Overview of the 8th Review Cycle of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Commission Meeting October 7, 2025
CMD 25-M33

DAMZHJW66V33-166150894-7967 (PPT)
DAMZHJW66V33-166150894-7968 (PDF)

Canada AECL EACL nwmo ONTARIO POWER GENERATION

Outline of Canada's Presentation

- Background of the Joint Convention
- Canada's Participation in the 8th Review Cycle
- Conclusions

Background of the Joint Convention

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

Image: Parliament of Canada

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

Image: The 8th Review Meeting of the Joint Convention (Source: IAEA)

- It seeks to **promote a high level of safety** through a peer review process every three years

Background (2/3)

Objectives of the Joint Convention are:

Image: Canadian delegates at the 8th 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)

Image: Canadian delegate presenting at the 8th Review Meeting of the Joint Convention (Source: CNSC)

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**

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
  - 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

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 matters concerning 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

Canada's Participation in the 8th Review Cycle

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

Image: Parliament of Canada

President of the 8th Review Meeting

- Contracting Parties elected by consensus the President of the 8th Review Meeting
- Main objectives of Mr. Jammal's term 2024-27:
  - raise awareness of the importance of the Joint Convention to increase signatories
  - increase participation in the Joint Convention by underrepresented and emerging nuclear nations
  - introduce new and support current improvements to the national reporting and peer review processes
  - facilitate participation, especially by Contracting Parties with minimal resources

First time Canada leads the Joint Convention

Highlights

- Canada actively participated in the 8th Review Cycle of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) from April 1, 2020 to March 31, 2024

- Canada's National Report demonstrated how Canada continued to meet its obligations under the articles of the JC

- The 8th Review Meeting of the Joint Convention took place from March 17 to March 28, 2025 at the International Atomic Energy Agency (IAEA) Headquarters in Vienna

8th Review Cycle Milestones

August 16, 2024
Submit National Report

December 17, 2024
submit questions /comments on other Contracting Parties' National Reports

February 17, 2025
submit answers to questions received on Canada's National Report

March 17-28, 2025
8th Review Meeting

March 19, 2025
Canada's National Presentation and Country Group Session

Canada's 8th National Report

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

- Available to the public 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 (1/2)

Items	7th Review Meeting	8th Review Meeting
Total number of questions posted	4,520	5,239
Total number of Contracting Parties	86	90
Number of Contracting Parties that submitted National Reports	83	88
Number of Contracting Parties that did not submit National Reports	3	2
Number of Contracting Parties that posted questions	54	62
Number of Contracting Parties that did not post questions	32	28
Number of questions posed to Canada	83	125
Number of Contracting Parties that posed questions to Canada	17	20
Number of questions posed by Canada	174	205

International Peer Review Overview (2/2)

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Belgium	Germany	Slovakia	Spain	United Kingdom	USA	Sweden	Ukraine
Bulgaria	Russian Federation	China	Republic of Korea	France	Canada (N/A)	Japan	Czech Rep.
Netherlands	Romania	Lithuania	Finland	Italy	Slovenia	Kazakhstan	Mexico
Switzerland	South Africa	Hungary	Armenia	Argentina	UAE	Belarus	Brazil
Australia	Austria	Chile	Denmark	Euratom	Georgia	Ghana	Greece
Indonesia	Iraq	Jordan	Latvia	Morocco	Nigeria	Norway	Peru
Poland	Portugal	Serbia	Syrian Arab Rep.	Thailand	Türkiye	Uruguay	Uzbekistan
Vietnam	Tajikistan	Zimbabwe	Albania	Benin	Bolivia	Bosnia & Herzegovina	Botswana
Congo	Croatia	Cuba	Cyprus	Eritrea	Estonia	Gabon	Iceland
Ireland	Kyrgyzstan	Lesotho	Luxembourg	Madagascar	Malawi	Malta	Mauritania
Mauritius	Montenegro	Niger	North Macedonia	Oman	Paraguay	Rep of Moldova	Rwanda
Saudia Arabia	Senegal						

Mandatory reports peer reviewed by Canada

Additional reports peer reviewed by Canada

8th Review Cycle
Canada's Participation Peer Review Process

Canada posted **205 questions** to **39 contracting parties**.

Canada received 125 questions from 20 Contracting Parties on our National Report; main topics included:

- Modernizing Canada's Radioactive Waste Policy and Integrated Strategy for Radioactive Waste
- Spent fuel dry storage operating experience/lessons learned
- Radioactive waste disposal site selection
- Financial liability and planning for decommissioning

Canada responded on time to all questions received

Canada is committed to the Joint Convention peer review process

8th Review Meeting – Canadian Delegation

Canadian Nuclear Safety Commission	Nancy Greencorn and Sarah Watt
The Permanent Mission of Canada to the International Organizations in Vienna	Canadian Ambassador to Austria and Permanent Representative to the International Organizations in Vienna and staff
Natural Resources Canada	Pui Wai Yuen, David Wilkinson, Emma Anderson
Atomic Energy of Canada Limited	Paul McClelland
Canadian Nuclear Laboratories	Sarah Brewer
Ontario Power Generation	Kapil Aggarwal, Heather Rambukkana, Tara McKenzie
Nuclear Waste Management Organization	Kiza Sauvé, Sara Dolatshahi, Mihaela Ion

Image: Canadian delegation at the 8th Review Meeting of the Joint Convention (Source: CNSC)

Canada's 8th Review Meeting
Country Group Session - Held March 19, 2025

Format for Country Group Sessions:

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

Image: Canadian delegates at the 8th Review Meeting of the Joint Convention (Source: CNSC)

Canada's session was attended by:

- Australia
- Belgium
- Chile
- Denmark
- **Estonia**
- Euratom
- Finland
- France
- **Georgia**
- Germany
- Iceland
- Italy
- Japan
- Kingdom of the Netherlands
- Norway
- Republic of Korea
- Romania
- **Slovenia**
- **Türkiye**
- **UAE**
- United Kingdom
- **USA**

***Countries in red indicate Country Group members**

Summary of Discussions

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

- Public engagement on the radioactive waste policy and regulatory oversight of waste management facilities
- Development of licensing guidance documents
- Current status, next steps and timelines for the spent fuel deep geological repository
- Funding structure for the long-term management of used fuel and the NWMO
- Regulatory expectations for, and industry implementation of, nuclear facility design to consider decommissioning and waste

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."

Update on Open Challenges

Three Challenges identified for Canada during the 6th Review Meeting, were CLOSED:

- **Challenge 1:**
  Decommissioning and remediation of AECL sites (under the management of CNL) and continued licensing process for CNL accelerated decommissioning and remediation projects

- **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

- **Challenge 3:**
  Development of Canada's Integrated Radioactive Waste Management Strategy for low and intermediate level waste

Canada's Good Practices

Canada received two Good Practices:

- **Canada's development of Artificial Intelligence -powered application to optimize the management of spent fuel in the fueling bay** reduces the time and effort needed for fuel handling and also minimizes the wear and tear on handling equipment, thereby extending its operational lifespan

- **Collaborative approach to "Waste-led design" in new nuclear technologies** – an approach that prioritizes waste management from the outset. Integrated approach by CNSC, NRCan, NWMO and the utility operators allows gathering data from technology vendors for preliminary assessment of their waste streams to ensure potential waste disposal challenges and safety concerns are identified early. This fosters innovation and sustainability in safe waste management solutions

Canada's Areas of Good Performance (1/2)

Canada received 8 Areas of Good Performance:

- **Adoption of a transparent, inclusive, site selection approach** has gained community support and resulted in informed and willing host communities for Canada's DGR for spent fuel
- **Prioritizing meaningful engagement and participant funding with Indigenous Nations and communities** for waste policy and strategy development, which builds trust and relationships that ultimately helps Canada to advance projects that contribute to the safe long-term management of radioactive waste
- **Trilateral collaboration to publish a report** outlining principles for the deployment of Artificial Intelligence (AI) in the nuclear sector
- **Inclusive approach to determine the strategy for disposal of RW** where gaps existed. This ensures that waste management plans are in place for all of Canada's RW
- **Continuous progress** in the successful implementation of decommissioning programmes at AECL owned sites (especially complex sites)

Canada's Areas of Good Performance (2/2)

Areas of Good Performance (continued):

- **Reducing volumes of previously stored LLW** through the successful implementation of sorting, segregation and processing technologies

- **CNSC Licence Application Guide REGDOC-1.2.3, Licence Application Guide: Licence to prepare Site for a Deep Geological Repository** improves clarity of regulatory expectations for licensees in the absence of safety standard requirements specific to requirements for licence applications

- **Audit Working Group: Canada (CNSC) and the Federal Authority for Nuclear Regulation (FANR) established an International Internal Audit Collaboration Working Group (IIACWG)** for nuclear regulatory bodies. This audit working group for nuclear regulatory bodies encourages sharing of best practices and knowledge with regards to both internal audit functions and technical functions

Challenges for Canada from the 8th Review Meeting

Canada received the following Challenges:

- **Progress in advancement of the regulatory approvals process** of the Spent Fuel DR while ensuring meaningful ongoing public and indigenous engagement

- **Initiating the implementation of early steps for disposal of intermediate level waste**

- **Undertaking steps needed to enable start-up of the planned Near Surface Disposal Facility at Chalk River**

No suggestions were given to Canada

Conclusions

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

Image: Parliament of Canada

Overall Conclusions

Canada was a strong participant at the 8th Review Meeting

- Contributed significantly to the Review Meeting, including active participation in the peer review and plenary sessions
- Contributed one Review Officer (Rapporteur) 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

Appendix: Canada's 8th National Presentation

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

Image: Parliament of Canada

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 8th Review Meeting

Country Group 6, March 19, 2025, Vienna

Canada AECL EACL nwmo ONTARIO POWER GENERATION

Outline of Canada's Presentation

Section 1
Highlights of Canada's Report

Section 2
Canada's Waste Management Facilities and National Inventory

Section 3
Canada's Legislative and Policy Framework/CNSC Regulatory 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 Generating Stations

Section 6
Long-term Management of Canada's Radioactive Waste in Deep Geological Repositories

Section 7
Responses to Actions from Previous Review Meetings, Proposed Good Practices and Areas of Good Performance

Section 8
Overarching Issues from Previous Meeting

Appendix A
Canada's Updated Matrix for the 8th Review Meeting

HIGHLIGHTS OF CANADA'S REPORT AND INTERNATIONAL PEER REVIEW OF CANADA

Presented by the Canadian Nuclear Safety Commission (CNSC)

Image: CNSC Inspector

Canada's 8th National Report – Key Messages

- The Government of Canada and the Canadian Nuclear Safety Commission (CNSC) have a comprehensive and robust legislative and regulatory framework that assures workers, the public, and the environment are protected.
- Spent fuel and radioactive wastes are managed in CNSC licensed facilities that are safe, secure, and environmentally sound.
- Canada continues to take actions to enhance inclusive engagement, openness and transparency on radioactive waste management and decommissioning.
- Canada is developing solutions for long-term management that do not place an undue burden on future generations.

Joint Convention 8th Review Meeting

Canada posted 205 questions to 39 contracting parties

Canada received 125 questions from 20 Contracting Parties on our National Report; main topics included:

- Modernizing Canada's Radioactive Waste Policy and Integrated Strategy for Radioactive Waste
- Spent fuel dry storage operating experience/lessons learned
- Radioactive waste disposal site selection
- Financial liability and planning for decommissioning

Canada responded on time to all questions received.

