



## Durham Nuclear Health Committee (DNHC)

Friday, April 19, 2024

1:00 p.m.

Virtual

Please note: All members of the public may view the Durham Nuclear Health Committee Meetings via live streaming at <https://www.eventstream.ca/events/durham-region>.

All information and materials sent to Durham Regional Committees will become part of the permanent public record. This includes presentations and oral submissions made during meetings. A video recording of the meeting will be posted on our Regional website. If you have any questions about the collection of information, please contact [dnhc@durham.ca](mailto:dnhc@durham.ca).

**1. Adoption of Agenda**

**2. Adoption of Minutes**

**2.1 Durham Nuclear Health Committee meeting - February 2, 2024**

**3. Correspondence**

**3.1 Update on the Darlington New Nuclear Project**

Received February 27, 2024 from the Ontario Power Generation (OPG), to update on the Darlington New Nuclear Project (DNNP). This update was emailed to DNHC members and observers on February 27, 2024.

For the latest project updates, visit the OPG [Neighbours newsletter \(News article | Neighbours - Pickering/Darlington - Winter 2024 – OPG\)](#). Should you have any questions about the project, contact the project phone line (1-800-461-0034), [email darlingtonnuclear@opg.com](mailto:darlingtonnuclear@opg.com) or visit the public information centre (1855 Energy Drive, Courtice, open Monday-Friday 9 a.m. – 3:30 p.m.)

**3.2 Nuclear Waste Management Organization (NWMO) 2023 Annual Report and 2024-28 Implementation Plan**

Received March 2024 from NWMO.

2023 Annual Report available at <https://annualreport.nwmo.ca/2023/>.

2024-28 Implementation Plan available at [Implementing Adaptive Phased Management 2024-28 | Implementation Plan \(nwmo.ca\)](https://www.nwmo.ca/Implementing-Adaptive-Phased-Management-2024-28-Implementation-Plan).

Share your thoughts on the Implementation Plan by visiting

<https://www.nwmo.ca/Canadas-plan/Implementing-Canadas-plan/Have-your-say>.

**4. Presentations**

**4.1 NWMO Project Update and Transportation Planning**

Presented by Caitlin Burley, Director, Strategic Programs and Transportation, NWMO

**4.2 Progress Report by OPG's Nuclear Sustainability Services Division concerning its handling and management of radioactive materials and waste**

Presented by Kapil Aggarwal, VP Nuclear Sustainability Services, OPG

**4.3 Progress Report by OPG's Nuclear Regulatory Affairs concerning the Pickering Nuclear Station Units 5-8 Operations to 2026**

Presented by Craig Axler, Director, Nuclear Regulatory Affairs, OPG

**4.4 Update from Ontario Tech University (OTU), Nuclear Engineering program**

Presented by Dr. Kirk Atkinson, Director, Centre for Small Modular Reactors, Associate Professor & Industrial Research Chair, Department of Energy & Nuclear Engineering, Faculty of Engineering & Applied Science, OTU

**5. Communications**

**5.1 Community updates from Pickering and Darlington Nuclear Generating Stations**

Analiene St. Aubin, Manager, Corporate Relations, Pickering Nuclear, OPG

**6. Other Business**

**7. Next Meeting**

Durham Nuclear Health Committee (DNHC)

7.1 June 21, 2024 1:00 PM

VIRTUAL

8. Adjournment

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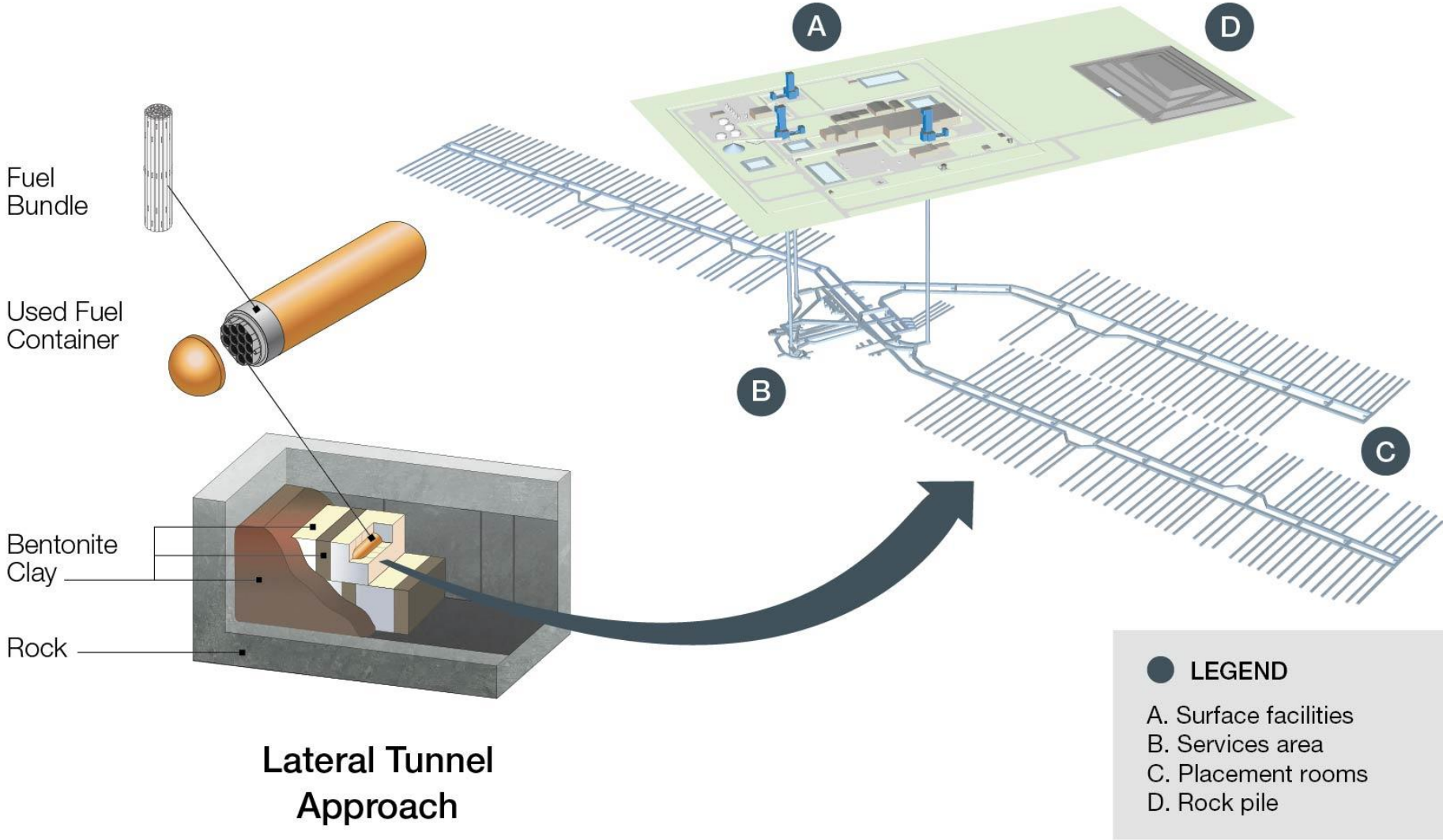
# NWMO Project Update and Transportation Planning

Caitlin Burley  
Director, Strategic Programs and Transportation (Social)  
Nuclear Waste Management Organization  
April 19, 2024



## Canada's plan

# Long-term management







● **Interim Storage Facilities**

- 1. Whiteshell Laboratories, Manitoba
- 2. Bruce Nuclear Generating Station, Ontario
- 3. Pickering Nuclear Generating Station, Ontario
- 4. Darlington Nuclear Generating Station, Ontario
- 5. Chalk River Laboratories, Ontario
- 6. Gentilly Nuclear Generating Station, Quebec
- 7. Point Lepreau Nuclear Generating Station, New Brunswick

■ **Assessments underway in the area**

- 1. Ignace / Wabigoon Lake Ojibway Nation
- 2. South Bruce / Saugeen Ojibway Nation





