANS (Cleanup of Abandoned Northern Sites)

is a multi-year project to assess and remediate the Gunnar Uranium Mine and Mill Site, Lorado Mill Site as well as 36 satellite Mine Sites in northern Saskatchewan. SRC’s Environmental Remediation Team is managing the project on behalf of the Governments of Saskatchewan and Canada.
PROJECT OBJECTIVES

1. Eliminate or reduce public safety hazards at the site and minimize the risks to the public in the future.

2. Eliminate or reduce environmental hazards at the site and minimize the risks to the environment in the future.

3. Develop options that are technically and economically practical.

4. Ensure long-term environmental monitoring at the cleaned up sites
- Athabasca basin
- Cracking stone Peninsula
- Uranium city
- Gunnar Site
Location

• The former Gunnar Mine is located on the north shore of Lake Athabasca, approximately 25 kilometers south of Uranium City, Saskatchewan.

• When the mine was closed a narrow trench was blasted in the rock, between the pit and Lake Athabasca to flood the pit and underground workings.
Gunnar Site History:

- Uranium mines operated in 1953-1964
- Average grade of deposit was 0.18% $\text{U}_3\text{O}_8\text{A}$
- Uranium Mill with capacity of 2,000 tonnes per day
- Total ~8.5 million tons of rock mined and processed
- Open pit - over 100 m deep, up to 3 million $\text{m}^3$ volume
- Underground mine - 600 m deep
- Uranium mill, acid plant, other utility, structures, and buildings
- Over 5 million tons of unconfined tailings
- Mining ceased in 1964
- The pit and subsurface workings were flooded, shaft plugged with concrete, and mine site abandoned
- All buildings, tailings, and waste rock piles were left on site “as is”
Gunnar Uranium Mine and Mill Site

- 4,400,000 tonnes of tailings
- 2,700,000 tonnes of waste rock
GUNNAR MINE SITE COMPONENTS

- Tailings
- Buildings and structures
- Mine pit
- Waste rock piles
Securing the Buildings and Structures on the Gunnar Site

• In July 2010, SRC was permitted to initiate work to take down buildings and structures on the Gunnar Site to address public safety concerns on the Site.
Objectives of Demolition Work:

- To take down buildings on the Gunnar Mine site that fail a structural safety assessment.
- To address risks on the site related to hazardous substances and materials (including asbestos).
- To address safety issues related to site maintenance (e.g., old sumps, tripping hazards, etc.)

Safety Surveillance by SRC
2010 Work was Focused On:

- Development of safe work plans, including:
  - Occupational Health and Safety Plan
  - Structural Safety Assessment
  - Hazardous Substances and Materials Inventory
  - Demolition Plan
  - Waste Management Plan
- Establishment of barriers
- Removal of overhead hazards
- Abatement and demolition of non-process buildings (e.g., wooden structures)
- Securing the site
2010 Demolition Work:

- 2 wooden barges
- 4 bunkhouses
- 2 Married Quarters
- Mine Manager’s Residence (Lodge)
- Wooden fishing shacks
- Small wooden residences
- School
- Curling rink (as shown in photos)
Bunkhouses: Before
Bunkhouses: After
2010 Demolition: School

Before:

![Image 1](image1.png)  ![Image 2](image2.png)  ![Image 3](image3.png)

After:

![Image 4](image4.png)  ![Image 5](image5.png)  ![Image 6](image6.png)
Addressing Other Safety Issues:
(some examples)

✓ Filling in old sumps
✓ Construction of berm as barrier around Gunnar Pit
✓ Clean-up of site debris
✓ Low- and moderate-risk asbestos abatement in the Community Centre
Asbestos Abatement:

SRC’s Asbestos Expert
Prep Work 2011 – Ice Road

• Preparation:
• Constructing Ice Road
Camp Location and Set Up

• Choosing a camp location took into account NORMS, location to the worksite, location to water.
Permitting & Start Up

