Canadian Nuclear Laboratories Proposed Near Surface Disposal Facility (NSDF)

Application to Amend the Licence to Construct the NSDF at the Chalk River Laboratories (CRL) Site

CNSC Staff Presentation

Commission Hearing, Part 2
May 30, 2022

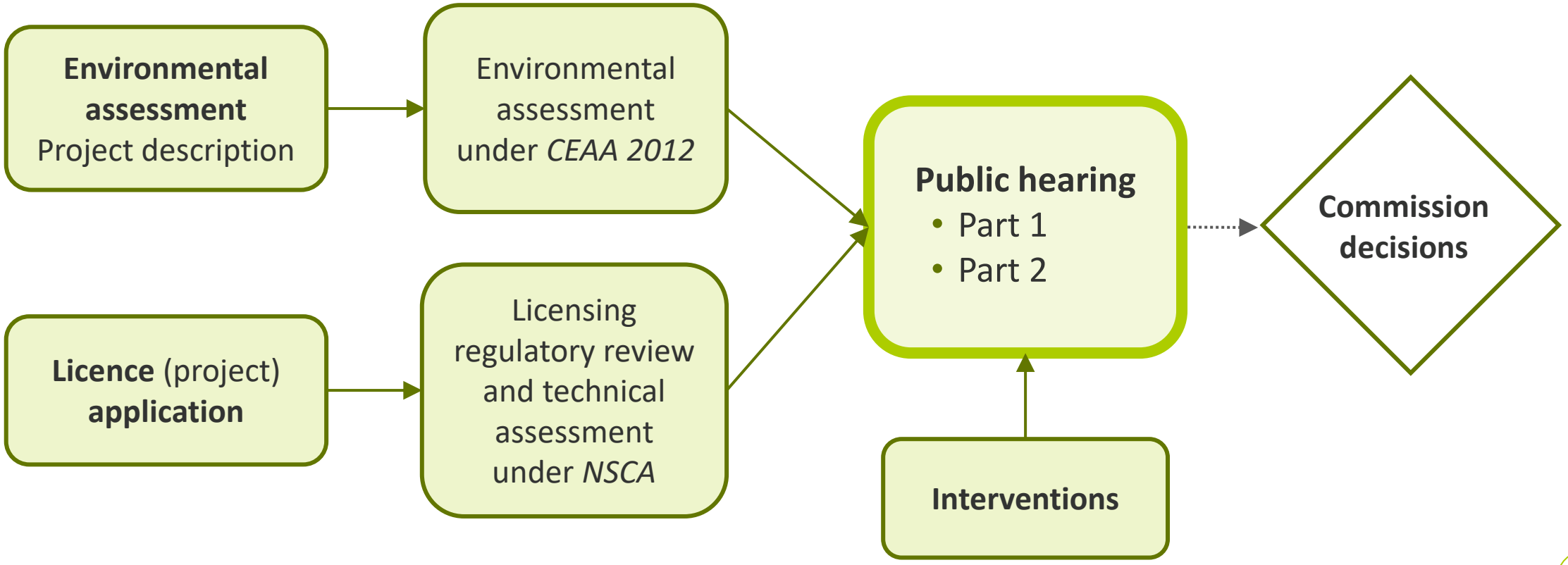
CMD 22-H7.C

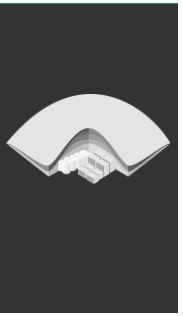
Background

- CNL has applied to construct the NSDF at the Chalk River Laboratories site
  - A new proposed Class IB nuclear facility to dispose of low-level radioactive waste
- Construction of the proposed NSDF cannot occur unless authorized by the Commission
- An environmental assessment (EA) was required in accordance with the *Canadian Environmental Assessment Act 2012* (CEAA 2012)
  - CEAA 2012 was the federal Environmental Assessment legislation at the time the submission was received
  - The NSDF project qualifies as a Designated Project as per section 37(b) of the *Regulations Designating Physical Activities*

CNSC staff's environmental and licensing assessments of the project are detailed in CMD 22-H7

Regulatory Review Process Overview





Commission Decisions

1. An environmental assessment decision under *Canadian Environmental Assessment Act*, 2012
2. A licensing decision under the *Nuclear Safety and Control Act*
3. A determination on whether the honour of the Crown has been upheld in fulfilling CNSC's duty to consult obligations as per the *Constitution Act*, 1982 (section 35)

Themes

CMD 22-H7.B includes information on the following themes:

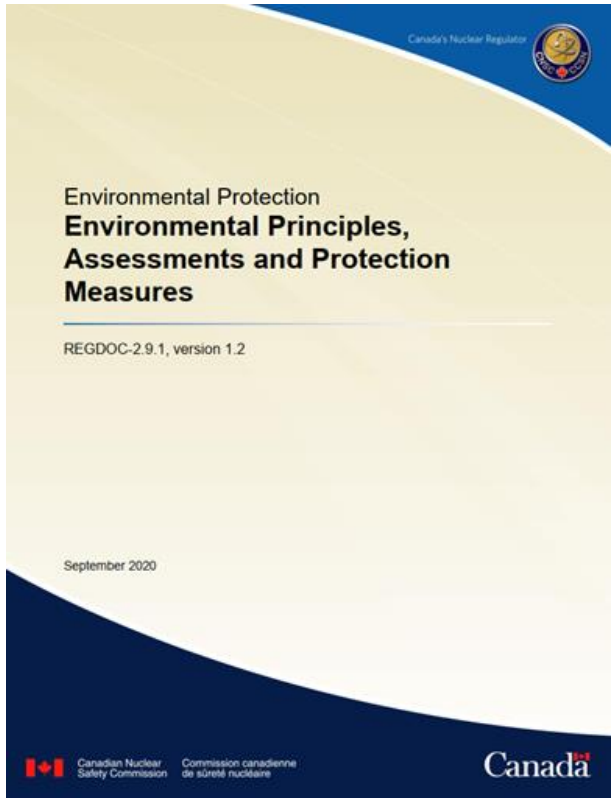
- Environmental Assessment and Environmental Protection
- Long-term safety
- Indigenous consultation and engagement
- Requested licence amendment

