



# Lessons Learned Remediating Abandoned Satellite Uranium Mines

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# Project CLEANS

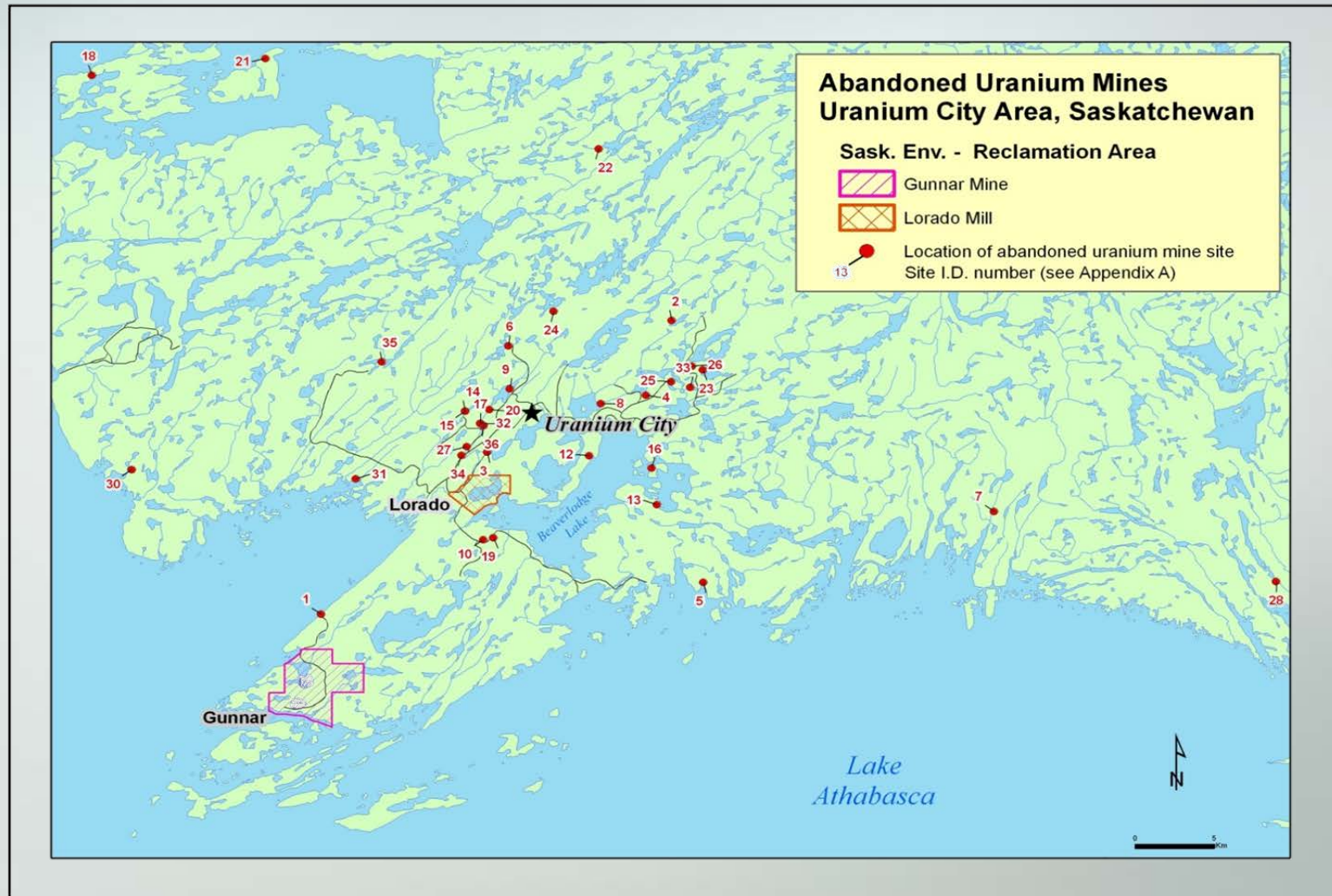
- ↳ SRC is managing Project CLEANS on behalf of the Government of Saskatchewan
- ↳ Clean up of Abandoned Northern Sites
- ↳ Uranium mills at Gunnar and Lorado
- ↳ 35 satellite uranium mines

