

## Regulating Uranium Mines and Mills in Canada



Canadian Nuclear Safety Commission

suretenucleaire.gc.ca

September 4 and 12, 2014





#### **Presentation Outline**



- The CNSC as Canada's nuclear regulator
- The CNSC's regulatory framework
- Regulatory oversight: licensing and compliance



## Canadian Nuclear Safety Commission



- Established in May 2000, under the *Nuclear Safety and Control Act* (NSCA)
- Exclusive jurisdiction over all nuclear-related matters in Canada
- CNSC is an independent regulatory quasijudicial tribunal:
  - Arms-length from the federal government and independent in its regulatory decision-making capacity
  - members appointed for fixed terms, can be removed only for cause

### Canadian Nuclear Safety Commission (cont'd)



- Independent, but not isolated from government:
  - subject to normal administrative requirements
  - reports to Parliament through the Minister of Natural Resources
  - appears before parliamentary committees
  - cooperates with other governmental agencies/departments
  - subject to directives on broad policy matters under section 19 of the NSCA

Canada's independent nuclear regulator

#### Our Mission



To regulate the use of nuclear energy and materials so that the health, safety and security of Canadians and the environment are protected, and to implement Canada's international commitments on the peaceful use of nuclear energy; and to disseminate objective scientific, technical and regulatory information to the public.



### Advanced Exploration

- Examples of activities that would require CNSC authorization:
  - bulk sampling
  - mining an ore body







## CNSC Regulates all Nuclear-Related Facilities and Activities

#### **Imports, Exports and Safeguards**

Controlled information, controlled material, controlled equipment

The chemical form of

uranium is converted

UF6 (for export), UO2

powder is shipped to

to UO2 (for CANDU

reactor fuel) or to

a fuel fabrication

facility.

#### Mining



Rock containing on average 1 - 19 % uranium (uranium ore) is extracted from the ground. The ore is transported to a regional mill.

#### Milling



Uranium ore is ground and the uranium (U3O8) is chemically separated from most other constituents. The uranium concentrate, containing approximately 98% uranium (yellowcake) is shipped to a refinery.



The remaining contaminants in the uranium concentrate are chemically separated from the uranium. The purified uranium (UO3) is shipped to a uranium conversion facility.

Refining

#### Conversion

#### Fuel Fabrication



The UO2 powder is pressed into pellets.

#### Fuel Assembly



The UO2 pellets are assembled in CANDU reactor fuel bundles. The fuel bundles are shipped to a nuclear generating station (NGS).





Fuel bundles are loaded into reactors, where they generate heat to produce electricity.

#### Cigar Lake Mine (Cameco), SK



McClean Lake Mill (AREVA Resources Inc.). SK

McArthur River Mine (Cameco), SK



Key Lake Mill (Cameco), SK

Rabbit Lake Mine (Cameco), SK



Rabbit Lake Mill (Cameco), SK



Blind River Refinery (Cameco), Blind River, ON



Uranium conversion facility (Cameco), Port Hope, ON



Nuclear Fuel Facility (Cameco Fuel Manufacturing Inc.), Port Hope, ON



Nuclear Fuel Processing Facility (GE Hitachi Nuclear Energy Canada Inc.), Toronto, ON



Nuclear Fuel Facility (GE Hitachi Nuclear Energy Canada Inc.), Peterborough, ON Pickering NGS Pickering, ON

Point Lepreau NGS, Point Lepreau, NB

Bruce A and B NGS, Kincardine. ON

Darlington NGS, Clarington, ON

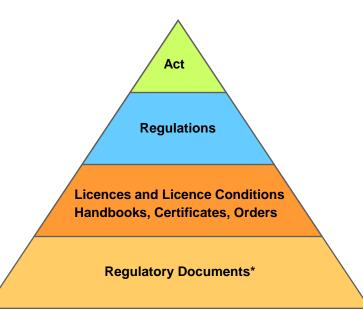
#### **Waste Management**

### Overview of the CNSC's Regulatory Framework



- Nuclear Safety Control Act (NSCA):
  - enabling legislation
- Regulations:
  - high-level and generally applicable requirements
- Licences and licence conditions handbooks, certifications, orders:
  - facility and/or activity specific requirements
- Regulatory documents:
  - include requirements and guidance

### Elements of the regulatory framework



## Overview of the Nuclear Safety and Control Act (NSCA)



- Under the Constitution Act (1982), nuclear power is a federal responsibility:
  - peace, order and good government (s. 91)
  - NSCA, para. 92(10)(c) s. 71
- NSCA and associated regulations in force since 2000
- Provides modern framework for regulation of nuclear sector
  decoupled from research and development activities
- Preamble indicates Parliament's intent in legislating for national and international interest