ENVIRONMENTAL ASSESSMENT AND ENVIRONMENTAL PROTECTION

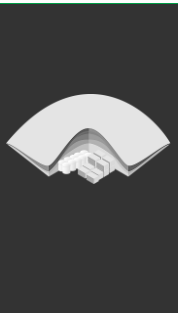
Canadian Nuclear Laboratories: Near Surface Disposal Facility (NSDF)
May 30, 2022, CMD 22-H7.C

Environmental Assessment

- Environmental reviews are central to the CNSC's mandate
- CNL's Environmental Impact Statement assessed against:
  - Requirements in *Canadian Environmental Assessment Act, 2012*
  - The CNSC's Generic Guidelines for the Preparation of an Environmental Impact Statement
  - REGDOC-2.9.1: *Environmental Protection: Environmental Principles, Assessments and Protection Measures*
  - REGDOC-3.2.2, *Indigenous Engagement*



Federal and provincial agencies contributed their expertise



Key Topics

Consideration of Alternatives

Alternatives to the project, alternative locations for the project

Potential Impacts on Perch Lake

Impacts on fish and fish habitat

Potential Impacts on the Ottawa River

Contamination of drinking water

Consideration of Alternatives

- An assessment of alternative means to the project is a requirement under the *Canadian Environmental Assessment Act, 2012*
  - Proponent is required to assess various technically and economically feasible ways that would allow the project to be carried out
  - CNSC staff reviewed CNL's methodology for assessing alternative means including options for location, technology and mitigation measures
- Proposed NSDF location
  - Location of nuclear projects is proposed by the applicant
  - CNSC staff assessed CNL's methodology to select the proposed location

Potential Impacts on Perch Lake

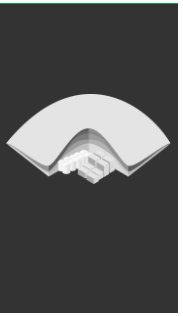
- CNSC staff assessed the predicted changes to the environment from the NSDF project on water resources, including Perch Lake
- Mitigation measures identified to reduce impacts to Perch Lake include:
  - Turbidity curtains and avoidance of sensitive periods for fish species during construction activities
  - Surface water monitoring
  - Engineering controls to allow detection of contaminants prior to treated effluent discharge

Mitigation measures and environmental design features are adequate to reduce the effects on surface water during all project phases

Potential Impacts to the Ottawa River

- CNSC staff assessed the predicted changes to the environment from the NSDF project on the Ottawa River
- Site characteristics and design features would minimize effects on the aquatic environment
- CNSC staff are satisfied that the project would not impact Ottawa River water quality

CNSC staff's analysis verified no detectable impact on the Ottawa River



CNSC Staff Conclusions on Environmental Assessment and Environmental Protection

CNSC staff reaffirm the conclusions of our assessment as presented to the Commission at Part 1:

- The proposed NSDF project is not likely to cause significant adverse environmental effects
- The proposed NSDF project incorporates measures to protect people and the environment

Canadian Nuclear Laboratories Proposed Near Surface Disposal Facility (NSDF)

Application to Amend the Licence to Construct the NSDF at the Chalk River Laboratories (CRL) Site

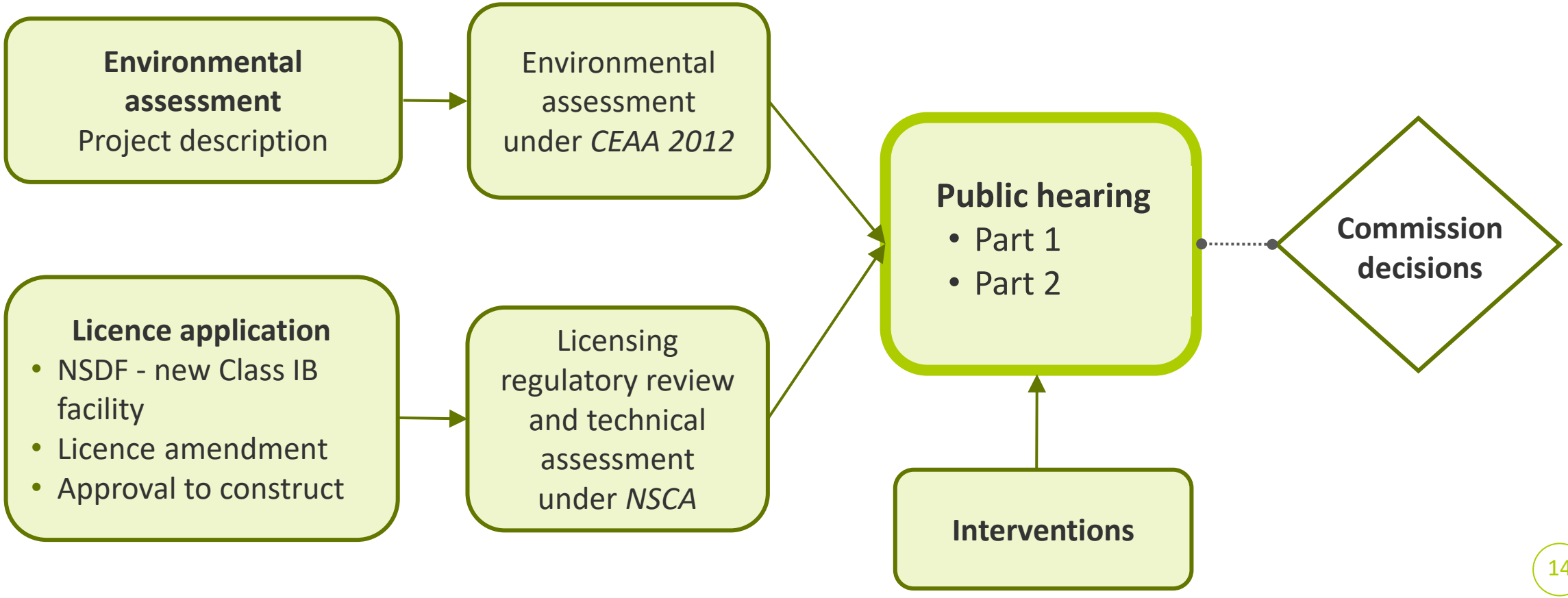
CNSC Staff Presentation

Commission Hearing, Part 2

May 30, 2022

CMD 22-H7.C

Regulatory Review of Proposed NSDF



Themes

CMD 22-H7.B includes information on the following themes:

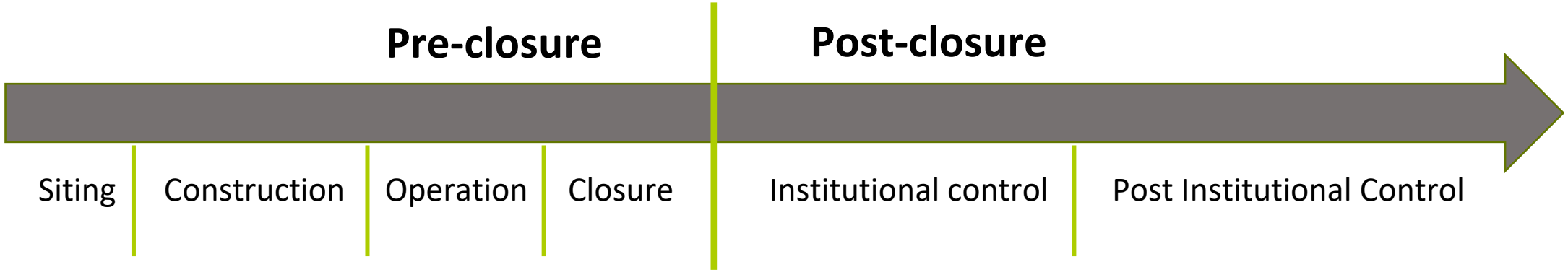
- Environmental Assessment and Environmental Protection
- **Long-term safety**
- Indigenous consultation and engagement
- Requested licence amendment

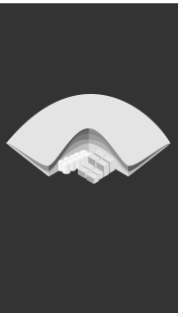
LONG-TERM SAFETY

Canadian Nuclear Laboratories: Near Surface Disposal Facility (NSDF)
May 30, 2022, CMD 22-H7.C

Long-Term Safety

- Long-term safety is the protection of human health and the environment after closure of the facility (or post-closure)
- The timeframe associated with post-closure depends on the hazardous time associated with the wastes
- Long-term safety relies mainly on passive means with minimal human intervention

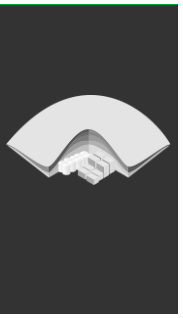




Fundamental Requirements for Ensuring Long-Term Safety

- The waste must be contained and isolated during its hazardous life
- Containment and isolation achieved by multiple engineered and natural barrier systems
- The overall disposal system and its individual barriers must be robust
- The evolution of the barrier system and the impact of disruptive events must be taken into account

A proponent must develop a safety case to demonstrate pre-closure and post-closure safety in support of licence application



Key Topics

NSDF Design

- Design life and robustness of base liner and cover systems
- Suitability of design for low-level radioactive waste disposal

Waste Inventory, Waste Acceptance Criteria and Waste Characterization

- Long-lived radionuclides
- Hazardous materials and mixed waste

Potential Long-Term Impacts

- Disruptive events
- Impact on human health and environment

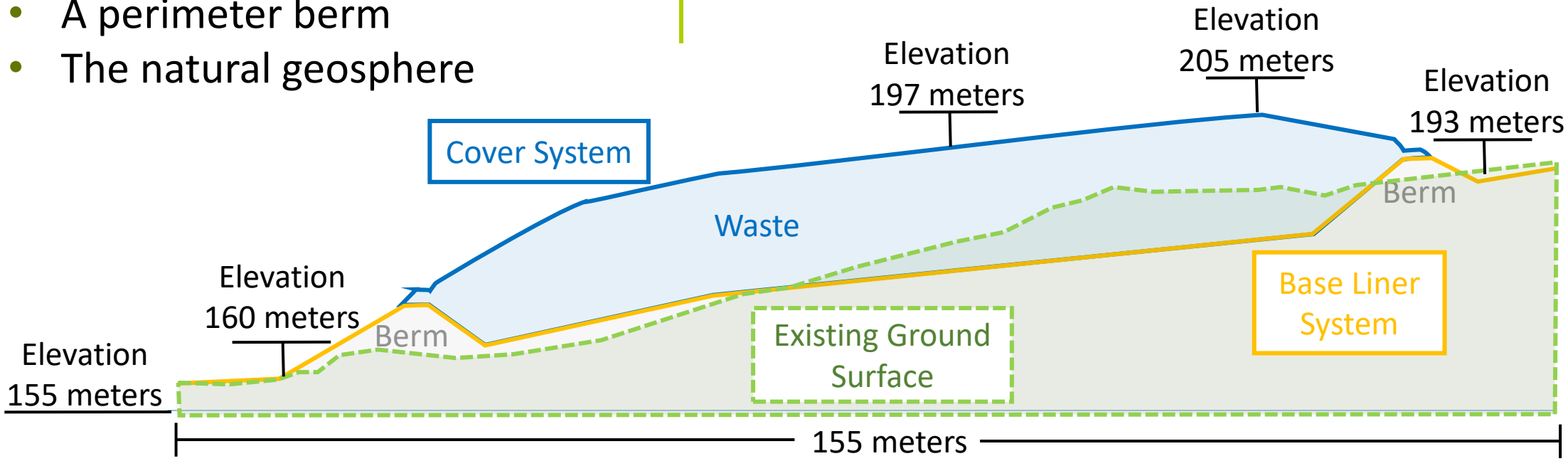
NSDF Design

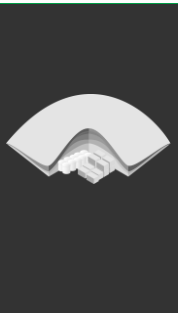
The design of the engineered containment mound complies with CNSC requirements and international standards

Long-term safety is ensured by:

- A multi-layer base liner system
- A multi-layer cover system
- A perimeter berm
- The natural geosphere

CNSC staff assessed that the engineered containment mound would meet or exceed its 550 year design life