# Project CLEANS

↳ Most located near Uranium City in the Athabasca region of northern Saskatchewan



# Project CLEANs





# Gunnar Uranium Mine and Mill Site



Photo pr



Photo provided courtesy of Woodland Aerial Photography

# Lorado Uranium Mill Site



Photo provided courtesy of Woodland Aerial Photography



# Satellite Mine Sites



Cayzor Athabaska Mines Ltd., on Jean Lake, northwest of Uranium City.

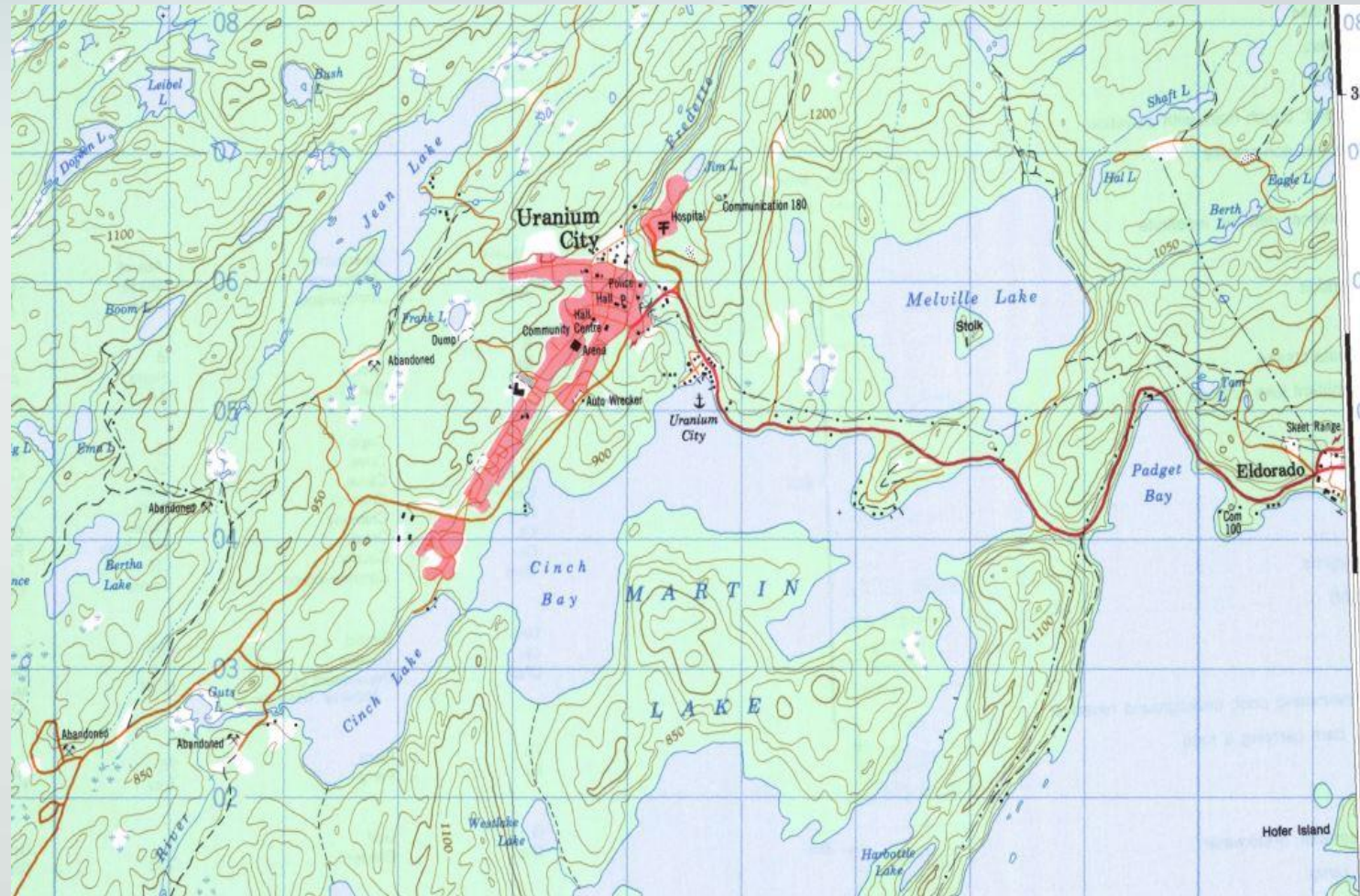
# Satellite Mine Sites



Cayzor Mine in 2009



# Mines in Uranium City area



# Public Safety Risks

- ↳ Openings to underground
- ↳ Radiation from spilled ore
- ↳ Buildings and utilidors collapsing
- ↳ Asbestos
- ↳ PCBs
- ↳ Hydrocarbon spills
- ↳ Metal and glass debris
- ↳ Unstable slopes



# Satellite Mine Sites





# Satellite Mine Sites



# Expectations

- ↳ Improve public safety
- ↳ Remediate environmental damage
- ↳ Expedite completion
- ↳ Use local contractors
- ↳ Provide employment
- ↳ Build local capacity for remediation work
- ↳ Seek public advice on remediation options

# Determining Project Scope

- ↳ Initial project scope based on Assessment of Abandoned Mines in Northern Saskatchewan, 2001, 2002, 2003
  - mine plans, historic documents, previous reports
- ↳ Secondary site assessments by SRC based on site visits and community input



# Challenges of Remote Location and Climate

- ↳ No road access to Uranium City
- ↳ Cost of site visits
- ↳ Cost of moving equipment into the region
- ↳ Ice road for 2 to 6 weeks in early spring
- ↳ Field season is 4 ½ months
- ↳ Currently one contractor in Uranium City

# Challenges and Opportunities in Public Engagement

- ↳ Support of local communities, including Aboriginal leadership, is critical
- ↳ Local knowledge of land and history
