Mining Waste Management

R. Liam Mooney
Vice President
Safety, Health, Environment, Quality and Regulatory Relations
Cameco Corporation
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Key Lake Mill and the Cigar Lake project
Uranium Mining Industry Waste Management

- Conventional uranium mining carried out by open pit or underground mines.
- Alternative mining technique called in-situ recovery (ISR)
- Current Canadian mines all conventional and focus of this presentation
- Two dominant waste streams are mill tailings and mine waste rock
General Advancements

- Tailings and waste rock account for roughly half of site decommissioning costs for an integrated mine/mill complex like Key Lake or Rabbit Lake.
- Much has changed over the years:
  - Sites noticeably more compact,
  - less land disturbance, and
  - generally better organized from a waste management perspective
- Better management of waste chemical and physical controls.
Waste Rock Management

- Relatively large volume waste to access ore, moreso in open pit than underground mining
- Historically, non-segregated piles created with less priority given to secondary factors
- Segregation by future management requirements now a core strategy
- Clean waste vs. special waste separated based on radiological, secondary metal and acid-generating potential
Waste Rock Management
Tailings Management

- Rabbit Lake In-Pit Tailings Management Facility

- Prior to and during construction of pit expansion.
Tailings Management

- Deilmann Tailings Management Facility at Key Lake

- Pit during early re-flooding and more current conditions.
Wastes generated from uranium mine and mill facilities classified as low level radioactive waste. Key characteristics are:

- Relatively large volumes
- Tailings relatively inert
- Waste rock relatively low in uranium concentration
Uranium Mining Regulations

Some of the key characteristics of the uranium mining and milling paradigm in Canada:

- Strong Federal and Provincial regulation
- Multiple environmental regulators
- Private sector ownership
Current Challenges

- Need for early selection of decommissioning designs
- Selection of end-state design objectives
- Extent of operating phase progressive decommissioning
- Balance between radioactive and conventional contaminant control
Current Challenges (continued)

- Other challenges include:
  - Maintaining healthy disposal capacity reserve
  - Developing management plans for legacy issues
  - Ongoing constructive community dialogue
Recent Successes

- Uranium mining facilities making strides to lower their environmental footprint:
  - Reducing treated effluent selenium and molybdenum loadings
  - Large scale application of reverse osmosis water treatment
  - Recycle of uranium-bearing products from downstream fuel processing
  - Significant progress in progressive reclamation projects, modeling, and environmental effects monitoring
Decommissioning Priorities

- Regardless of design, overall objective is safe and environmentally acceptable site conditions.
  - Must avoid growing liability and minimize long-term care and control requirements
  - Can be achieved through passive or institutional controls
  - Province of Saskatchewan has made great strides in developing an institutional control framework to address licensing and long-term needs requirements
Transfer to Provincial Control

- Return properties that pose minimal risk to people and the environment back to the province
- Institutional Control Program
Linkage to Cameco’s Strategy

Business Activities

Safe, Healthy, & Rewarding Workplace
Clean Environment
Supportive Communities
Outstanding Financial Performance

Strategic framework for building competitive advantage
Questions