## Statutory Powers Under NSCA



- Court of record, hearing powers (s. 20)
- Arrangements, programs (s. 21)
- Licensing (s. 24, 37)
- Financial guarantees (s. 24)
- Orders of the inspector and designated officers (s. 35, 37)
- Regulation-making (s. 44), including Rules of Procedure
- Emergency orders (s. 47)
- Punishment for offences (s. 48)
- Administrative monetary penalties (s. 65.01)

## Other Federal Acts That Apply to Uranium Mines and Mills

- Federal/provincial and municipal acts, regulations and policies may apply to CNSC licensees
- Examples of other federal acts that may apply to licensees:
  - Canadian Environmental Assessment Act, 2012
  - Canadian Environmental Protection Act
  - Canada Labour Code
  - Fisheries Act
  - Migratory Birds Convention Act
  - Navigable Waters Protection Act
  - Nuclear Fuel Waste Act
  - Nuclear Liability Act
  - Species at Risk Act
  - Transportation of Dangerous Goods Act
- CNSC works collaboratively with other federal departments, including Environment Canada, Transport Canada, Fisheries and Oceans, and Employment and Social Development Canada

#### Other Jurisdictions



- In addition to federal legislation, operators of uranium mines and mills are also subject to provincial and territorial regulations and requirements
  - the main regulators for safety and environment are concerned (e.g., CSST and the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques)
- CNSC works closely with its provincial counterparts in environmental inspections, licensing, compliance programs and inspections

Looking for harmonization to avoid duplication and inefficiencies

## Aboriginal Consultation



- Duty to consult
- Consideration of potential or established Aboriginal or treaty rights:
  - James Bay and Northern Quebec Agreement
- Intergovernment approach
- Commitment to consult with Aboriginals
- Ongoing consultation during the project period



## NSCA Regulations



- General Nuclear Safety and Control Regulations
- Radiation Protection Regulations
- Nuclear Security Regulations
- Uranium Mines and Mills Regulations
- Class I Nuclear Facilities Regulations
- Class II Nuclear Facilities and Prescribed Equipment Regulations
- Nuclear Substances and Radiation Devices Regulations
- Packaging and Transport of Nuclear Substances Regulations
- Nuclear Non-Proliferation Import and Export Control Regulations
- CNSC Cost-Recovery Fees Regulations
- Canadian Nuclear Safety Commission Rules of Procedure
- Canadian Nuclear Safety Commission By-laws

## Licences and Licence Conditions, Handbooks, Certificates, Orders



- Licences and licence conditions handbooks:
  - the CNSC issues licences for various nuclear activities and facilities
  - once issued, the company or corporation becomes a CNSC licensee

#### Certificates:

 the CNSC issues certificates that indicate that a nuclear device or person working in the nuclear sector meets specific requirements

#### Orders:

- an inspector may make an order to address a safety concern, to which the licensee must adhere.
- orders are referred to the Commission for review

## Regulatory Documents



- Clarify requirements
- Provide guidance on how to comply with requirements
- Are developed through consultation
- Some examples:
  - decommissioning
  - financial guarantees
  - mine waste management
  - environmental protection
  - radiation protection

## CNSC Cost-Recovery Fees Regulations



- CNSC sets the annual amount payable by the licensee as part of the cost recovery program
- Fees are based on a cost estimate and must comply with the federal cost recovery policy:
  - corporate costs
  - travel costs
  - etc.
- Approximately 1.4 to 1.5 million dollars for mines currently in operation



#### Financial Guarantees



- Subsection 24(5) of the NSCA stipulates that:
  - "A licence may contain any term or condition that the Commission considers necessary for the purposes of this Act, including a condition that the applicant provide a financial guarantee in a form that is acceptable to the Commission."
- Financial guarantees are required for uranium mines and mills to ensure the availability of funds for decommissioning
- Total costs (100%) are estimated on the basis of a decommissioning plan that is reviewed and approved by CNSC and the province
- Regulatory documents:
  - G-206, Financial Guarantees for the Decommissioning of Licensed Activities
  - G-219, Decommissioning Planning for Licensed Activities

## Financial Guarantees: Uranium Mines and Mills



| Facility   | Amount in Canadian dollars (2013) |
|--|-----------------------------------|
| Cigar Lake Project                                 | 49.2                              |
| McArthur River Operation                           | 48.4                              |
| Rabbit Lake Operation                              | 202.7                             |
| Key Lake Operation                                 | 225.1                             |
| McClean Lake Operation (includes Midwest)          | 43.1                              |
| Total financial guarantees for the five facilities | 568.5                             |