Waste Inventory, Waste Acceptance Criteria and Waste Characterization

- The waste acceptance criteria set the requirements for waste that could be accepted in the NSDF
  - Require waste to be characterized
  - Specify limits on the concentration and activity of key radionuclides
  - Limit total inventory for each radionuclide in the waste
  - Align with Canadian and international definitions for low-level radioactive waste
- Long-lived radionuclides constitute a small proportion of the total radioactive inventory

CNSC staff determined the waste acceptance criteria comply with CNSC requirements and international standards

Hazardous Waste

- Hazardous waste on its own would not be accepted for disposal in the NSDF
- Radioactive waste with hazardous components (mixed waste) could be accepted
  - CNL would be required to perform analysis, treatment, processing or stabilization of mixed waste to ensure it is acceptable

CNSC staff determined that the limits and conditions for hazardous waste comply with Canadian requirements

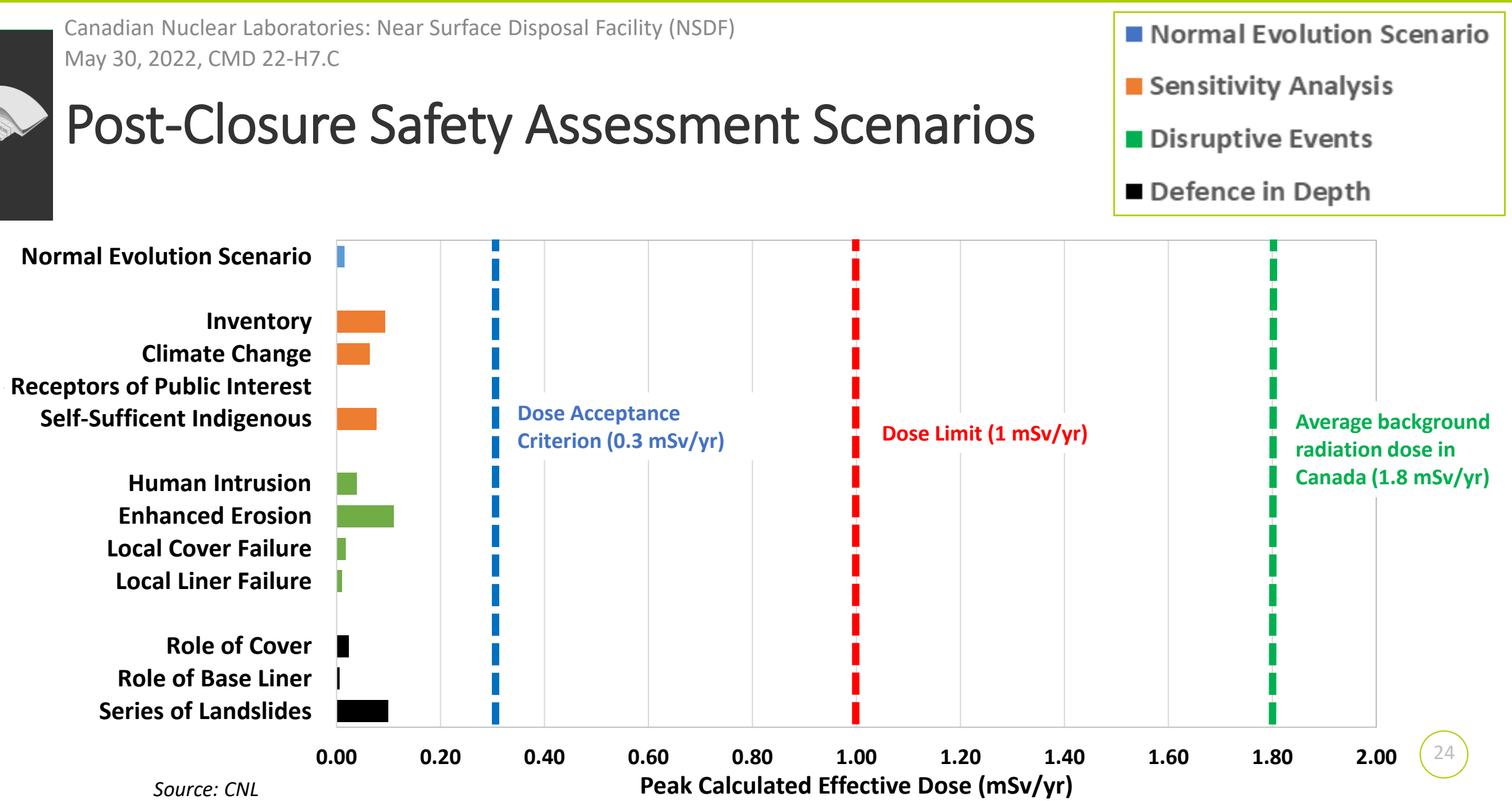
Potential Long-Term Impacts

Variety of scenarios assessed:

- Normal evolution (most-realistic scenario)
- Human intrusion
- Disruptive events (e.g., earthquakes, erosion, climate change)
- Other worst case “what if” scenarios (e.g., mass excavation, permanent flooding)