## Siting Update

# Site Investigation: Wabigoon Lake Ojibway Nation - Ignace



# Site Investigation: Saugeen Ojibway Nation - South Bruce



# Site Selection Criteria

To identify a preferred location to take into detailed site characterization



Safety

1



Partnership

3

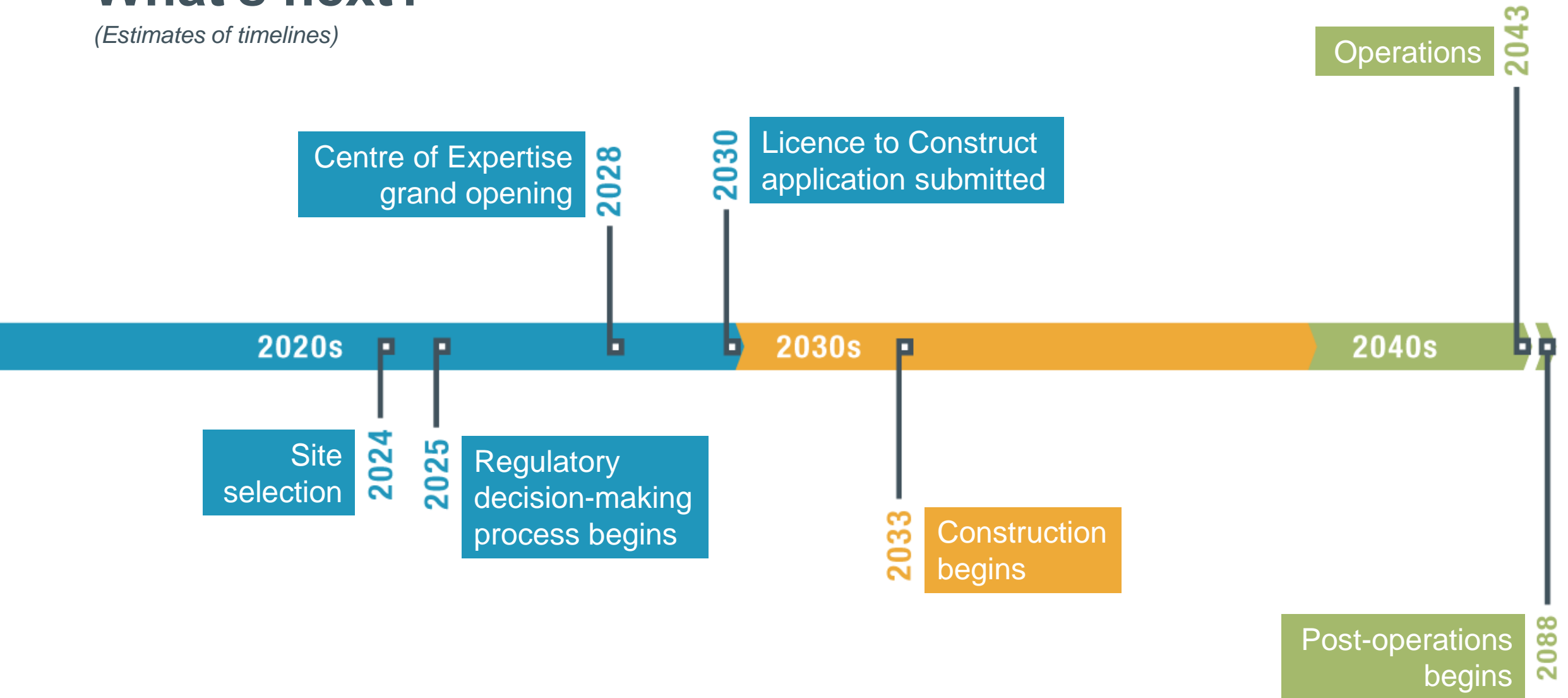
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Transportation



