Canadian Nuclear Laboratories | Laboratoires Nucléaires Canadiens

Remediation, Sustainability, and Reconciliation

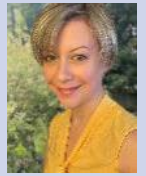
The Port Hope Area Initiative as a Framework for Long-Term Environmental Stewardship

Jennifer Turner, BA, MSc, EP
Manager, HWP Environmental Management

2025 NOVEMBER 06
REMPLEX 2025

Land Acknowledgment

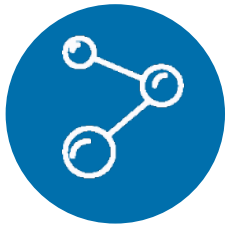
Agenda for Today's Case Study

Timeline (PST)	Presentation Title	Presenter	Who We Are
9:00-9:25	Remediation, Sustainability, and Reconciliation: The Port Hope Area Initiative as a Framework for Long-Term Environmental Stewardship	Jennifer Turner	
9:25-9:45	Indigenous and Stakeholder Engagement: Finding a balance between regulatory compliance, reconciliation, transparency and public trust	Dave Mowat (virtual)	
9:45-10:05	Construction and Operation of the Long-Term Waste Management Facility	Ajit Ghuman (virtual)	
10:05-10:25	Remediation of Major and Industrial Sites in an Urban and Suburban Environment	Brian Shipp	
10:25-10:45	Remediation of Private Properties in an Urban and Suburban Environment	Jeff Ahlers	
10:45-11:00	BREAK		
11:00-12:00	Panel Discussion		

Canadian Nuclear Laboratories

Laboratoires Nucléaires Canadiens

The science of tomorrow, today.