The questions and answers will be publicly available on the CNSC website in both English and French

Canada is committed to the Joint Convention peer review process

2024 IRRS Follow-up Mission to Canada

- In June 2024, the CNSC hosted an Integrated Regulatory Review Service (IRRS) follow-up mission
- The IRRS team noted achievements in the radioactive waste management framework, including the revision of Canada's Policy for Radioactive Waste Management and Decommissioning
- The IRRS team considered the development and implementation of CNSC's human resource plan as a good performance
- The international team of experts remarked that
  - Canada has a comprehensive and robust regulatory framework for nuclear and radiation safety
  - The CNSC strives to continually update its regulatory framework to address new challenges and upcoming technologies

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

2023 EPREV Follow-up Mission to Canada

- In June 2019, the CNSC hosted an Emergency Preparedness Review (EPREV) Mission to Canada
- The EPREV follow-up mission to Canada was conducted from June 26-30, 2023
- The IAEA review team concluded that all the recommendations and suggestions formulated in 2019 are closed

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

2022 Audit by Office of Auditor General of Canada

- In 2022, the Office of the Auditor General of Canada (OAG), an officer of Parliament, performed an audit on the management of low and intermediate level radioactive wastes in Canada

- The audit found that:

  - the federal entities responsible for waste in Canada did a good job of managing the low- and intermediate-level radioactive waste that makes up 99.5% of Canada's radioactive waste output

  - CNSC consistently documented its approval of licensees' radioactive waste management programs and waste acceptance criteria, and followed up on all unplanned activity or event reports related to waste management

  - The management of this waste aligns with key international standards that seek to protect the environment and the safety of current and future generations

- The audit also highlighted areas of improvement, that will be addressed in the spirit of continuous improvement

CANADA'S WASTE MANAGEMENT FACILITIES AND NATIONAL INVENTORY

Presented by the Canadian Nuclear Safety Commission (CNSC)

Image: The Chalk River waste management facility

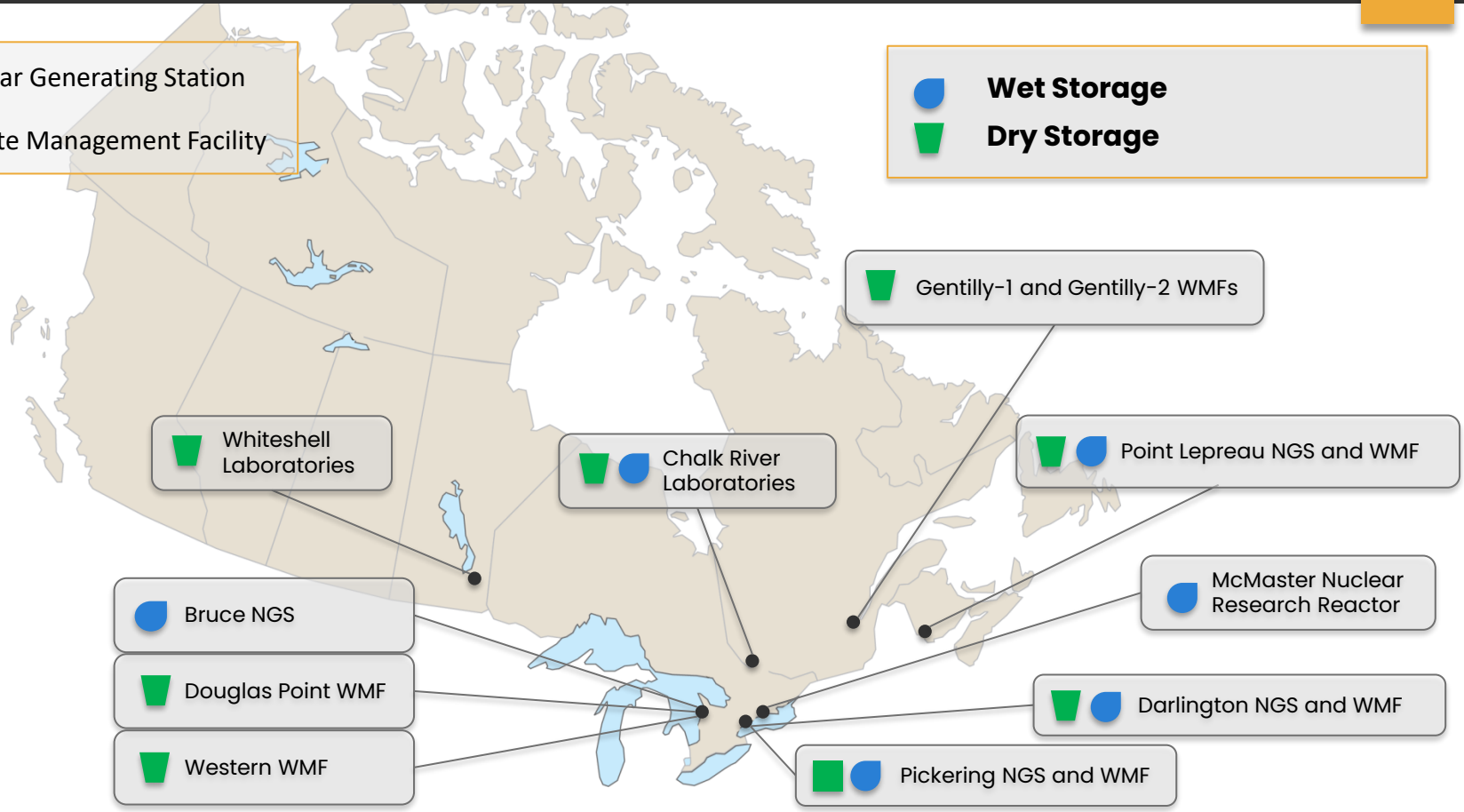
Canada's Radioactive Waste Management Facilities
High-Level Radioactive Waste

NGS: Nuclear Generating Station

WMF: Waste Management Facility

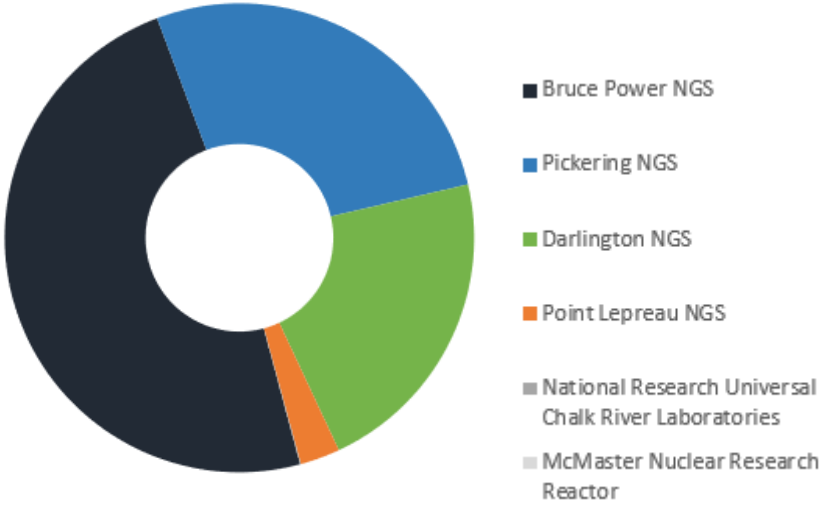
Wet Storage

Dry Storage

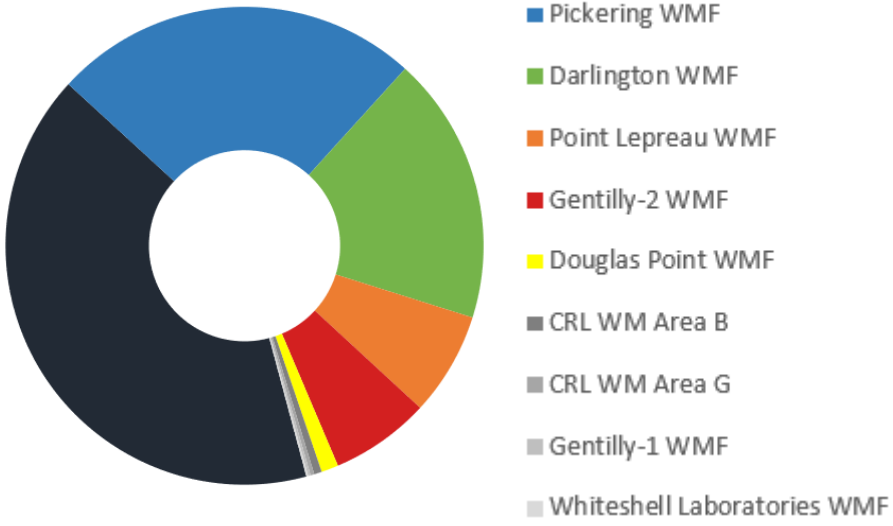


High-Level Radioactive Wastes

Spent fuel bundles in wet storage

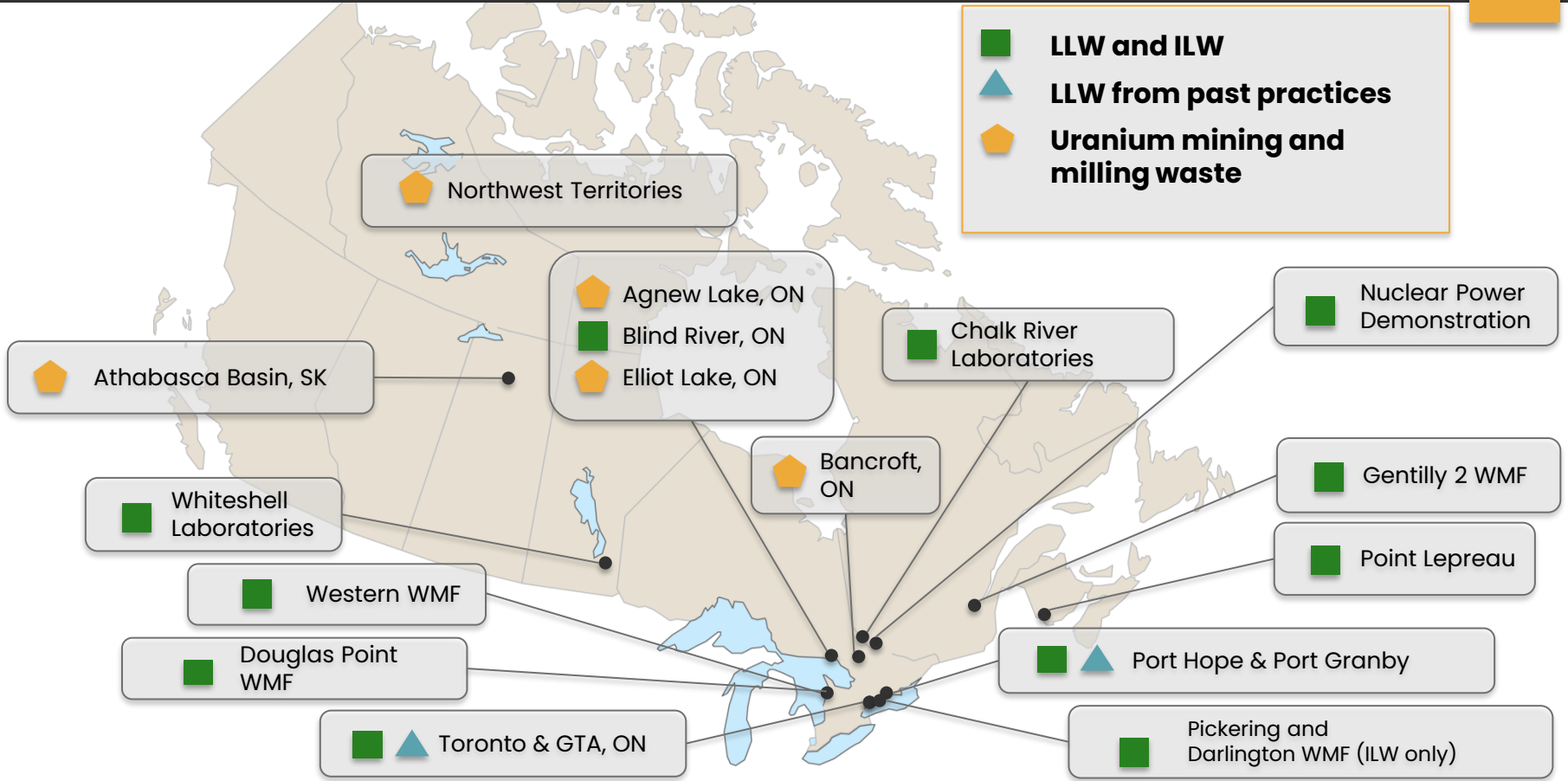


Spent fuel bundles in dry storage



HLW comprises approximately 0.6% by volume of radioactive wastes in Canada

Canada's Radioactive Waste Management Facilities
Non-spent fuel Radioactive Wastes

