# Overview of the 7th Review Cycle of the

# Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

**Commission Meeting**
November 1-3, 2022
CMD 22-M40

E-Doc 6869135 PPT
E-Doc 6893152 PDF

Canadian Nuclear Safety Commission
Commission canadienne de sûreté nucléaire

Canada

# Presentation Outline

- Highlights
- Background of the Joint Convention
- Canada's Participation in the 7th Review Cycle
- Conclusions and Next Steps

# Highlights

- Canada participated in the 7th Review Meeting of the Joint Convention from June 27 to July 8, 2022, at the International Atomic Energy Agency (IAEA) Headquarters in Vienna
- The 7th Review Cycle of the Joint Convention was from April 1, 2017, to March 31, 2020
- Canada's Delegation consisted of representatives from government and industry
- Canada's Country Group Session took place on July 1, 2022
- Canada received 1 Good Practice, 5 Areas of Good Performance, 3 Challenges, and 2 Suggestions

Image: Parliament of Canada

# BACKGROUND OF THE JOINT CONVENTION

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

# Background (1/3)

- **The Joint Convention was adopted on September 5, 1997** and came into force on June 18, 2001
- **Canada ratified** the Joint Convention on May 7, 1998
- It is **the only international legally binding instrument** to address, on a global scale, the safety of spent fuel and radioactive waste management
- It seeks to **promote a high level of safety** through a peer review process every three years

Image: Canadian Nuclear Safety Commission (CNSC) delegates at the 7th Review Meeting of the Joint Convention (Source: CNSC)

# Background (2/3)

## The objectives of the Joint Convention are:

Image: Canadian delegates at the 7th Review Meeting of the Joint Convention (Source: CNSC)

To achieve and maintain a high level of safety worldwide in spent fuel and radioactive waste management.

To ensure that there are effective defenses against potential hazards in the course of such activities.

To prevent accidents with radiological consequences and mitigate their consequences should they occur during any stage of spent fuel or radioactive waste management.

# Background (3/3)

## The Joint Convention applies to:

- **Spent fuel** arising from the operation of civilian nuclear reactors
- **Radioactive waste** arising from civilian applications
- **Uranium mining and milling wastes**
- **Discharges** from regulated activities
- Specific provisions on **disused sealed sources**

## The Joint Convention does not apply to:

- **Reprocessed spent fuel**
- **Naturally occurring** radioactive materials (NORM)
- Radioactive waste generated by **military and defence programs**


Image: Canadian delegate at the 7th Review Meeting of the Joint Convention (Source: CNSC)

# Obligations of the Joint Convention

The obligations of each Contracting Party to the Joint Convention are to conduct the following on a three-year basis:

- Submit a National Report
- Participate in the international peer review
  - Respond to questions from other Contracting Parties on Canada's National Report
  - Canada's peer review of other Contracting Parties' National Reports
- Attend the Review Meeting
  - Deliver Canada's National Presentation
  - Respond to follow-up questions from other Contracting Parties
  - Actively participate in Country Group Sessions of other Contracting Parties

CNSC coordinates Canada's contributions to the Joint Convention

# Joint Convention Rules and Guidelines

- INFCIRC/546, Articles of the Joint Convention
- INFCIRC/602, Rules of Procedure and Financial Rules
- INFCIRC/603, Guidelines Regarding the Review Process
- INFCIRC/604, Guidelines Regarding the Form and Structure of National Reports
- Brochure, An Overview of the Joint Convention

# Importance to Canada and the CNSC (1/2)

- Through the development of the National Report, Canada performs a **structured self-assessment** against the Articles of the Joint Convention on a **three-year basis**
- Confirms that national arrangements for spent fuel and radioactive waste management, including decommissioning, are **in conformance with international standards**
- National Reports are a **useful vehicle** for informing the public and Indigenous Nations and communities on radioactive wastes in Canada
- Joint Convention is an international forum for **co-operation and experience sharing** for regulators and industry

# Importance to Canada and the CNSC (2/2)

- Good Practices issued to other Contracting Parties identify potential areas of improvement for Canada
- Active participation in the open-ended working group sessions allows Canada to contribute to the continuous improvement of the Joint Convention review process
- Active participation in the topical sessions provides the opportunity to have discussions on specific topics that impact many of the Contracting Parties, including Canada
- CNSC staff present to the Commission in public proceedings the outcomes of the Joint Convention review cycles

Image: Parliament of Canada

# CANADA'S PARTICIPATION IN THE 7TH REVIEW CYCLE

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

# 7th Review Cycle Milestones

**October 27, 2020**
Submit National Report

**March 31, 2022*** submit answers to questions received on Canada's National Report

**July 1, 2022***
Canada's National Presentation and Country Group Session

**October 30, 2021***
submit questions/comments on other Contracting Parties' National Reports

**June 27 – July 8, 2022***

7th Review Meeting

*Postponed date due to the COVID-19 pandemic

# Canada's 7th National Report

Canada's National Report addresses and is in conformance with each of the Articles of the Joint Convention.

- Currently available on the CNSC public website in English and French
- Developed by:

Canada AECL EACL nwmo

ONTARIO POWER GENERATION Bruce Power Énergie NB Power

Hydro Québec Cameco orano

Nordion A Sotera Health company BWXT

# International Peer Review Overview

| | |
|---|---|
| 86 | Total number of Contracting Parties |
| 83 | Number of Contracting Parties that submitted National Reports |
| 3 | Number of Contracting Parties that did not submit National Reports |
| 4,520 | Total number of questions posted |
| 54 | Number of Contracting Parties that posted questions |
| 32 | Number of Contracting Parties that did not post questions |
| 83 | **Number of questions posted to Canada** |
| 17 | **Number of Contracting Parties that posted questions to Canada** |
| 174 | **Number of questions posted by Canada** |

# International Peer Review from Canada

| Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 | Group 7 | Group 8 |
|---|---|---|---|---|---|---|---|
| United States of America | France | Japan | China | Russian Federation | United Kingdom | Germany | Republic of Korea |
| Czech Republic | Bulgaria | Slovakia | Belgium | Spain | Sweden | Ukraine | **Canada** |
| Switzerland | Finland | Hungary | Italy | Argentina | Armenia | Brazil | Lithuania |
| Jordan | United Arab Emirates | Slovenia | Kazakhstan | South Africa | Romania | Netherlands | Mexico |
| Kyrgyzstan | Latvia | Lesotho | Luxembourg | Madagascar | Malta | Mauritania | Mauritius |
| Paraguay | Oman | Norway | North Macedonia | Nigeria | Niger | Morocco | Montenegro |
| Peru | Poland | Portugal | Republic of Moldova | Saudi Arabia | Senegal | Serbia | Tajikistan |
| Belarus | Austria | Australia | Albania | Vietnam | Uzbekistan | Uruguay | Thailand |
| Benin | Bolivia | Bosnia & Herzegovina | Botswana | Chile | Croatia | Cuba | Cyprus |
| Greece | Ghana | Georgia | Gabon | EURATOM | Estonia | Eritrea | Denmark |
| Iceland | Indonesia | Ireland | | | | | |

Additional reports peer reviewed by Canada

Mandatory peer review by Canada

# International Peer Review to Canada

**17 Contracting Parties submitted 83 written questions** on Canada's National Report; main topics included:

- Radioactive waste disposal and long-term monitoring
- Spent fuel dry storage operating experience/lessons learned
- Integrated long-term management strategy for Canada's radioactive wastes
- Modernizing Canada's Radioactive Waste Policy
- Historic low-level radioactive wastes
- Modernized waste management series of regulatory documents
- Environmental monitoring, derived release limits, and discharge limits
- Emergency response plans and emergency planning zones
- Public communication and acceptance experience/lessons learned

Canada's Q&As are currently available on the CNSC public website in English and French

# 7th Review Meeting – Canadian Delegation

| | |
|---|---|
| **Canadian Nuclear Safety Commission** | **Ramzi Jammal**, Kavita Murthy, Nancy Greencorn, Shona Thompson, Jocelyn Truong, Julia Smith, Anna Mazur |
| **The Permanent Mission of Canada to the International Organizations in Vienna** | Christopher Cole |
| **Natural Resources Canada** | Jim Delaney, Julie Mecke, Pui Wai Yuen |
| **Atomic Energy of Canada Limited** | Alastair MacDonald |
| **Canadian Nuclear Laboratories** | Sarah Brewer |
| **Ontario Power Generation** | Nuala Zietsma, Kapil Aggarwal, Dean Baker |
| **Nuclear Waste Management Organization** | Shanu Shaikh |

Image: Canadian delegation at the 7th Review Meeting of the Joint Convention (Source: CNSC)

# Canada's Country Group Session July 1, 2022

## Format for Country Group Sessions:

- National presentation
- Question and answer period
- Rapporteur report presentation



Images: Canadian delegates at the 7th Review Meeting of the Joint Convention (Source: CNSC)

## Canada's session was attended by:

- Australia
- Belarus
- Belgium
- China
- **Cyprus**
- **Denmark**
- Finland
- France
- Germany
- **Republic of Korea**
- **Lithuania**
- **Mauritius**
- **Mexico**
- **Montenegro**
- Poland
- Romania
- Russian Federation
- South Africa
- Sweden
- Switzerland
- **Tajikistan**
- **Thailand**
- UAE
- UK
- Ukraine
- USA

# Summary of Discussions

Questions and discussions following Canada's presentation touched on the key following topics:

- Disposal plans for the different classes of radioactive wastes in Canada
- Financial guarantee procedures and responsibilities to ensure adequate funding
- Interweaving Indigenous peoples traditions and way of life into waste management programs
- Modernization of the waste management policy and public involvement
- Management of wastes from Small Modular Reactors (SMRs)
- Climate change and the need to implement various energy options including nuclear power

# Joint Convention Review Process Terms

"A **Good Practice** is a new or revised practice, policy or program that makes a significant contribution to the safety of radioactive waste and spent fuel management."

"An **Area of Good Performance** is a new or enhanced practice, policy or programme for a Contracting Party that is recognized as an improvement of safety and is being implemented. An Area of Good Performance is a significant accomplishment for that Contracting Party, although it may have been undertaken by other Contracting Parties."

"A **Challenge** is a difficult issue for the Contacting Party. It may be a demanding undertaking (beyond day-to-day activities); or a weakness that needs to be remediated."

"A **Suggestion** is an area for improvement. It is an action needed to improve the implementation of the obligations of the Convention."

# Canada's Good Practice

**13 Good Practices** were issued to 11 Contracting Parties.

**Canada received one Good Practice:**

**Participant Funding Program (PFP)**

enables Indigenous peoples and eligible recipients to access funding to bring added information to Commission and policy makers for informed decision making. Decision on funding is made by independent committee.