- ↳ Expectation of contracts and jobs, though a large labour force not needed
- ↳ Ability to affect reputation of SRC, Project CLEANs and Government of Saskatchewan
- ↳ Influence on engagement of SRC employees

# Scope Creep Factors

- ↳ Site assessments missed spatial extent of impacted areas and site components
- ↳ Openings to underground found that hadn't been mapped
- ↳ Shafts backfilled by previous responsible parties collapsed
- ↳ Polyurethane foam closures now suspect
- ↳ Concrete closures not feasible
- ↳ Engineered stainless steel caps now the only accepted closure method



# Closing Openings to Underground



# Current Approach

- ↳ More extensive and intensive site assessments
  - Desk top study of historic information
  - Map site components including extent of impacted area
  - Sample to delineate contamination by hydrocarbons, PCBs and asbestos
  - Determine level of risk
  - Seek regulatory agreement on radiation objectives and presentation
  - Seek regulatory agreement on scope before beginning remediation

# Detailed Remediation Plans are Critical

- ↳ Next 14 sites are not road accessible
- ↳ Will allow larger contracts to include several sites
- ↳ Will allow regional contractors to commit equipment and workers for entire season



# Risk-Based Approach

- ↳ Tax-payers are funding this remediation
- ↳ Best solutions might not be affordable
- ↳ Understand risks (e.g., down hole instrumentation)
- ↳ Look at level of risk based on accessibility of site
- ↳ Continue to engage communities
- ↳ Tackle highest risks first

# Crown Pillar and Ground Stability



# Engage Consultants

- ↳ Site assessments
- ↳ Risk assessments
- ↳ Crown pillar risks
- ↳ Ground stability
- ↳ Acid rock drainage