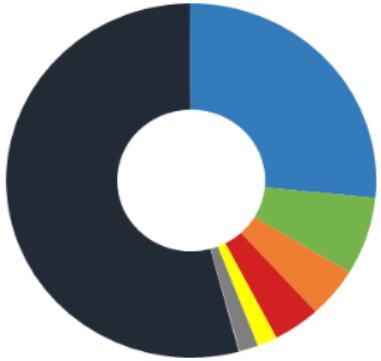


Low- and Intermediate-Level Radioactive Waste

Low-Level Waste (LLW)

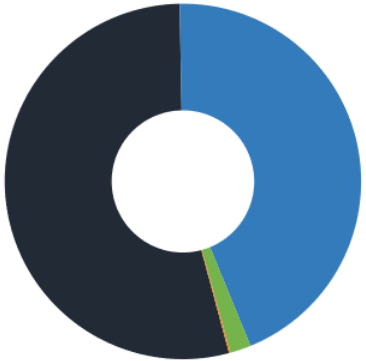
- Chalk River Laboratories
- Western and Doulgas Point WMFs and RWOS-1
- Whiteshell Laboratories
- Port Hope Conversion Facility Cameco Fuel Manufacturing
- BWXT NEC
- Blind River Refinery
- Point Lepreau WMF
- Gentilly-2 WMF
- Nuclear Power Demonstration

Intermediate-level Waste (ILW)



- Western and Douglas Point WMFs, RWOS-1
- Chalk River Laboratories Waste Management Areas
- Darlington WMF
- Pickering WMF
- Whiteshell Laboratories
- Point Lepreau WMF
- Gentilly-2 WMF
- Nordion

Low-level Waste from past practices



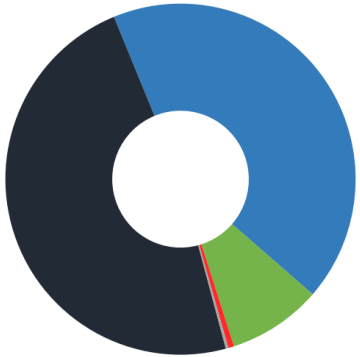
- Port Hope
- Port Granby
- Deloro Mine site
- Greater Toronto Area

LLW and ILW comprise approximately 98.5% and 0.9% by volume, respectively, of radioactive wastes in Canada

Uranium Mining and Milling Waste

Tailings

Waste Rock



Operational

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

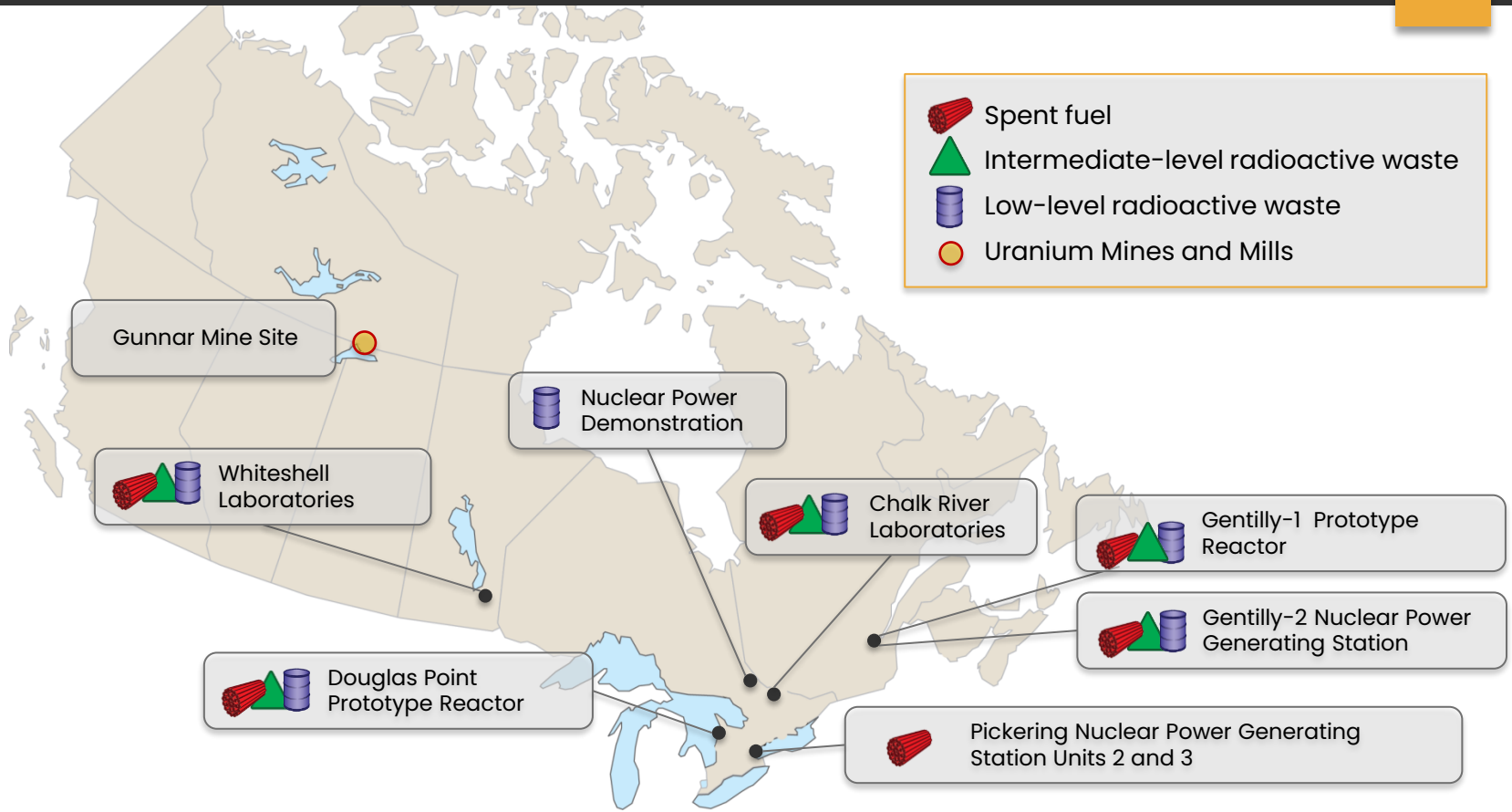
Tailings

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

Nuclear Facilities in Decommissioning in Canada



CANADA'S LEGISLATIVE AND POLICY FRAMEWORK

Presented by Natural Resources Canada (NRCan)

Image: Parliament of Canada

Legislative & Policy Framework in Canada

PARLIAMENT - Nuclear energy is under federal jurisdiction

Minister

Natural Resources Canada

Leads development and implementation of federal nuclear energy policy

Regulates nuclear energy and materials to protect people and the environment

AECL EACL

Oversees federal roles and responsibilities in waste and decommissioning, and nuclear laboratory science and technology

Government of Canada's legislative framework

- *Nuclear Safety and Control Act* (1997)
- *Nuclear Fuel Waste Act* (2002)
- *Nuclear Liability and Compensation Act* (2017)
- *Impact Assessment Act* (2019)
- *UN Declaration on the Rights of Indigenous Peoples Act*

Ministers

Other Departments with a role in nuclear management include:

- Global Affairs Canada
- Transport Canada
- Health Canada
- Environment and Climate Change Canada
- Fisheries and Oceans Canada

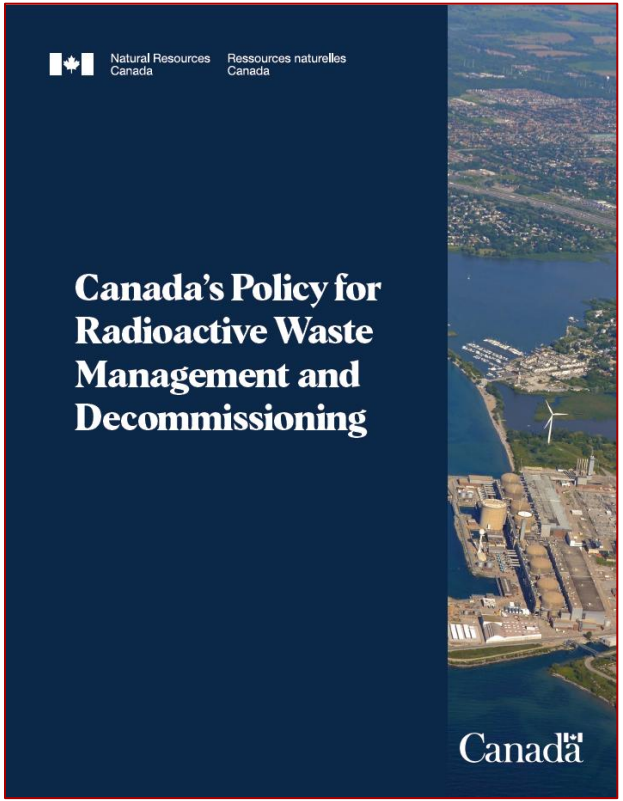
Recent Federal Developments

- Federal Budget 2024:
  - set a **three-year target for nuclear project reviews** under the *Impact Assessment Act*
  - provided **$3.1 billion dollars over 10 years to Atomic Energy of Canada Limited** to continue advancing nuclear science research and to manage the government's radioactive waste and decommissioning liabilities
- Under the Electricity Predevelopment Program, NRCan announced funding for **pre-development projects** for new nuclear across the country, including in jurisdictions that would be new to nuclear power
- NRCan's Enabling Small Modular Reactor (SMR) Program was launched, providing funding to support SMR R&D, **to include novel fuel and waste**

Canada's Modernized Policy

- The Federal Government is responsible for radioactive waste policy, legislative and regulatory regime, ensuring radioactive waste management activities prioritize the health, safety, and security of people and the environment, and ensuring nuclear non-proliferation
  - Policy to be reviewed and, as appropriate, updated every 10 years to ensure that it maintains alignment with International Atomic Energy Agency guidance and the implementation of United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)
- Waste owners are responsible for preventing and minimizing the generation of radioactive wastes, safely managing their radioactive wastes, and ensuring adequate funding over the short and long terms
  - Financial guarantees are required of nuclear operators for decommissioning and long-term waste management
  - Waste owners are to collaborate on maintaining an Integrated Strategy for Radioactive Waste, with input from Canadians and Indigenous Peoples

Priorities of the Modernized Policy



- Health, safety, and security of people and the environment
- Inclusive engagement, openness, and transparency
- Commitment towards building partnerships and advancing reconciliation with Indigenous peoples
- Global Excellence in radioactive waste management and decommissioning

Engagement Approach for Policy Modernization

- Engagement period occurred virtually from 2020-2023
  - NRCan and other federal departments heard the input of interested parties on a wide range of waste management and decommissioning matters
  - Discussion papers were provided in advance to help guide the discussion
- Approach ensured inclusive engagement, openness, and transparency
  - Meetings and virtual engagement sessions (participants from environmental and public interest groups, Indigenous peoples, youth, academia, and industry)
  - Written submissions from individuals and organizations
  - Online engagement and policy modernization website/open forum
- Outputs included the *What We Heard* report and two Engagement Summary Reports