# What's next?

*(Estimates of timelines)*

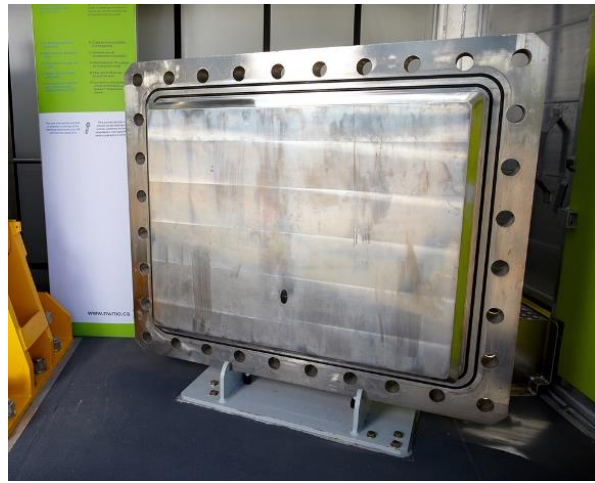




## **Introduction to transportation of used nuclear fuel**



**Transportation  
is safe and  
secure**



# The NWMO's multi-layered safety program

Management system and compliance assurance

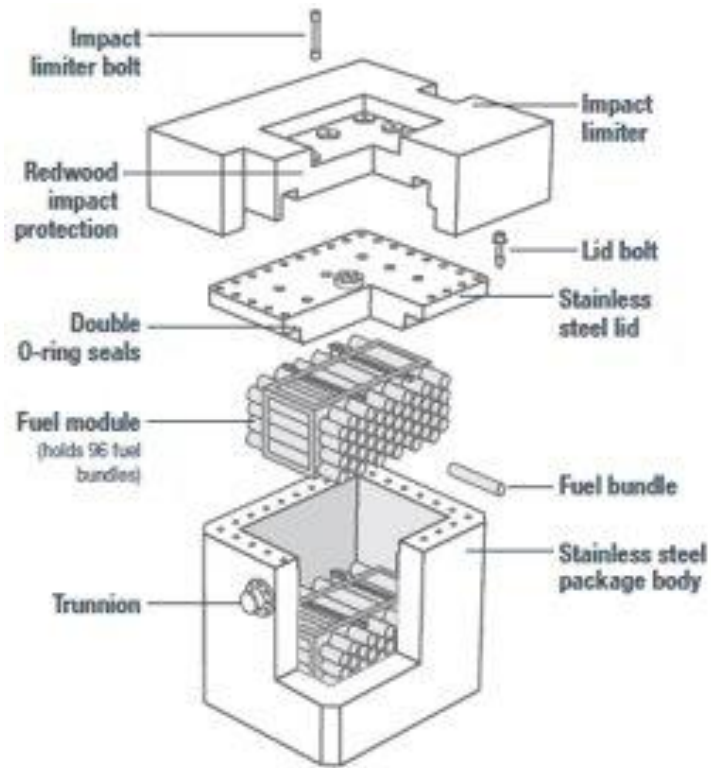
Security and emergency management

Operational controls

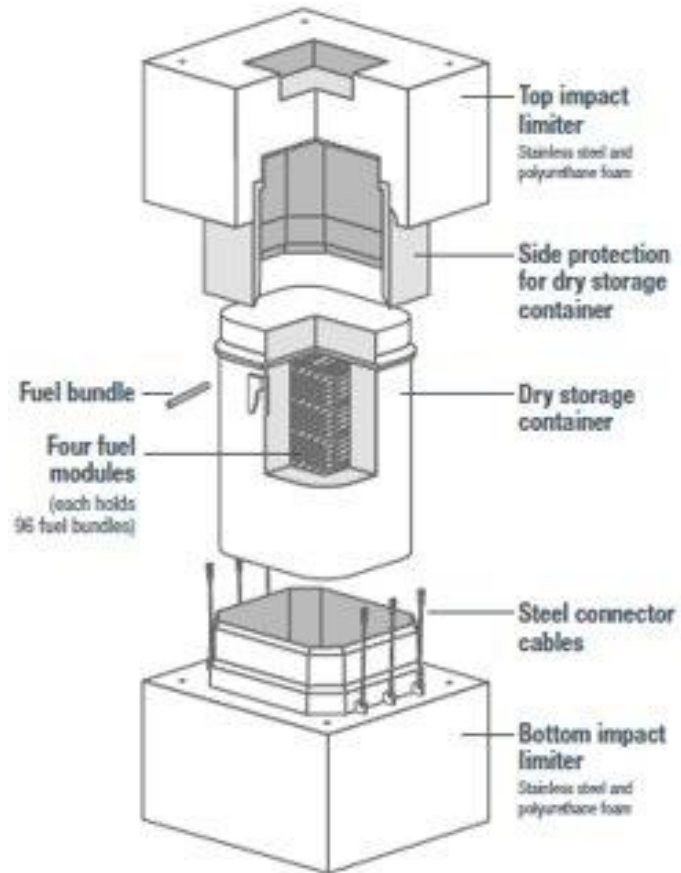
Certified and registered packages



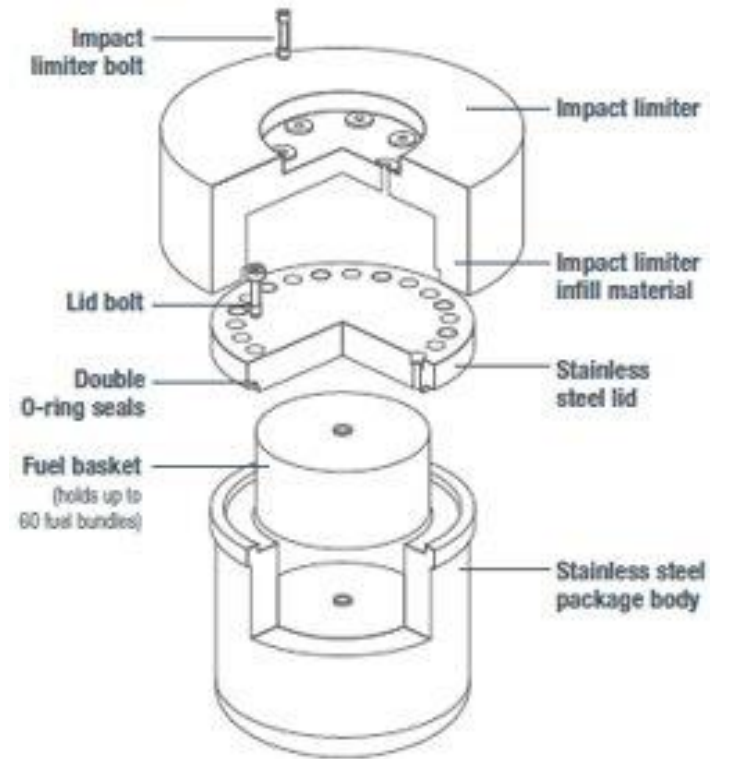
# Transportation packages



Used Fuel Transportation Package (UFTP)



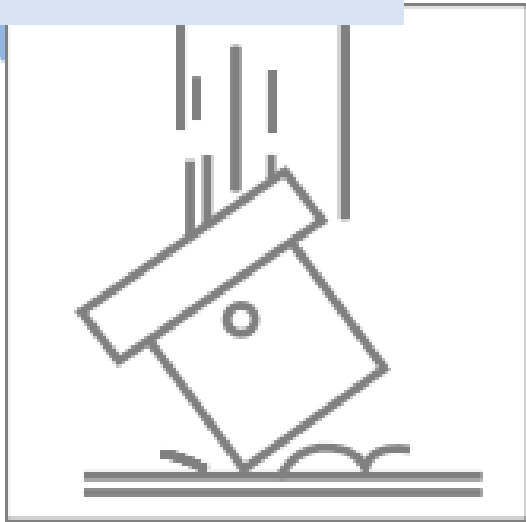
Dry Storage Container Transportation Package (DSC-TP)



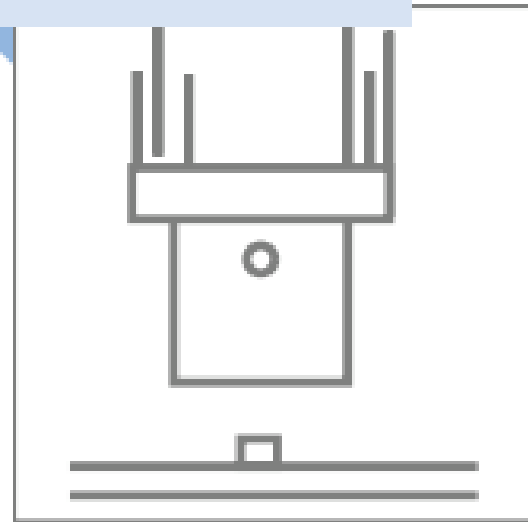
Basket Transportation Package (BTP)