# Canada's Areas of Good Performance

## Canada received the following Areas of Good Performance:

- Incorporating Indigenous Knowledge and traditions into modern science to enhance trust and confidence in the regulatory and policy decisions
- Financial Guarantee as a regulatory requirement is clearly established through a clear guidance and the CNSC is the beneficiary of the financial instruments
- The development of CANDU used/spent fuel specific engineered barrier system
- Continued progress in the waste management and decommissioning regulatory framework
- Successful implementation of the CNSC's Technical Co-op Program

# Challenges for Canada

**No new Challenges were identified for Canada at the 7th Review Meeting**

While progress had been made on the three Challenges identified for Canada during the 6th Review Meeting, all three remain open, as follows:

- Decommissioning and remediation of AECL sites (under the management of CNL) and continued licensing process for CNL accelerated decommissioning and remediation projects (NPD, Whiteshell, NSDF, PHAI)
- Finding an acceptable site in a willing host community for spent fuel repository and continued progress in engineered design for the long-term management of spent fuel (Adaptive Phased Management)
- Development of Canada's Integrated Radioactive Waste Management Strategy (for L&ILW)

Open challenges will be addressed at the 8th Review Meeting

# Suggestions for Canada

## Canada received the following Suggestions:

- Completion of Canada's commitment from the **2019 IRRS Mission** with regards to Canada's Radioactive Waste Policy
- Undertaking an **ARTEMIS Mission** (Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation)

# Overarching Issues for all Contracting Parties

- **Nine overarching issues** were identified throughout the Country Group discussions
- The following overarching issues are required to be reported on for the 8th Review Meeting:
  - Competence and staffing linked to timetable for spent fuel management and radioactive waste management programmes
  - Inclusive public engagement on radioactive waste management and on spent fuel management programmes
  - Ageing management of packages and facilities for radioactive waste and spent fuel, considering extended storage periods
  - Long-term management of disused sealed sources, including sustainable options for regional as well as multinational solutions

# Continuous Improvement to the Joint Convention

**Four administrative procedural changes** to the Joint Convention review process were adopted, by consensus of the Contracting Parties, during the 7th Review Meeting.

The most significant change of the four was the one that was tabled by Canada:

**Enhancing the peer review process** by improving the mechanism for assigning Contracting Parties to Country Groups. This change will come into effect for the 8th Review Cycle of the Joint Convention.

# The Russian Federation's Invasion of Ukraine

- Prior to the start of the 7th Review Meeting, Canada released a **National Statement** regarding the Russian Federation's Invasion of Ukraine
- **Good Practice for Ukraine**: Keeping up emergency preparedness and regulatory supervisory activities under exceptionally difficult circumstances
- **Overarching Issue**: Response to natural or man-made events that could adversely affect the safety of spent fuel and radioactive waste
- At the close of the 7th Review Meeting, a **Joint Statement** was issued by 36 Contracting Parties, including Canada, on the Russian Federation's invasion of Ukraine and its impacts on the 7th Review Meeting of the Joint Convention

Image: Parliament of Canada

# CONCLUSIONS AND NEXT STEPS

# Overall Conclusions

## Canada was a strong participant at the 7th Review Meeting

- Contributed significantly to the Review Meeting, including active participation in the peer review and plenary sessions
- Contributed two Review Officers to the Meeting
- Continued to demonstrate leadership in nuclear safety, regulatory excellence, openness, and transparency

Canada has demonstrated its:

- Commitment to the Joint Convention's objectives
- Compliance with the Articles of the Joint Convention

The Joint Convention is a valuable peer review process

- Fosters an international approach to spent fuel and radioactive waste management, and sharing expertise in these areas

Canada encourages Contracting Parties to commit to peer reviews, openness, and transparency

# Next Steps

## Prepare for the 8th Review Meeting in 2025.

- Lessons learned from the 7th Review Meeting
- Assemble new team in 2023 to begin drafting Canada's 8th National Report
- Engage in work to propose enhancements to the Joint Convention review process
- Manage Canada's efforts to address identified Challenges and Suggestions


Image: Canadian delegate at the 7th Review Meeting of the Joint Convention (Source: CNSC)

Canada will continue to be a leader in the safety of spent fuel management and radioactive waste management

# References

- Canada's 7th National Report to the Joint Convention – April 2021
- Executive Summary of Canada's 7th National Report to the Joint Convention
- Responses to Questions Posted to Canada during the International Peer Review – June 2022
- Canada's National Presentation at the 7th Review Meeting – July 1, 2022
- Summary Report of the Seventh Review Meeting of the Contracting Parties
- Information from Past Review Cycles

References available on the CNSC public website in English and French

# Connect With Us

Join the conversation

nuclearsafety.gc.ca

Image: Parliament of Canada

# APPENDIX: CANADA'S 7TH NATIONAL PRESENTATION

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

# CANADIAN NATIONAL PRESENTATION

## Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

**Canada's Presentation to the 7th Review Meeting**

Country Group 8, July 1, 2022, Vienna

Canada AECL EACL nwmo ONTARIO POWER GENERATION

# Outline of Canada's Presentation

**Section 1**
Highlights of Canada's Report and International Peer Reviews to Canada

**Section 2**
Canadian Nuclear Safety Commission Regulatory Framework and Initiatives Update

**Section 3**
Canada's Legislative and Policy Framework

**Section 4**
Management of Spent Fuel and Radioactive Waste at Atomic Energy of Canada Limited-Owned Sites

**Section 5**
Management of Spent Fuel and Radioactive Waste at Canadian Nuclear Power Plants

**Section 6**
Long-term Management of Canada's Spent Fuel

**Section 7**
Responses to 6th Review Meeting, Questions on 7th National Report, Planned Activities, Proposed Good Practices and Areas of Good Performance, Conclusions

**Appendix A**
Canada's Updated Matrix for the 7th Review Meeting

Image: McClean Lake

# HIGHLIGHTS OF CANADA'S REPORT AND INTERNATIONAL PEER REVIEWS TO CANADA

## Presented by the Canadian Nuclear Safety Commission (CNSC)

# Main Themes in Canada's 7th National Report

- Primary responsibility for safety rests with licensees
- The Government of Canada and the Canadian Nuclear Safety Commission (CNSC) have a comprehensive legislative and regulatory framework that assure workers, the public, and the environment are protected
- The CNSC is one of the most open and transparent regulators in the world

Image: Gunnar Mine's Central Tailings Site

# Key Messages in Canada's 7th National Report

- CNSC waste management regulatory framework aligns with IAEA safety standards
- Spent fuel and radioactive wastes are managed in CNSC licensed facilities that are safe, secure, and environmentally sound
- Regulatory oversight is continuous throughout the lifecycle of all facilities and activities
- Canada is developing solutions for long-term management that do not place an undue burden on future generations

Image: Nordion

# Canada's International Presence

- The President of the CNSC is the Chair of CSS, CNSC staff are Chairs of safety committees at the IAEA and OECD

- Canada participates in a variety of international peer reviews of Member States

  - Since the last RM, CNSC has participated in IRRS Missions, IPASS Missions, EPREV Missions and technical cooperation expert missions
  - Canadian utilities actively participate in World Association of Nuclear Operators (WANO) and Operational Safety Review Team (OSART) Missions

Peer Review missions encourage international accountability and transparency to help strengthen global nuclear safety

## International Peer Reviews

# 2019 IRRS Mission to Canada

- In September 2019, the CNSC hosted an IRRS mission to Canada
- 6 Good Practices, 16 Suggestions, and 4 Recommendations were issued
- IRRS team identified that:
  - Canada has a comprehensive and robust regulatory framework
  - CNSC strives to continuously upgrade the framework to address new challenges and upcoming technologies
  - CNSC proactively developed extensive guidance and processes to assist potential applicants determine content of SMR applications
- Follow-up mission planned to be hosted in 2023/2024

**Canada is committed to addressing the findings of the 2019 IRRS Mission**

## International Peer Reviews

# 2019 EPREV Mission to Canada

- In June 2019, the CNSC hosted an EPREV Mission to Canada
- 5 Good Practices, 6 Suggestions, and 6 Recommendations were issued
- The EPREV team identified that Canada has a well-developed and mature emergency preparedness and response system in place
- Follow-up mission will be hosted in 2023/2024

**Canada was the first G7 country to request an IAEA EPREV Mission**

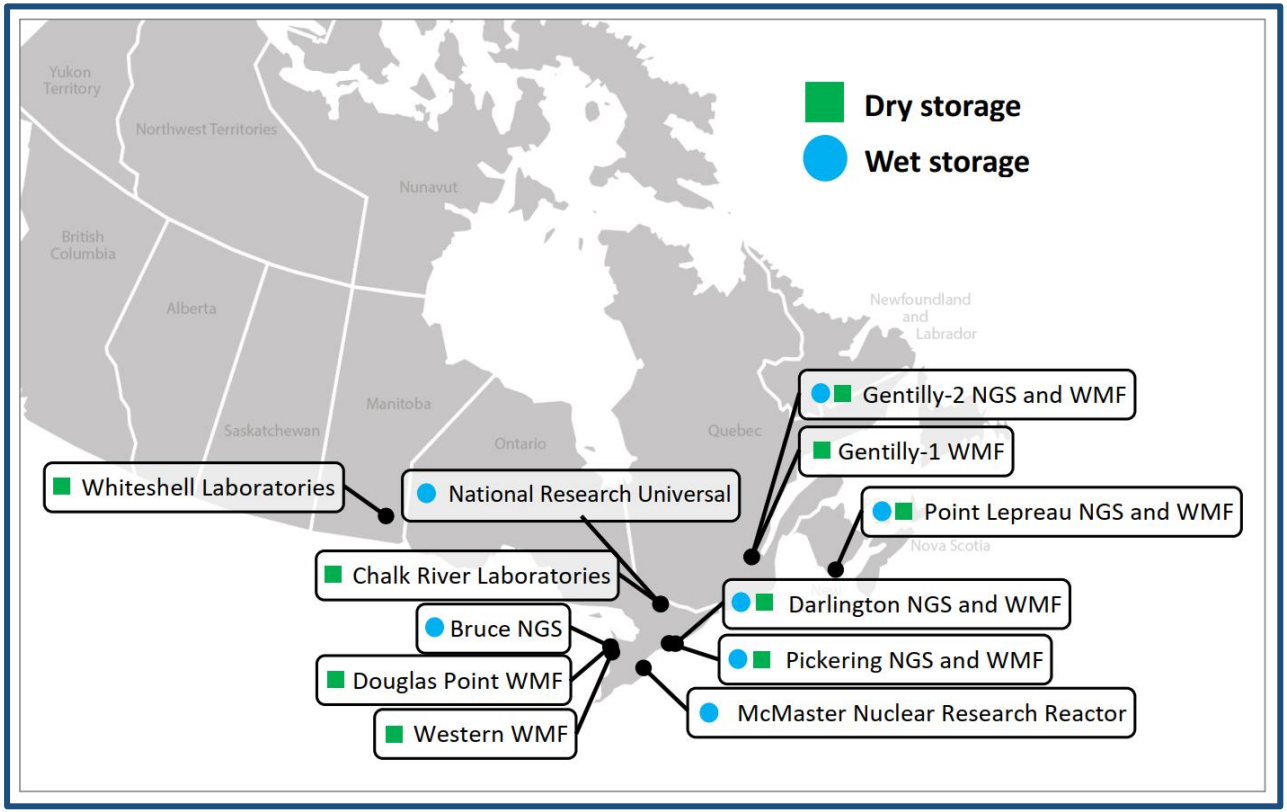
# Canada's Waste Classification System

- REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* sets out Canada's waste classification system, which is aligned with the IAEA safety standards
  - Low-level radioactive waste (LLW)
    - Very low-level radioactive waste (VLLW)
    - Very short-lived low-level radioactive waste (VSLLW)
  - Intermediate-level radioactive waste (ILW)
  - High-level radioactive waste (HLW)
  - Uranium mine and mill tailings

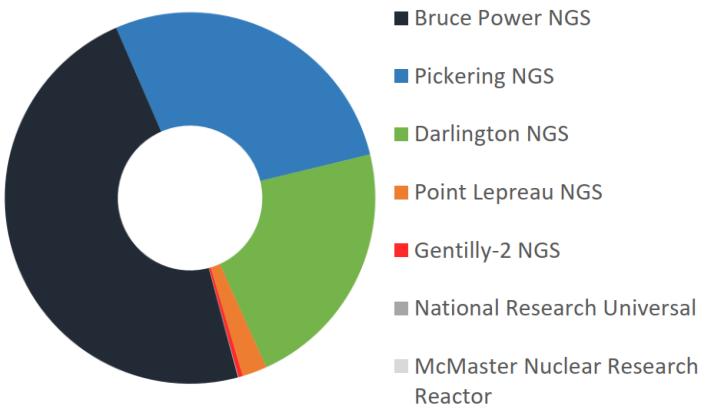
Regulatory requirement to consider the waste hierarchy (reduce, reuse, recycle)