All scenarios result in doses lower than the 1mSv/year regulatory limit

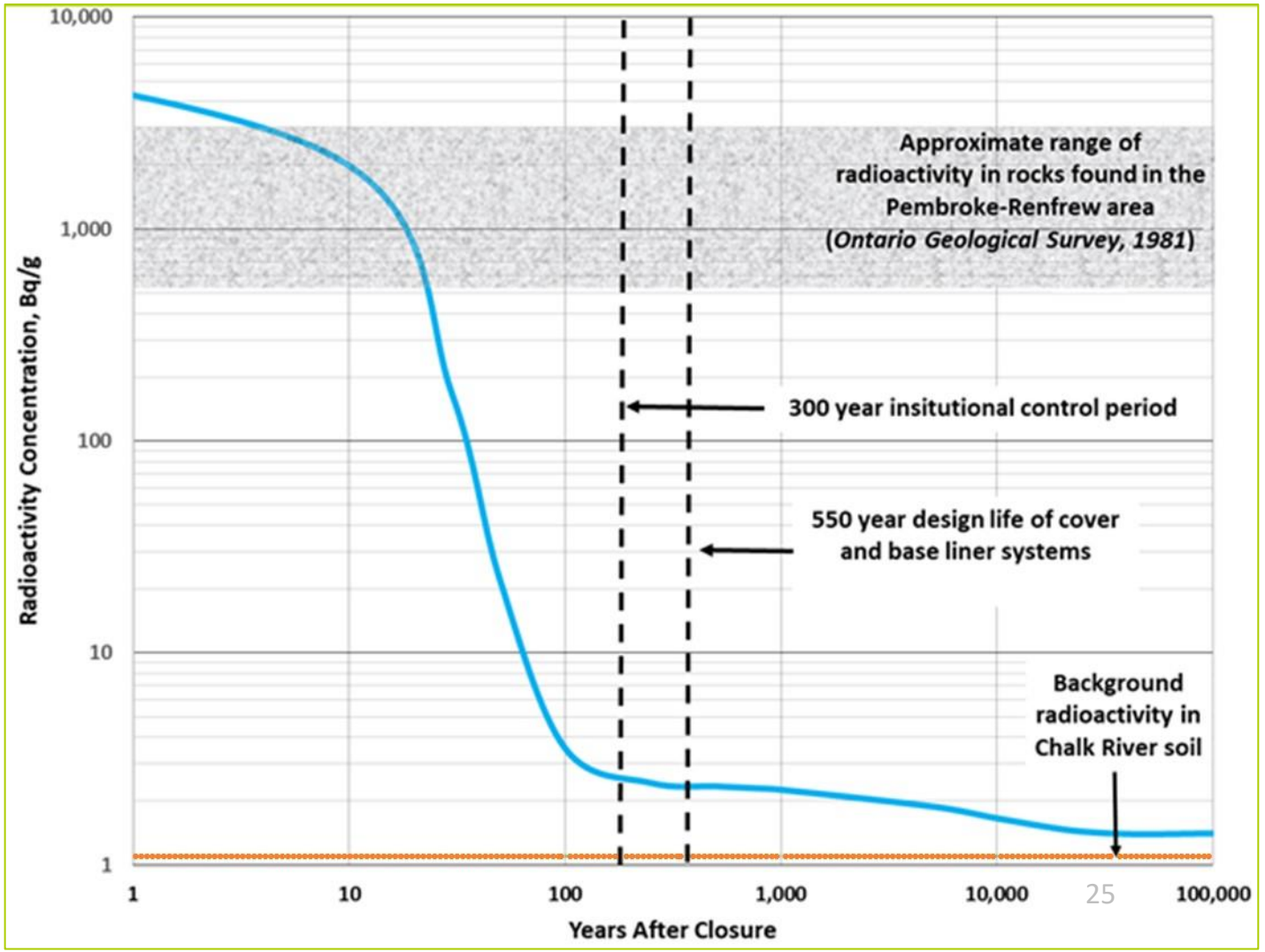
Post-Closure Safety Assessment Scenarios



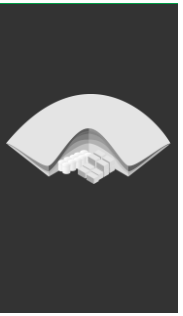
Source: CNL

Post-Closure Timeframe Assessment

- At 300 years the majority (99%) of the NSDF inventory would have decayed to near background levels
- Evidence supports timeframes for institutional control (300 years) and barrier design life (550 years)



Source: CNL



CNSC Staff Conclusions on Long-term Safety

CNSC staff reaffirm the conclusions of our assessment as presented during Part 1:

- CNL's licence application to construct the NSDF at the CRL site complies with all applicable regulatory requirements
- The engineered containment mound will not negatively impact the Ottawa River
- The NSDF facility design provides for safe operation, decommissioning and closure, providing adequate protection for workers, Indigenous peoples, the public and the environment over the near and long-term

Canadian Nuclear Laboratories Proposed Near Surface Disposal Facility (NSDF)

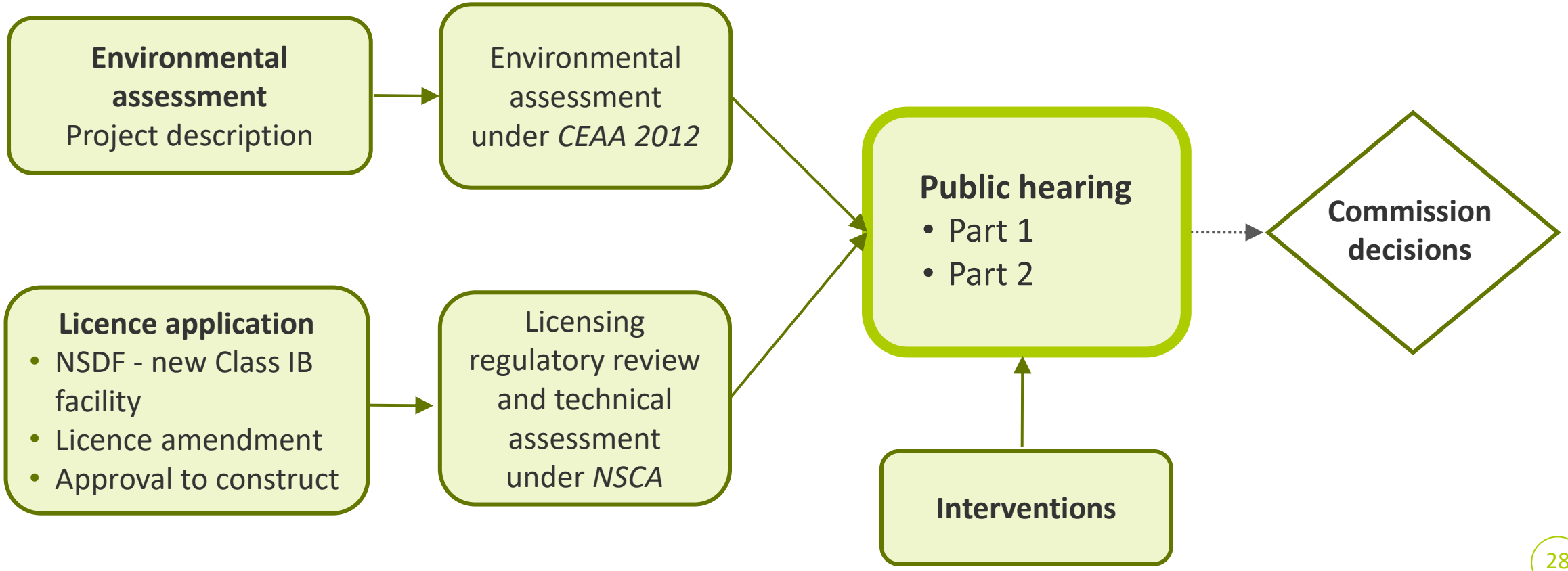
Application to Amend the Licence to Construct the NSDF at the Chalk River Laboratories (CRL) Site