#### Financial Guarantees



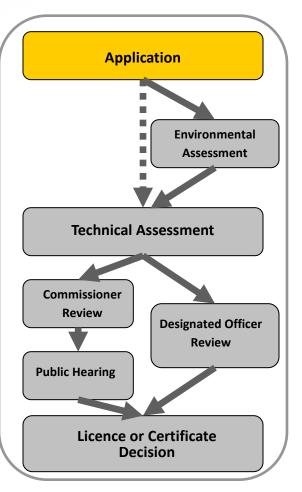


Responsibility is transferred to the province once the site has been decommissioned

#### Licence or Certificate Decision

#### **Licensing Process**



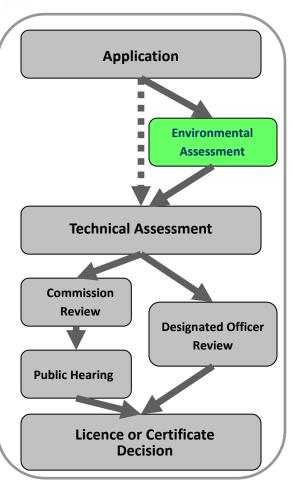


- Applicants must demonstrate that they are qualified
- The Regulations outline the information required to apply for a licence

## Environmental Assessment (EA)

#### **Licensing process**

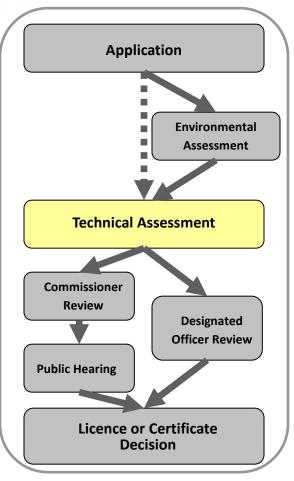




- An EA is required for activities listed under the Canadian Environmental Act, 2012 and the NSCA, regulations
- Purpose:
  - predict the environmental effects of a specific project
  - minimize or avoid adverse environmental effects before they occur
  - incorporate environmental factors into decision making
- Provide opportunities for public participation
- No licence can be granted unless there is a decision that the project will not likely cause significant adverse environmental effects

#### Technical Assessment

#### **Licensing process**



#### 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
- Guarantees
- Packaging and transport



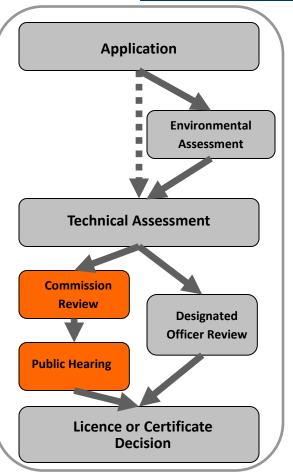
- Other areas
- Financial guarantees
- Consultations and communications



## Commission Hearings and Meetings

# Chisc + CCS

#### Licensing process

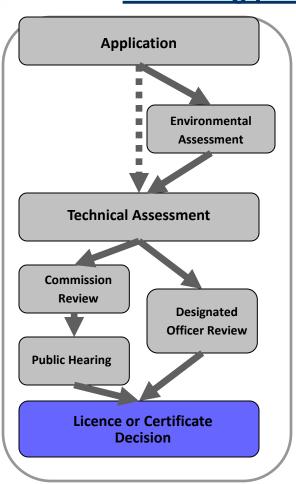


- The Commission makes independent, fair and transparent decisions through public hearings and meetings
- Proceedings are as informal and expeditious as possible
- The Commission makes decisions on the basis of the evidence brought before it

#### Licence or Certificate Decision

# Chec CCS

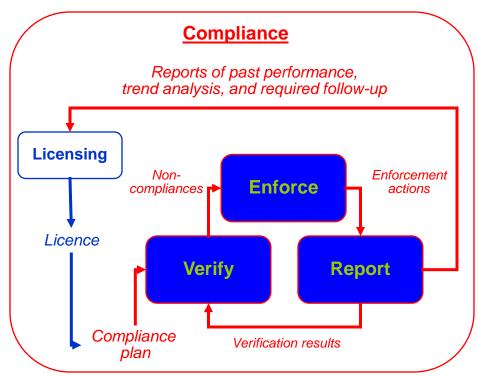
#### **Licensing process**



- The decision will take the form of a licence grant or a letter of refusal
- The decision is made public in the form of a written document
- Conditions may be placed on a licence
  - licensees must meet all conditions of the licence