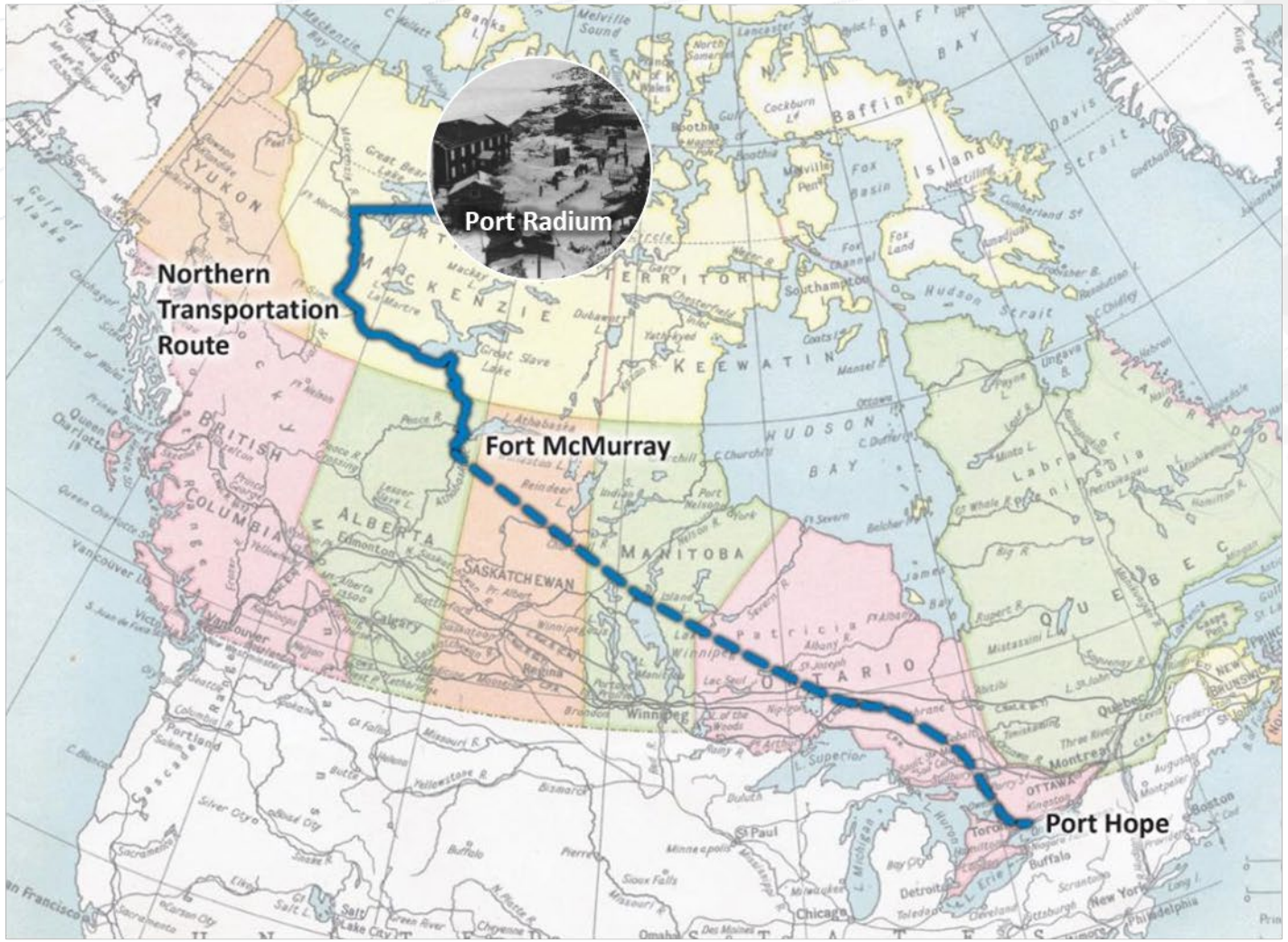


Contributing to the health of Canadians

Clean energy for today and tomorrow

Restore &protect Canada's environment

Source of the Ore & Transportation



Mid-1970s Problem Identified
LLRW - past refining practices: former Crown corporation Eldorado Nuclear Ltd.

1976-82 Initial Cleanup
100,000 m^3 to Chalk River

1986-96 Independent Siting Task Force
province-wide search unsuccessful

1997-99 Community Solutions
brought to federal government

2001 Legal Agreement
Canada, Clarington,