**Waste Classification in Canada Infographic**

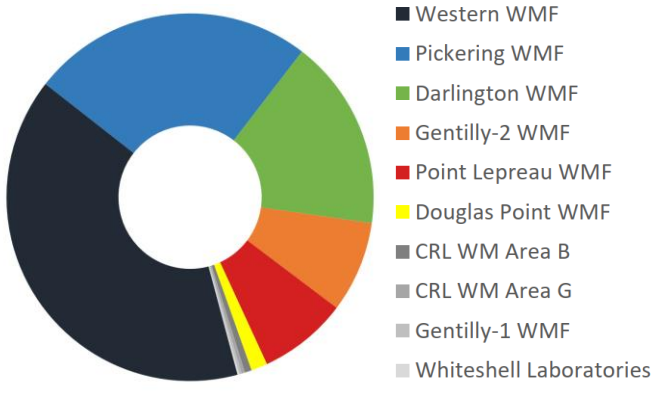
# Canada's Radioactive Waste Inventory
# High-Level Radioactive Waste



# Canada's Radioactive Waste Inventory
# High-Level Radioactive Wastes




**Spent fuel in wet storage**

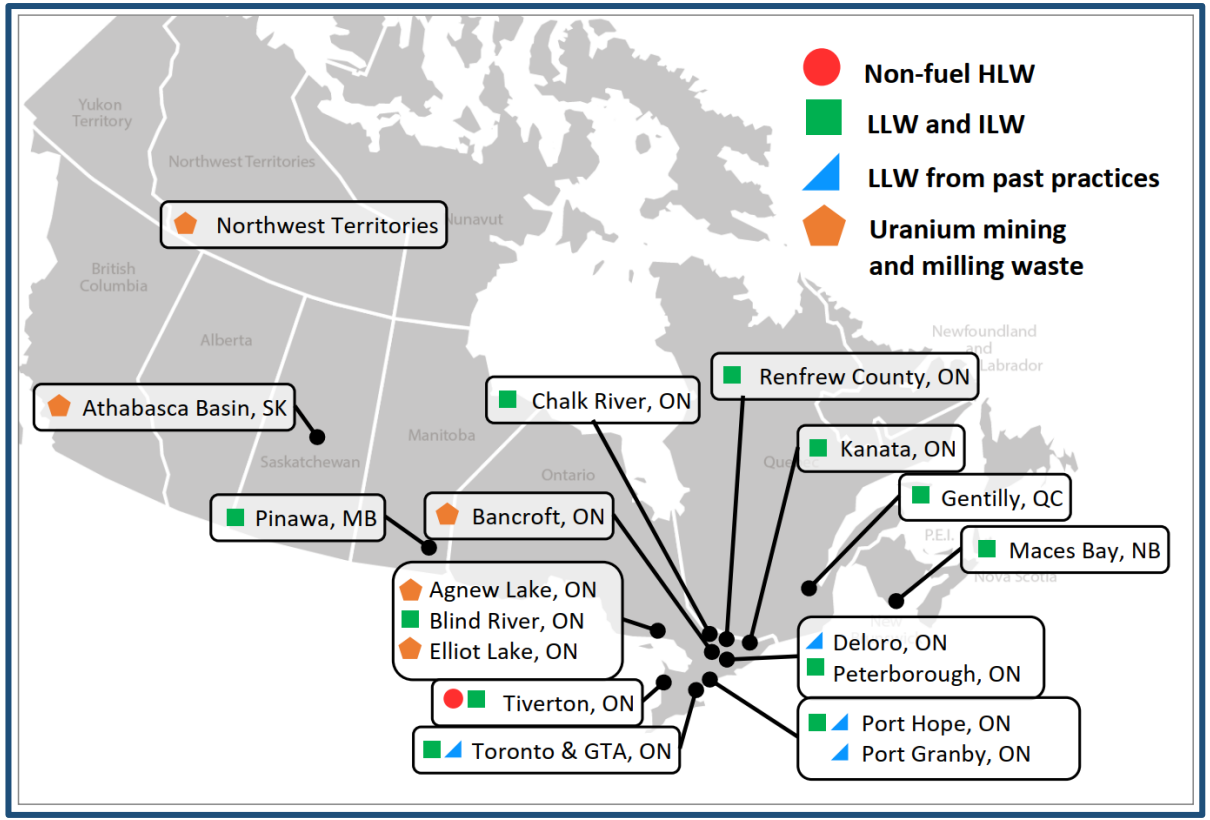



**Spent fuel in dry storage**

HLW comprises approximately 0.5% of radioactive wastes in Canada

# Canada's Radioactive Waste Inventory

# All Non-spent Fuel Radioactive Wastes



# Canada's Radioactive Waste Inventory
# Low- and Intermediate-Level Radioactive Waste

## LLW

- Chalk River, ON
- Tiverton, ON
- Pinawa, MB
- Port Hope, ON
- Blind River, ON
- Renfrew County, ON
- Maces Bay, NB
- Gentilly, QC
- Toronto & GTA, ON
- Peterborough, ON
- Kanata, ON

## ILW

- Tiverton, ON
- Toronto & GTA, ON
- Chalk River, ON
- Renfrew County, ON
- Maces Bay, NB
- Gentilly, QC
- Pinawa, MB
- Kanata, ON

## LLW from past practices

- Port Granby
- Port Hope
- Welcome WMF
- Deloro Mine site
- Greater Toronto Area

LLW and ILW comprise approximately 98.9% and 0.6%, respectively, of radioactive wastes in Canada

# Canada's Radioactive Waste Inventory
# Uranium Mining and Milling Waste

Tailings

Waste Rock

**Operational**

- Key Lake
- McClean Lake
- Rabbit Lake
- Cigar Lake
- McArthur River

Tailings

**Decommissioned**

- Elliot Lake, ON
- Athabasca Basin, SK
- Bancroft, ON
- Northwest Territories
- Agnew Lake, ON

There are approximately 218 million tonnes of uranium mining and milling wastes in Canada

# Canada's Response to the COVID-19 Pandemic

- For the review and modernization of Canada's radioactive waste policy, NRCan adapted by launching a Virtual Engagement Hub
- CNSC adapted its work in a timely manner while continuing to maintain strong effective regulatory oversight, including a risk-informed transition to remote inspections
- AECL and CNL have demonstrated a very flexible approach with strong controls, and swift monitoring to successfully strike a balance between progressing high hazard risk reduction work and protecting the workforce
- The NWMO adapted in a timely manner and continued its work program in consultation with the respective communities, vendors and contractors leveraging the use of virtual platforms
- OPG's dedicated employees worked safely and continuously to perform their critical work in keeping the lights on for Ontario's hospitals, care facilities, clinics, and homes

Image: Port Granby Long-Term Waste Management Facility

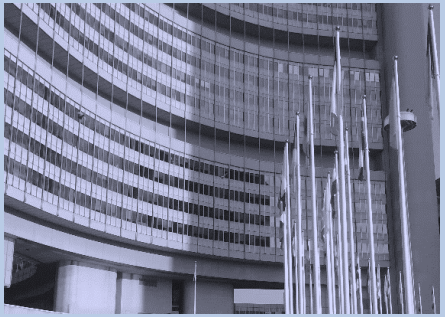
# CANADIAN NUCLEAR SAFETY COMMISSION REGULATORY FRAMEWORK AND INITIATIVES UPDATE

## Presented by Canadian Nuclear Safety Commission

# Canadian Nuclear Safety Commission

## OUR MANDATE

**REGULATE**
the use of nuclear energy and materials to protect health, safety, security, and the environment



**IMPLEMENT**
Canada's international commitments on the peaceful use of nuclear energy


**DISSEMINATE**
objective scientific, technical, and regulatory information to the public

OVER 75 YEARS OF REGULATORY EXPERIENCE

# Canadian Nuclear Safety Commission
# The Commission

- The Commission is an independent, quasi-judicial administrative tribunal
- Mandated under the *Nuclear Safety and Control Act* to make regulations and take regulatory decisions, which it does through public proceedings
- Decisions are reviewable by Federal Court

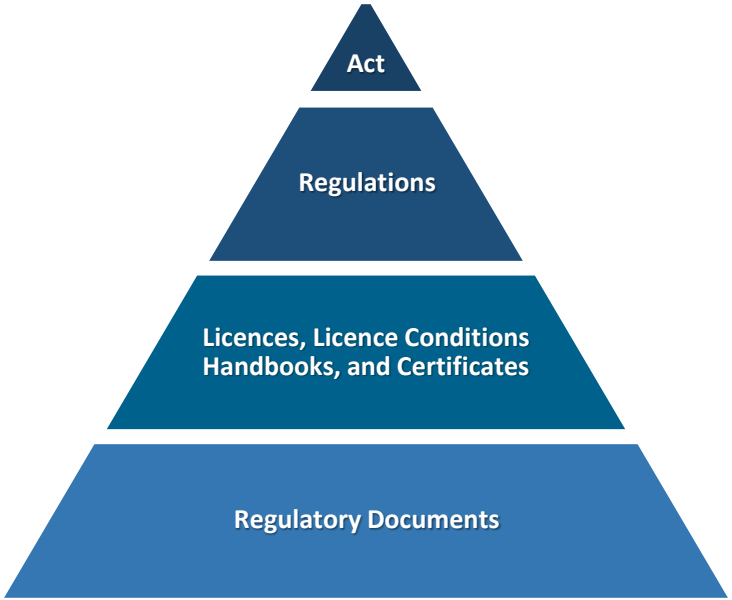
Public Hearings throughout lifecycle of facility

# Canadian Nuclear Safety Commission
# The Staff


CNSC Staff located across Canada

# Canadian Nuclear Safety Commission
# Canada's Nuclear Regulator

# Canada's Regulatory Framework




Effective and flexible regulatory framework

# Canada's Regulatory Framework
# Safety and Control Areas

Safety and control areas are the technical topics CNSC staff use across all regulated facilities and activities to assess, evaluate, review, verify, and report on regulatory requirements and performance

**Ensuring the safety of all regulated activities**

| | |
|---|---|
| **Management** | Management System |
| | Human Performance Management |
| | Operating Performance |
| **Facility and Equipment** | Safety Analysis |
| | Physical Design |
| | Fitness for Service |
| **Core Control Processes** | Radiation Protection |
| | Conventional Health and Safety |
| | Environmental Protection |
| | Emergency Management and Fire Protection |
| | Waste Management |
| | Security |
| | Safeguards and Non-Proliferation |
| | Packaging and Transport |

# Canada's Regulatory Framework
# Evergreen

- The Commission makes regulations and approves regulatory documents through a transparent process through public consultation
- Regulatory requirements are updated based on a systematic process
  - Reflected in a comprehensive 10-year plan
  - Aligned with IAEA safety standards
  - Adoption of national and international standards in regulatory framework
- Extensive consultation is held with all stakeholders

**Regulatory philosophy is risk-informed and performance-based**

## Canada's Regulatory Framework

# Continuous Improvement – Regulations

**CNSC regulations amended since last RM:**

- Administrative Monetary Penalties Regulations
- Class II Nuclear Facilities and Prescribed Equipment Regulations
- Radiation Protection Regulations

CNSC continuously improves the regulatory framework

## Canada's Regulatory Framework

# Continuous Improvement – REGDOCs

Radioactive waste related REGDOCs published since last RM:

- **REGDOC-1.2.1,** Guidance on Deep Geological Repository Site Characterization
- **REGDOC-2.11,** Framework for Radioactive Waste Management and Decommissioning in Canada, Version 2
- **REGDOC-2.11.1,** Waste Management, Volume I: Management of Radioactive Waste
- **REGDOC-2.11.1,** Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings
- **REGDOC-2.11.1,** Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste, Version 2
- **REGDOC-2.11.2,** Decommissioning
- **REGDOC-3.3.1,** Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities

Available on the CNSC public website

## Canada's Regulatory Framework

# Continuous Improvement - CSA

- CSA standards complement CNSC regulatory documents
- Radioactive waste related CSA standards published since last RM:
  - **CSA N292.0-19**, General principles for the management of radioactive waste and irradiated fuel
  - **CSA N292.6-18**, Long-term management of radioactive waste and irradiated fuel
  - **CSA N292.7-22**, Deep geological disposal of radioactive waste and irradiated fuel
  - **CSA N292.8-21**, Characterization of radioactive waste and irradiated fuel
  - **CSA N294-19**, Decommissioning of facilities containing nuclear substances

# Waste Management Principles in Canada

- Generation of radioactive waste is minimized to the extent practicable
- Management of radioactive waste is commensurate with its properties
- Assessment of future impacts encompasses the period where the maximum impact is predicted to occur
- Predicted impacts are no greater than the impacts that are permissible in Canada today
- Measures needed to prevent unreasonable risk to present and future generations are developed, funded and implemented as soon as reasonably practicable
- Trans-border effects are not greater than the effects experienced in Canada

REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada*

# Regulatory Oversight
# Licensing

1. Site preparation
2. Construction
3. Operation
4. Decommissioning
5. Release from licensing

Decommissioning plans and a financial guarantee are required for stages 1 to 4

## Regulatory Oversight

# Compliance and Enforcement

- CNSC undertakes necessary and reasonable measure to ensure compliance. The measures include compliance awareness, verification, and enforcement

- Compliance is verified through:
  - Inspections
  - Reviews of operational activities and documentation
  - Licensee reporting of performance data, including annual reports and unusual occurrences
  - Independent environmental monitoring

# Regulatory Oversight
# Independent Environmental Monitoring Program

Image: Deloro Closed Mine Site

Results available to the public on the CNSC website

## CNSC's Continued Early Involvement

# Long-term Management of Spent Fuel

- CNSC outreach activities – heightening public awareness and understanding of regulating radioactive waste
- Independent Advisory Group – provides objective, independent advice to CNSC staff on geoscience aspects
- Independent research program – focused on safety
- International collaboration - exchange information and knowledge on geological repositories

CNSC role will expand and adapt as initiative progresses

# Open and Transparent Regulatory Activities

- Public and Indigenous groups invited to participate in public Commission proceedings, Environmental Assessments,
  and licensing reviews
- Participant Funding Program
- Extensive community outreach activities
- CNSC publishes information on public website and social media
- Committed to building long-term positive relationships with Indigenous peoples

Image: Outreach activities, Ottawa

Image: Public hearing

**CNSC committed to enhancing transparency and building trust**

# UN Declaration on the Rights of Indigenous Peoples (UNDRIP)

- Adopted in 2007 by the UN General Assembly, signed by Canada in 2010
- In 2021 Canada passed the UNDRIP Act, a law that obligates the Government to, in consultation and cooperation with Indigenous peoples, take all measures necessary to ensure that the laws of Canada are consistent with the Declaration
- Government of Canada must prepare and implement an action plan to achieve the objectives of the Declaration – 2 years to table plan in Parliament
- Licensees and applicants are obligated to engage Indigenous groups and address concerns

CNSC, as an agent of the Crown, consults and considers potential accommodation as part of its regulatory and licensing role

Image: Parliament of Canada

# CANADA'S LEGISLATIVE AND POLICY FRAMEWORK

## Presented by Natural Resources Canada

# Federal Legislative & Policy Framework in Canada

- Radioactive Waste Policy Framework
- Government of Canada's legislative framework
  - *Nuclear Energy Act* (1985, amended in 2011)
  - *Nuclear Safety and Control Act* (2000)
  - *Nuclear Fuel Waste Act* (2002)
  - *Nuclear Liability and Compensation Act* (2017)
  - *Impact Assessment Act* (2019)

# Recent Decisions and Initiatives

- Nuclear energy is fundamental to achieving and sustaining Canada's climate change goals
- Nuclear energy, SMRs in particular, will be part of the "all-options" approach Canada is pursuing
- Utilizing nuclear energy technologies in innovative ways to meet Canada's environmental, economic and social objectives
- Provinces collaborating on the development and deployment of SMRs

Nuclear energy will continue to play a role
in Canada's low-carbon future
– Long-term solutions for waste will be required

# Modernizing Canada's Radioactive Waste Policy

- The Government of Canada is committed to continuous improvement to ensure safe solutions are in place for managing radioactive waste and decommissioning
- NRCan, with support from other federal departments, is developing a comprehensive modernized policy
- Addresses an international recommendation (2019 IRRS Mission) and national interest
- NRCan is engaged with Indigenous peoples, the general public, stakeholders, experts, and any other interested parties to review Canada's radioactive waste policy

Ensuring that Canadians can have confidence
in the management of Canada's radioactive waste

# Modernizing Canada's Radioactive Waste Policy

| | |
|---|---|
| **November 2020** | Virtual Engagement Hub launched |
| **November 2020 - May 2021** | Engagement Phase – Indigenous peoples and interested Canadians |
| **Winter 2021/2022** | Release of the draft Policy & What We Heard |
| **2022** | Modernized Policy release |

Reflects international practices, best available science, and the values important to the public and Indigenous peoples

# Canada's Integrated Strategy for Radioactive Waste

- Development of an Integrated Radioactive Waste Strategy is well underway
- Launched in March 2021, the NWMO conducted extensive community dialogue sessions, round table sessions and technical sessions for experts, as well as an online survey
- What We Heard reports and survey results publicly available
- The Integrated Strategy will be submitted to the Minister of Natural Resources after a final modernized radioactive waste policy

Create a safe, integrated, long-term strategy for all radioactive waste in Canada

Image: Port Granby Long-Term Waste Management Facility

# MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE AT ATOMIC ENERGY OF CANADA LIMITED-OWNED SITES

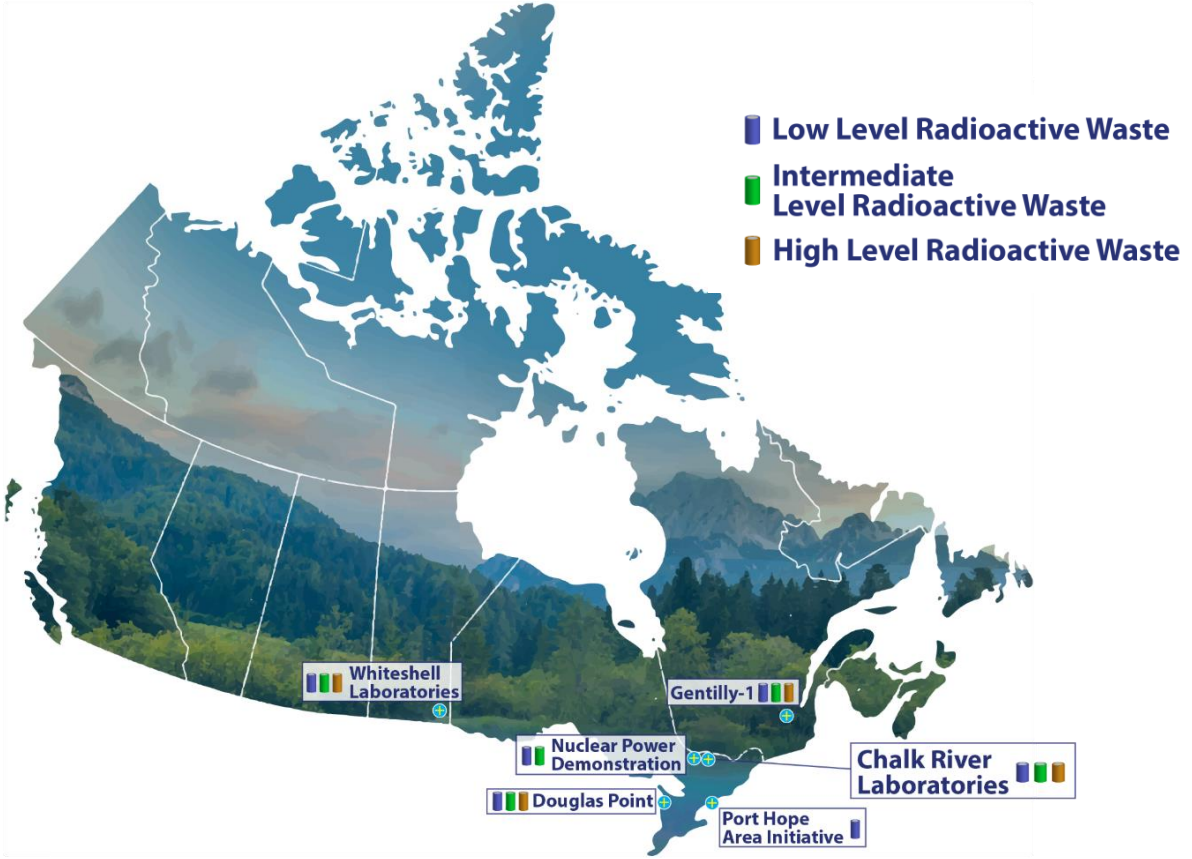
## Presented by Atomic Energy of Canada Limited

# Atomic Energy of Canada Limited

AECL's mission is to realize value to Canadians by driving nuclear innovation, creating a state-of-the-art nuclear campus, and cleaning up our legacy wastes

- Decommissioning Responsibilities:
  - Legacy sites
  - Historic sites
- Our Priorities:
  - Accelerate decommissioning
  - Revitalize the Chalk River Laboratory
  - S&T – supporting multiple Federal priorities and growing a commercial business
- Planning for decommissioning takes place throughout
  the entire lifecycle of the facilities

# Spent Fuel & Radioactive Waste Owned by AECL and Managed by CNL



# Indigenous Engagement

No relationship more important in Canada than with the Indigenous nations and governments on whose land our activities take place.