Over **150** meetings and virtual engagement sessions

Over **600** written submissions received

70 online forum posts

Integrated Strategy for Radioactive Waste

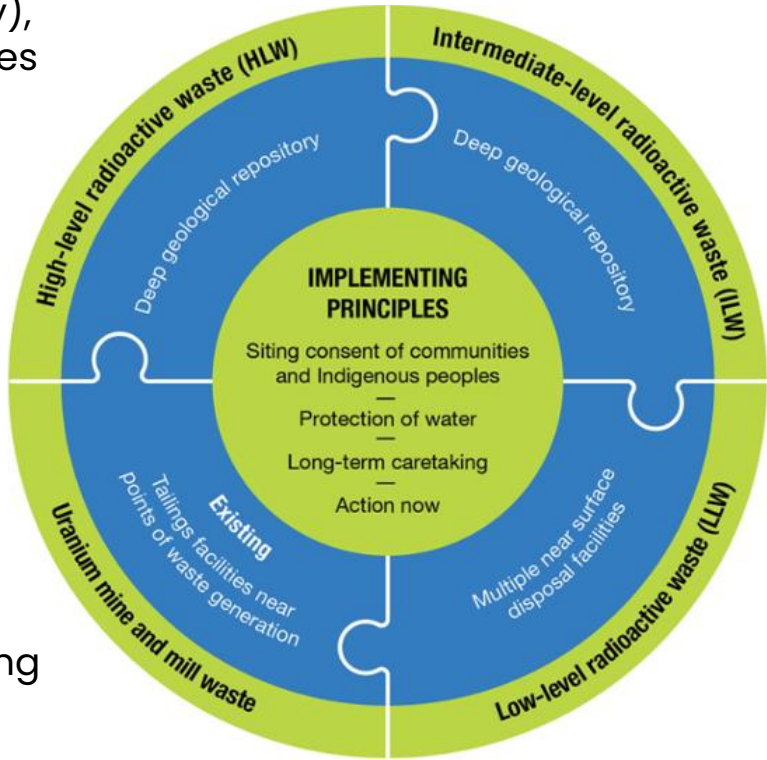
The Integrated Strategy for Radioactive Waste (Strategy), prepared by the NWMO on behalf of waste owners, outlines an integrated, national plan for the long-term management of all of Canada's radioactive waste

- Strategy is key to ensuring safe and secure long-term management plans are implemented, including where there were gaps

In October 2023, the Government of Canada accepted the Strategy and its recommendations:

- Low-level waste to be managed in near-surface disposal facilities with implementation by waste owners
- Intermediate-level and non-fuel high-level waste to be managed in a DGR with implementation by the NWMO

Waste owners are currently collaborating on implementing the Strategy, which they will update by 2028



CNSC REGULATORY FRAMEWORK

Presented by the Canadian Nuclear Safety Commission (CNSC)

Image: Preparations for a Saskatoon Commission Hearing

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 only by Federal Court

President

PIERRE TREMBLAY | DR. TIMOTHY BERUBE | MS. ANDREA HARDIE | MR. JERRY HOPWOOD | DR. MARCEL LACROIX | DR. VICTORIA REMENDA

Public Hearings throughout lifecycle of facility

CNSC Staff

- **Headquarters (HQ) in Ottawa**
- **4 site offices at power plants**
- **1 site office at Chalk River**
- **4 regional offices**

CNSC Staff located across Canada

The CNSC Regulates
All Nuclear Facilities and Activities in Canada…

Uranium mines and mills

Uranium fuel fabrication and processing

Nuclear power plants

Nuclear substance processing

Industrial and medical applications

Nuclear research and educational activities

Transportation of nuclear substances

Nuclear security and safeguards

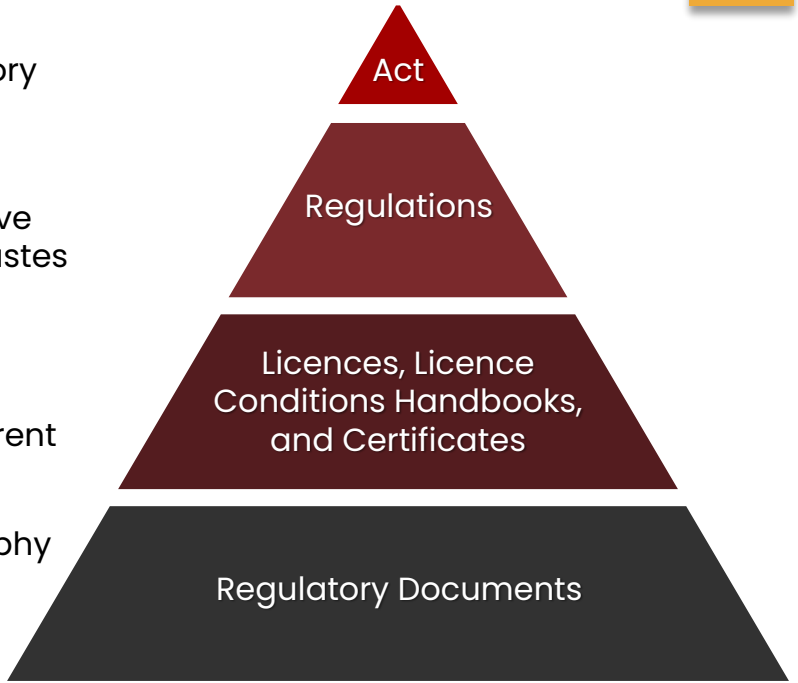
Import and export controls

Waste management facilities

… over the entire Lifecycle.

Canada's Regulatory Framework

- The Commission makes regulations and approves regulatory documents through a transparent process with public consultation
- Comprehensive and robust framework that ensures effective oversight of all steps in the management of radioactive wastes
- Modern and aligned with international standards and best practices
- Flexible and technology neutral that is applicable to all current and future wastes
- Risk-informed and performance-based regulatory philosophy
- Consultative approach to managing and improving the regulatory framework



CNSC continuously improves the regulatory framework

Canada's Regulatory Framework - Continuous Improvement in Waste Management and Decommissioning

Regulatory documents (REGDOCs):

Published in 2024:

- **REGDOC-1.2.3**, *Licence Application Guide: Licence to prepare Site for a Deep Geological Repository*

Published in 2021:

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

CSA standards

Published in 2023:

- **CSA N292.4**, *Storage of radioactive waste and irradiated fuel*

Published in 2022:

- **CSA N292.7**, *Deep geological disposal of radioactive waste and irradiated fuel*

Published in 2021:

- **CSA N292.8**, *Characterization of radioactive waste and irradiated fuel*

Updated since the last review meeting:

- **CSA N292.0,** *Radioactive Waste Management: Common requirements of the CSA N292 series of Standards*
- **CSA N292.5**, *Guideline for the exemption or clearance of materials that contain, or potentially contain, nuclear substances*
- **CSA N294**, *Decommissioning 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*

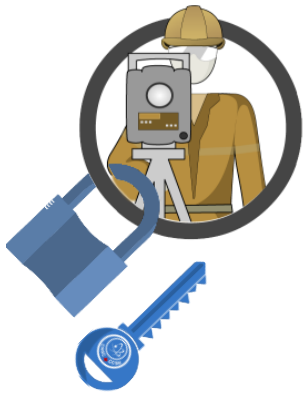
Safety and Control Areas

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

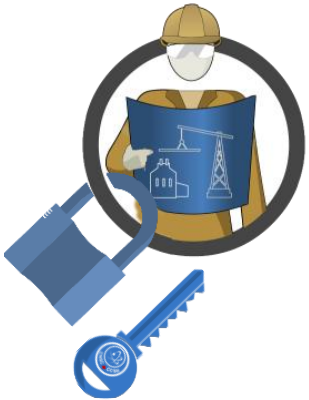
Ensuring the safety of all regulated activities

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

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

Compliance and Enforcement

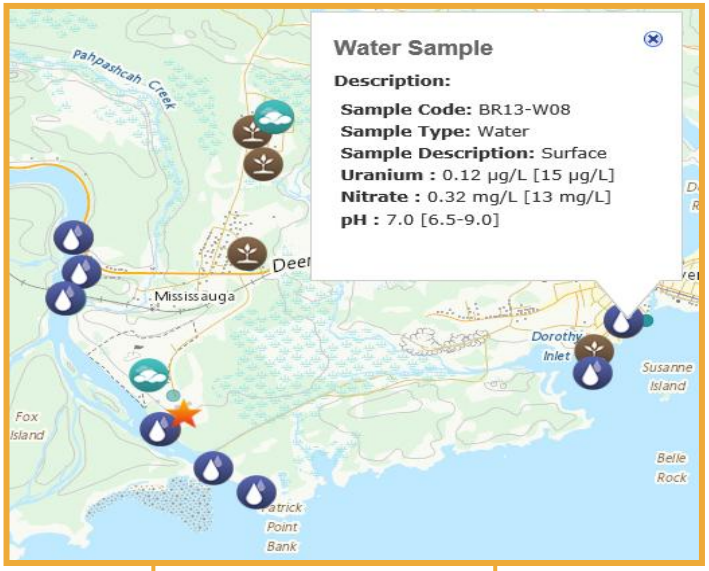
- CNSC undertakes necessary and reasonable measures to ensure compliance. The measures include compliance awareness, verification, and enforcement

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 Program

The IEMP does not relieve licensees of their responsibilities
Results available on CNSC public website



Program and sample planning → **Sampling** → **Laboratory analysis** → **Interpretation of results** → **Publication of results**

Open and Transparent Regulatory Activities

CNSC has mandate to disseminate scientific, technical and regulatory information to all stakeholders

- Public and Indigenous Peoples invited to participate in public Commission proceedings
- Participant funding programs
- Extensive community outreach activities
- Information published on CNSC website and social media
- Engagment is structured, formalized and continuous
- Building long-term relationships with Indigenous Peoples based on trust and mutual respect

CNSC is committed to enhancing transparency and building trust

MNO Nuclear Safety Open House, May 2023

BWTX Licence renewal hearing, March 2020

UN Declaration on the Rights of Indigenous Peoples

- **In 2021 Canada passed the United Nations Declaration Act (UNDA). This Act requires the Government of Canada, in consultation and cooperation with Indigenous peoples, to:**
  - Take all measures necessary to ensure the laws of Canada are consistent with the declaration
  - Prepare and implement an action plan to achieve the declaration's objectives
  - Table an annual report on progress to align the laws of Canada and on the action plan

- Concerns raised by Indigenous Nations and communities, including related to consent or lack of consent for a project, are considered as part of the public Commission hearing and in the Commission's decision-making process

- CNSC, as an agent of the Crown, is required to fulfil the Duty to Consult and where appropriate accommodate Indigenous peoples when regulatory or licensing decisions may adversely impact potential or established Aboriginal or treaty rights

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

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

Presented by Atomic Energy of Canada Limited

Image: Port Granby Long-term Management Facility

Atomic Energy of Canada Limited (AECL)

AECL's mission is to drive nuclear innovation to deliver clean energy technologies and improve the quality of life of Canadians while caring for the land

Canadian Nuclear Laboratories (CNL) operates AECL sites and delivers radioactive waste management and decommissioning activities on behalf of AECL under a Government owned Contractor operated model

Our Priorities:

- Accelerate decommissioning
- Revitalize the Chalk River Laboratories (CRL)
- Science & Technology – supporting multiple Federal priorities and growing commercial opportunities that align with the public interest

Indigenous Relations

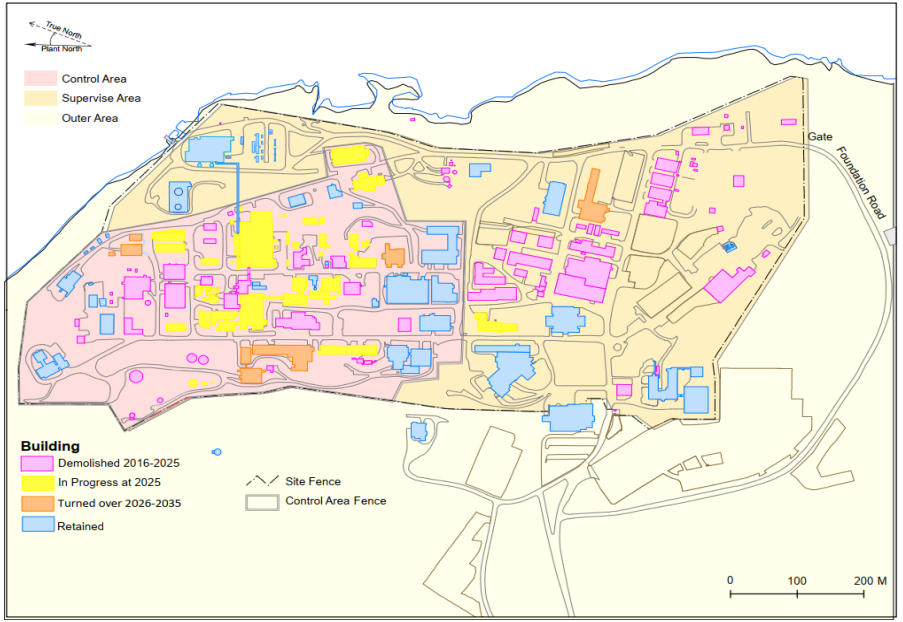
AECL is committed to advancing reconciliation with First Nation, Métis, and Inuit peoples aligned with the Government of Canada's action plan to implement the *United Nations Declaration on the Rights of Indigenous Peoples Act*

