Cluff Lake Decommissioning Project

Tina Searcy and Kebbi Hughes

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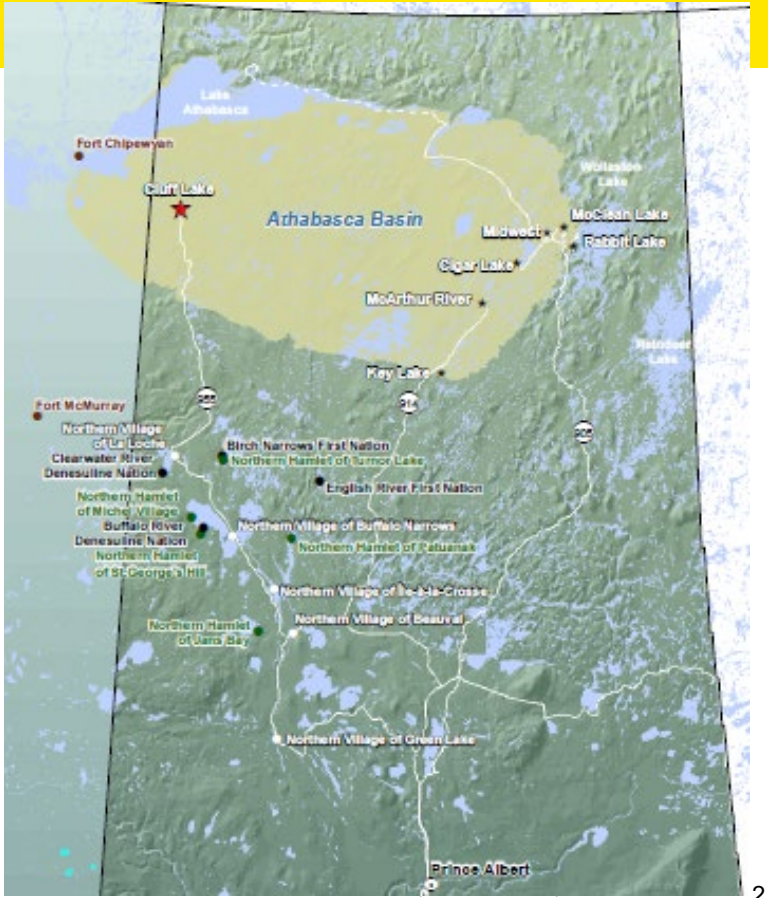
Project Location

- on Treaty 8 Territory and within the Homeland of the Métis
- site is remote, with unrestricted access
- primary, potential future users of the site are resource development and traditional land users



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Project Overview

- Discovered in mid ’60’s
- Operated from 1980 - 2002
- Underground and open pit mining and milling produced 62M lb (or 28M kg) uranium concentrate (U3O8)
- ~4,000 person years of company staff employment; 52% northern

Market

A 18 The Leader-Post Regina, Saskatchewan Friday, April 3, 1981

Cluff Lake mine officially opens

Senate higher

CLUFF LAKE (CP) — The Cluff Lake uranium mine and mill was officially opened Thursday, 14 years after exploration in the area began and almost three years after the Saskatchewan government gave its approval.

Amok Ltd., a French company which owns 80 per cent of the Cluff Lake project, started production last summer at the site and now is operating at 70 per-cent capacity.

Amok officials say 20,000 tonnes of ore has been generated from the open pit mine, 720 kilometres northwest of Saskatoon, and exported into 1.8 million kilograms of magnesia briquette or "yellowcake."

Production of the yellowcake is sent to a refinery in Port Hope, Ont., for further processing.

The Saskatchewan government approval for the project followed an extensive public hearing into the proposal. The Bayda commission, headed by Mr. Justice E. D. Bayda, recommended the mine proceed provided certain environmental and social conditions were met.

