

**Unique Regulatory Approach for
Licensing the Port Hope Remediation Project in Canada – 13315**

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ABSTRACT

The Port Hope remediation project is a part of a larger initiative of the Canadian Federal Government the Port Hope Area Initiative (PHAI) which is based upon a community proposal. The Government of Canada, through Natural Resources Canada (NRCan) is investing \$1.28 billion over 10 years to clean up historic low-level radioactive waste in the Port Hope Area and to provide long-term safe management of the low-level radioactive wastes in the Port Hope Area. These wastes arose from the activities of a former Federal Crown Corporation (Eldorado Nuclear) and its private sector predecessors. In Canada, historic waste are defined as low-level radioactive waste that was managed in a manner no longer considered acceptable, but for which the original producer cannot reasonably be held responsible or no longer exists and for which the Federal Government has accepted responsibility.

In Canada, under the current regulatory framework, the environmental remediation is not considered as a distinct phase of the nuclear cycle. The regulatory approach for dealing with existing sites contaminated with radioactive residues is defined on the basis of risk and application of existing regulations. A unique regulatory approach was taken by the Canadian Nuclear Safety Commission (CNSC) to address the various licensing issues and to set out the requirements for licensing of the Port Hope Project within the current regulatory framework.

INTRODUCTION

The PHAI is a community-based project to develop and implement a safe, local, long-term solution for historic low-level radioactive waste in the Port Hope area. The Port Hope project is one of the two projects under the PHAI, the other one being the Port Granby Project.

The Port Hope Project is located in the Municipality of Port Hope, County of Northumberland, in the Province of Ontario. The municipality is located on the north shore of Lake Ontario, approximately 100 km east of the City of Toronto.



Fig. 1. Location of the Port Hope and the Port Granby Projects

The PHAI is addressing historic waste resulting from radium and uranium refining operations of the former Crown Corporation Eldorado Nuclear and its private sector predecessors beginning in the 1930s. The waste dates back to the 1930s, 40s, and 50s. From 1933 to 1948, residues from the processing of pitchblende ores and other contaminated materials were discarded or used in construction and landscaping at various locations within the Port Hope area. From 1948 to 1955, the waste was placed and stored just outside the town at the Welcome Waste Management Facility (WMF). Further in 1955, a second waste management facility was opened in Port Granby, Municipality of Clarington which operated until 1988. Both Welcome and Port Granby WMFs were closed for receiving waste until a long-term solution for managing of the historic low-level radioactive waste in the area was found.

The issue of contamination in Port Hope was discovered in the 1970s, when an initial cleanup took place in Port Hope to remove key sources of contamination. After years of searching for a long-term solution for managing the historically contaminated material in the area of Port Hope, the communities of Port Hope, the Township of Hope and Clarington came forward with a proposal to manage the waste within their boundaries. The Federal Government agreed to these community-initiated solutions and in 2001 signed with the participating municipalities a legal agreement that launched the PHAI [1].

The Port Hope Project is being conducted on behalf of the Federal Government by Atomic Energy Canada Limited (AECL). The project includes the construction and the operation of new

Long-Term Low-Level Radioactive Waste Management Facility (LTWMF), the remediation of the existing Welcome WMF and the remediation of sites containing historic low-level radioactive waste located within the Municipality of Port Hope.



Fig. 2. Location of the existing Welcome WMF and the proposed LTWMF

A total of 19 major remediation sites were defined as indicated with purple dots in Figure 3. Of these, 15 are LLRW contaminated sites and four are industrial waste-contaminated sites. In addition, there are multiple small-scale residential and roadway sites, which have yet to be fully identified and delineated through the resurvey of the Port Hope area currently conducted by AECL.