# Transportation package testing

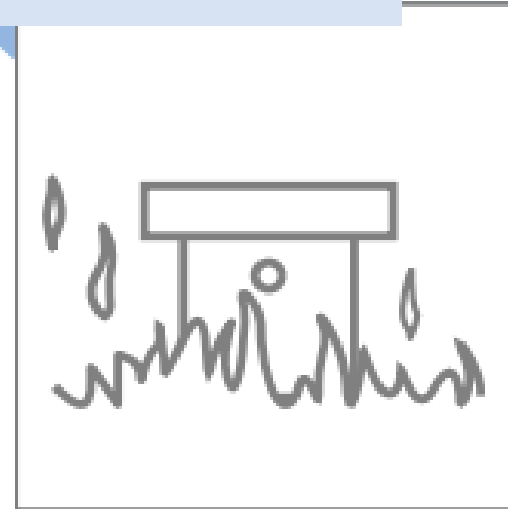
Free-drop test



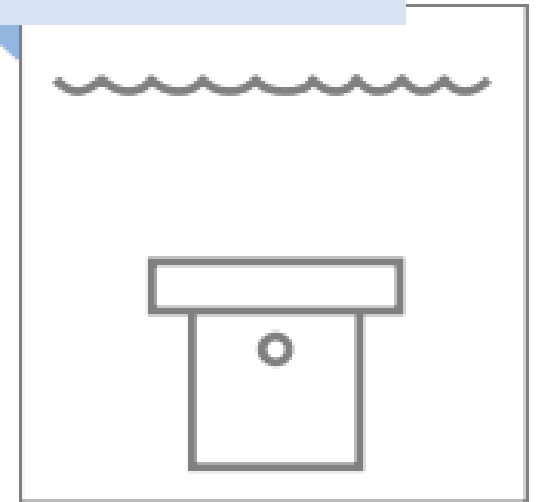
Puncture test



Thermal test



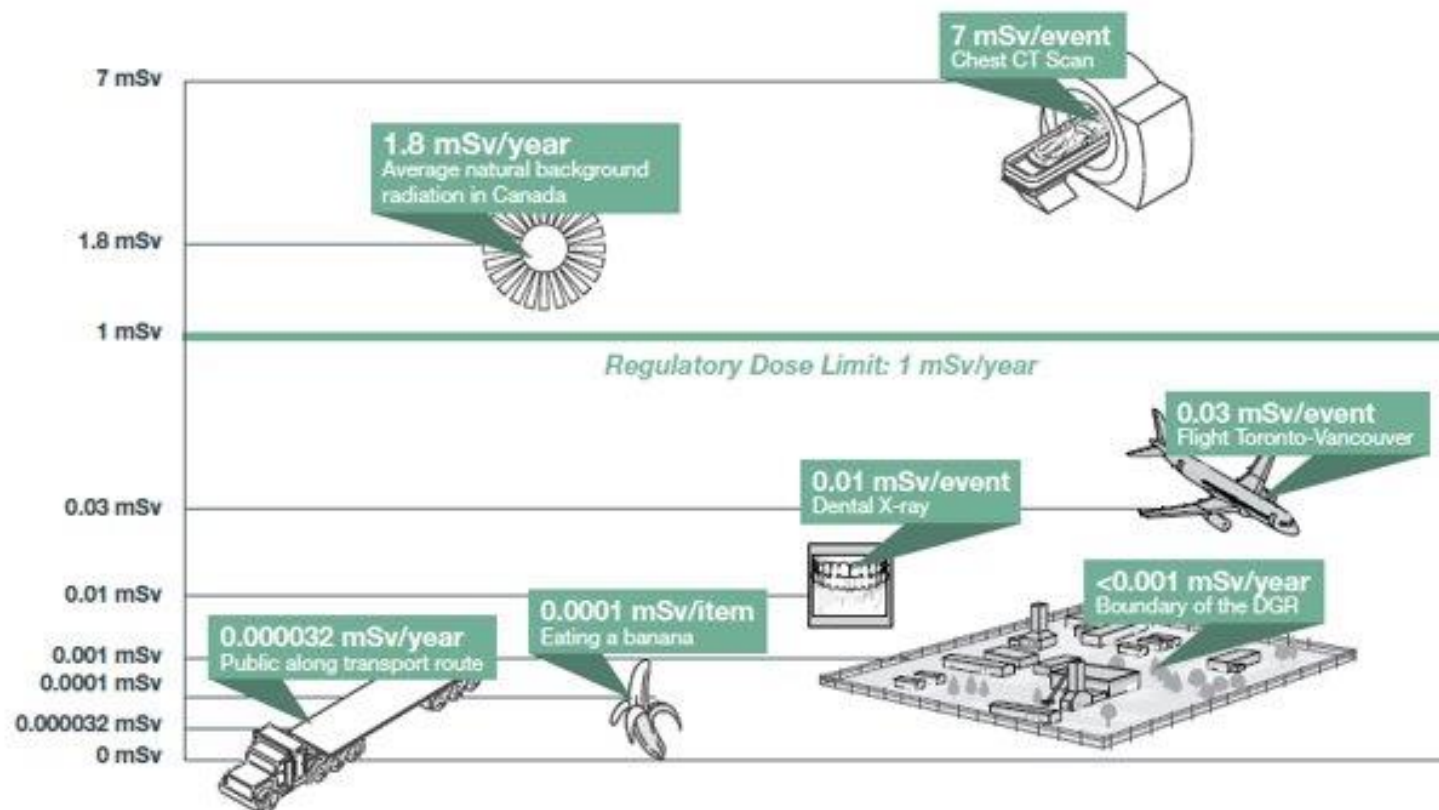
Immersion test



# Radiation safety

## Comparison of Sources of Radiation

The graphic below compares dose rates from common sources of radiation to what members of the public would encounter if they were located 30 metres from a transportation route for used nuclear fuel and experienced all 620 truck shipments or 62 train shipments. Based on a generic dose study, the annual dose would be 0.000032 mSv, which is significantly lower than the public dose limit of 1 mSv set by the regulator.



# Hearing from the public on priorities, questions and concerns

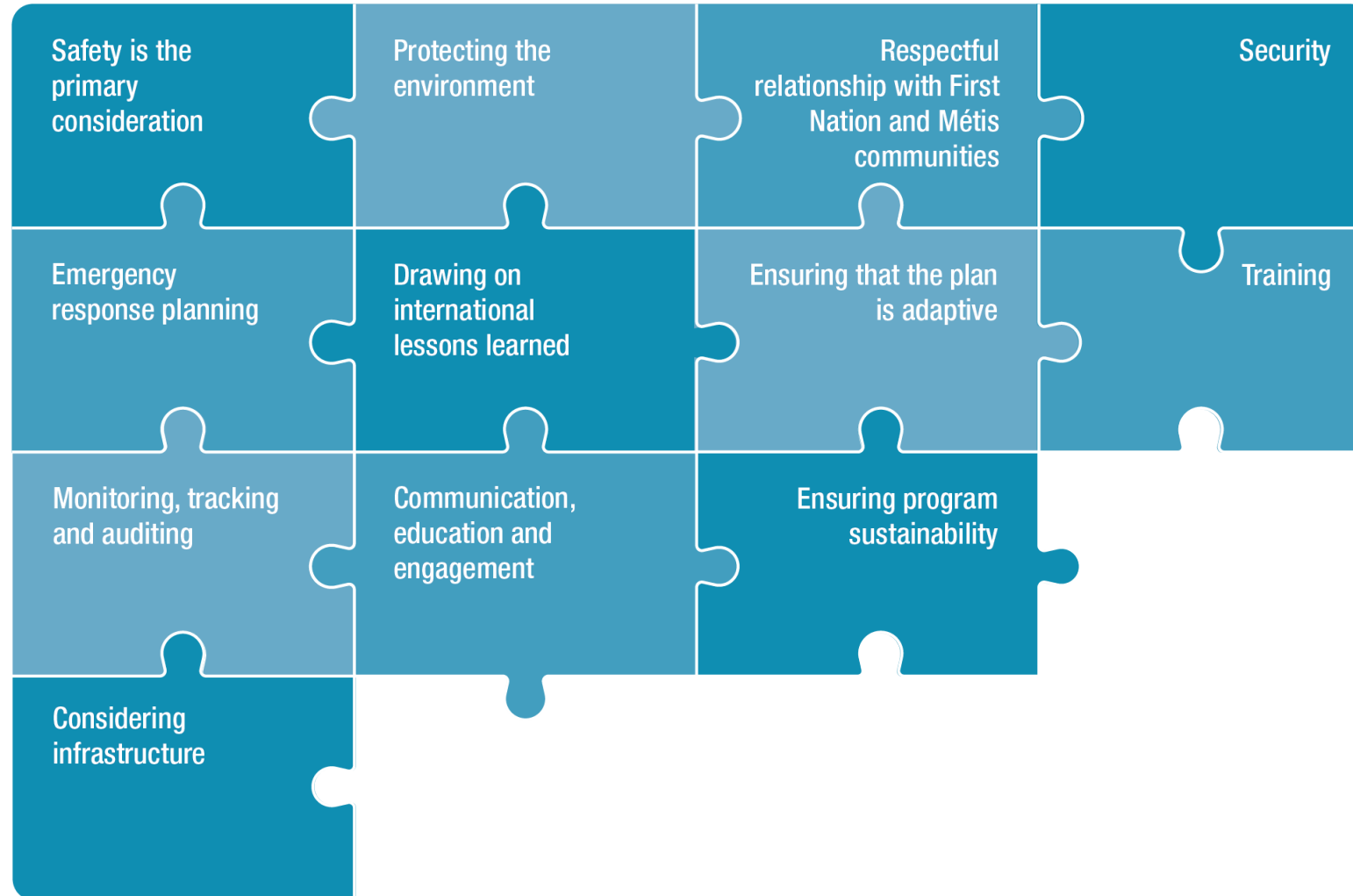
- Since 2015 we have heard from thousands of individuals and groups on the subject
  - Over 1,000 meetings
  - Engage with roughly 5,000 people every year



# Transportation Planning Framework



# Public-identified priorities



# Proposed approach to implementing framework

The approach will be flexible and adaptive, and continue to involve people at key milestones along the way





# Durham Nuclear Health Committee

April 19, 2024 • Kapil Aggarwal, Vice President, Nuclear Sustainability



# All waste in our care falls under three categories of action.

## Preventing

**▶▶▶ We prevent waste before it is created.**

**OPG's NS division takes many actions to reduce the amount of total waste we produce.**

**Within every level of waste we manage we are successfully finding solutions to ensure we prevent waste from being created.**

## Managing

**▶▶▶ We manage the waste in our care.**

**A small percentage of the waste generated by nuclear power must be effectively disposed of for the long term.**

**This action - Managing Waste - speaks to our long-term stewardship and commitment to safety. While abiding by federal and international regulations we ensure not even an ounce of waste is left unmanaged.**

## Harnessing

**▶▶▶ We harness waste and by-products to make nuclear power useful beyond just generation.**

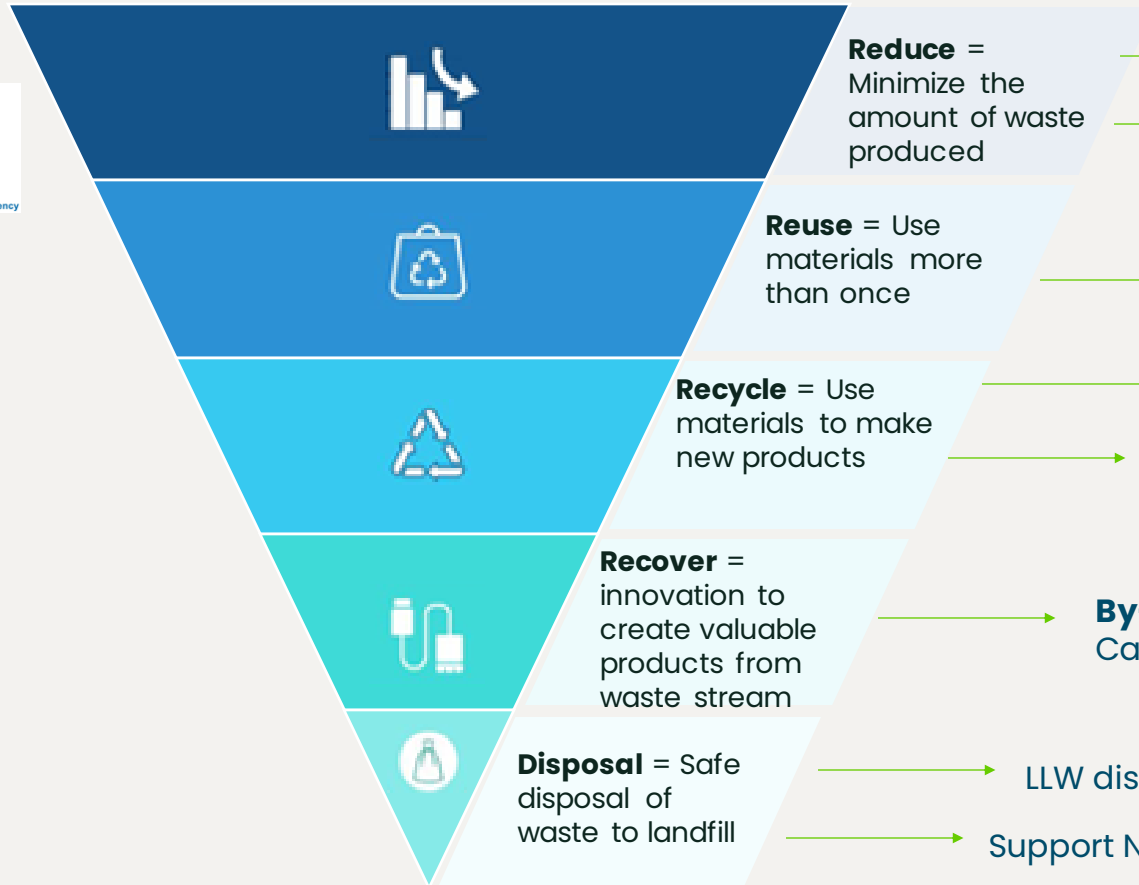
**Here we find the most innovative and directly beneficial of our actions. The nuclear industry has made massive leaps in creating a more circular economy. Our waste and by-products benefit many industries including: Healthcare, Food, Pharmaceuticals, Computing, and new nuclear.**