CNSC Staff Presentation

Commission Hearing, Part 2
May 30, 2022

CMD 22-H7.C

Regulatory Review of Proposed NSDF



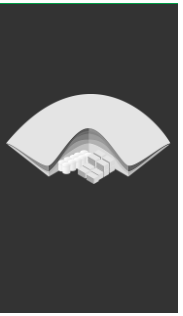
Themes

CMD 22-H7.B includes information on the following themes:

- Environmental Assessment and Environmental Protection
- Long-term safety
- Indigenous consultation and engagement
- Requested licence amendment

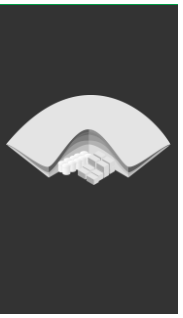
INDIGENOUS CONSULTATION AND ENGAGEMENT

Canadian Nuclear Laboratories: Near Surface Disposal Facility (NSDF)
May 30, 2022, CMD 22-H7.C



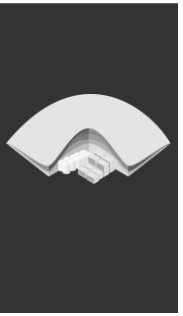
Indigenous Consultation

- As an agent of the Crown, the Commission must ensure that all of its licensing decisions and environmental reviews under the *Nuclear Safety and Control Act,* the *Canadian Environmental Assessment Act 2012,* the *Impact Assessment Act*, or other relevant legislation uphold the honour of the Crown and consider Indigenous peoples' potential or established Indigenous or treaty rights as per section 35 of the *Constitution Act*
- The CNSC continues to ensure our relationship with Indigenous peoples supports the principles of reconciliation



Indigenous Nations and Communities CNSC Staff Consulted and Engaged With on the NSDF

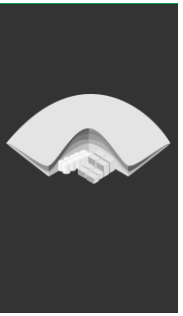
- Anishinabek Nation
- Algonquin Anishinabeg Nation Tribal Council
- Algonquins of Ontario
- Algonquins of Pikwakanagan First Nation
- Algonquin Nation Secretariat
  - Wolf Lake First Nation
  - Timiskaming First Nation
  - Mitchikanibikok Inik
- Kitigan Zibi Anishinabeg
- Kebaowek First Nation
- Métis Nation of Ontario
- Williams Treaties First Nations
  - Alderville First Nation
  - Curve Lake First Nation
  - Chippewas of Beausoleil First Nation
  - Chippewas of Georgina Island First Nation
  - Chippewas of Rama First Nation
  - Hiawatha First Nation
  - Mississaugas of Scugog Island First Nation



Consultation and Engagement - Approach

In order to fulfill the Duty to Consult, since 2016, CNSC staff provided many opportunities for consultation and collaboration with Indigenous Nations and communities, including:

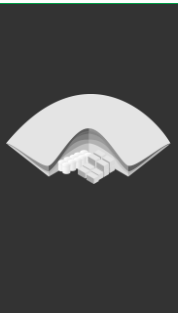
- Offered, consulted, and engaged in meetings and sent correspondence
- Funded and incorporated indigenous knowledge studies
- Signed terms of references for collaborative approaches to consultation
- Reviewed and collaborated on drafting of environmental assessment report, rights impact assessments
- Ensured CNL engagement activities met REGDOC-3.2.2: *Indigenous Engagement* and related guidance



Consultation and Engagement – Feedback

- Some Indigenous Nations expressed appreciation for CNSC efforts for collaboration and engagement over the years
- Some concerns were raised regarding how the principles of the UN Declaration on the Rights of Indigenous Peoples were incorporated
- Some Indigenous Nations raised the concern that they were not consulted

CNSC staff strived to collaborate and develop a meaningful approach to consultation with all potentially impacted Indigenous Nations



Consultation and Engagement: The Path Forward

- CNSC staff encourage all Nations and communities who are participating in the process to bring forward any additional information or concerns through the Commission Hearing
- CNSC staff remain open to working with all interested and identified Indigenous nations and communities to develop meaningful relationships

Canadian Nuclear Laboratories Proposed Near Surface Disposal Facility (NSDF)