Town of Port Hope, Hope Township

History of Refining in Port Hope

From 1934-1944 processing residues were stored adjacent to the plant in Port Hope

1944
The Government of Canada took over Eldorado Gold Mines and renamed it Eldorado Mining and Refining

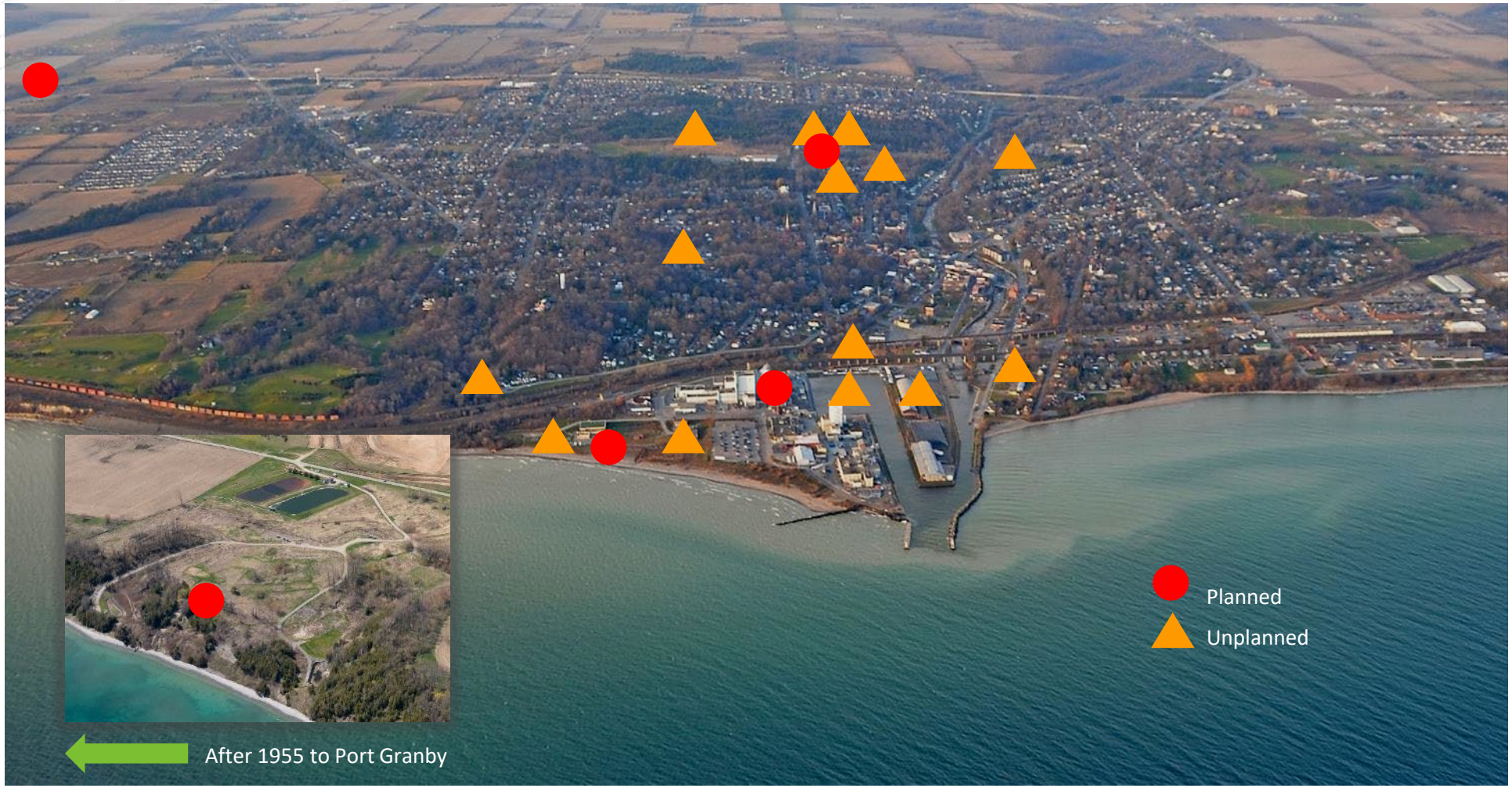
Manhattan Project 1942-1945
Ore from the Belgian Congo (now the DRC) and Port Radium (NWT) was processed during the first 3 years of the Manhattan Project, with pure U235 produced for the Little Boy weapon and the research reactors at Hanford