# Strategic Plan: Focus on Waste Minimization

**Why are we focusing on waste minimization?** In 2021, we embraced the **3R's** and developed key initiatives to **reduce** our environmental footprint, to **be ready for OPG's nuclear growth program**.



Most Desirable



## Strategic Plan Main Initiatives

Waste minimization at stations

**WCSR Sort & Seg Facility**

**Resin processing & C-14 isotope capture**

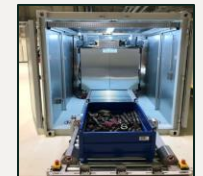
**Free release governance & research (LEP)**

**Metal decontamination and processing**

**By-product Isotopes Strategy:** Tritium, Helium-3, Heavy Water, Carbon-14

LLW disposal consent-based siting

Support NWMO DGR siting (HLW/ILW)



# Nuclear Sustainability Services – Pickering Waste Management Facility (NSS-PWMF)

## Operations

- In 2023 Used Fuel from Pickering Nuclear Generating Station (PNGS) continued to be removed from the station, and stored safely and on time.
- In 2023, Pickering loaded 70 Dry Storage Containers (DSCs), hitting our 2023 target of 70.
- Current 10-year operating licence to 2028.



Dry Storage Containers loaded and transferred in 2023

# Nuclear Sustainability Services – Darlington Waste Management Facility (NSS-DWMF)

## Operations

- In 2023, Used Fuel from Darlington Nuclear Generating Station (DNGS) continued to be removed from the station, and stored safely and on time.
- In 2023, DWMF loaded 57 DSCs, hitting the target of 57.
- The Retube Waste Storage Building provides on-site storage in support of Darlington Refurbishment.
- Received 10-year license renewal in 2023 to 2033.



57

Dry Storage Containers loaded and  
transferred in 2023

# Safety

## Nuclear Safety

- Public and employee safety remains OPG's top priority.
- Safety Analysis demonstrates that public and worker dose remains within CNSC regulatory limits during normal operations, and within Safety Report acceptance criteria due to credible accidents and malfunctions.
- OPG's exemplary record of public and employee safety is supported by the Waste Management Facility Safety Report summary, available on [Reporting > Regulatory reporting - OPG](#)

## Radiation Safety

Radiation Protection has four key objectives:

- Keeping individual doses below regulatory limits.
- Preventing unplanned exposures.
- Maintaining individual risk from lifetime radiation exposure at an acceptable level.
- Ensuring collective doses are As Low As Reasonably Achievable (ALARA).

# Pickering Refurbishment & Decommissioning

01

Refurbishment of ***Units 5-8*** at PNGS

02

Decommissioning of ***Units 1-4*** at PNGS

03

Securing more than ***2100 megawatts*** of clean, reliable nuclear power



## Loading 6-Year Cooled Fuel into DSCs at NSS-PWMF PN

- OPG has requested an amendment to the Waste Facility Operating Licence (WFOL) at NSS- PWMF to allow for the storage of minimum 6-year cooled fuel to support PNGS Units 5-8 Refurbishment defuelling activities.
- Submission to the Canadian Nuclear Safety Commission (CNSC) for this Licence amendment was completed in June 2023 with a written hearing scheduled Q2 2024.
- The storage of 6-year cooled fuel at NSS-PWMF has been assessed and will have negligible effect on the safe operation of PWMF, public, environment and worker safety.

## Storage Building 5

- A new storage building is required to provide adequate storage space for DSCs at NSS-PWMF until a permeant Deep Geological Repository (DGR) is in-service in mid 2040s. The planned capacity of Storage Building 5 is 1,400 DSCs.
- Initial planning is underway to construct the storage building, with construction planned for 2026.
- Existing WFOL allows for up to a total of six (6) storage buildings onsite.

## Pickering Component Storage Structure (PCSS)

- To support the refurbishment of Pickering NGS Units 5-8, additional onsite interim storage space for removed L&ILW reactor components is required.
- A Letter of Intent to construct the PCSS was submitted to the CNSC on February 1, 2024.
- License Amendment Submission to CNSC is planned for Q2 2024.

# Airborne Emissions Monitoring

- The Darlington Nuclear site has 18 stack monitoring points for airborne emissions
- Pickering Nuclear site has 29 stack monitoring points for airborne emissions
- Monitoring requirements are added or removed when risk and operation changes.
- OPG has demonstrated that radiological air samplers for Used Fuel Dry Storage facilities (DSC) at the Darlington Waste Management Facility (DWMF), Pickering Waste Management Facility (PWMF) and Western Waste Management Facility (WWMF) are unnecessary and can be removed.
- OPG will continue to maintain comprehensive monitoring programs, including radiological and non-radiological airborne emissions, groundwater, subsurface drainage, and environmental risk assessments. These programs consider all potential impacts to the environment from site wide operations.