For AECL this means:

- Continuous learning about Indigenous history and worldviews
- Integrating Indigenous Knowledge and ceremony into our work
- Co-developing plans, procedures, and strategies
- Prioritizing capacity-building and economic development
- Developing long-term relationship agreements

Chalk River Laboratories
Decommissioning

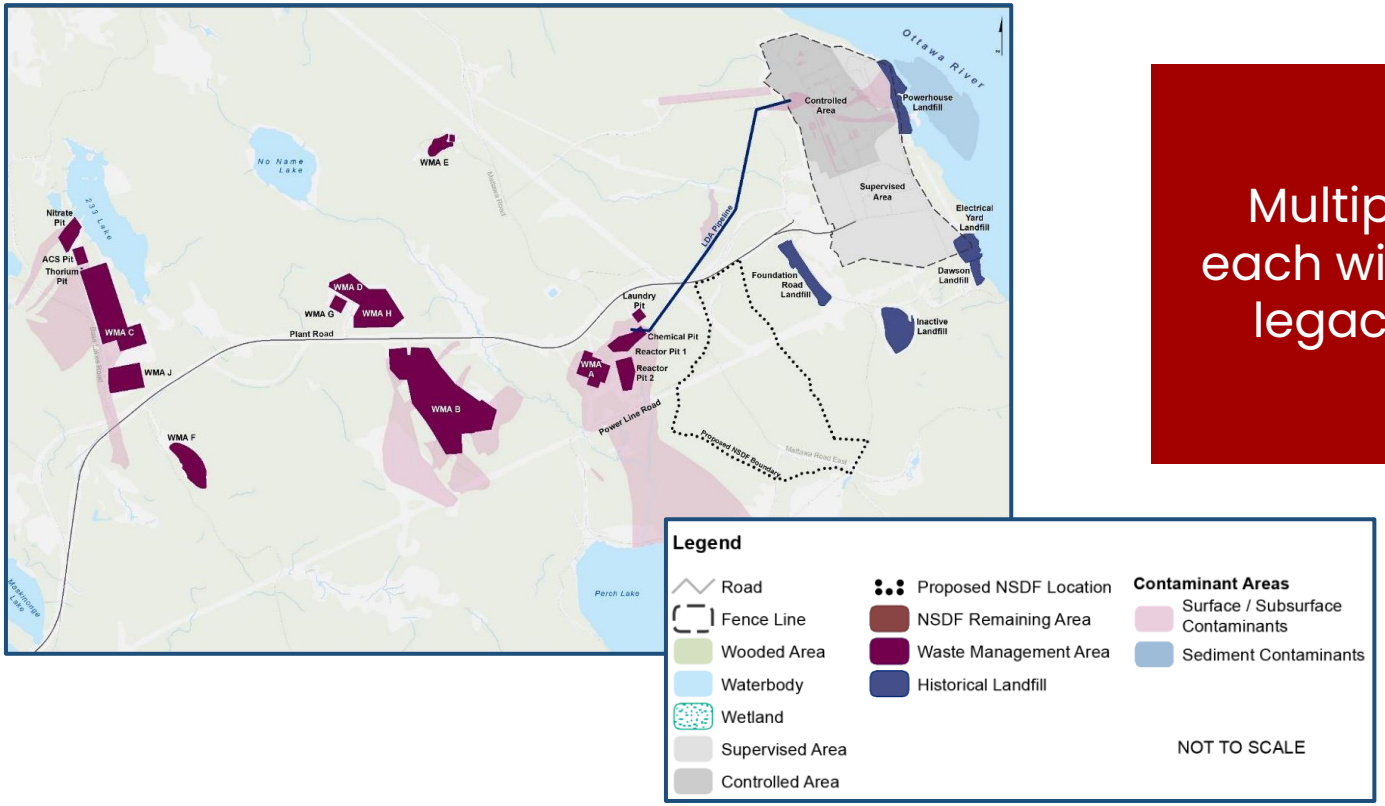
Over the last 9 years CNL has made significant decommissioning progress with 121 buildings demolished at the CRL site since September 2015



Fuel Repatriation

- Successfully and safely completed 190 highly enriched uranium (HEU) shipments over 15 years
- Materials included:
  - SLOWPOKE reactor cores
  - HEU fuel (NRU/NRX reactors)
  - Target residue material (nitrate solution)
  - Materials from fuel manufacturing
  - Targets for MAPLE reactors
  - Booster assemblies from Gentilly-1
- Exploring other repatriation opportunities

Environmental Remediation



Multiple WMAs, each with different legacy wastes

Waste Management Area B

- Storage of HLW, ILW and LLW, fissile
- Co-mingled, underground
- Engagement has been initiated to develop concepts to clarify path forward to manage the wastes stored in WMA B by March 2027
- Various option assessments (Best Available Technology studies)
  - Assessing storage conditions
  - Retrieval
  - Processing
  - Stabilization
  - Storage

Management of LLW

- Since the last review meeting, CNL undertook activities to strengthen processes around characterization and certification in preparation for LLW to be emplaced in a near surface disposal facility
- Additional storage capacity at CRL for LLW has been put in place to ensure adequate safe storage until construction and operation of a NSDF

- Efforts continue to focus on minimizing waste generated and in storage, including sorting & segregation, clearance and use of commercial processing

Management of ILW and HLW

- Both ILW and HLW continue to be stored safely in compliance with CNSC license conditions

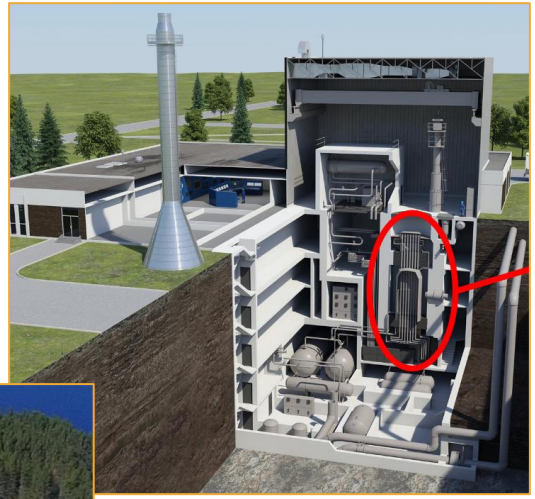
- **Strategy for HLW and ILW management:**
  - CNL is aligning plans for ILW management with the national ILW repository project being led by the NWMO
  - ILW will be consolidated for storage at CRL, and then appropriately packaged and conditioned, as necessary, to meet the NWMO repository waste acceptance criteria
  - All AECL owned spent fuel is destined for the proposed deep geological repository being developed by NMWO

Prototype Reactors – Douglas Point & Gentilly-1

- Douglas Point (DP) currently undergoing dismantling of non-nuclear buildings and decommissioning of internals of nuclear buildings
- Gentilly-1 (G-1) facility currently in storage with surveillance; licence hearing anticipated for 2026 to authorize execution of decommissioning
- Spent fuel transfer underway from G-1 to Chalk River Laboratories for consolidated storage awaiting NWMO DGR
- Completion of decommissioning and demolition for both DP and G-1 is 2035

In-Situ Disposal (ISD) Projects

- CNL is proposing in-situ disposal for the Nuclear Power Demonstration (NPD) at Rolphton and Whiteshell Reactor-1 (WR-1) at Whiteshell
  - Ongoing environmental assessments and engagement with local communities and Indigenous Nations
  - WR-1 Environmental Impact Statement has been submitted to the CNSC for review
  - Continuing dialogue with UK and US sharing experience and perspectives with in-situ disposal



Whiteshell Laboratories (WL)

- Whiteshell Laboratories (WL) currently undergoing decommissioning
- In January 2025, CNSC issued WL a 3-year decommissioning license
- CNL's objective is to close site and make it available for re-use
- LLW is being shipped to CRL for planned disposal in NSDF
- LLW trench characterization has commenced and will inform a preferred option for decommissioning
- ILW and HLW will be consolidated at CRL for interim storage

Main Campus

WMA Trenches

Whiteshell Laboratories WMA Retrievals

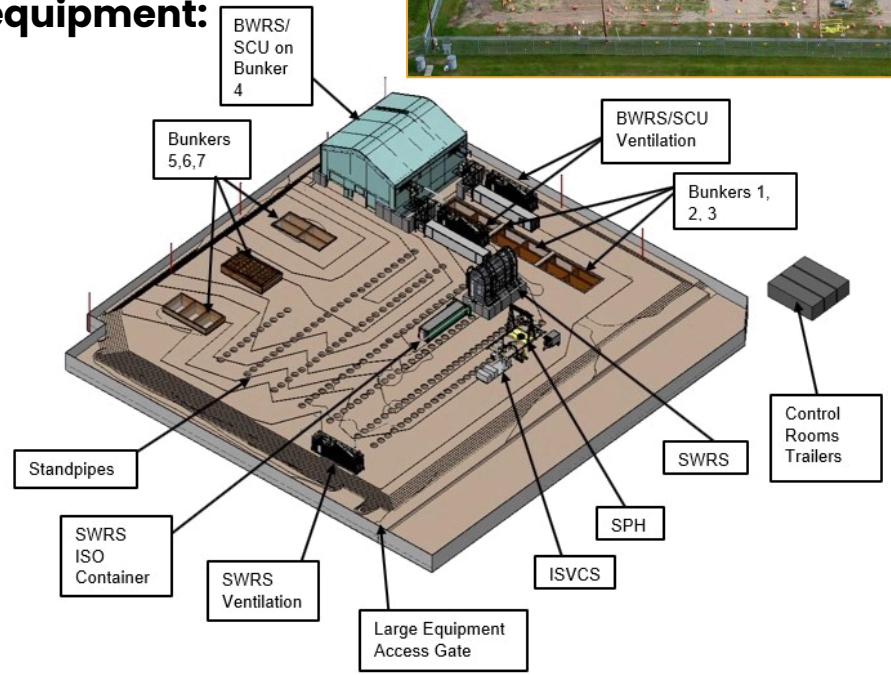
Work on the equipment for removal of the WMA waste has been progressing

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 complete:

- For SWRS, BWRS, SCU
- Integration system operability
- Testing – in progress



Historic Waste – Port Hope Area Initiative

- Historical contamination from former crown and private-sector uranium refining
- Safe emplacement of historic waste in two long-term Waste Management Facilities (WMF)
- Port Granby Long-Term WMF
  - Remediation completed, mound closed and capped in 2021
- Port Hope Long-Term WMF
  - Remediated Welcome Waste facility, temporary storage sites and twelve major sites
  - Remaining: complete two Major Waste Sites (Q2 2025) and Small-Scale Sites (2030)

Port Hope WMF

Harbour and Centre pier remediation

Highland Drive landfill remediation

MANAGEMENT OF SPENT FUEL AND RADIOACTIVE WASTE AT CANADIAN NUCLEAR GENERATING STATIONS

Presented by Ontario Power Generation (OPG)

Image: Western Waste Management Facility

Safe and Reliable

- Canada ensures safe and environmentally sound nuclear waste management; handling, storage, processing and transportation
- CNSC provides rigorous regulation, including inspections
- Canadian Nuclear Generating Stations follow the IAEA waste hierarchy to minimize nuclear waste

Responsible Management of Radioactive Waste

Low-Level Waste (LLW)

Sort and Segregate

Recycle and Free Release

Process techniques

Intermediate-Level Waste (ILW)

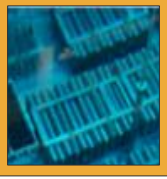
Interim Storage

LLW Disposal (Waste Owner)