1930s-1970s
Properties and sites in Port Hope become contaminated from spillage during transportation, diversion of contaminated fill and materials, wind/water erosion and spread from residue storage areas

1953-1954
Radium refining stops, facilities dismantled and removed from plant site

[PHAI Project History - PHAI]

Historic Waste Locations



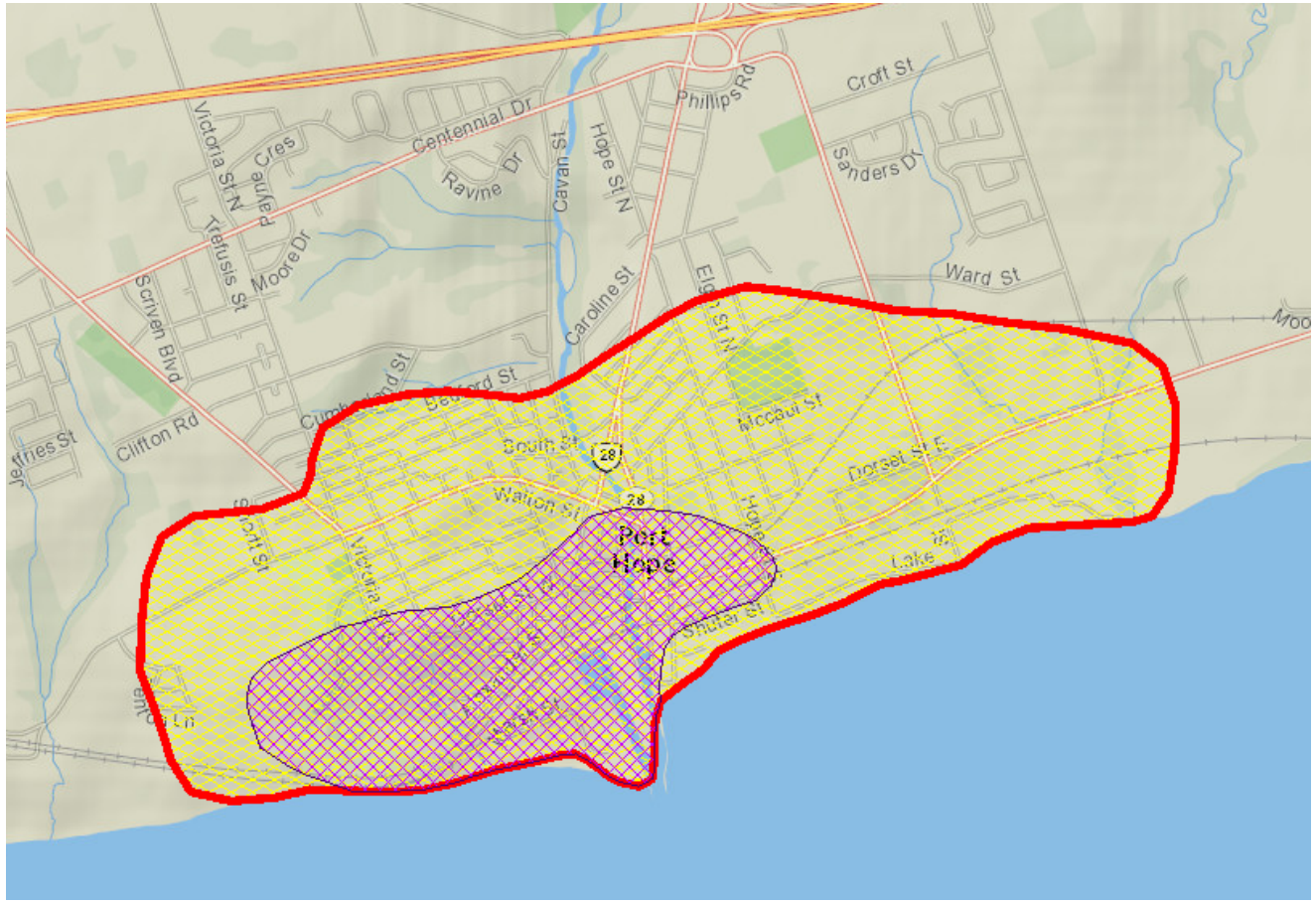
Theoretical versus Practical

2018 to Current

Inferred areas of historic low -level radioactive waste contamination in Port Hope:

Purple – Area closest to the former Eldorado facility called the “stack deposition zone”. Contamination is largely surficial with higher levels of arsenic due to incomplete combustion during the refining process.

Yellow – Area of inferred contamination due to the emplacement of contaminated fill material.



Creation of the Port Hope Area Initiative (PHAI)