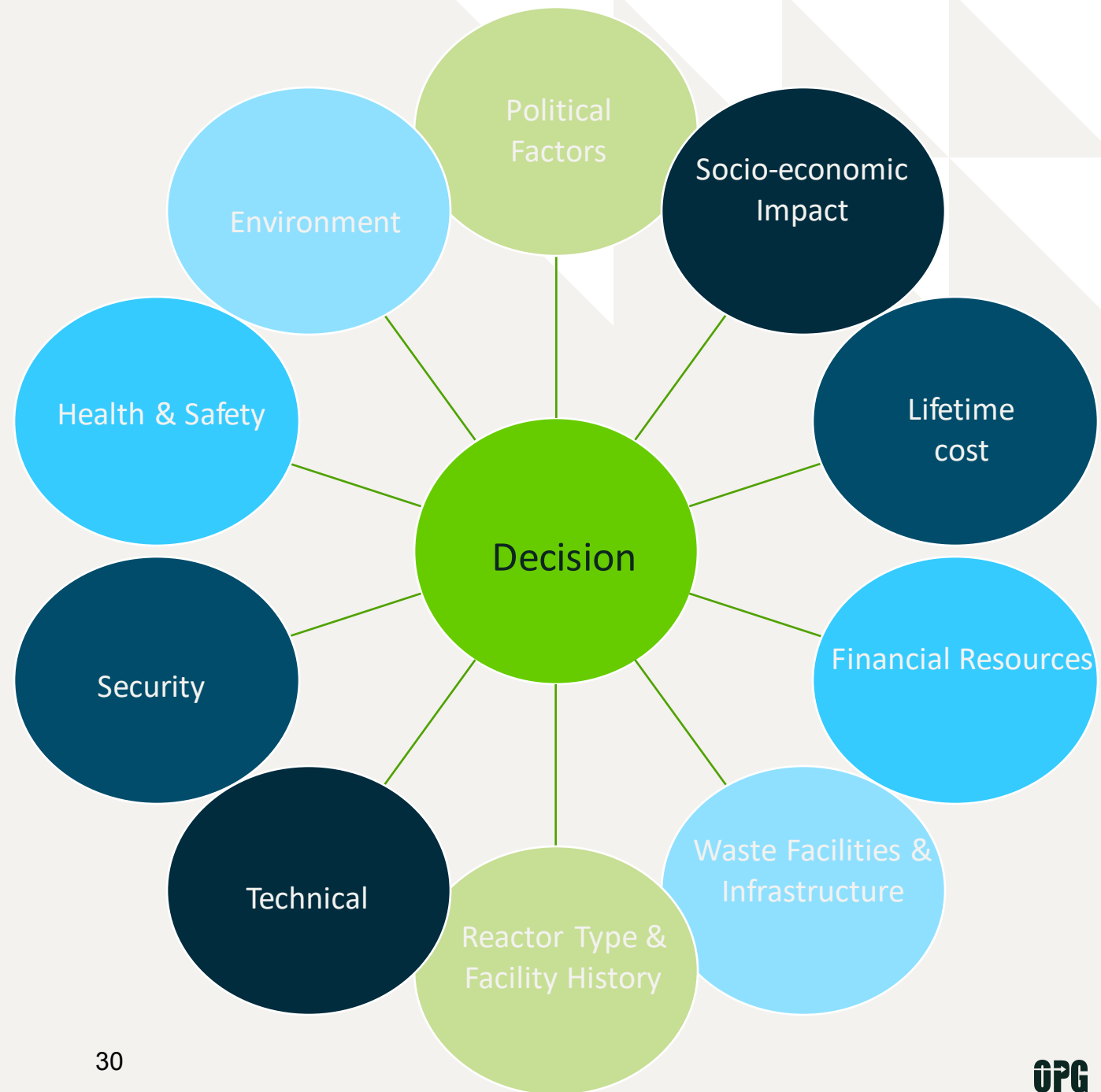




# Decision Factors

OPG will utilize a Decision Matrix to develop decommissioning plans that are safe, scientifically-sound, sustainable, fiscally responsible, and aligned with international best practices.

The framework will incorporate regulatory requirements, operating experience and input from Indigenous Nations & Communities, and Municipalities, as well as our industry partners.



# Unlocking the promise of tomorrow

- OPG's reactors also produce valuable Isotopes:
- Tritium, used in the production of self-powered lights, medical research, and nuclear fusion development
- Laurentis is also helping to extract high-purity Helium-3 (He-3), a rare isotope used in quantum computing, border security, and medical imaging



Thank you.

Questions?





*Electrifying  
life*

# Pickering Nuclear 2026

Durham Nuclear Health Committee, April 19 2024

Craig Axler – Director Regulatory Affairs Programs, OPG



# Today's Agenda



- 1 Background**
- 2 Why Extend Pickering?**
- 3 Work Done in the Past Year**
- 4 Regulatory Process**
- 5 Resources**

# Background

- Pickering's current power reactor operating (PROL) licence allows operation of all units until December 2024.
- OPG is seeking approval of the Canadian Nuclear Safety Commission (CNSC) to continue operating Pickering's Units 5 to 8 to the end of December 2026.
- OPG submitted an application to the CNSC in June 2023
- The CNSC will hold a public hearing in June 2024
- Units 1 and 4 will retire at the end of 2024 as planned and be placed in safe storage. (Units 2 and 3 are already placed in safe storage.)



# Why Extend Pickering 5-8?

- Extensive refurbishment programs on both the Bruce and Darlington Units have temporarily reduced Ontario's power supply
- The Independent Electricity System Operator is projecting a significant and growing capacity deficit on the Ontario system, beginning in 2023
- Pickering produces 10% of the world's Cobalt-60 supply
- The safe, sequential shutdown of all units will maximize the economic benefits of the generation station in the community
- Continual investments in equipment reliability improvements ensure continued strong performance through 2026



# Work Done in the Past Year

- **Ontario government approval to extend Pickering 5-8**
- **Canadian Nuclear Safety Commission (CNSC) approval still outstanding**
- **Periodic Safety Review (PSR)** conducted to re-assess that existing nuclear designs and components can continue to operate safely and reliably
  - Opportunities identified for Nuclear Safety enhancements to be completed by the end of 2024
  - Concluded that the current plant design, operation, processes and management system will ensure continued safe operation of Pickering NGS Units 5 to 8 to the end of December 2026
- **Pickering Nuclear Environmental Risk Assessment (ERA)** submitted to CNSC in April 2023 and is available on-line via [opg.com](http://opg.com)
  - Confirmed that Pickering NGS is continuing to operate in a manner that is protective of the health of the public and the environment.
- **Safe Storage Predictive Effects Assessment Addendum** updated in April 2023 to address comments received from the CNSC and to reflect continued operation of Pickering NGS until 2026
  - Concluded that there are no potential adverse effects predicted to human health or the environment from continued operation of Pickering NGS (Unit 5 to Unit 8) to 2026



# Regulatory Process

All nuclear power plants require a licence from the CNSC. To be granted a licence, a facility must meet regulatory requirements grouped under 14 topics called Safety and Control Areas.

To obtain a licence:

01

The nuclear power plant operator must provide the CNSC with a licence application that addresses all applicable regulatory requirements.

02

CNSC reviews the application and associated materials and provides a recommendation to the Commission in the form of a CMD

03

The Commission makes decisions on the licensing of major nuclear facilities through a public hearing process which give involved parties and members of the public an opportunity to be heard by the Commission.

04

Following the public hearing, the Commission decides on whether a licence should be issued

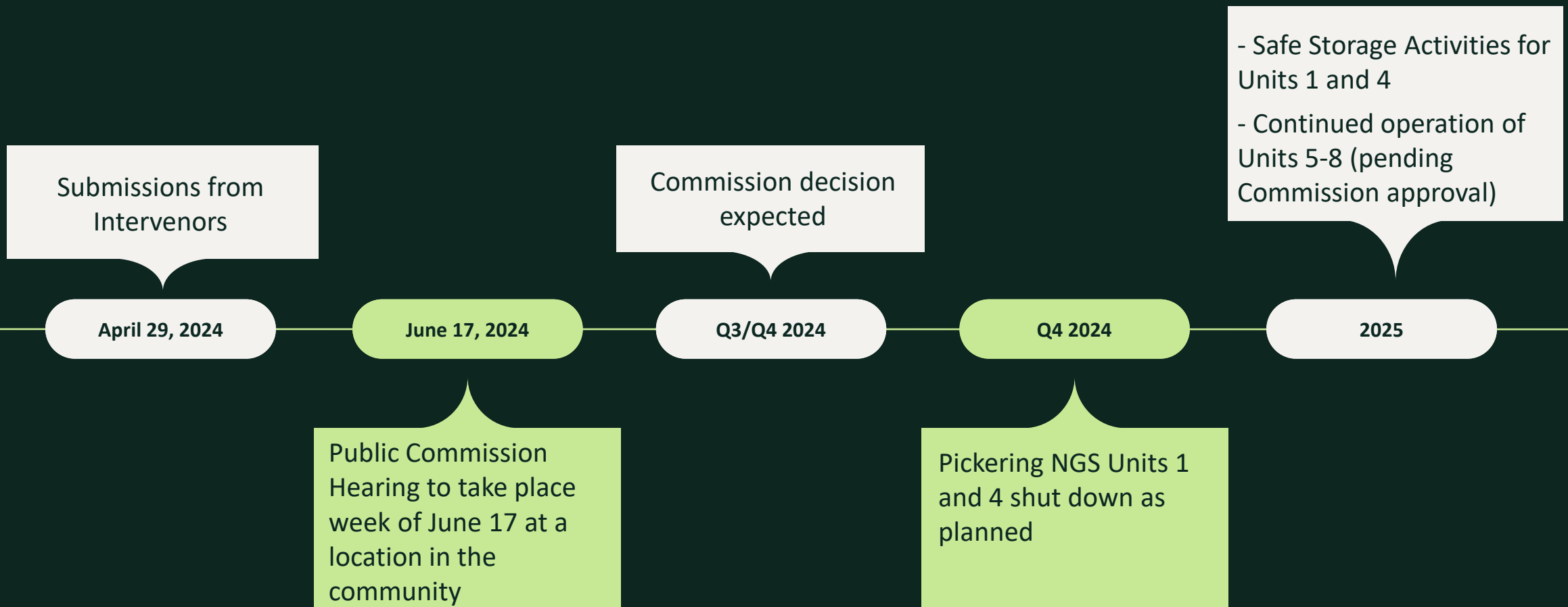
05

If a licence is granted, the applicant can operate the facility for the duration and under the conditions of its licence