ILW Disposal (NWMO)

High-Level Waste (HLW)

Wet Storage

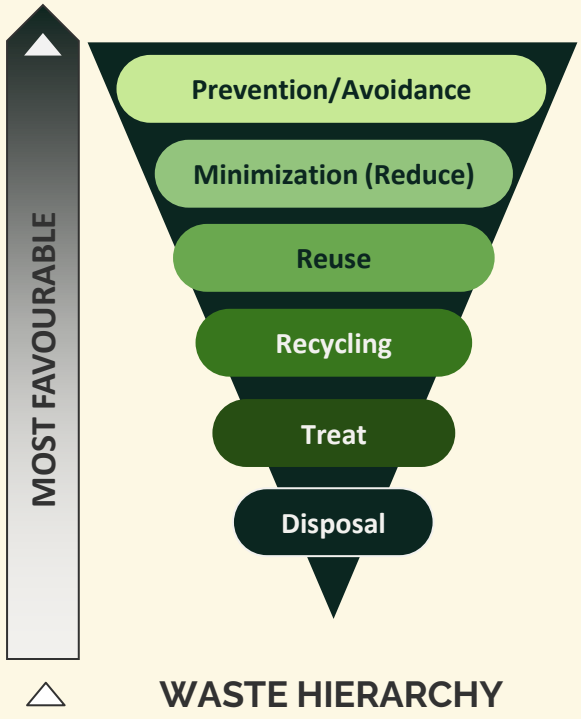


Dry Storage

HLW Disposal (NWMO)

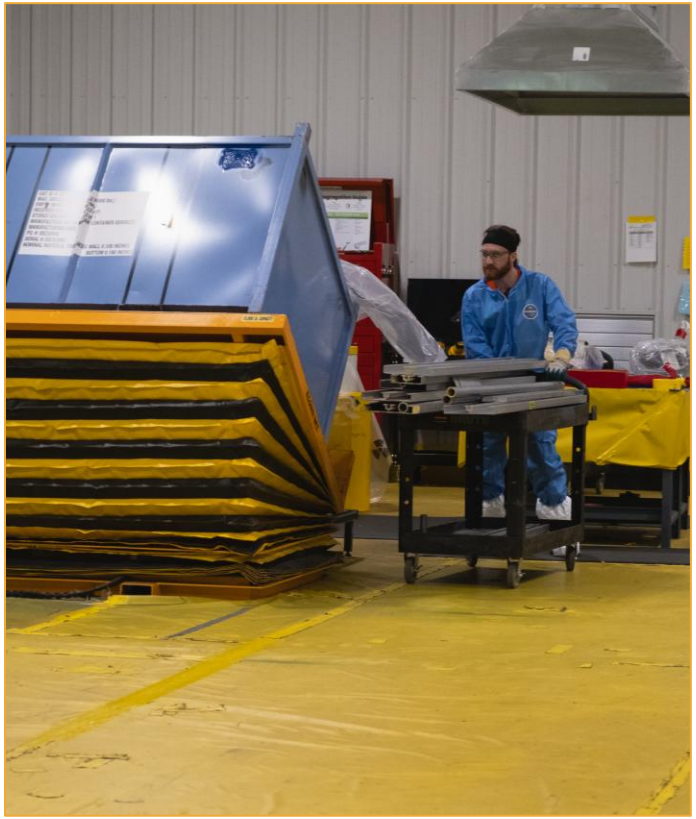
Low-Level Waste Management

- All LLW generated by NGSs in Canada is stored on an interim basis at licenced waste management facilities
- LLW and some ILW may be reduced through various processing methods
  - Minimizing waste at the source
  - Sorting and segregating
  - Incineration
  - Compaction
  - Decontamination and free release
  - Metal processing
  - Washable Personal Protective Equipment



Sorting and Segregation

- In partnership with vendors and a university, research advances and look for innovation in sorting and recycling
- Western Clean-Energy Sorting and Recycling Center created to sort LLW that has been sitting in interim storage and segregate into better volume reduction streams: free release, metal processing, incineration, compaction
- Average of 60% volume reduction achieved by sorting this LLW



Intermediate-Level Waste Management

- All ILW generated by NGSs in Canada is stored on an interim basis at licensed 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 Western Waste Management Facility
- ILW refurbishment radioactive waste stored in above-ground containers

Darlington Storage Overpacks for ILW from refurbishment located at the Darlington Waste Management Facility

Intermediate level radioactive waste stored in in-ground containers

Harnessing Waste to Produce Isotopes

Tritium	Produced in CANDU reactors during operation. Ontario Power Generation owns and operates the world's largest Tritium Removal Facility. OPG partners with Canadian Nuclear Laboratories to dispense tritium to the market.	Used for radiopharmaceutical research (biotracer), radioluminescence, fuel source for fusion energy
Helium-3	Tritium decays to Helium-3. Extracted by Ontario Power Generation subsidiary, Laurentis Energy Partners, simultaneously reducing waste and meeting commercial demand	Used in security (i.e. bomb detection),neutron research, quantum computing and medical imaging

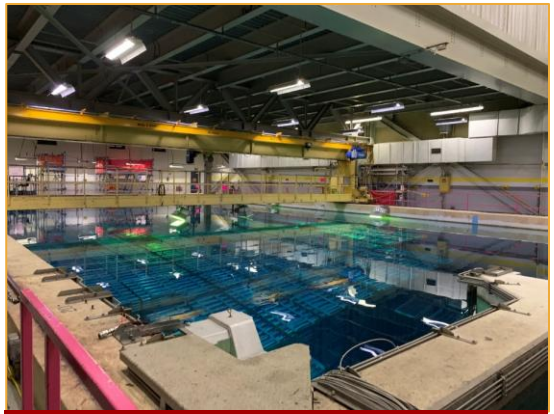
Tritium Container Vault

Immobilized Tritium Container

High-Level Waste Management

- In CANDU reactors, the fuel stays in the reactor for approximately 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 6-10 years
- At OPG, AI is used to optimize movements in the spent fuel pools
- After 6-10 years, it is transferred to a Dry Storage Container (DSC) and remains stored at the Site

CANDU Fuel Bundle

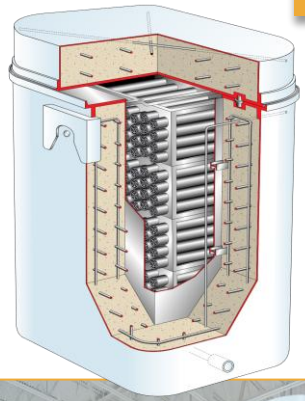


Pickering NGS Spent Fuel Bay

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, with aging management program, service life expected to be well beyond this
- All filled containers are stored indoors at site
- Currently there are over 4,400 DSCs stored at the three Used Fuel facilities

Used fuel DSC



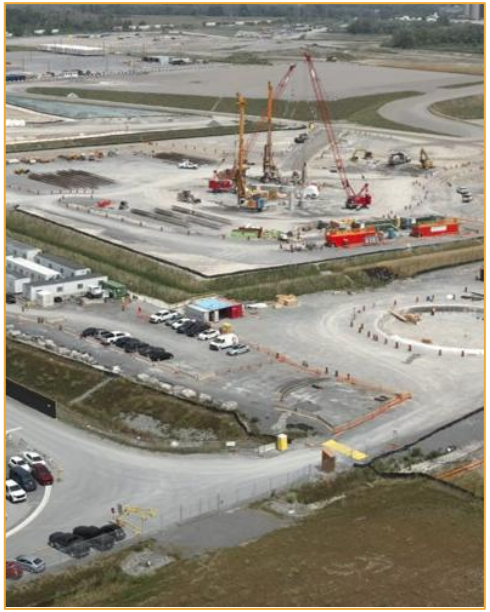
OPG Used Fuel DSCs stored at the Western Waste Management Facility

Refurbishment Projects

- Refurbishment at both OPG and Bruce Power are in progress or complete (10 units) with another 4 units to start at OPG over the next 5 years
- Approximately 50% increase in waste volumes generated compared to regular operations during the refurbishment period
- Non-routine waste streams such as reactor components and feeder tubes
- Lessons learned in waste management from completed refurbishments are shared and incorporated into ongoing and future projects

New Nuclear Projects
Small Modular Reactors

- OPG partnership with GE Hitachi Nuclear Energy (GEH) to deploy up to 4 SMRs at the Darlington new nuclear site. Licence to Construct is being sought for Unit 1 from the CNSC
- Used fuel will be stored on-site in a fuel pool followed by outdoor storage in Independent Spent Fuel Storage Installation in dry storage casks
- Early consultation with NWMO on disposal criteria for the Deep Geological Repository has informed designs and waste technology selection – planning for the entire lifecycle



- For additional new nuclear projects, Impact Assessments will be completed, as needed, involving extensive consultation with potential host communities and Indigenous Nations

Lasting Solutions

OPG remains committed to the safe disposal of nuclear waste and supports the Integrated Strategy for Radioactive Waste:

HLW

OPG supports the NWMO process to advance a DGR for all of Canada's existing spent fuel

ILW

OPG supports NWMO process to site a DGR for all of Canada's ILW

LLW

OPG 's intention is to initiate outreach to find solutions for disposal of LLW starting with Indigenous Nations & Communities through the development of an Indigenous Energy Literacy program

LONG-TERM MANAGEMENT OF CANADA'S RADIOACTIVE WASTE IN DEEP GEOLOGICAL REPOSITORIES

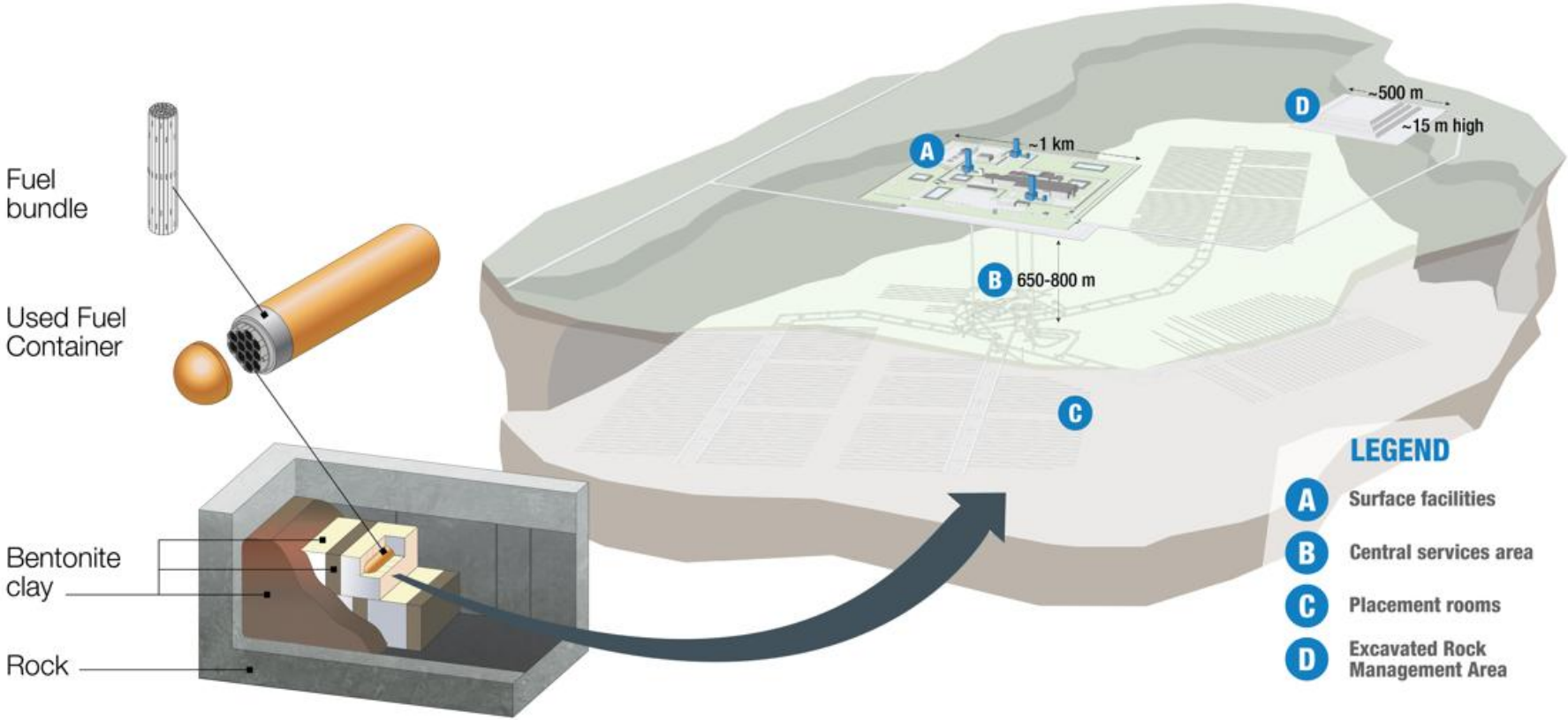
Presented by the Nuclear Waste Management Organization