As well, a land surface agreement with the provincial government stipulates a minimum number of natives and

Adjust rates

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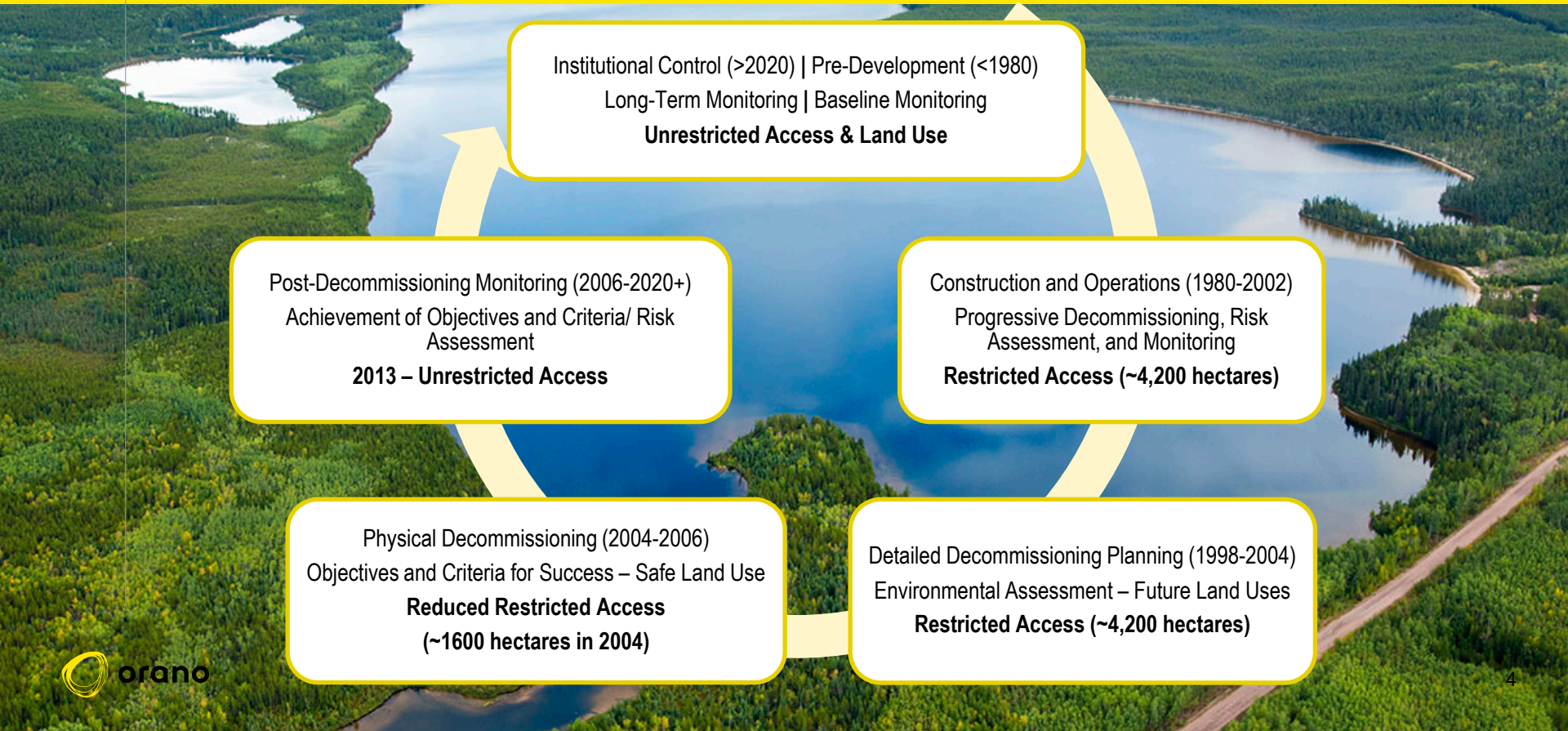
Temporary Use of the Land



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Decommissioning is Complete

Decommissioning Objectives

1. Achievement of surface water quality objectives (now and long-term) 
2. Levels of gamma, radon, and long-lived radioactive dust (LLRD) that pose no unacceptable risk to traditional land uses 
3. Reduction of infiltration rates around covered tailings and waste rock 
4. A site similar in appearance and land capability to that which existed prior to mining 
5. No unreasonable risk to humans or the environment 

- Decommissioning objectives are achieved
- Decommissioned end-state ≠ absence of risk; Decommissioned end-state = absence of unreasonable risk
- Residual risks are well understood and documented
- Decommissioned end-state = waste management (decommissioned tailings, waste rock)
- Site decommissioned to remain stable under passive care
- Transition monitoring demonstrates recovery from operational effects

