Uranium Mining Regulatory Processes and Facility Design Evolution in Canada

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Outline

- Overview of the CNSC
- Regulatory Processes
- Environmental Regulation
- Facility Design & Evolution
  - Effluent Treatment
  - Tailings Management
  - Waste Rock Management
- Conclusion
Canadian Nuclear Safety Commission (CNSC)
- Canada’s nuclear watchdog
- Quasi-judicial body

Independent of, but not isolated from, government

Regulates all nuclear facilities and activities in Canada to protect the health, safety and security of Canadians and the environment; as well as ensure that Canada meets its nuclear international obligations.
CNSC Regulatory Framework

- Regulations
- Licence Conditions
- Supported by Policies, Standards and Guidelines

- Licensees are responsible for the protection of health, safety, security, and the environment and respecting Canada’s international commitments.

- The CNSC is responsible for regulating licensees, assessing whether licensees are compliant with the NSCA, regulations, and international obligations.
Located on-sites across Canada

- HQ in Ottawa
- 5 Site Offices at Power Reactors
- 1 Site Office at Chalk River
- 4 Regional Offices

Staff: ~ 700+
There are 6 uranium mining projects in the Athabasca Basin of northern Saskatchewan.

Uranium ore from these mines are processed either at an onsite or local offsite mill. Average ore grade can range up to 24.7%.

The end product (uranium oxide or yellowcake) is transported by truck down to Saskatoon, and then continues on to other sites for refining or processing.
Licensing Approach (Step-wise Approach and early planning)

1. Site Preparation
2. Site Construction
3. Site Operation
4. Decommissioning
5. Abandonment (Release from Licensing)

Each stage Requires a Licence and maybe an EA

Financial Guarantees also required for steps 1-4
Public hearings give affected parties and members of the public an opportunity to be heard before the Commission.
Protection of the Environment
Environmental Regulation

- Prevent unreasonable risk to the environment
- Includes non-human biota and non-radiological stressors
- EMS – CSA ISO 14001:2004
- Ecological Risk Assessment - receiving environment effects monitoring and control
Regulatory Approach

Assessment

Monitoring

Controls
• Treatment for additional contaminants
• Multi-stage chemical precipitation
• Filtration
• Batch discharge
• Membrane technologies
Tailings Management Facilities

- Geochemical characterization
- Engineered tailings
- Thickened slurry and paste tailings
- Tailings Consolidation
- Site-specific design
- Pore water monitoring
Tailings Management: In-pit
McClean Lake In-Pit TMF
Waste Rock Management

- Segregation of waste rock
- Reduction and re-use
- Temporary storage of special waste rock
- Leachate containment and control
Concluding Comments

- CNSC is Canada’s nuclear regulator
- CNSC responsible for licensing, compliance and enforcement of uranium mining industry in Canada
- Increasing environmental standards
- Evolution of milling, effluent treatment and tailings management facilities
- Continuing innovation
More information at website: http://www.nuclearsafety.gc.ca

Thank You,-
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CNSC - Canada