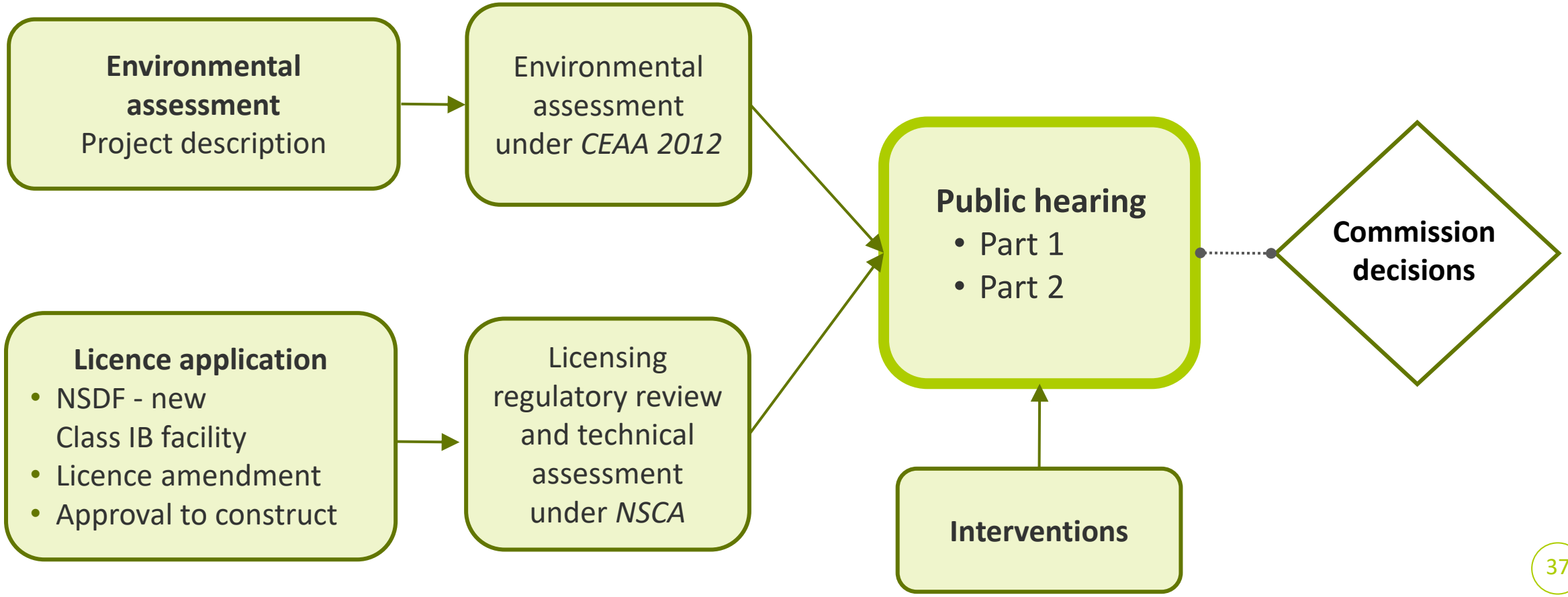
Application to Amend the Licence to Construct the NSDF at the Chalk River Laboratories (CRL) Site

CNSC Staff Presentation

Commission Hearing, Part 2
May 30, 2022

CMD 22-H7.C

Regulatory Review of Proposed NSDF



Themes

CMD 22-H7.B includes information on the following themes:

- Environmental Assessment and Environmental Protection
- Long-term safety
- Indigenous consultation and engagement
- Requested licence amendment

REQUESTED LICENCE AMENDMENT

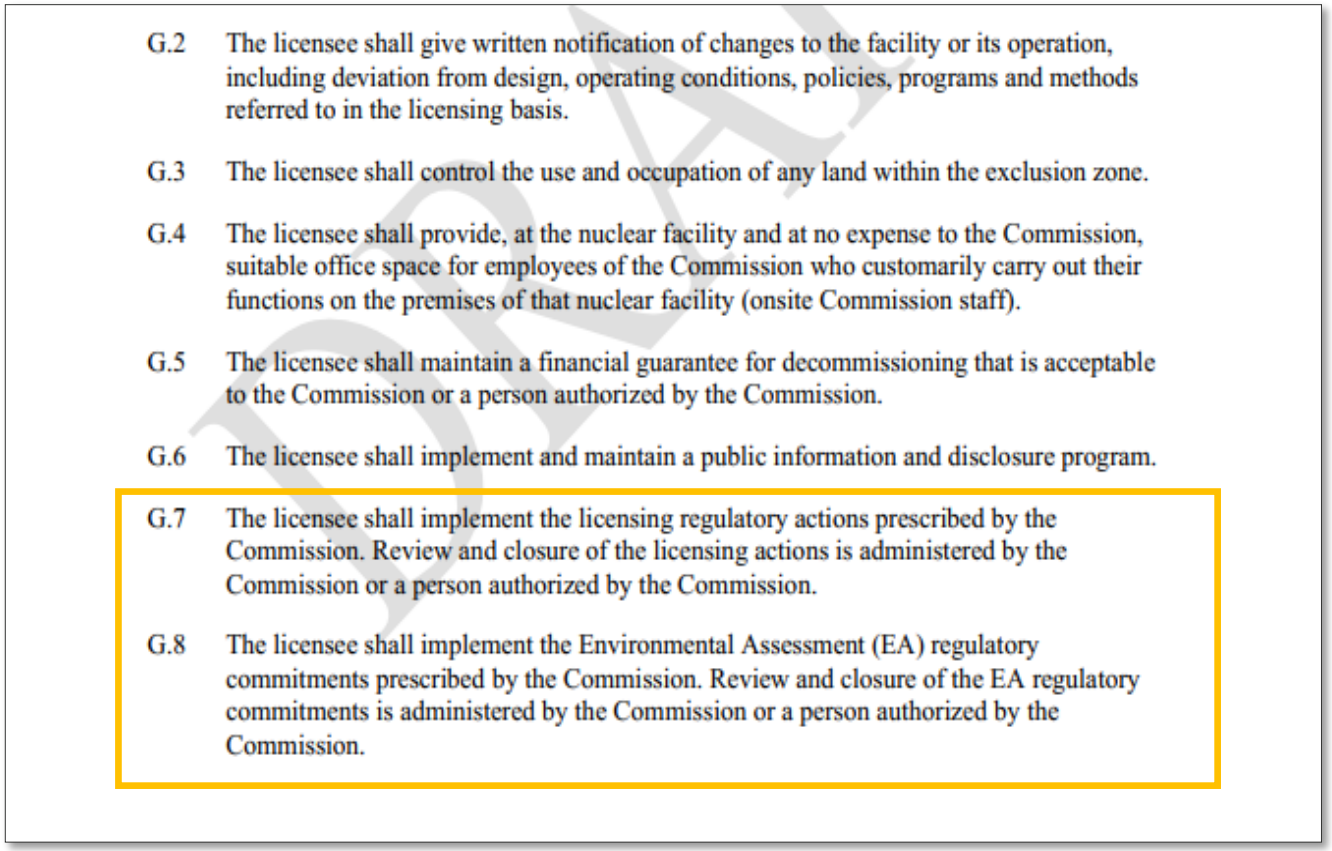
Canadian Nuclear Laboratories: Near Surface Disposal Facility (NSDF)
May 30, 2022, CMD 22-H7.C

Requested Licence Amendment

- **Current Chalk River Laboratories operating licence NRTEOL-01.00/2028**
  - Valid from April 1, 2018 to March 31, 2028
- **Proposed construction of NSDF**
  - The NSDF is a new proposed Class IB nuclear facility that is outside the current licensing basis
  - Construction of the proposed NSDF cannot occur unless authorized by the Commission

Proposed Licence and Licence Conditions Handbook

- Addition of two NSDF facility-specific licence conditions
  - Implementation of Environmental Assessment regulatory commitments and licensing regulatory actions
- Regulatory oversight
  - Compliance verification activities
  - Track completion of commitments
- Current authorization request is for NSDF construction only



G.2 The licensee shall give written notification of changes to the facility or its operation, including deviation from design, operating conditions, policies, programs and methods referred to in the licensing basis.