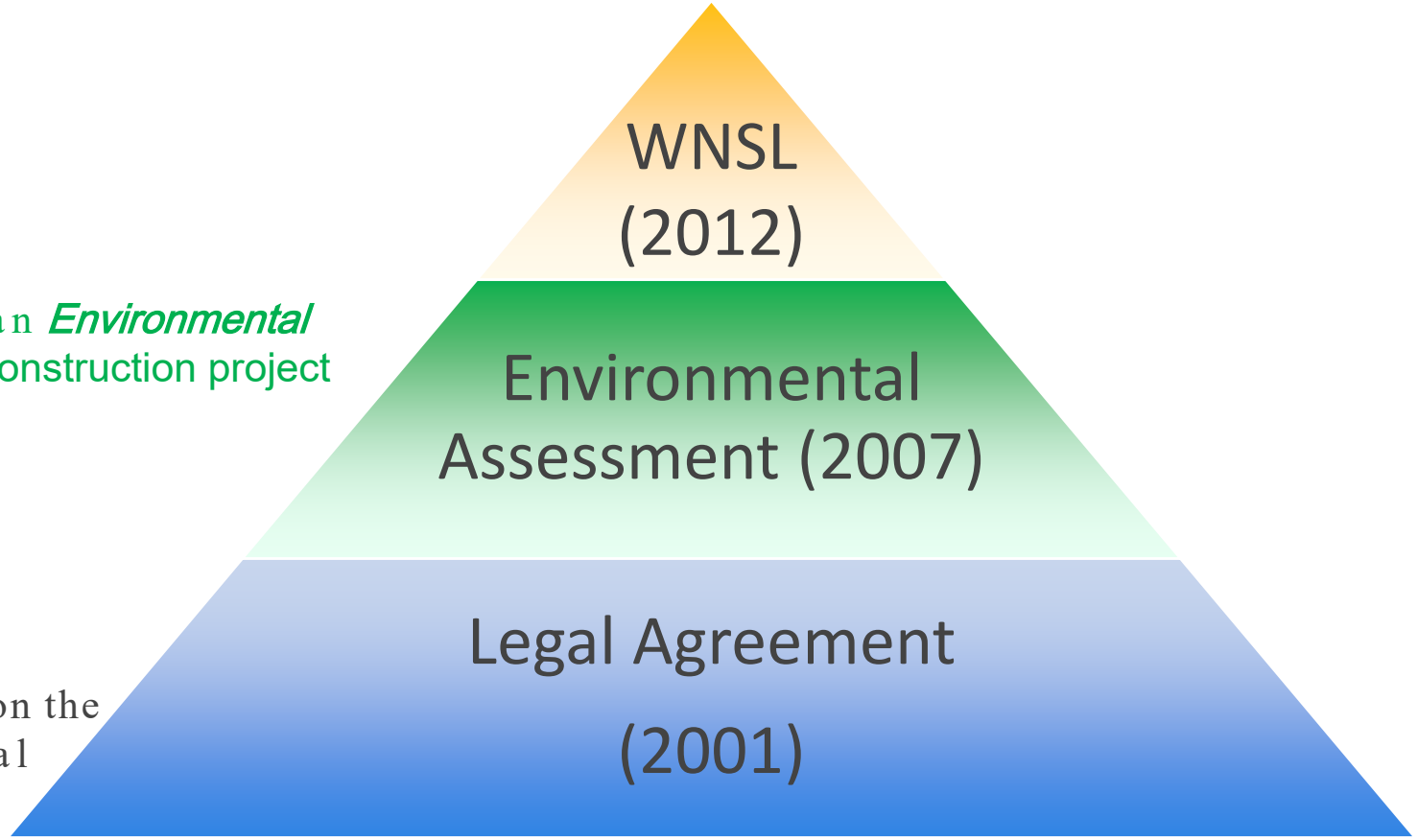
Legal Agreement

- The PHAI represents the federal government's response to the ***community-requested solution*** for the cleanup and local, long-term, safe management of historic low-level radioactive waste in the municipalities of Port Hope and Clarington
- The original Eldorado refining operation and plant were established in the 1930s without consultation with Indigenous peoples of the area
- A **legal agreement**, finalized in March 2001, between the Government of Canada and the two municipalities, launched the PHAI by defining the framework and setting out the responsibilities for the Port Hope Project and the Port Granby Project
- Through its Historic Waste Program Management Office (HWP MO), Canadian Nuclear Laboratories (CNL) is implementing the PHAI on behalf of Atomic Energy of Canada Limited (AECL), a federal Crown corporation

The Three Pillars of the PHAI

Legal Agreement, Environmental Assessment, Waste Nuclear Substance License

Fundamentally, the PHAI is an ***Environmental Remediation*** project, not a construction project



Each component builds upon the other, starting with the Legal Agreement signed in 2001

Environmental Assessment

The Environmental Assessment (EA), approved by Natural Resources Canada in 2007, undertook an evaluation of the Background Conditions of Port Hope and the Expected Environmental Effects associated with the removal of the waste from the community. The EA began in 2002 and looked at the impact of the project on each of the factors below, and ways of mitigating those impacts. The results of the EA created the scientific basis for the project to proceed, and included the **Cleanup Criteria** for remediation of waste.

INDIGENOUS RIGHTS & INTERESTS
Constitutional rights and traditional practices

ATMOSPHERIC
Air quality and noise

TERRESTRIAL
Plants and wildlife habitat

SOCIO-ECONOMIC
Community life, heritage, traffic and transportation

GEOLOGY & GROUNDWATER
Groundwater, storm water, waste water quality; flow, soil quality