• Training
• Safety Plans
• Specialized Plans
• Air Strip
Focus of the 2011 Demolition Work:

- Mobilization to the Gunnar Mine Site on the ice road.
- Establishment of a camp.
- Development of safe work plans.
- Establishment of a temporary hazardous materials storage facility.
- Abatement and demolition of process buildings (including mill, acid plants, water tank, head-frame and others).
- Planning transport of hazardous materials off-site.
- Maintaining site security.
2011 Demolition Work: Summary of Buildings Down

- Maintenance Warehouse
- Geology Mine Dry
- Administrative/Engineering Building
- 2 Acid Plants
- Fine Crushed Waste Bin and Surge Bin Transfer Towers
- Powerhouse
- Water Tank
- Two Acid Tanks
- Mill (with exception of the north wall, as shown in the photos)
- Small Buildings and Structures
- Head-frame
Demolition of the Gunnar Head-frame:
Demolition of the Gunnar Head-frame: Action
Mill Complex: Before
Mill Complex: After
Sulphur Pad:

Before

After
Acid Plants: Before
Acid Plants: After
Due Diligence: Inspections of Demolition Footprints at Gunnar
Off Site Waste Disposal
2011 Progress: Summary of Demolished Buildings
2011 Progress: Summary of Demolished Buildings

Before

After
2011 Progress: Summary of Demolished Buildings

Before

After
Training in Preparation for Work at Gunnar:
Joint Training Partnerships: SRC, PAGC and QMLP

- 50% funded by the Government of Canada's Aboriginal Skills and Employment Partnership.
- **Objective**: To provide capacity building and employment opportunities in the Athabasca Basin Region.
- Seven communities: Hatchet Lake First Nation, Wollaston Lake, Black Lake First Nation, Stony Rapids, Fond du Lac First Nation, Uranium City and Camsell Portage.
Training Opportunities:

• Curriculum consisted of the following modules:
  
  • Construction Basics (Ladder & Safety Awareness, Hand & Power Tools, Working Around Heavy Equipment, Hand Signals, Pumps & Compressors)
  • Confined Space Entry Awareness
  • TDG (Transportation of Dangerous Goods Clear Language C.E. Value 0.3)
  • WHMIS (Workplace Hazardous Materials Information System)
  • RPE (Respiratory Protective Equipment)
  • PPE (Personal Protective Equipment)
  • Asbestos abatement and awareness
  • Radiation Protection
  • First aid and CPR

  – 109 Athabasca-basin residents participated in the training.
Team Exercises

Corrosive Liquids Discussion

Part of the Wollaston Class
Northern Hiring:

- Northern training and capacity building
- Development of an SRC northern vendors and workers database.
- Inclusion of the database in tender packages.
- Setting statistics for hiring of Athabasca-basin workers.
- Tracking by numbers of workers and hours worked.
- Development of both short- and long-term opportunities in the north.
Summary of Hiring Statistics:

- Half of the workforce for the 2011 Gunnar demolition consisted of Athabasca-basin workers.
- The remaining workers were QMLP employees from other parts of Canada, including Ontario, Alberta and British Columbia.
- The workforce included residents of Uranium City, Camsell Portage, Black Lake, Stony Rapids and Fond du Lac.
- Community and Environmental Monitors were hired as community contacts for the CLEANS Project.
- Training and employment opportunities will be provided throughout the CLEANS Project.
Recycling at Gunnar: A ‘Homegrown’ Initiative
Closure & Work Completed

- In 1996, the channel was filled with waste rock as a barrier between the pit and Athabasca Lake
- Extensive Asbestos Abatement of Buildings
- Demolition of more than 80 Buildings
- Construction of Barrier around the Open Pit
- Removal of physical, chemical and biological hazards
- Disposal of Demolition Debris
- Off Site Disposal of Hazardous Waste
Work remaining to be Completed

- Cover of Mine Tailings
- Water Treatment
- Handling of Waste Rock
- Re-Vegetation
- Ongoing Monitoring
Thank You!

Any Questions?

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