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Project Site Status

- **Decommissioning is complete and objectives are met**
  - Remove, minimize & control potential sources of contamination
  - Meets surface water quality objectives
- **Site is well understood**
- **Physically and chemically stable under passive care**
  - Safe, stable and self-sustaining landscape
- **Unrestricted access**
- **Public safety at site is comparable to other wilderness areas**
- **Site is available and safe for traditional land use**

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Click below to view video

Claude Mining Area

- Pit was backfilled with waste rock and demolition debris, covered, planted with trees
- Waste rock pile was shaped, compacted, covered with a ‘moisture store-and-release’ till layer, and seeded
- Vegetation is self-sustaining, pile is stable, and successfully minimizing net percolation rates
- Achieving surface water quality in Claude Lake now and in the long-term

Claude Area Re-Vegetation

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DJ Mining Area - Pit

- **DJX waste rock placed at bottom of DJN pit and covered with bentonite**
- **Decommissioned as pit lake, flooded in 2005-06**
- **Stable chemocline, surface water quality objectives being achieved now and in the long-term**

DJ Mining Area
Waste Rock and Overburden

- Former locations of waste rock and overburden
- DJN waste rock entirely relocated to Claude pit; overburden used as cover material in Claude Waste Rock Pile decommissioning
- Areas regraded and revegetated

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Underground Mining Areas DJ & OP/DP

- Raises (8) entirely backfilled, reinforced concrete caps placed, additional 1m till cover
- Declines (2) backfilled about 180m down the ramp, concrete plug placed, covered with till
- Underground mining was by the cut-and-fill method; long term stability

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D Mining Area

- First deposit mined
- Decommissioned as pit lake, flooded in 1983
- Stable chemocline, surface water quality objectives achieved in the long-term

Mill Complex Area

- **Mill and warehouses demolished**
- **Demolition debris placed in Claude pit**
- **Area covered with clean till, graded, and revegetated**

Tailings Management Area

- Low permeability tailings consolidated to remove pore water
- Till ‘moisture store-and-release’ cover placed, graded, and seeded
- Storm water management: north and south diversion ditches, collector channel, surface grading; designed to route Probable Maximum Flood
- Vegetation is self-sustaining, storm water management achieved under passive care, design successfully minimizing net percolation rates
- Achieving surface water quality in Snake Lake now and in the long-term

How Do We Measure Decommissioning Success?

- Physical stability and erosion control including revegetation success
- Water and sediment quality in surface water bodies
- Contaminant transport modelling
- Ecological and Human Health Risk Assessment
- Radiological clearance

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Institutional Control

- Established by legislation
  - Reclaimed Industrial Sites Act
  - Reclaimed Industrial Sites Regulations
- Allows for the **transfer** of a decommissioned site, or portions of, back to the **Province** (as land owner)
- Ensures that the government has **adequate funds** & **site knowledge** to administer decommissioned sites
- Sites are ***not*** **abandoned** – long-term monitoring and maintenance

Long-term Monitoring & Maintenance Plan

- **Monitoring measures COPCs in the environment to:**
  - Confirm level of risk and ERA predictions
  - Demonstrate compliance with surface water objectives
- **Surface Water Monitoring**
  - Verifies the effectiveness of the decommissioning in controlling contaminant transfer to the receiving environment
  - utilized to determine if risks to VECs remain within predictions
- **Geotechnical Inspections**
  - Ensure site is physically safe
  - Monitor for low likelihood accidents and malfunctions
  - Monitor for indications of site use

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Regulatory Path Forward

- **SK Ministry of Energy & Resources**
  - to accept the property in accordance with the Reclaimed Industrial Sites Act
  - Orano must provide funds for monitoring and maintenance
  - Orano must provide funds for unforeseen events
- **SK Ministry of Environment**
  - to release the property from decommissioning and reclamation pursuant to Section 22 of the Mineral Industry Environmental Protection Regulations
  - termination of the Cluff Lake Surface Lease Agreement
- **CNSC**
  - transfer licence (with sole activity of possess, manage, store waste) to Province
  - Province exempt from CNSC licence
  - public hearing with the Commission

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Questions?

- **Thank You!**
  - Check us out on social media

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Giving nuclear energy its full value