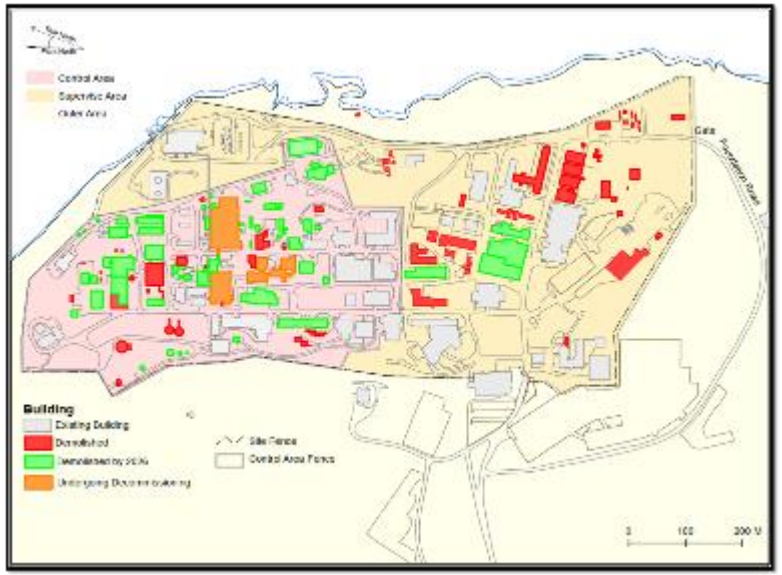
For AECL this means:

- Shifting from a project-based to a relationship-focused engagement approach
- Co-developing plans and strategies
- Integrating Indigenous Knowledge, perspectives, practices and ceremony into all aspects of our work
- Prioritizing capacity-building initiatives
- Developing long-term relationship agreements

# Chalk River Laboratory

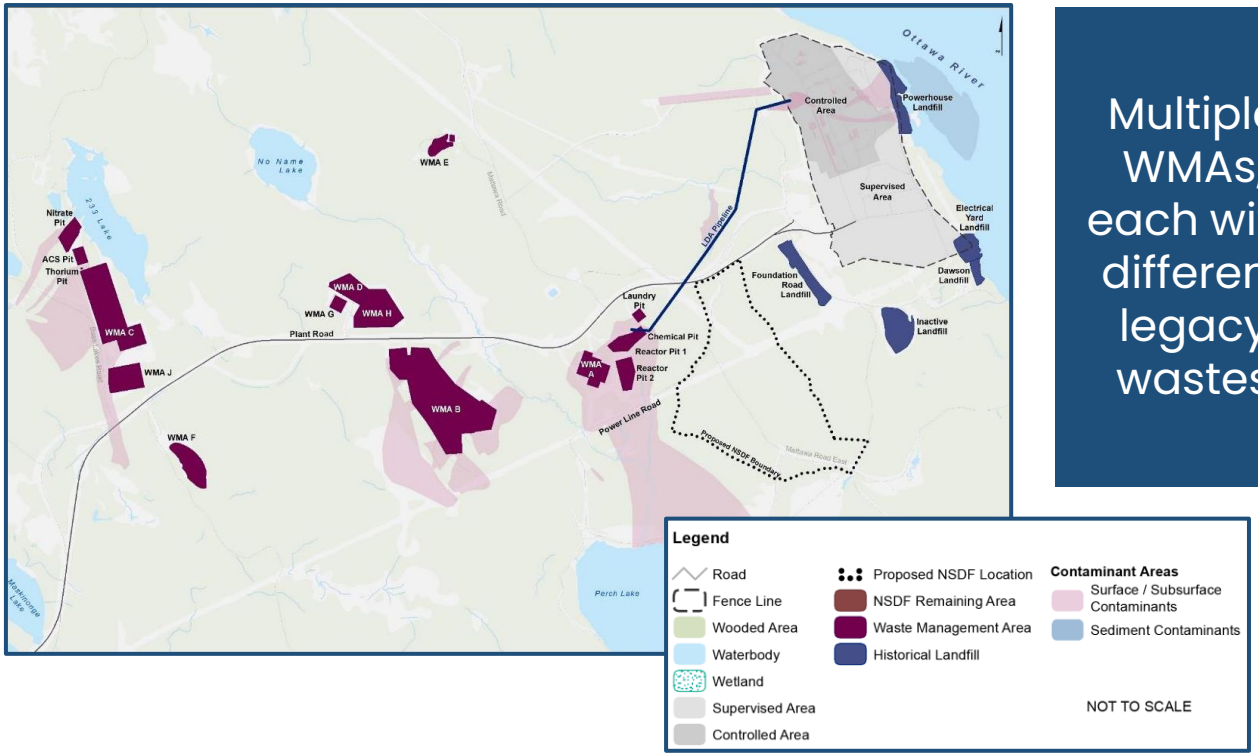
- Canada's nuclear laboratory with many ongoing activities
- Revitalization to create modern laboratories and manage aging assets and infrastructure
- Challenges associated with legacy operations and facilities
- Ensuring LLW, ILW, and HLW are safely stored at the site

# Chalk River Laboratory
# Decommissioning




Over the last 7 years CNL has made significant decommissioning progress

# Chalk River Laboratory
# Waste Management Areas (WMAs)




Multiple WMAs, each with different legacy wastes

## Chalk River Laboratory

# Waste Management Area B

- Storage of HLW, ILW and LLW, fissile
- Co-mingled, underground
- Developing concepts to clarify path forward to manage the wastes stored in WMA B by March 2023
- Various option assessments (Best Available Technology studies)
  - Assessing storage conditions
  - Retrieval
  - Processing
  - Stabilization
  - Storage

# Chalk River Laboratory
# Fuel Repatriation

- On going programme of repatriation
- Completed shipments of 30 tonnes of Highly Enriched Uranyl Nitrate liquid
- Completed shipment of 1000 irradiated HEU fuel sub-assemblies from NRU and NRX reactors
- Exploring other repatriation opportunities

## Chalk River Laboratory

# Management of LLW – NSDF

- The Near Surface Disposal Facility proposed to dispose of current and future LLW
- Environmental assessment and licence application for construction currently before the Commission for decision

# Chalk River Laboratory
# ILW and HLW

## ILW

- Considering our own long-term disposal options
- Construction of a flexible storage building that meets modern standards
- Work with other Canadian organizations as an integrated solution is developed

## HLW

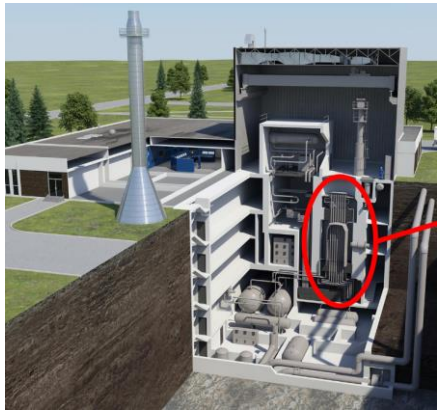
- All AECL owned spent fuel destined for the proposed deep geological repository being developed by NWMO

# Prototype Reactors – Douglas Point & Gentilly-1

- Currently in SWS and undergoing hazard reduction activities
  - Waste removal
  - Characterization of nuclear components
  - Decommissioning of non-nuclear buildings at DP
- Considering reducing the deferment period for SWS from 2060 to 2030/40
- Prior to executing dismantling of nuclear facilities, Commission approval will be required

# In-Situ Disposal (ISD) Projects

- Nuclear Power Demonstration (NPD) at Rolphton and Whiteshell Reactor-1 (WR-1) at Whiteshell are both proposed for in-situ disposal
  - Ongoing environmental assessments and engagement with local communities and Indigenous Nations
  - Continuing dialogue with UK and US



# Whiteshell Laboratories (WL)

- Objective to close site and make it available for re-use
- Plan to ship LLW, ILW and HLW to Chalk River
- Working with the community to understand and help mitigate the economic impact of closure
- Anticipated closure 2027 with staff reductions this year
- Plans are well advanced to manage legacy standpipes and bunkers

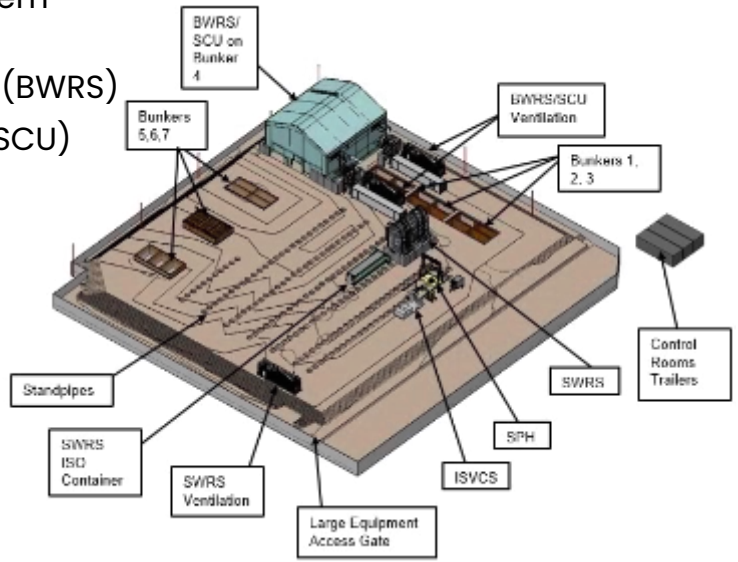
Main Campus

Waste Management Area

# WMA Retrievals at WL

Fabrication, testing, installation, training, and support equipment for removal of the WMA waste.

- The scope of work includes the following equipment:
  - Standpipe Waste Retrieval System (SWRS)
  - Bunker Waste Retrieval System (BWRS)
  - Sorting and Conditioning Unit (SCU)
  - Standpipe Headworks (SPH)
  - Ventilation systems
  - Support equipment
- Fabrication near completion
  - For SWRS, BWRS, SCU, SPH
  - Factory Acceptance Testing – Summer 2022



# Historic Waste – Port Hope Area Initiative

- Historical contamination from former crown and private-sector uranium refining
- Two long-term WMFs will have the waste safely emplaced
- Port Granby Long-Term WMF
  - Mound closed and capped in 2021
- Port Hope Long-Term WMF
  - Remediated Welcome Waste facility, temporary storage sites and two major sites
  - Remaining Major Waste Sites, Industrial Sites and Small-Scale Sites

Image: Western Waste Management Facility

# MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE AT CANADIAN NUCLEAR POWER PLANTS

## Presented by Ontario Power Generation

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

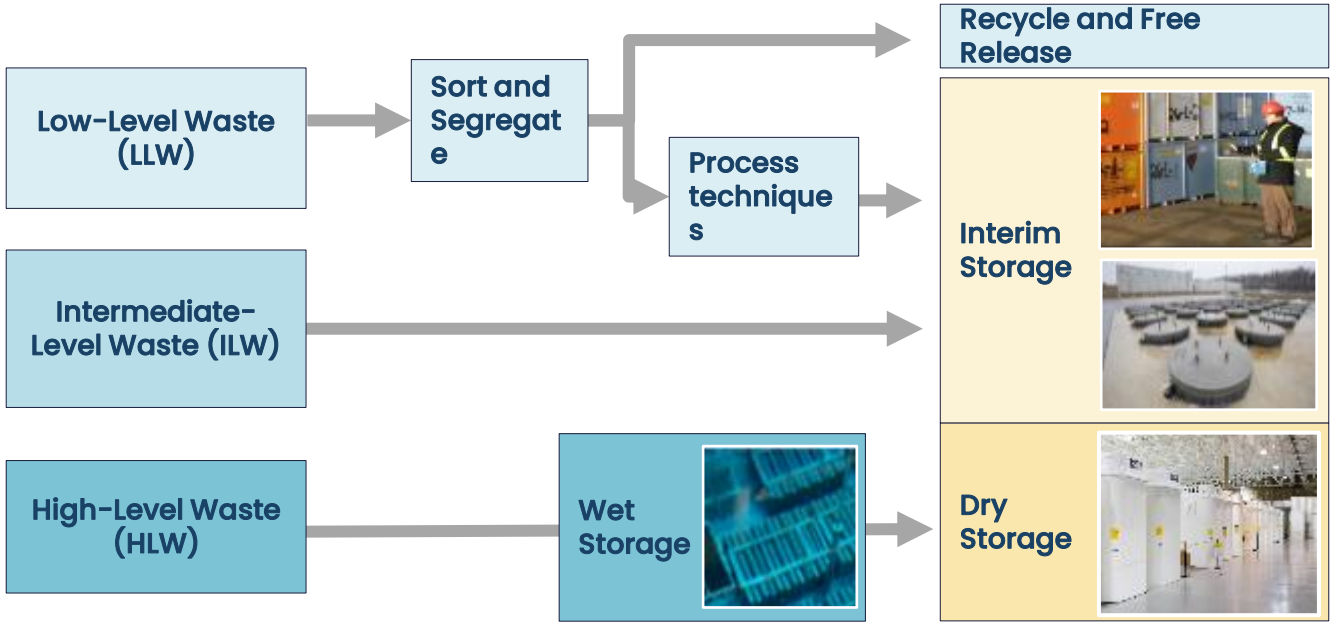
# Safe and Reliable

- Canada ensures safe and environmentally sound nuclear material management; handling, storage, processing and transportation
- CNSC provides rigorous regulation, including inspections

