



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire

Canada

Regulatory Operating Experience at Canada's Fuel Cycle Facilities

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Canadian Nuclear Safety Commission

- ▶ Regulates the use of nuclear energy and materials to protect the **health, safety** and **security** of Canadians and the **environment**
- ▶ Implements Canada's **international commitments** on the peaceful use of nuclear energy
- ▶ **Disseminates objective scientific, technical and regulatory information** to the public

Canada's nuclear watchdog



The Commission

- ▶ Quasi-judicial administrative tribunal
- ▶ Commission members are independent and part time
- ▶ Commission hearings are public and webcast
- ▶ Decisions can only be reviewed by Federal Court

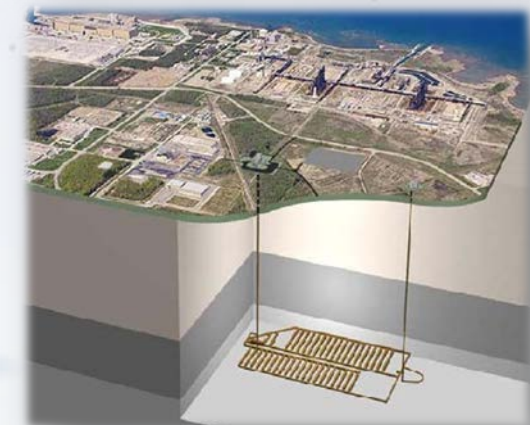


Transparent, science-based decision making

CNSC Regulates All Nuclear-Related Facilities and Activities

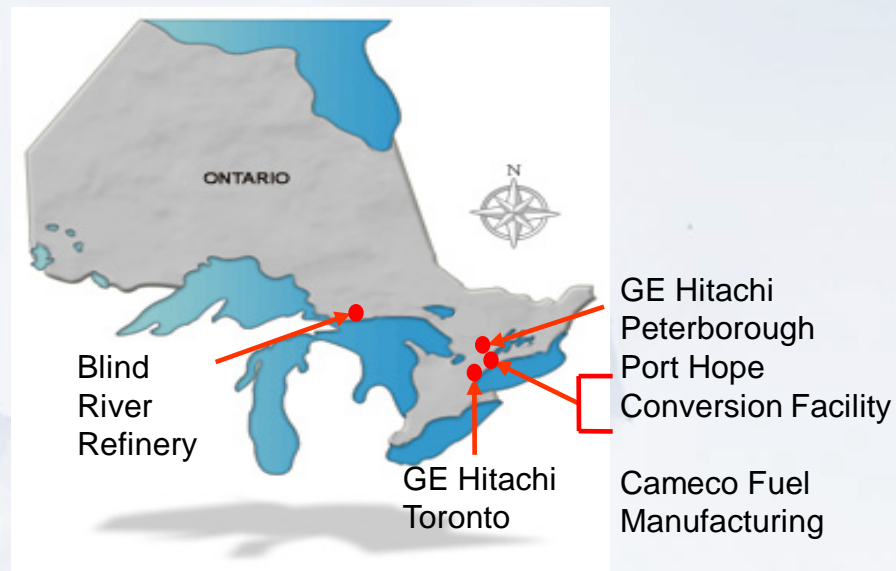
- ▶ Uranium mines and mills
- ▶ Uranium fuel fabricators and processing
- ▶ Nuclear power plants
- ▶ Waste management facilities
- ▶ Nuclear substance processing
- ▶ Industrial and medical applications
- ▶ Export/import control

...From cradle to grave



Uranium Processing Facilities in Canada

- ▶ Blind River Refinery
- ▶ Port Hope Conversion Facility
- ▶ GE Hitachi Nuclear Energy Canada – Fuel Fabrication
- ▶ Cameco Fuel Manufacturing



All Located in Ontario



Cameco Corporation's – Blind River Refinery



Photo Courtesy of Cameco Corp.