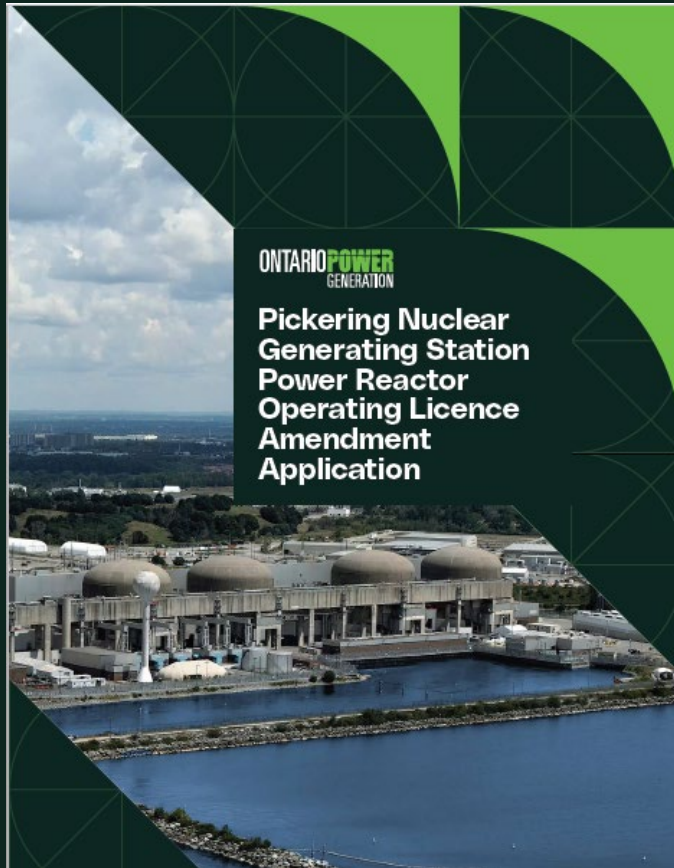
# Interventions

- Persons/Organizations who have an interest or expertise in this matter or information that may be useful to the Commission in coming to a decision, are invited to comment on OPG's application.
- Requests to intervene must be filed with the Commission Registry by April 29, 2024 using the online request form (<https://www.nuclearsafety.gc.ca/eng/the-commission/intervention/>) or email to: [interventions@cnsccsn.gc.ca](mailto:interventions@cnsccsn.gc.ca)
- The request to intervene must include the following information:
  - a written submission of the comments to be presented to the Commission
  - a statement setting out whether the requester wishes to intervene by way of written submission only or by way of written submission and oral presentation
  - the requester's name, address, telephone number and email address

# Milestones



# Resources



OPG's application is available at <https://www.opg.com/power-generation/our-power/nuclear/operating-licences/P>

- *Note - written submissions from OPG and CNSC staff will be submitted on Feb. 28, 2024.*

CNSC website: <https://nuclearsafety.gc.ca/eng/>

CNSC Notice of Public hearing: [https://nuclearsafety.gc.ca/eng/the-commission/hearings/documents\\_browse/results.cfm?dt=17-Jun-2024&yr=2024](https://nuclearsafety.gc.ca/eng/the-commission/hearings/documents_browse/results.cfm?dt=17-Jun-2024&yr=2024)

# *Electrifying* **life**

**OPG**

# Nuclear @ Ontario Tech University – an update for DNHC

**Dr. Kirk Atkinson (Associate Professor and UNENE-NSERC Associate IRC;  
Director, Centre For Small Modular Reactors)**

## International survey continues to rank Ontario Tech as a Top-3 Engineering school in Ontario

ONTARIO TECH PLACES NO. 7 AMONG ALL ENGINEERING PROGRAMS IN CANADA

February 15, 2024



Ontario Tech University Engineering students in a Faculty of Engineering and Applied Science machining lab.

Ontario Tech University's consistent strength in Engineering is reinforced again this year in an influential survey of global universities.

The latest data from the [U.S. News and World Report](#) shows Ontario Tech ranking competitively in the field of

Share this page



### More news



Ontario Tech celebrates renewed international accolade for environmental commitment



Ontario Tech Ridgebacks men's basketball team leaps into national Top-10 rankings for the first time



Smart engineering: Ontario Tech's expertise in real-time software systems research shining on international stage

**Success!**

**Ranked #7 in Canada  
for engineering**

# Nuclear-related academic programs/degrees

## Bachelor's

- Nuclear Engineering, BEng
- Health Physics & Radiation Science, BSc
- Energy Engineering, BEng

## Master's

- Nuclear Engineering, MAsC
- Nuclear Engineering, MEng - Course-based option
- Nuclear Engineering, MEng - Graduate Research Project option
- Nuclear Engineering, MEng - Industrial Research Project option
- Nuclear Engineering, MEng - UNENE administered program

## PhD

- Nuclear Engineering, PhD

## GDips

**Developed for industry**

- Nuclear Design Engineering
- Nuclear Technology - Fuel, Materials and Chemistry
- Nuclear Technology - Health Physics
- Nuclear Technology - Operation and Maintenance
- Nuclear Technology - Radiological Applications
- Nuclear Technology - Reactor Systems
- Nuclear Technology - Safety, Licensing and Regulatory Affairs
- UNENE Graduate Diploma in Nuclear Engineering



## Ontario Tech's high school student application growth continues to significantly outpace provincial university system

OUAC DATA CONFIRMS ONTARIO TECH ESTABLISHES ANOTHER NEW RECORD FOR TOTAL APPLICANT NUMBERS

January 22, 2024

**Canada's only accredited undergraduate Nuclear Engineering program is seeing double-digit percentage growth as high schoolers now see good job prospects in nuclear – this will help satisfy the strong workforce demand.**

**The Health Physics & Radiation Science program is being updated for Fall 2024 to better serve industry needs.**



Ontario Tech students, between the Campus Library and Shawenjigewining Hall at the university's north Oshawa location.



Ontario Tech researcher investigating the opportunities and risks associated with drone swarms

**Out of schools in North America, Ontario Tech is 2<sup>nd</sup> or 3<sup>rd</sup> in terms of graduating bachelors-level nuclear students**

## Top marks: Ontario Tech named Canada's Research University of the Year

FOR THE FIRST TIME, RESEARCH INFOSOURCE RANKS ONTARIO TECH'S RESEARCH IMPRINT NO. 1 AMONG THE COUNTRY'S SMALLER, PRIMARILY UNDERGRADUATE UNIVERSITIES

December 7, 2023



Ontario Tech University research laboratory of Dr. Denina Simmons, Canada Research Chair in Aquatic Toxicology, and Associate Professor, Faculty of Science.

Ontario Tech University's impressive reputational trajectory for top-notch research continues with a fresh distinction as **Canada's Research University of the Year for 2023**. The accolade comes from [Research Infosource \(RI\)](#), Canada's premier research ranking organization and leading provider of research intelligence for business and higher education.

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### More news



Ontario Tech University promotes sustainable commuting solutions through scooter demonstration event



Partnership between Ontario University and Grandview Kids helping advance the field of childhood disability research



Ontario Tech University grows leadership and sustainability in engineering by hosting First Year Integration Conference

More success!