There is no greater priority than public and employee safety

Darlington Nuclear Generating Station

# Responsible Management of Nuclear By-Products



# Low-Level Waste Management

- All LLW generated by NPPs in Canada is stored on an interim basis at waste management facilities
- LLW may be reduced through various processing methods
  - Sorting and segregating
  - Incineration
  - Compaction
  - Decontamination
  - Metal processing

Western Waste Management Facility

# Embracing Minimization

## Embraces the environmental 3 Rs:

- ✓ **Reduce**
  - Focus on minimizing waste at source
  - Sorting and segregating
- ✓ **Re-use**
  - Clean tools found in the waste stream are saved for re-use
- ✓ **Recycle**
  - Clean materials, such as copper and steel
  - Use of washables PPE

# New Name, New Mission

- New name for OPG Nuclear Waste Management:

**Nuclear Sustainability Services**

- Nuclear is clean energy, vital to achieving net-zero goals
- All energy sources have by-products. Many nuclear by-products are valuable (not “waste”), such as medical isotopes, tritium, heavy water, Helium-3
- Aligns with OPG’s Climate Change Plan, and reflects mission to reduce our environmental footprint and embrace 3 R’s

# Research and Innovation in Materials Handling

- OPG's Centre for Canadian Nuclear Sustainability (CCNS) is focusing on innovations in decommissioning nuclear plants
- Laurentis Energy Partners has partnered with McMaster University to research advances in sorting and recycling
  - Research at Hamilton laboratory since 2020, to support increased processing, volume reduction and the 3 R's

Centre For Nuclear Sustainability


McMaster University Innovation Park

# LLW Large Metal Object Volume Reduction

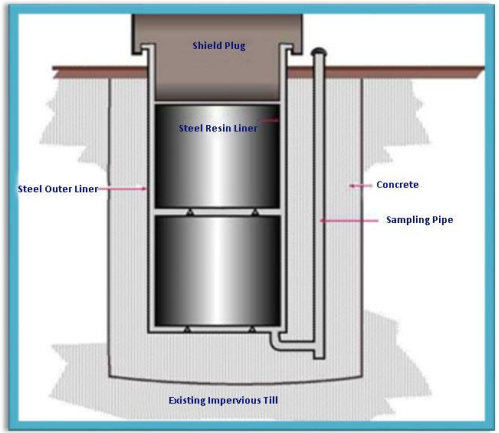
- Large Metal Objects (LMO) include:
  - Steam generators
  - Heat exchangers
  - Transportation packages
- LMOs are large in volume but relatively low in radioactivity
- Minimize volume of the radioactive material through decontamination and processing

Bruce Power Units 1 & 2 Steam Generators

Heat Exchanger

# Intermediate-Level Waste Management

- All ILW generated by NPPs in Canada is stored on an interim basis at waste management facilities
- Higher-activity, longer-lived radioactive waste stored in in-ground containers (IC)
- Cranes are used to lower ILW into ICs for storage at the NSS-Western Facility
- ILW refurbishment radioactive waste stored in above-ground containers




Intermediate level radioactive waste stored in in-ground containers

# High-Level Waste Management

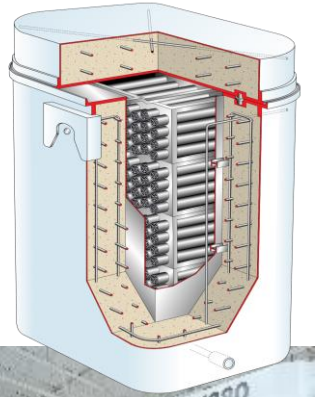
- In CANDU reactors, the fuel stays in the reactor for 1.5 years and re-fueling is done online
- Once the fuel has reached its lifetime use, the used or spent fuel is transferred from the reactors and placed in a pool of water, where it is cooled for 10 years
- After 10 years, it is transferred to a Dry Storage Container (DSC) and remains stored at the Site

CANDU Fuel Bundle

Pickering NGS Spent Fuel Bay

# OPG High-Level Waste Interim Storage

- Dry Storage Containers (DSCs) hold 384 bundles in four modules
- Steel and high-density concrete construction with a welded lid design
- Design life is 50 years
- All filled containers are stored indoors at site
- Currently there are over 2,900 DSCs stored at the three Used Fuel facilities

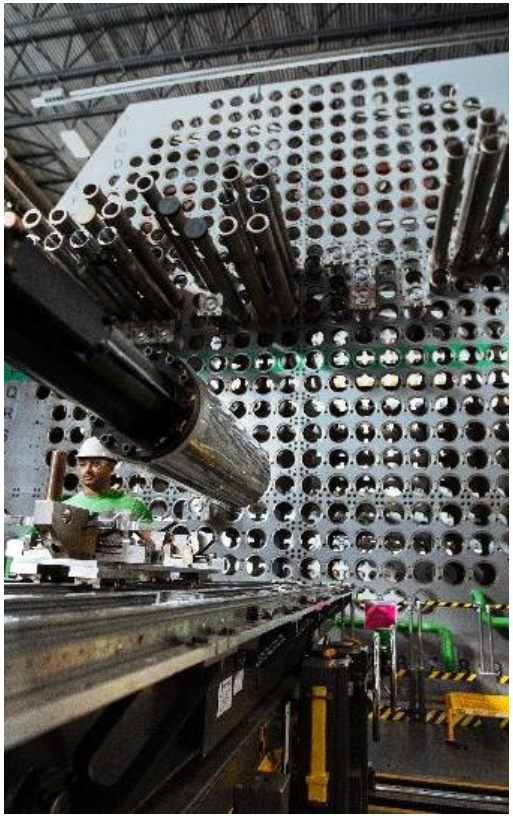




OPG Used Fuel DSCs stored at the Western Waste Management Facility

# Refurbishment Projects

- Refurbishment at both OPG and Bruce Power for the next 15 years for 10 units
- Approximately 50% increase in waste volumes for each unit
- Non-routine waste streams such as reactor components and feeder tubes
- Requires new containers and facilities as well as transportation packages
- Significant effort to coordinate and manage logistics



# Small Modular Reactors

- SMRs are a key pillar in fighting climate change, while providing a reliable source of electricity
- OPG announced partnership with GE Hitachi Nuclear Energy (GEH) to deploy an SMR at the Darlington new nuclear site
- Committed to the safe management of nuclear by-products in an environmentally, socially, and financially responsible way and will continue to seek out R&D and innovative ways to manage/store the by-products
- Used fuel will be stored on-site until a radioactive waste disposal facility is in service and ready to receive

# Lasting Solutions

**OPG remains committed to the safe disposal of nuclear by-products:**

**Used fuel:**
OPG supports NWMO process to site a DGR for all of Canada's used fuel

**Low- and intermediate-level materials:**
Awaiting NWMO recommendation on supporting Integrated Strategy for Radioactive Waste

- Any OPG site-selection process for a disposal facility would engage with stakeholders, Indigenous peoples, the public

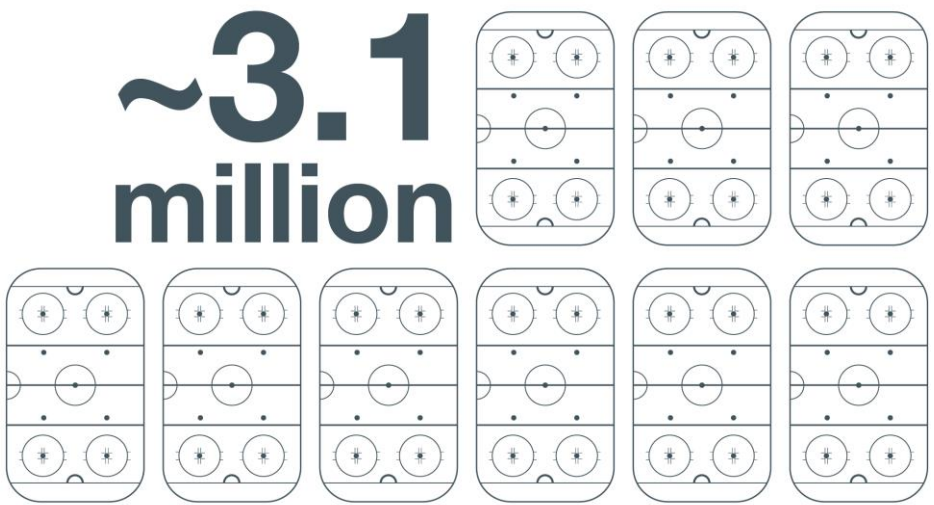
Image: McMaster University

# LONG-TERM MANAGEMENT OF CANADA'S SPENT FUEL

## Presented by the Nuclear Waste Management Organization

# Current Management of Canada's Spent Fuel

**Canada's Spent Fuel Inventory:**
**~3.1 million bundles as of June 30, 2021**




If stacked like cordwood, all this used nuclear fuel could fit into nine hockey rinks from the ice surface to the top of the boards

# Adaptive Phased Management

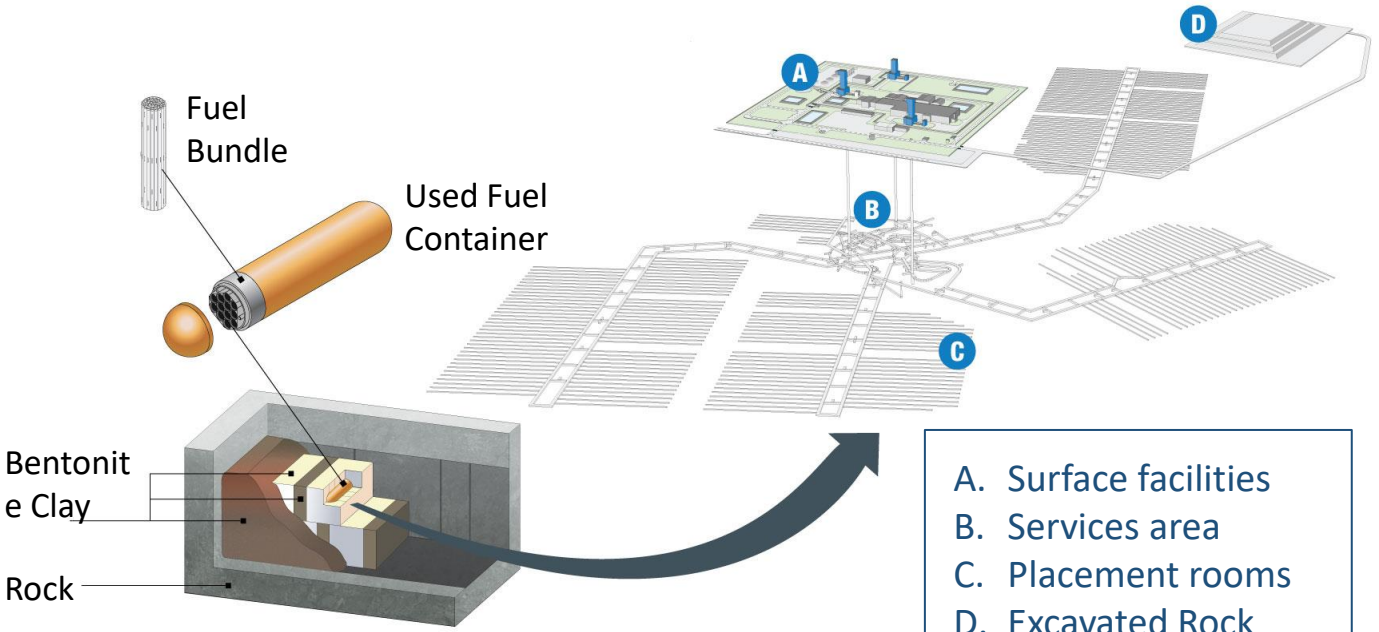
- Three-year options study by NWMO with extensive dialogue with Canadians (2002-2005)
- Government of Canada selected Adaptive Phased Management (APM) approach in 2007
- NWMO continues to implement APM:
  - Centralized isolation and containment in a Deep Geological Repository
  - Flexibility in pace and manner of implementation
  - Open, inclusive, fair siting process to seek a willing and informed host
  - Sustained engagement of people and communities