Access Road to Borehole Site in Wabigoon Lake Ojibway Nation - Ignace Area
Source: NWMO

Adaptive Phased Management: National Infrastructure Project

- 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 of spent fuel in a Deep Geological Repository
  - On a site with willing and informed host communities which was a result of an open, inclusive, fair siting process
  - Sustained engagement of communities
- The Deep Geological Repository will have the following key features:
  - Protection of health, safety and environment
  - Strongly regulated
  - Highly technological national infrastructure project

NWMO's Conceptual Deep Geological Repository



Site Selected – November 2024

Indigenous Knowledge

Through its Indigenous Knowledge and Reconciliation policies, the NWMO is committed to work together with Indigenous Peoples to create meaningful alignment with Indigenous Knowledge in all its activities:

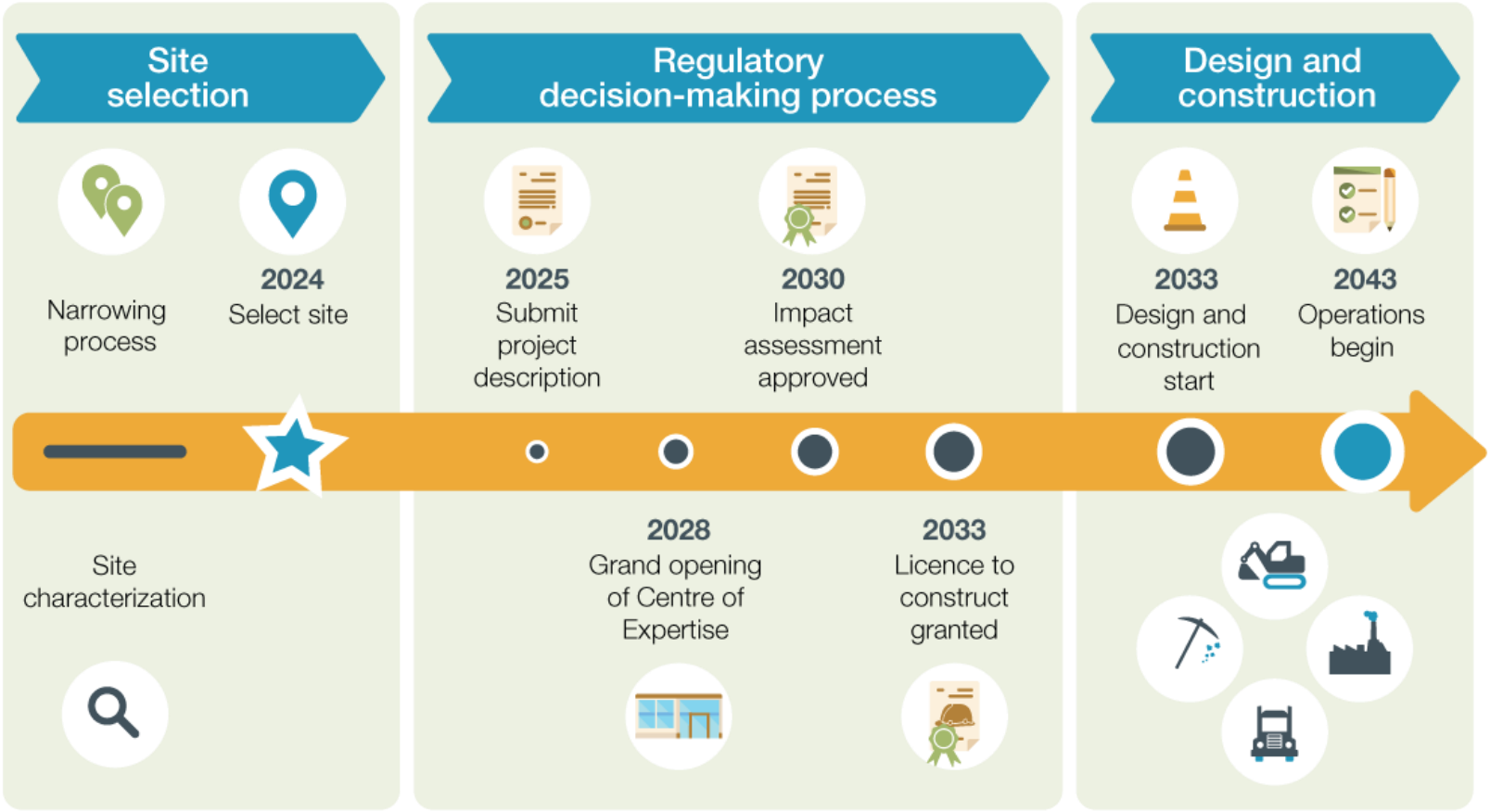
- Working together to collect information and interpret findings
- Ceremonies and offerings led by communities prior to field work
- Cultural training for contractors prior to field work
- Seeking advice from a Council of Elders and Youth
- Working together to develop regulatory submissions that are reflective of Indigenous Worldview

Ongoing Technical Work

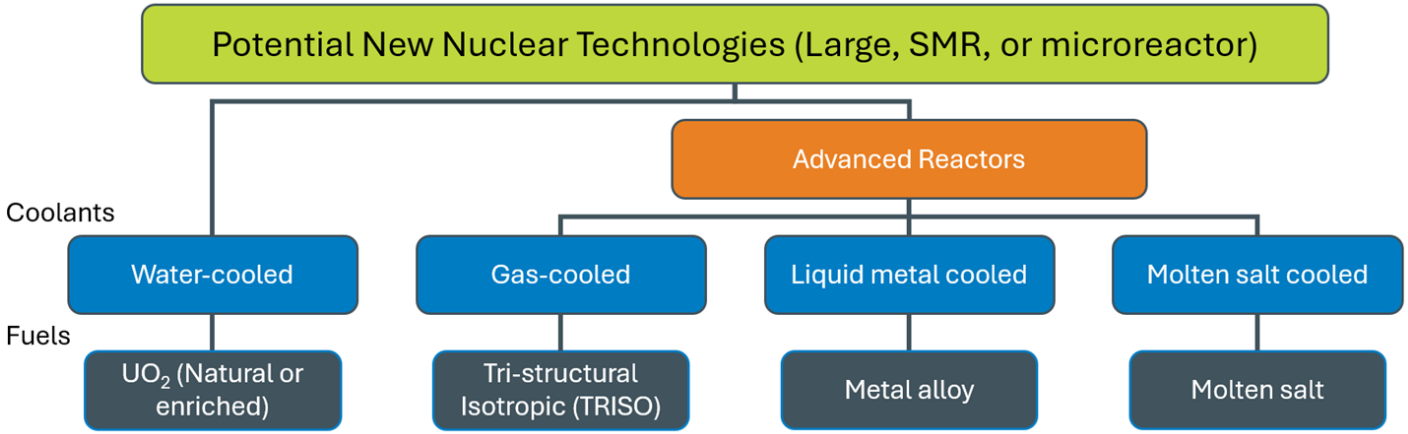
NWMO Site Characterization - Coring Drill Rig (courtesy NWMO)

NWMO's Engineered Barrier System – UFC External Pressure Test (courtesy NWMO)

Looking Ahead for Used Fuel Disposal



Used Fuel from New Nuclear Reactors



- Early engagement with operators/vendors to perform initial assessments to identify potential waste disposal issues early
- Subsequent assessments prioritized based on where the vendors are in their Vendor Design Review/licensing process
- Framework in place to gather essential information to complete preliminary assessment commensurate to the level of detail needed for the licensing phase & to identify suitable fuel waste forms development

Anticipated Timelines for disposal of ILW

Accepting the responsibility for intermediate-level and non-fuel high-level waste	October 2023	Canada's Minister of Energy and Natural Resources accepts the recommendations of the Integrated Strategy for Radioactive Waste.
Developing the siting process	2024-27	The NWMO develops a proposed siting process and conducts public engagement activities before finalizing the process.
Identifying a site using the siting process	2028–mid-2030s	The site selection process is initiated. Site characterization, preliminary design and narrowing down process advance. The NWMO selects a site for the repository.
Towards construction	Late 2030s-50s	The NWMO submits the project description. Further characterization and detailed design are undertaken. Regulatory decision-making takes place. Construction begins. Operations begin.

RESPONSES TO ACTIONS FROM PREVIOUS REVIEW MEETINGS, PROPOSED GOOD PRACTICES AND AREAS OF GOOD PERFORMANCE

Presented by the Canadian Nuclear Safety Commission (CNSC)

Image: CNSC staff taking a water sample in Whiteshell, MB

Response to Challenges from Previous Review Meetings (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

- Significant progress has been achieved in the areas of decommissioning and remediation as evidenced by:
  - 121 buildings decommissioned at CRL site since 2015
  - 35 buildings decommissioned at WL site since 2015
  - Majority of major remediation sites at the Port Hope Area Initiative are complete:
    - Port Granby WMF mound closed and capped and in monitoring and surveillance
    - Welcome WMF, temporary storage sites and 12 other major sites complete
    - 2 remaining major sites forecasted for completion in 2026

This challenge should be closed

Response to Challenges from Previous Review Meetings (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

- On November 28, 2024, NWMO selected a site for the deep geological repository for spent fuel
- Wabigoon Lake Ojibway Nation and the Township of Ignace confirmed they would be willing to host the project
  - Each of the communities developed their own processes for defining willingness and determining how they would express it
  - The selected site is safe and secure; has informed and willing hosts; and meets the highest scientific, professional and ethical standards

This challenge should be closed

Response to Challenges from Previous Review Meetings (3/3)

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

- In 2023, Canada published its Integrated Strategy for Radioactive Waste (ISRW) for all of Canada's radioactive waste, including low- and intermediate-level radioactive waste
- ISRW recommends the long-term management of:
  - Low-level waste in multiple near surface disposal facilities with implementation by waste owners and generators
  - Intermediate level waste and non-fuel high-level waste in a deep geological repository with implementation by NWMO

This challenge should be closed

Proposed Good Practice for Canada in Context of 8th Review Meeting

Proposed Good Practice 1:

Reducing volumes of previously stored low-level waste through the successful implementation of sorting, segregation and processing technologies.