G.3 The licensee shall control the use and occupation of any land within the exclusion zone.

G.4 The licensee shall provide, at the nuclear facility and at no expense to the Commission, suitable office space for employees of the Commission who customarily carry out their functions on the premises of that nuclear facility (onsite Commission staff).

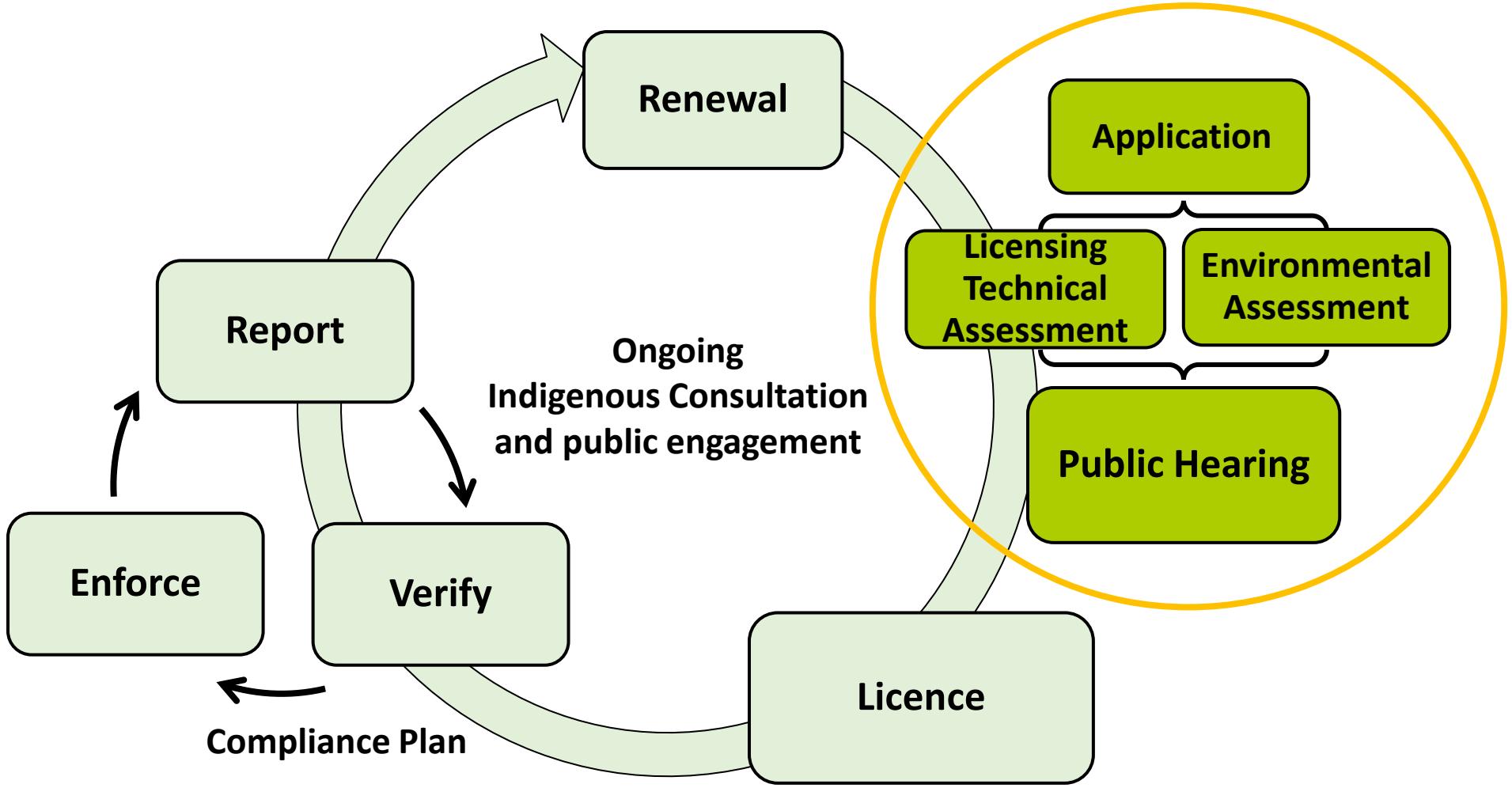
G.5 The licensee shall maintain a financial guarantee for decommissioning that is acceptable to the Commission or a person authorized by the Commission.

G.6 The licensee shall implement and maintain a public information and disclosure program.

G.7 The licensee shall implement the licensing regulatory actions prescribed by the Commission. Review and closure of the licensing actions is administered by the Commission or a person authorized by the Commission.

G.8 The licensee shall implement the Environmental Assessment (EA) regulatory commitments prescribed by the Commission. Review and closure of the EA regulatory commitments is administered by the Commission or a person authorized by the Commission.

CNSC Licensing and Compliance Process



CNSC Staff Conclusions on the Requested Licence Amendment

CNSC staff reaffirm that:

- CNL's licence application to construct the NSDF at the Chalk River Laboratories site complies with all applicable regulatory requirements
- The draft licence and licence conditions handbook submitted to the Commission in CMD 22-H7 is appropriate for the licensing actions, commitments and regulatory oversight for construction of the NSDF

CNSC Staff Overall Conclusions on the NSDF Project

CNSC staff reaffirm our conclusions on the NSDF project presented to the Commission in Part 1:

The proposed NSDF project:

- Is not likely to cause significant adverse environmental effects, taking into account the implementation of all identified Environmental Assessment regulatory commitments
- Incorporates measures to protect people and the environment, taking into account the implementation of all identified Environmental Assessment regulatory commitments and licensing regulatory actions

The potential impacts to Indigenous and/or treaty rights have been adequately identified, assessed and mitigated.

Connect With Us

Join the conversation

nuclearsafety.gc.ca