AQUATIC
Water quality, flow and sediment quality

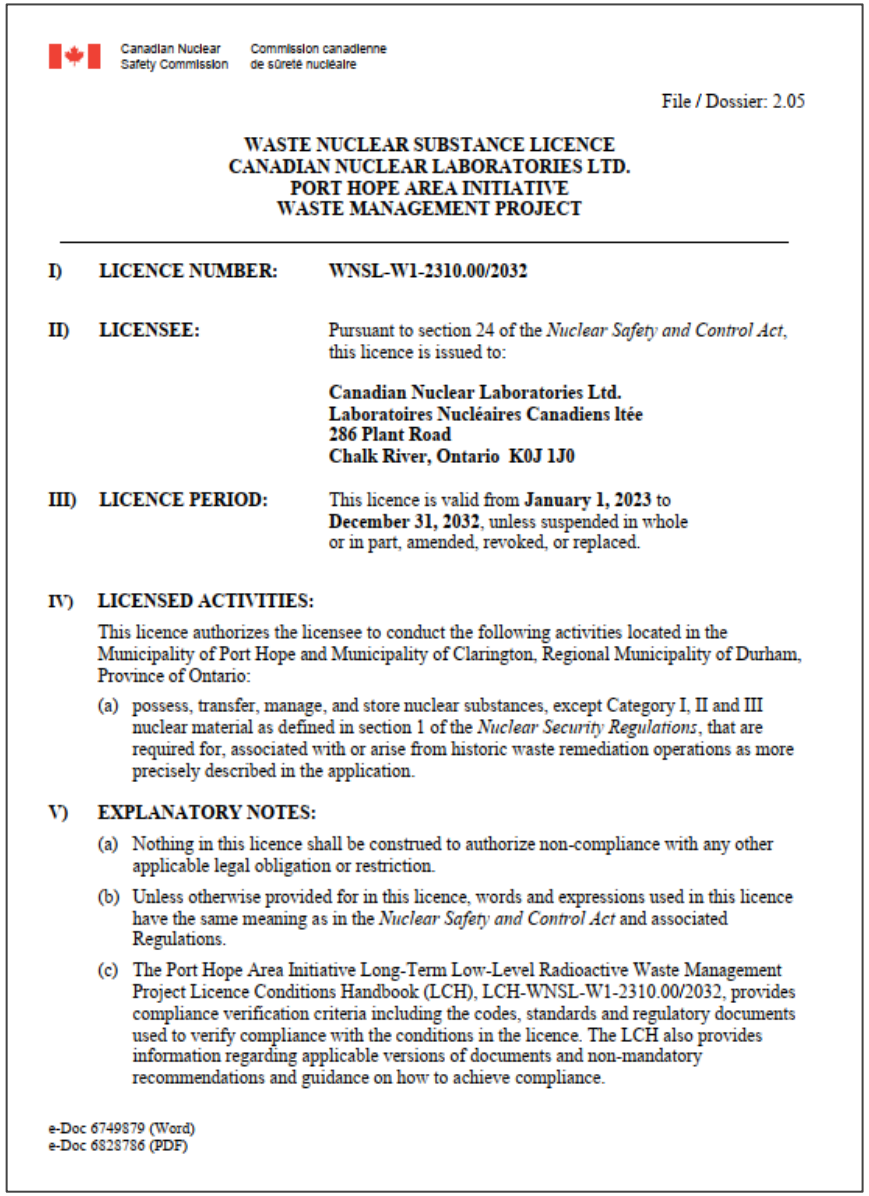
Waste Nuclear Substance Licence

WNSL-W1-2310.00.2032

The Waste Nuclear Substance Licence (WNSL), issued by the Canadian Nuclear Safety Commission (CNSC), establishes the federal regulatory requirements that CNL must adhere to, including the **Cleanup Criteria for radioactive and non-radioactive waste**. These regulatory requirements encompass radiation protection, environmental management, health and safety, transportation of dangerous goods, etc. The content of the WNSL for the PHAI is heavily based on the findings of the Environmental Assessment.

The WNSL expires every 10 years. Should CNL wish to make a change to any portion of the WNSL that is deemed “less safe” by the CNSC, that request must be reviewed and approved by the CNSC Commission.

Issuance of the WNSL allowed teams to begin remediation of the waste within the community.



Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

File / Dossier: 2.05

WASTE NUCLEAR SUBSTANCE LICENCE
CANADIAN NUCLEAR LABORATORIES LTD.
PORT HOPE AREA INITIATIVE
WASTE MANAGEMENT PROJECT

I) LICENCE NUMBER: **WNSL-W1-2310.00/2032**

II) LICENSEE: Pursuant to section 24 of the *Nuclear Safety and Control Act*, this licence is issued to:

Canadian Nuclear Laboratories Ltd.
Laboratoires Nucléaires Canadiens ltée
286 Plant Road
Chalk River, Ontario K0J 1J0

III) LICENCE PERIOD: This licence is valid from **January 1, 2023** to **December 31, 2032**, unless suspended in whole or in part, amended, revoked, or replaced.