- Waste owners are undertaking activities to sort and segregate low-level waste that was previously considered non-processible and placed into storage
- Modernized regulatory framework for waste management and present-day practices for segregation and volume reduction techniques have enabled processing of this waste
- Achieved significant volume reduction of low-level waste by using incineration, compaction and metal processing
- Resulted in reduced volume of waste requiring long-term management

Proposed Good Practice for Canada in Context of 8th Review Meeting

Proposed Good Practice 2:

Canada's development of Artificial Intelligence -powered application to optimize the management of spent fuel in the fueling bay

- Deterministic algorithm helps operators determine the most efficient and safest path to move fuel baskets that hold fuel bundles, thereby minimizing disruption and reducing the risk of damage during fuel movements
- This capability not only reduces the time and effort needed for fuel handling but also minimizes the wear and tear on handling equipment, thereby extending its operational lifespan
- Over time, the algorithm also assists in sorting and organizing the bay more efficiently

Proposed Good Practices for Canada in Context of 8th Review Meeting

Proposed Good Practice 3:

Canada's collaborative approach to "waste-led design" in new nuclear technologies

- CNSC "Vendor design review" and the NRCan's "Enabling Small Modular Reactors Program" encourage a proactive approach and early waste disposal considerations
- NWMO encourages and utilities encourage & apply a "waste-led Design" approach
  - Example: OPG seeking to minimize the solid radioactive wastes from BWRX-300 in design phase
- What distinguishes this practice is not merely the concept itself but rather the approach Canada has adopted to promote it
- The collaborative and yet independent roles of CNSC, NRCan, NWMO and the utilities in early integration of waste management considerations fosters innovation and sustainability in safe waste management solutions

Early waste integration fosters innovation & sustainability in waste solutions

Proposed Good Practices for Canada in Context of 8th Review Meeting

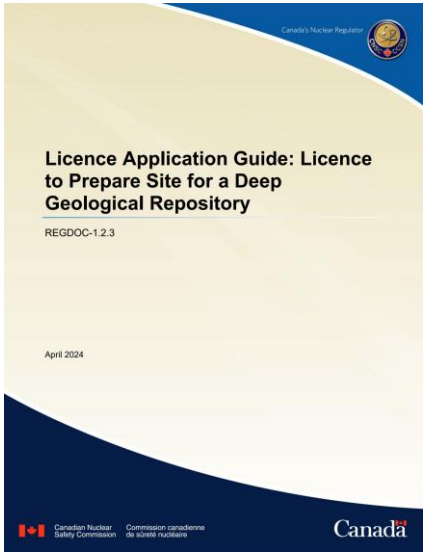
Proposed Good Practice 4:

Filling the international gap with a licence application guide

- CNSC Licence Application Guide **REGDOC-1.2.3**, *Licence Application Guide: Licence to prepare Site for a Deep Geological Repository* improves clarity of regulatory expectations for licensees in the absence of safety standard requirements specific to requirements for licence applications

- With the lack of international guidance on applications for a licence to prepare a site for a deep geological repository, **the licence application guide:**
  - Maps relevant regulatory documents and technical standards to topics, to inform the licence application process
  - Describes the licensing requirements and guidance associated with the Nuclear Safety and Control Act (NSCA) and its regulations, to obtain a licence to prepare site for a DGR

- Extensive consultation was undertaken to ensure active engagement by all stakeholders to allow for an informed document from a variety of different perspectives



Proposed Area of Good Performance for Canada in Context of 8th Review Meeting

Proposed Area of Good Performance 1:

Adoption of a transparent, inclusive site selection approach has resulted in informed and willing host communities for Canada's DGR for spent fuel

- After over 14 years of open and transparent engagement with Indigenous Peoples and municipalities, on November 28, 2024, NWMO made a site selection decision with willingness of host communities
- Wabigoon Lake Ojibway Nation and Township of Ignace confirmed they would be willing to host the project
  - One of the key criteria was development of strong and sustainable partnerships in the siting area
  - Each of the communities developed their own processes for defining willingness and determining how they would express it

Open, transparent, fair and inclusive site selection process

Proposed Areas of Good Performance for Canada in Context of 8th Review Meeting

Proposed Area of Good Performance 2:

Prioritizing meaningful engagement and participant funding with Indigenous Nations and Communities on waste policy and strategy development

- Canada expanded the manner in which it seeks the in-depth views and perspectives of Indigenous Peoples on radioactive waste policy and strategy development, which included providing participant funding
- Represents an enhanced approach to policy and strategy development that prioritizes engagement and reconciliation efforts with Indigenous Peoples
- Built trust and relationships with Indigenous Nations around radioactive waste policy and strategy, which ultimately helps Canada to advance projects that contribute to the safe long-term management of radioactive waste
- Practice is applicable to other Contracting Parties with Indigenous populations and could be adopted in other contexts

Enhancing social and Indigenous Peoples acceptance for safe long-term waste management

Proposed Good Practices for Canada in Context of 8th Review Meeting

Proposed Area of Good Performance 3:

Canada (CNSC) and the Federal Authority for Nuclear Regulation (FANR) established an International Internal Audit Collaboration Working Group (IIACWG) for nuclear regulatory bodies

- Collaboration has strengthened aspects of respective mandates by sharing best practices and knowledge with regards to both internal audit functions and technical functions
  - Developed high-level guidance in the form of a methodology and audit program for Internal Audit Functions of nuclear regulatory bodies to audit the inspection process for nuclear power plants, radioactive waste management and storage facilities and regulated materials licensees (radioactive and nuclear material users)
  - IIACWG will be used to share best practices with the internal audit functions of nuclear regulatory bodies

Proposed Good Performance for Canada in Context of 8th Review Meeting

Proposed Area of Good Performance 4:

Tri-lateral collaboration to publish a report outlining principles for the deployment of Artificial Intelligence (AI) in the nuclear sector

- The joint AI paper, published in September 2024, establishes a common set of overarching considerations for the use of AI technologies in nuclear activities
- Describes important topics to consider when deploying AI to ensure continued safe and secure operation of nuclear activities

OVERARCHING ISSUES FROM PREVIOUS REVIEW MEETING, PLANNED ACTIVITIES

Presented by the Canadian Nuclear Safety Commission (CNSC)

Image: CNSC staff taking grass samples near Point Lepreau, NB

Overarching Issues from 7th Review Meeting

Competence and staffing linked to timetable for spent fuel management and radioactive waste management programs

- Canada has invested in human resources management to ensure access to qualified competent staff to regulate existing and emerging facilities and technologies
- Recruitment and retention practices include:
  - **Succession management** – assessing leadership capabilities and succession planning for leadership positions
  - **Advance hiring** – identification of critical positions to ensure fully trained staff are in place
  - **Development and co-op student program** – recruitment of university and college students
  - **Participation in workforce planning** – focus on skilled operator and maintenance positions to provide core skills and training
  - **Knowledge management** – managing critical knowledge and the associated knowledge risk for people existing positions
  - **Indigenous Opportunities** - program to create and engaging and inclusive workforce that reflect the diversity of Indigenous Nations and communities

Overarching Issues from 7th Review Meeting

Aging management of packages and facilities for radioactive waste and spent fuel, considering extended storage periods

- Design life is assured and assessed through aging management programs and licensees conduct periodic inspections to ensure structural integrity
  - Periodic non-destructive inspections of containers and structures
  - Monitoring, maintenance, component replacement and testing
- Life-cycle management plans include structured, forward-looking inspection and maintenance schedules, requirements for monitoring and trending of aging effects and preventative actions to minimize and control aging
- Aging management is considered as part of compliance inspections to ensure relevant plans and licence conditions are followed
- Extension beyond design life may require an update to the safety assessment to verify that the safety case continues to be met

Overarching Issues from 7th Review Meeting

Long-term management of disused sealed sources, including sustainable options for regional as well as multinational solutions

- CNSC has published an internal policy document, *CNSC Policy and Strategy on Meeting the IAEA Guidance on the Management of Disused Radioactive Sources*
- CNSC implemented Sealed Source Tracking System (SSTS) and National Sealed Source Registry (NSSR) in its commitments to the IAEA *Code of Conduct on the Safety and Security of Radioactive Sources*
- For long-term storage prior to disposal, radioactive sources that are no longer active may be sent to a licensed waste management facility or to an organization licensed by the CNSC

Canada has demonstrated its long-term commitment to the safe and secure management of radioactive sources when they are no longer in active use

Overarching Issues from 7th Review Meeting

Inclusive public engagement on radioactive waste management and on spent fuel management programmes

"Structured, formalized, continuous engagement"

Planned Activities for Canada
During the Next JC Reporting Period

- Submission of documentation and commencement of regulatory approvals by the Impact Assessment Agency and the CNSC for the spent fuel DGR, a multi-year regulatory review and approval process – lead NWMO
- In support of nuclear growth in Canada, continue to enhance robust waste management plans – lead OPG
- Collaboration on advancing and implementation of the Integrated Strategy on Radioactive Waste with an update by 2028 – lead waste owners
- For the NSDF project at CRL, resume consultation with Kebaowek First Nation (KFN) with a view to implementing the UNDRIP FPIC standard, and to develop a process that is aimed at reaching an agreement. The process is to be completed on or before September 30, 2026 as directed by the Federal Court in KFN v CNL Judicial Review - lead CNL and CNSC
- Continued decommissioning and remediation of AECL sites – lead AECL and CNL

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 8th Review Meeting

Canada's Updated Matrix

Type of Liability	Long-term Management Policy	Funding of Liabilities	Current Practices / Facilities	Planned Facilities
Spent Fuel	National approach for the long term management (LTM) of spent fuel stipulated in the Nuclear Fuel Waste Act (NFWA), 2002. NFWA outlines process and implementation	Long term: • licensees are required to contribute to segregated funds to finance LTM activities under the NFWA. Short term: • licensees are financially responsible and required to provide a financial guarantee for the decommissioning of interim WMFs for spent fuel under the Nuclear Safety and Control Act	Spent fuel from power reactors held in interim storage in wet and dry storage facilities. Spent fuel from research reactors returned to the fuel supplier or transferred to CRL for storage.	Long term: • Nuclear Waste Management (NWMO) implementation of the APM approach – a DGR for the LTM of spent fuel in Canada Short term: • interim dry storage facilities constructed as needed
Nuclear Fuel Cycle Waste	Waste generators and waste owners are responsible to ensure adequate funding is available for long term management of radioactive wastes, nuclear fuel cycle waste (Policy for Radioactive Waste Management and Decommissioning) Government of Canada accepted responsibility for LTM of historic wastes and funds the management of legacy waste.	Licensees are financially responsible and required to provide a financial guarantee for the decommissioning and LTM of the waste they generate and/or own.	• managed by licensee (on-site or at a dedicated WMF) • mines and mills waste managed in near surface facilities adjacent to the mines and mills. • waste from small generators transferred to licensed WMFs for management. • material decontaminated and recycled/disposed of through conventional means. • recovery of uranium from recoverable process streams	• Canada's Integrated Strategy for Radioactive Waste (ISRW), 2023, provides that low-level waste to be managed in near-surface disposal facilities with implementation by waste owners. • Waste owners are currently collaborating on implementing the IRWS which they will update by 2028 • Planned Near Surface Disposal Facility at CRL for AECL LLW • LTM of the bulk of Canada's historic waste implemented under the PHAI. • LTM of uranium mines and mills in near surface facilities adjacent to the mines and mills • LTM of ILW: NWMO
Application Waste	Licensees are responsible for the funding, organization, management, and operation of their WMFs	Licensees are financially responsible and required to maintain a financial guarantee for the decommissioning and the LTM of the waste that they produce. Required under Section 3(1) (l) of the General Nuclear Safety and Control Regulations (GNSCR).	• delay and decay. • returned to manufacturer. • transferred to licensed WMFs for management	Waste owners are currently collaborating on implementing the ISRW which they will be update by 2028
Decommissioning Liabilities	Licensees are responsible for the funding, organization, management, and implementation of decommissioning activities. Licensees to give due consideration to the immediate dismantling approach when proposing a decommissioning strategy (REGDOC 2.11.2)	Licensees are financially responsible and required to maintain a financial guarantee for the decommissioning and LTM of the waste that they produce. Required under Section 3(1) (l) of the General Nuclear Safety and Control Regulations (GNSCR).	Major facilities required to keep decommissioning plans and financial guarantee up to date throughout the lifecycle of a licensed activity (REGDOC-2.11.2 and REGDOC-3.3.1). These are reviewed on a five-year cycle by the licensee and regulator	• Planned Near Surface Disposal Facility at CRL for AECL LLW • OPG assessing options for LTM of its LLW arising from decommissioning • LTM of ILW which includes operational and decommissioning waste: NWMO
Disused Sealed Sources	Licensees are responsible for the funding, organization, management, and operation of their WMFs Sources tracked through National Sealed Source Registry and Sealed Source Tracking System	Licensees are financially responsible and required to provide a financial guarantee for the decommissioning and the LTM of the waste that they produce.	• delay and decay. • returned to manufacturer. • transferred to licensed WMF for LTM • recycling by reusing, re-encapsulating or reprocessing	Addressed in the ISRW waste streams following their waste classification.


Canada