Cameco Corporation's – Port Hope Conversion Facility





Cameco and GE Hitachi - Fuel Fabrication Facilities

GE Hitachi Nuclear Energy Canada – Fuel Manufacturing Facility



Cameco Corporation's – Fuel Manufacturing Facility



CNSC Regulatory Framework

Safety and Control Areas

- ▶ **Management System**
- ▶ Human Performance Management
- ▶ Operating Performance
- ▶ Safety Analysis
- ▶ Physical Design
- ▶ Fitness for Service
- ▶ Radiation Protection
- ▶ Conventional Health and Safety
- ▶ Environmental Protection
- ▶ Emergency Management and Fire Protection
- ▶ Waste Management
- ▶ Security
- ▶ Safeguards and Non-proliferation
- ▶ Packaging and Transport

Regulatory Requirement: Operational Experience

- ▶ Requirements for Licensees Established in 'Management System' (CSA N286-12)
 - Relevant experience will be sought and used
 - Nonconformance/deficiencies will be identified and remedied
 - Corrective action - root causes will be identified and corrected



...Modern Regulatory Requirements

Regulatory Requirement: Operational Experience

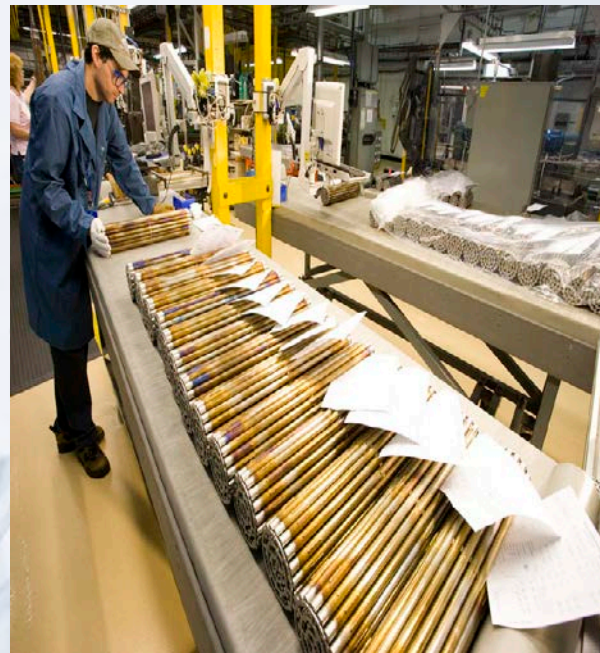
- ▶ Relevant Experience will be Sought and Used
 - Process to identify, obtain, and evaluate in-house and external experience gained.
 - The analysis of this information is used, and action is taken, to improve safety, quality and the management processes



...Compliance Verification Criteria

Example Licensee Program to Meet Requirement Operational Experience

- ▶ CANDU Owners Group (COG)
- ▶ Cameco Incident Reporting System (CIRS)
 - ▶ Electronic event tracking database
 - ▶ Events rated 1 to 4 based on significance
 - ▶ Shared company wide
- ▶ Internal Committees (Radiation Safety, Health and Safety)
- ▶ Daily Shift Change Meetings



Recurrence of a Familiar Event

Pressurized Uranium Concentrate Drum

- ▶ 2012 – drum depressurized when lid loosen by worker
- ▶ ~20 kg of Uranium Concentrate released to air within the facility
- ▶ Dose to the employee of approximately 1.7 mSv
- ▶ Corrective Actions put in place
- ▶ **2015 – Event recurrence but consequences mitigated**

OpEx results in safety...



Other Recent Events

- ▶ **Conversion Facility lost supervisory control of UF6 Plant**
 - ▶ Categorized as a 'near miss'
 - ▶ No releases from facility nor exposures to workers
- ▶ **Unplanned release of Anhydrous Hydrogen Fluoride (AHF)**
 - ▶ Minor worker exposure
 - ▶ Safety systems employed



Safety maintained...

Operational Experience for Regulators

► Regulatory OpEx – Inputs

- Inspections
- Annual Compliance Reports
- Reportable Events
- CNSC's Harmonized Plan
- International Working Groups (FINAS, WGFCs)
- “Regulator-to-Regulator” Co-operation



...Can we do better?

Summary

- ▶ OpEx for fuel cycle facilities is important
- ▶ OpEx for Canadian licensees well defined in requirements for a Management System
- ▶ CNSC recognizes need to respond to OpEx to continually improve and enhance our regulatory oversight
- ▶ CNSC can also benefit from shared experiences amongst regulators

...Value in Peer-to-Peer exchanges



Perspectives on Regulatory and Public Policy

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