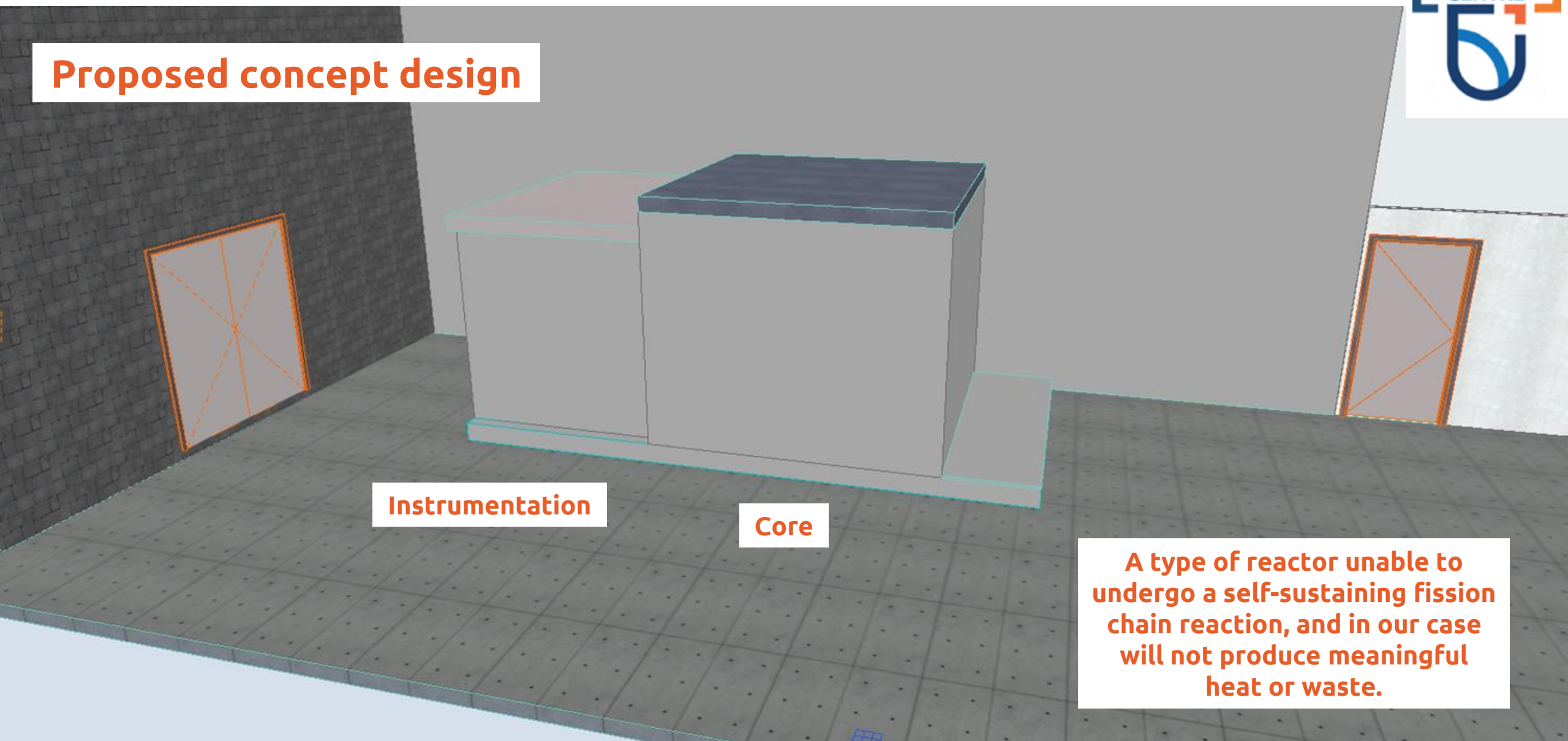
Significant federal funding recently awarded to support SMR deployment in Canada

**Cs-137 irradiator**  
(12.4 TBq category 2 source)



**New Research <sup>48</sup> Capabilities**

## Proposed concept design



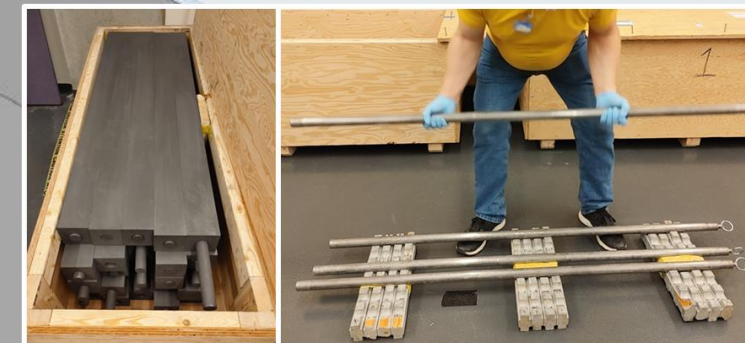
Instrumentation

Core

A type of reactor unable to undergo a self-sustaining fission chain reaction, and in our case will not produce meaningful heat or waste.

# Subcritical Assembly Project (under development)

**Proposed concept design**



**Graphite**

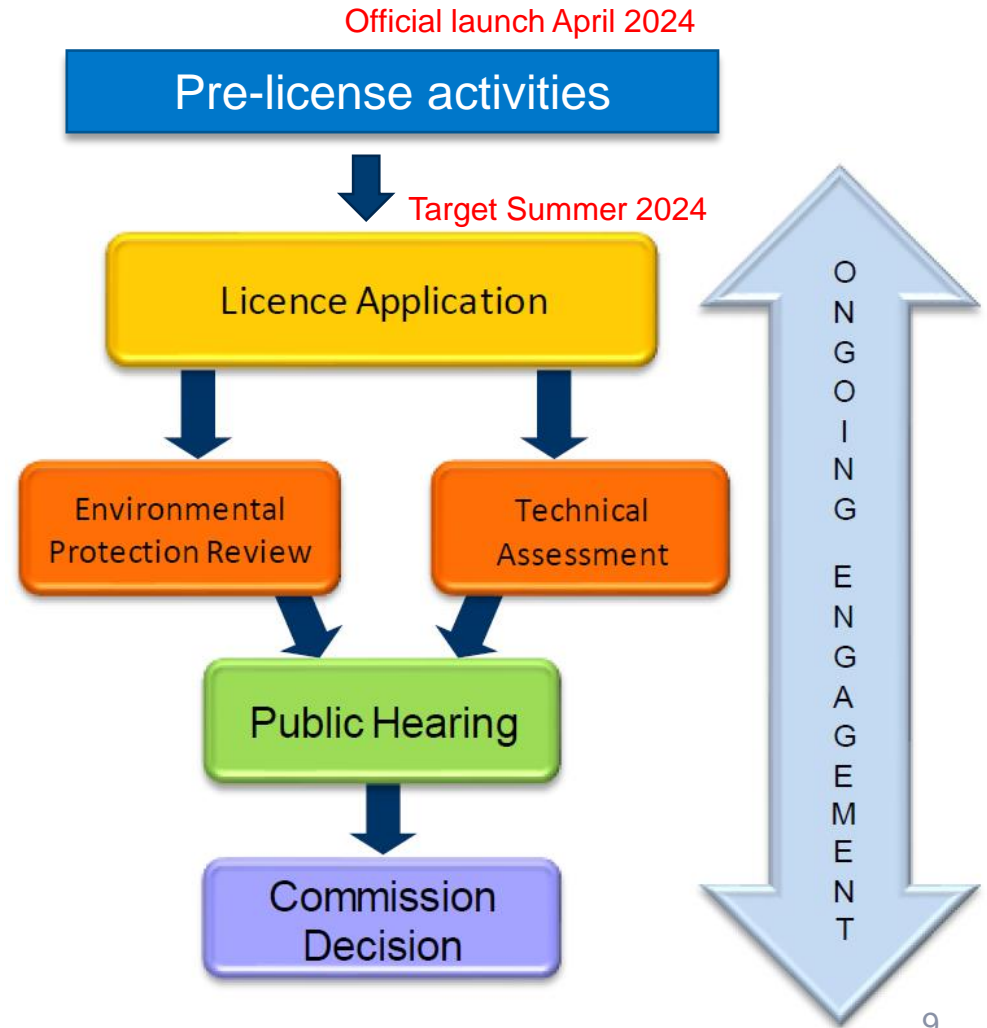
**Natural uranium fuel**

<https://ontariotechu.ca/subcritical/>

# **Subcritical Assembly Project (under development)**

# Canadian Nuclear Safety Commission - Licensing Process

- Currently in the preliminary planning stage of pre-license activities with many steps ahead.
- An operating license is required from the CNSC to operate the device.
  - In accordance with their graded approach, one license incorporating all necessary aspects of EA, preparing site, construction and operation will be sought.
- Commission will consider our application at a public hearing. Public has opportunity to participate.
- Participation by Indigenous representatives and the public is highly encouraged.



# Engagement

Over 100 specific engagements undertaken, so far, for the subcritical assembly project (class 1A licence application)



Point of contact:

Kirk Atkinson [kirk.atkinson@ontariotechu.ca](mailto:kirk.atkinson@ontariotechu.ca)



## Shape the future of nuclear energy with us!

Ontario Tech University is at the forefront of innovation, elevating nuclear education, training, and research.

Join our global collaboration with industry, communities, academia, and government partners to advance sustainable nuclear technology and ensure universal access to clean energy and advanced medicine.

Partner with us for a cleaner, brighter future!