## Compliance Process





#### **Verify**



#### **Enforce**

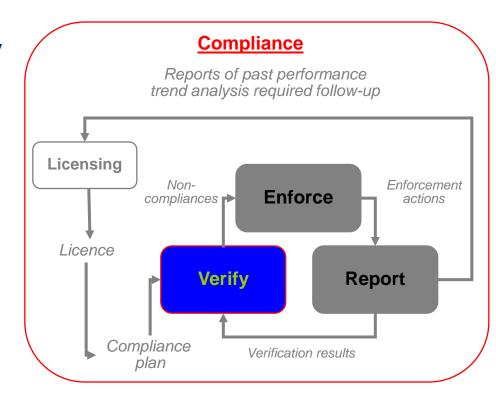




## Verifying Compliance

- The CNSC verifies that licensees abide by the terms of their licences through inspections and desktop reviews
- The scope, frequency and complexity of inspections are risk-based and take into consideration the licensee's compliance history:
  - approximately 4 to 6 inspections per year
  - each inspection takes from 2 to 4 days
- Inspectors are empowered under the NSCA to enforce regulatory requirements





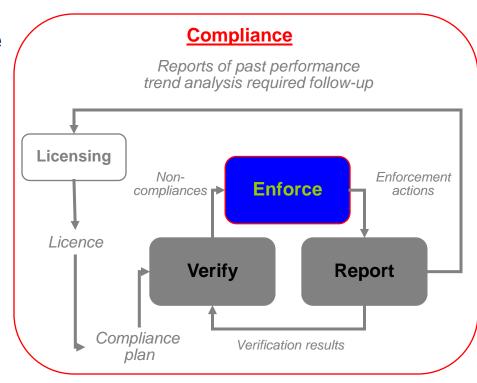
## Enforcing Compliance

- The CNSC uses a graduated enforcement approach that takes into consideration the non-compliance and the licensee's compliance history
- Inspectors and the Commission have various powers. For example, they can:

#### Inspector:

- recommend/suggest potential improvement
- request that actions be taken
- request information under the General Nuclear Safety and Control Regulations
- issue an order or administrative monetary penalty (AMP)



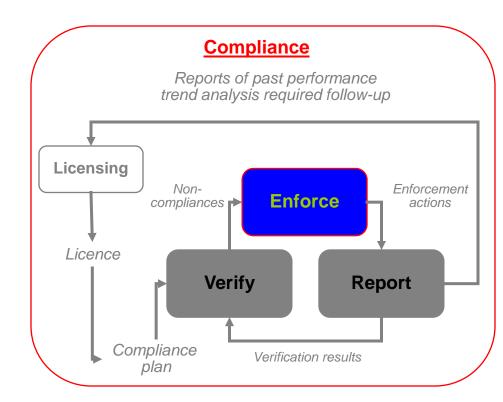


## Enforcing Compliance (cont'd)



#### **Commission:**

- summon licensees to appear
- impose restrictions or revoke licenses
- recommend prosecution to the Attorney General of Canada



## Accident and Incident Management

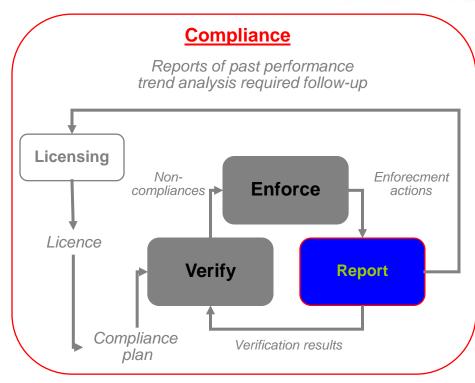


- Multi-level response to ensure adequate resources and communication with province and municipality
- Severe Accident Management Guidelines
- Mandatory reporting:
  - 24 hours to report an incident (spill, accident)
  - 21 days to file a detailed report (safety analysis)
  - reporting the incident to the Commission, depending on severity (Early Notification Report [ENR])
  - CNSC inspectors carry out an onsite audit
- Minor incidents are reported in a monthly report
- Transparency through communication to the public and media

## Reporting Compliance

- The final stage is reporting compliance, the key component of the cyclical licensing compliance program
- CNSC staff provide reports to:
  - the Commission (e.g., orders)
  - the public
  - licensees
  - the Government of Canada
  - the International Atomic Energy Agency
  - other stakeholders





The CNSC Staff Report on the Performance of Canadian Uranium Mines and Mills: 2013 will be presented to the Commission on October 2014

#### Conclusion



- Canada's uranium mines are strictly regulated
- By assessing, controlling and monitoring the process, we can better understand and minimize the risks for humans and the environment
- TheCNSC works closely with its provincial counterparts in regulating uranium mines and mills



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## Thanks!