# National Infrastructure Project

**The Deep Geological Repository is a national infrastructure project that will have the following key features:**

- Protection of health, safety and environment
- High technology
- Strongly regulated
- Long-term partnership between NWMO and host communities
- Investment of CAD$23 billion over the project's ~175-year life
- Decades of sustainable operation

# NWMO's Conceptual Deep Geological Repository




A. Surface facilities
B. Services area
C. Placement rooms
D. Excavated Rock Management Area

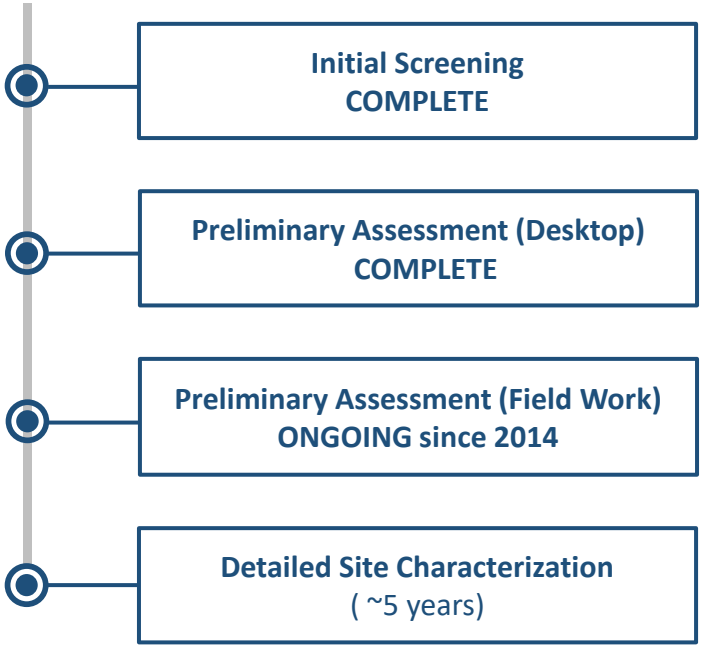
# Criteria for Selecting a Preferred Site

| | |
|---|---|
| **SAFETY** | Confidence a deep geological repository can be developed with strong safety case at that location |
| **TRANSPORTATION** | Confidence a safe, secure, and socially acceptable transportation plan can be developed |
| **PARTNERSHIP** | Confidence a strong partnership can be developed – with interested community, impacted First Nation, Métis and surrounding communities |

# Site Selection Process

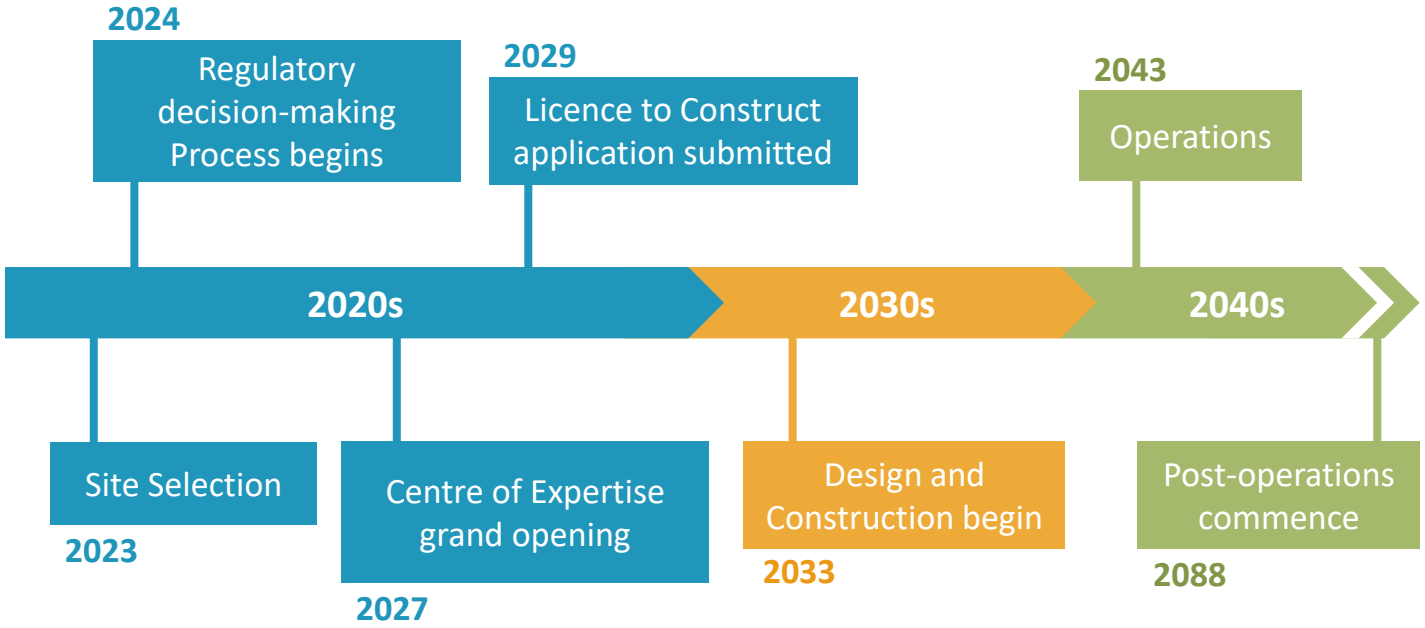
## Guiding Principles:

- Safety first
- Informed and willing host community
- Multi-stage technical and socio-economic and cultural assessments
- Broad involvement of people in siting areas and regions, including Municipalities, First Nations and Métis people



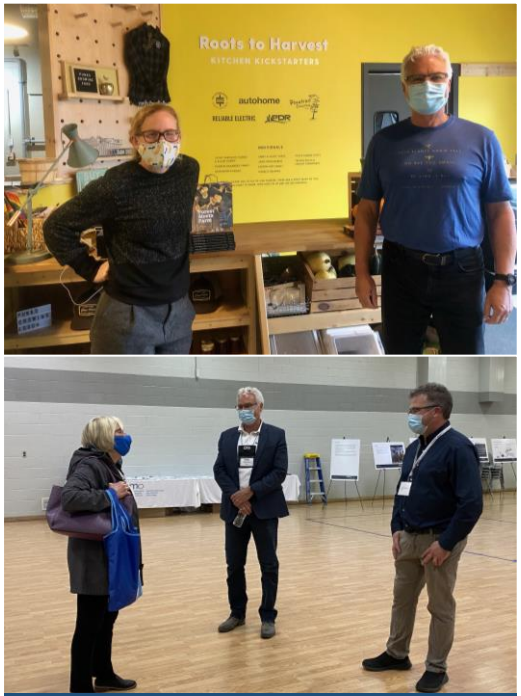
# Site Selection Process

# Looking Ahead



# Advancing the Site Selection Process

- Ongoing engagement with municipal and Indigenous communities to build and sustain support for the project
- Gradually reducing the number of communities from twenty-two to two in an open and transparent manner
- Identifying technically suitable and socially acceptable repository sites with the involvement of people, taking into account Indigenous Knowledge
- Actively exploring the potential for partnerships with communities




NWMO's engagement activities (courtesy NWMO)

# Advancing Field Investigations

**Initial Studies**

Community members visiting survey plane (courtesy NWMO)

**High Resolution Airborne Geophysical Surveys**
**Completed**

Geologists conducting mapping (courtesy NWMO)

**Geological Mapping**
**Completed**

**Intensive Field Work**

Geologist analyzing drill core (courtesy NWMO)

**Deep Borehole Drilling**
**Completed**
**(Downhole Monitoring and Testing**

**In Collaboration with Communities**

# Advancing Field Investigations

## Intensive Field Work

Scientist at installed Micro-Seismic Station (courtesy NWMO)

**Monitoring/Maintenance of Micro-Seismic Stations**

**Ongoing**

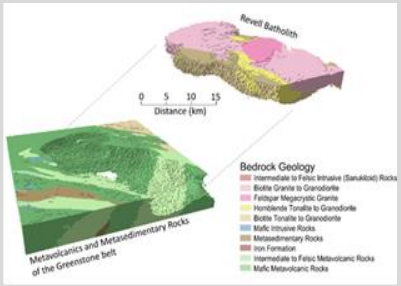
## Lab Analysis

Geomechanical Testing (courtesy NWMO)

**Analysis of Collected Core and Water Samples**

**Ongoing**

## Geoscientific Modelling




**Prepare First Draft Geoscientific Model**

**Ongoing**

**In Collaboration with Communities**

**Academia**

# Interweaving Indigenous Knowledge

Through its Indigenous Knowledge policy, the NWMO is committed to work together with Indigenous peoples to respectfully interweave Indigenous Knowledge in all its activities:

- Joint planning of field studies
- Work together to collect information and interpret findings
- Ceremonies and offerings led by communities prior to field work
- Cultural training for contractors prior to field work
- Seek advice from a Council of Elders and Youth

# Engineered Barrier System Development

- Engineered Barrier System (EBS) developed for CANDU fuel
- Used fuel container (UFC) serial production prototyping in progress:
  - 5 of 15 UFCs completed successfully (April 2022)
  - 10 UFCs in advance stages of manufacturing (target completion December 2022)
  - Further manufacturing process optimization from serial production lessons learned and parallel R&D programs ongoing

Cold spray copper coating being applied to container lid weld region

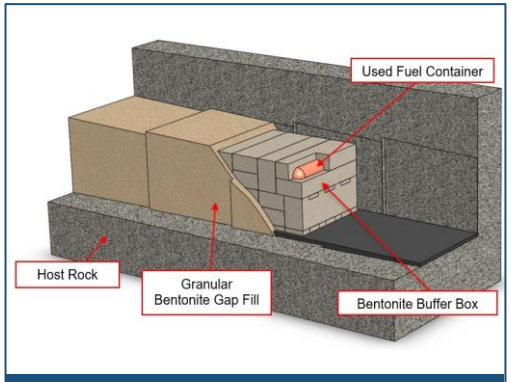
Non-Destructive Examination of UFC (courtesy NWMO)

First Completed Serial Production UFC

# Engineered Barrier System Development

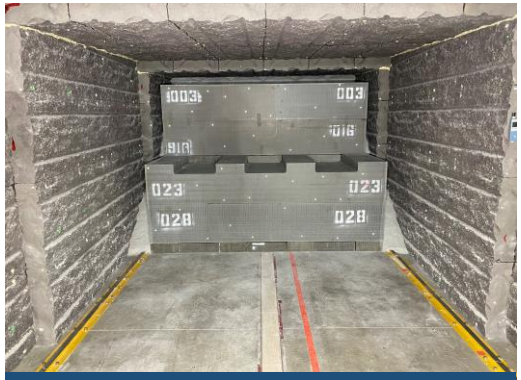
Completed full-scale EBS emplacement trial in a mock-up underground room

- 7 bentonite clay buffer boxes with weighted UFCs were emplaced
- ~13.5 tonnes of bentonite gap fill material augured into the emplacement room
- Successful trial with further process development ongoing




NWMO's Engineered Barrier System (courtesy NWMO)

Prototype Remote Emplacement Equipment (courtesy NWMO)



Full Scale Emplacement of EBS components in mock-up underground room (courtesy NWMO)