IV) LICENSED ACTIVITIES:

This licence authorizes the licensee to conduct the following activities located in the Municipality of Port Hope and Municipality of Clarington, Regional Municipality of Durham, Province of Ontario:

(a) possess, transfer, manage, and store nuclear substances, except Category I, II and III nuclear material as defined in section 1 of the *Nuclear Security Regulations*, that are required for, associated with or arise from historic waste remediation operations as more precisely described in the application.

V) EXPLANATORY NOTES:

(a) Nothing in this licence shall be construed to authorize non-compliance with any other applicable legal obligation or restriction.

(b) Unless otherwise provided for in this licence, words and expressions used in this licence have the same meaning as in the *Nuclear Safety and Control Act* and associated Regulations.

(c) The Port Hope Area Initiative Long-Term Low-Level Radioactive Waste Management Project Licence Conditions Handbook (LCH), LCH-WNSL-W1-2310.00/2032, provides compliance verification criteria including the codes, standards and regulatory documents used to verify compliance with the conditions in the licence. The LCH also provides information regarding applicable versions of documents and non-mandatory recommendations and guidance on how to achieve compliance.

e-Doc 6749879 (Word)
e-Doc 6828786 (PDF)

Developing PHAI Cleanup Criteria

2007 - 2012 & Publication of the WNSL

- Continued refinement of the cleanup criteria to reflect changes in federal and provincial policies
- Additional discussion with the municipality, Indigenous communities and public interest groups
- Parameters largely stayed the same (21 COPCs), values were changed and non-radiological parameters reflect Ontario Ministry of Environment values published in Table 2 – Full Depth Generic Site Condition Standards in a Potable Ground Water Condition, published in *"Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act"*[1]
- Column A (Residential/Parkland/Institutional), Column B (Industrial/Commercial), Column C (Landfill sites)

Since the 1980s, Construction Monitoring Program (CMP) staff monitored excavations for LLRW. Any material found was transported to an interim storage location until the dedicated waste management facility was constructed and ready to receive waste.

[1] Ontario Ministry of the Environment. *Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act*. PIBS: 7382e01. Last updated: April 15, 2011.

Sustainability and Circularity

- Regenerating land for community use
- Ecosystem resilience
- Resource efficiency, circular practices

West Beach Restoration 2025

Lions Park Restoration 2025

Sustainability and Circularity – Focus on Port Granby

- Sustainability was considered in the restoration plan with a focus on climate change adaptation
- Waste was removed from the shoreline and former landfill, and over 20,000 trees and shrubs were replanted on the site
- Naturalized, end-use concept developed in collaboration with the Municipality of Clarington
- AECL is considering the creation of a nature reserve in consultation with local First Nation communities

Port Granby Replanting 2025

Community and Indigenous Engagement as a Tool to Facilitate Sustainability

- Inclusive consultation processes
- Indigenous knowledge systems
- Transparency & accountability

PHAI Town Hall
June 2025

Williams Treaties First Nations participate in an archaeology site walk down of Lions Park

Port Hope Project Status

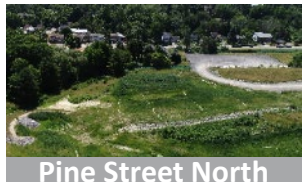
WORK COMPLETED


Centre Pier TSS

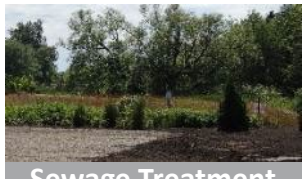

Peter Street Mound


Sewage Treatment Plant Storage Cell


Waterworks East


Pine Street North Consolidation Site


Pine St. North TSS


Sewage Treatment Plant TSS


95 Mill Street S.


Strachan Street Consolidation Site


Viaducts

More than 200 Private Properties completed

WORK UNDERWAY


Lions Park


Coal Gas Plant


Centre Pier


West Beach


Port Hope Harbour


Highland Dr. Landfill


Chemetron Lagoon


Alexander St. Ravine


Highland Drive South Ravine


Private Properties work continues

2018 | 2019 | 2021 | 2022 | 2023 | 2024 | 2025

Key Challenges & Adaptive Approaches

Risk-informed decision making

Adaptive environmental monitoring & management

Evolving municipal and community priorities

Reconciliation with First Nation communities, groups and organizations

Miigwetch . Thank you. Merci

info@phai.ca

PH.Area.Initiative

@PHAI_PORT_HOPE

PHAI.ca

Phai_porthope

CNL's Port Hope Area Initiative