# Highlights

- Sound legislative framework
- Funding for the project in place; Government oversight
- Progressing towards the selection of a safe and socially acceptable site in 2023, in an open and transparent manner
- Continued and substantive progress in engineering design
- Continued use of peer reviews and guidance from external advisory bodies


# RESPONSES TO 6TH REVIEW MEETING, QUESTIONS ON 7TH NATIONAL REPORT, PLANNED ACTIVITIES, PROPOSED GOOD PRACTICES AND AREAS OF GOOD PERFORMANCE, CONCLUSIONS

Presented by the Canadian Nuclear Safety Commission

# Response to 6th Review Meeting Challenges (1/3)

**Challenge 1:**
Decommissioning and remediation of AECL sites (under the management of CNL) and continued licensing process for CNL accelerated decommissioning and remediation projects (NPD, Whiteshell, NSDF, PHAI)

- **Chalk River Laboratories** - 52 facilities/structures demolished since July 2018, with a further 29 to be demolished by 2026, the Public Hearing for the NSDF was conducted from May 30 – June 3, 2022
- **Whiteshell Laboratories** - 15 facilities/structures demolished since July 2018. Site planned to be decommissioned by 2027, following Commission approval
- **NPD decommissioning** – proposed to be completed by 2026, pending Commission approval
- **Port Hope Area Initiative** (PHAI) - proposed to be completed by 2028, pending Commission approval

This challenge should remain open

# Response to 6th Review Meeting Challenges (2/3)

**Challenge 2:**
Finding an acceptable site in a willing host community for spent fuel repository and continued progress in engineered design for the long-term management of spent fuel (Adaptive Phased Management)

- Site selection process progressed from 22 to 2 communities with a single preferred site to be identified in 2023
- CNSC and NWMO are actively engaged with First Nations and Métis communities, with the commitment to understand, honour, and interweave Indigenous Knowledge
- NWMO further optimized engineered-barrier system design
- NWMO's first phase of preliminary assessments are complete, initiated geoscientific and environmental fieldwork

This challenge should remain open

# Response to 6th Review Meeting Challenges (3/3)

**Challenge 3:**
Development of Canada's Integrated Radioactive Waste Management Strategy (for L&ILW)

- The Government of Canada asked the NWMO to lead the development of an integrated radioactive waste management strategy (ISRW) for Canada's low- and intermediate-level radioactive waste
- For the ISRW, NWMO conducted extensive engagement with the public, Indigenous peoples, industry, academia, youth and civil society organizations in 2021 on approach for L&ILW (What We Heard Reports publicly available)
- ISRW will be published for public comment in 2022 before formal submissions to the Minister of Natural Resources Canada

This challenge should remain open

# Progress on Planned Measures to Improve Safety from the 6th Review Meeting (1/2)

## Planned Measure 1:
Modernization of the waste and decommissioning regulatory framework

- In 2021, CNSC published five Regulatory Documents on waste management and decommissioning to align with international guidance and best practices

**Complete**

## Planned Measure 2:
Implementation of the Impact Assessment Act

- Impact Assessment Act (IAA), came into force on August 28, 2019. The impact assessment process is led by the Impact Assessment Agency of Canada (IAAC)

**Complete**

# Progress on Planned Measures to Improve Safety from the 6th Review Meeting (2/2)

**Planned Measure 3:**
OPG's deep geological repository for its L&ILW

- In 2020, OPG cancelled its proposed DGR for L&ILW at the Bruce nuclear site, following a vote by local Indigenous communities not to support it,
- As a result, OPG withdrew its licence application for the L&ILW DGR
- OPG remains committed to safe disposal of radioactive wastes

**Closed**

# Canada Responded to All Questions on our National Report

- Canada received 83 questions from the Contracting Parties on our National Report
- Canada provided an answer to all questions received, on time
- The questions and answers are currently publicly available on the CNSC website in both English and French

**Canada is committed to the Joint Convention peer review process**

# Planned Activities for Canada During the Next JC Reporting Period

- Completion of Canada's commitment from the 2019 IRRS Mission with regards to Canada's Radioactive Waste Policy – lead NRCan
- Development of Canada's Integrated Radioactive Waste Management Strategy (for L&ILW) – lead NRCan
- Identification of a proposed site in a willing host community for spent fuel repository and continued progress in engineered design for the long-term management of spent fuel (Adaptive Phased Management) – lead NWMO
- Decommissioning and remediation of AECL sites and continued licensing process for CNL decommissioning and remediation projects – Lead AECL/CNL

# Proposed Good Practices for Canada in Context of 7th Review Meeting

## Proposed Good Practice 1:

### Canada's Interweaving of Indigenous Knowledge with Western Science

- The government worked together with Indigenous partners to co-develop and undertake engagement activities in the review and modernization of Canada's radioactive waste policy
- Canada's commitment to UNDRIP
- Statutes require the incorporation and consideration of Indigenous Knowledge
- AECL is Implementing an Indigenous-led/proponent-funded Guardianship Program (environmental monitoring incorporating Indigenous Knowledge) at federal legacy nuclear waste projects
- The NWMO is committed to respect Indigenous rights and treaties and engage Indigenous peoples throughout all aspects of Canada's APM plan through its Indigenous Knowledge Policy
- OPG has a Reconciliation Action Plan that makes a series of commitments, including building positive and mutually beneficial relationships with indigenous communities

# Proposed Good Practices for Canada in Context of 7th Review Meeting

## Proposed Good Practice 2:

### Canada's Financial Guarantee Regulatory Requirements and Guidance

- CNSC stipulated regulatory requirements in REGDOC-3.3.1
- Financial guarantees are:
  - Required as part of licence application and approved by the Commission
  - Payable on demand to the CNSC
  - Separate from a licensee's assets and can be accessed by the CNSC if required
  - Required throughout the entire lifecycle of the facility
  - To be updated and reviewed (along with decommissioning plans and cost estimates) every five years, sooner if requested by the Commission
  - Subject to annual reporting to demonstrate value and validity

Financial guarantees cover all costs for decommissioning, including dismantling and long-term waste management

# Proposed Good Practices for Canada in Context of 7th Review Meeting

## Proposed Good Practice 3:

### Canada's Participant Funding Program

- The CNSC established the Participant Funding Program (PFP) in 2011
- Assists eligible recipients to access funding support to help bring value added information to the Commission
- Directly improved and enhanced the CNSC's decision-making process and regulatory oversight
- The PDP disburses over $1 million a year to recipients, with a majority going to Indigenous Nations and communities

# Proposed Areas of Good Performance for Canada in Context of 7th Review Meeting

## Proposed Area of Good Performance 1:

### Canada's continued modernization of the waste management and decommissioning regulatory framework

- As a result of the 2019 IRRS Mission to Canada, the IRRS team identified that the CNSC strives to continuously upgrade the framework to address new challenges and upcoming technologies
- In 2021, CNSC published five Regulatory Documents on waste management and decommissioning that align with international guidance and best practices
- Currently developing:
  - REGDOC-1.1.4, Licence Application Guide: Licence to Decommission Reactor Facilities
  - REGDOC-1.2.3, Licence Application Guide: Licence to Prepare Site for a Deep Geological Repository

# Proposed Areas of Good Performance for Canada in Context of 7th Review Meeting

## Proposed Area of Good Performance 2:

### CNSC's Technical Co-op Program


https://www.youtube.com/watch?v=7_3tu3MpSeE

# Conclusions

## Canada has demonstrated:

- Its commitment to the Joint Convention objectives
- Its compliance with the Articles of the Joint Convention
- Its openness and transparency
- Its commitment to the safety of human health and the environment
- Its commitment to the improvement of the safety of spent fuel and radioactive waste management

All radioactive wastes managed in facilities that are safe, secure, and environmentally sound

# Team Canada


# APPENDIX A:

## Canada's Updated Matrix for the 7th Review Meeting

# Canada's Updated Matrix

| Type of Liability | Long-term Management (LTM) Policy | Funding of Liabilities | Current Practice / Facilities | Planned Facilities |
|---|---|---|---|---|
| **Spent Fuel (SF)** | National approach for the LTM of SF are set by the Federal Government under the *Nuclear Waste Fuel Act* (NFWA), which came into effect in 2002. Under the NFWA, a dedicated Nuclear Waste Management Organization (NWMO) was established for developing a central deep geological repository and to address the funding. | **Long-term:**<br>• Licensees are required to contribute to segregated funds to finance LTM activities under the NFWA<br>**Short-term:**<br>• In accordance with their licence, licensees are required to maintain financial guarantees for decommissioning, including the management of spent fuel under the *Nuclear Safety and Control Act* (NSCA) | • SF from power reactors held in interim wet or dry storage facilities located at the waste producers' site<br>• SF from research reactors is either returned to the fuel supplier or transferred to Canadian Nuclear Laboratories (CNL) Chalk River Laboratories (CRL) for storage | **Long-term:**<br>• Nuclear Waste Management Organization (NWMO) implementing the Adaptive Phased Management (APM) Approach - a deep geological repository (DGR) for the LTM of SF in Canada<br>**Short-term:**<br>• Interim dry storage facilities are constructed as needed |
| **Nuclear Fuel Cycle Waste** | • In accordance with Canada's Radioactive Waste Policy Framework, waste owners are responsible for the funding, organization, management & operation of their waste management facilities (WMFs)<br>• Government of Canada accepted responsibility for LTM of historic wastes and funds the management of legacy waste | Under the NSCA, licensees are financially responsible and required to provide an FG for the decommissioning and LTM of the wastes they generate. | Managed safely by licensee:<br>• onsite or at a dedicated WMF<br>• in above ground mounds<br>• for mines and mills, in near-surface facilities adjacent to the mines and mills<br>• transferred to licensed WMFs<br>• material decontaminated and recycled/disposed of through conventional means<br>• recovery of uranium from recoverable process streams | • NWMO leading development of Canada's integrated radioactive waste management strategy for L&ILW<br>• CNL pursuing a Near Surface Disposal Facility at the CRL for LLW<br>• LTM of the bulk of Canada's historic waste implemented under the Port Hope Area Initiative (PHAI)<br>• LTM of Uranium Mines and Mills (UMM) in near-surface facilities adjacent to the mines and mills |
| **Application Wastes** | Licensees are responsible for the funding, organization, management and operation of their WMFs. | Licensees are financially responsible and required to provide an FG for the decommissioning and the LTM of the waste that they generate. | • Delay and decay<br>• Returned to manufacturer<br>• Transferred to licensed WMFs for management | • NWMO leading development of Canada's integrated radioactive waste management strategy for L&ILW<br>• CNL pursuing a Near Surface Disposal Facility at the CRL for LLW |
| **Decomm. Liabilities** | Licensees are responsible for the funding, organization, management and implementation of decommissioning activities. | Licensees are financially responsible and required to provide an FG for the decommissioning & the LTM of the waste that they generate. | Regulations require decommissioning plans for nuclear facilities and a FG throughout the lifecycle of a licensed activity. These are reviewed on a five-year cycle by the licensee and accepted by the regulator | • NWMO leading development of Canada's integrated radioactive waste management strategy for L&ILW<br>• CNL pursuing a Near Surface Disposal Facility at the CRL for LLW |
| **Disused Sealed Sources** | • Licensees are responsible for the funding, organization, management and operation of their WMFs<br>• Sources tracked through National Sealed Source Registry (NSSR) and Sealed Source Tracking System (SSTS) | Licensees are financially responsible and required to provide an FG for the decommissioning and the LTM of the waste that they generate. | • Delay and decay<br>• Returned to manufacturer<br>• Transferred to licensed WMF for LTM<br>• Recycling by reusing, re-encapsulating, or reprocessing | • NWMO leading development of Canada's integrated radioactive waste management strategy for L&ILW<br>• CNL pursuing a Near Surface Disposal Facility at the CRL for LLW |

Canada