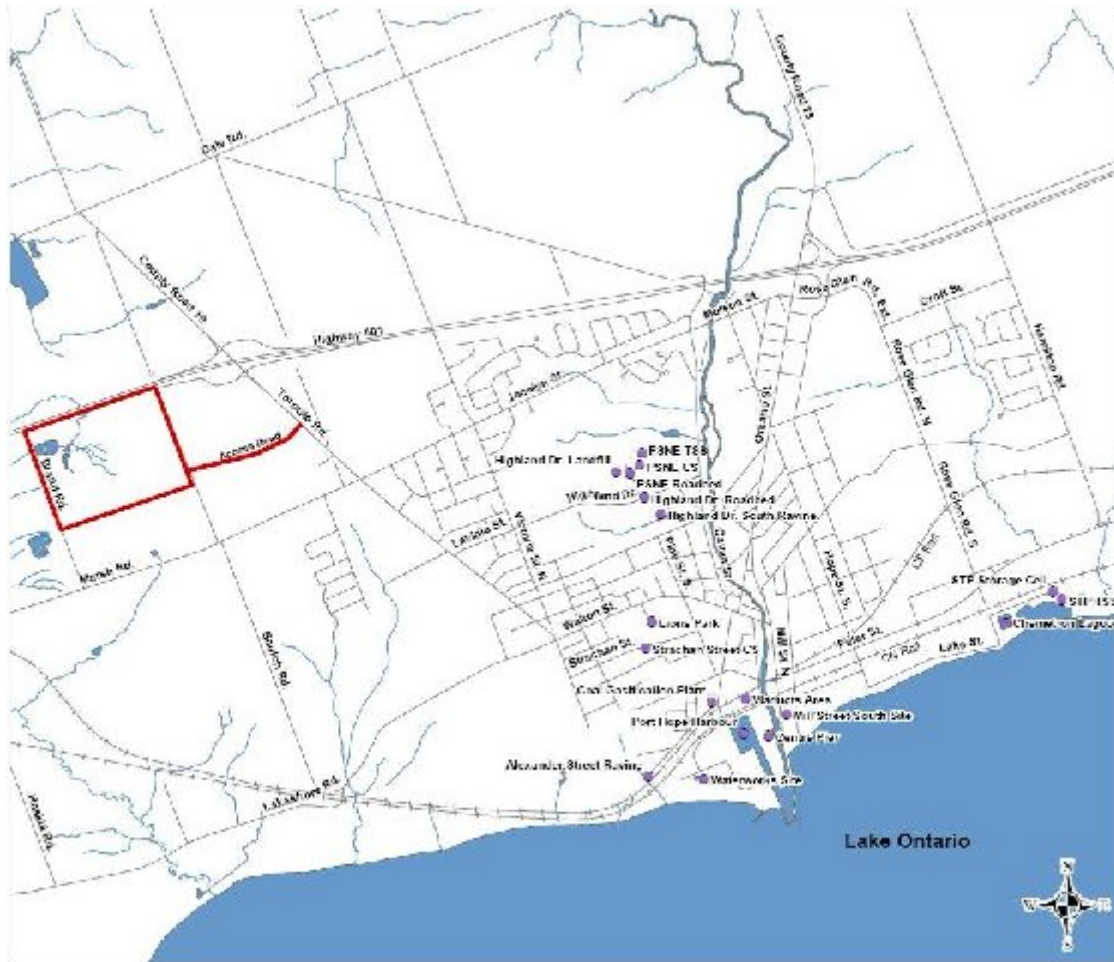


Fig. 3. Major Remediation Sites in Port Hope

The Port Hope Project is conducted in three distinct phases:

1. Phase I: The transition phase, which is now in its third year, involves:
 - Possession and management of the nuclear substances at the Welcome WMF
 - Development and acceptance of the Detailed Engineering Design and associated supporting documentation;
2. Phase II: The implementation phase, expected to take up to seven years, involves:
 - Construction of the LTWMF at the site of the existing Welcome WMF
 - Integration of the waste from the Welcome WMF
 - Cleanup and remediation of off-site historic waste within the Municipality of Port Hope and transfer to the new LTWMF

3. Phase III: The post-closure phase, involving long-term monitoring and maintenance of the LTWMF.

As part of the transition Phase I, AECL assumed the on-going management responsibility for the Welcome WMF and its inventory of low-level radioactive waste. During Phase I AECL proceeded with the development of the detailed engineering design of the LTWMF; and the development and submission of the associated programs for the implementation of Phase II.

DISCUSSION

In Canada, the historic waste is defined as waste for which the original producer can no longer reasonably be held responsible or no longer exists and for which the federal government has accepted responsibility. The Government of Canada, through NRCAN took the responsibility for cleaning the historic LLRW in the Port Hope area.

On December 1, 2004, AECL submitted an application for a Waste Nuclear Substance Licence for the Port Hope Area Initiative, Port Hope Project. At this time an Environmental Assessment had already started on the Port Hope Project with NRCAN as a lead Responsible Authority. In March 2007, following CNSC Public Commission Hearing, it was concluded that the Port Hope Project, taking into account the mitigation measures identified by the Environmental Assessment Screening Report, would not likely cause significant adverse environmental effects [2].

Following the completion of Environmental Assessment, AECL was required to develop the detailed design for the LTWMF and other project-specific programs required for obtaining regulatory approvals and moving to the implementation Phase II of the project. The Government approved the PHAI more than ten years ago when the project was still in the concept phase. For advancing the detailed design for the new LTWMF and the required licensing documentation for authorizing the implementation Phase II, the estimates made at this time had to be reviewed.

The CNSC has taken a unique regulatory approach to address the various licensing issues and to set out the requirements for licensing of the Port Hope Project within the current regulatory framework. Specific regulatory tools were used to allow government funding and advance the project through Phase I.

Protocol for Licensing Activities

The total activity of the radioactive waste that will be stored and managed under the Port Hope project is less than 10^{15} Bq. As per applicable regulations in Canada, the appropriate type of licence for the Port Hope project would be a Waste Nuclear Substance Licence (WNSL).

A WNSL will authorize AECL to possess, manage and store nuclear substances that are required for, associated with or arise from Port Hope Project activities. However, the Port Hope Project activities include operation of the existing Welcome WMF, preparation of the site and construction of the new LTWMF, transfer of LLRW from Welcome WMF to the LTWMF and remediation of contaminated sites. Normally, those activities are not included in an application for a WNSL and the regulatory requirements for this low level risk licence do not cover such activities.

To define the project- specific technical information required to support a WNSL covering all project activities, a Protocol for the Port Hope project Licensing Activities was developed and signed by the regulator CNSC, the Federal Government responsible authority NRCan and the proponent AECL [3]. The Protocol established the administrative framework and service standards for the submission and the regulatory review of the technical documentation leading to the project licensing.

Licence with Hold Point

The Port Hope project was ranked as a low risk project in terms of radiological and health and safety risk. As per the current regulatory framework in Canada, the authority for making licensing decisions on the low risk projects is delegated to the level of CNSC staff, Director General. However, due to the huge public interest for the Port Hope project arising from the fact that most of the remediation activities will be conducted in the town of Port Hope and on people's private properties, the risk profile of the project was raised. For a licensing decision, the project was presented in a public proceeding to the CNSC Commission Tribunal.

In 2009, following a Public Commission Hearing, a WNSL with hold point was issued to AECL. Condition 1.4 of the licence restricts AECL from conducting the Phase II project activities until the supporting documentation specified in the licence is submitted and accepted by the CNSC. This is the same technical documentation defined by the Protocol for Port Hope project licensing activities. Condition 1.4 is a hold point for Phase II activities.

The Commission, in making its decision, considered information presented by the regulator CNSC staff, the proponent AECL, the NRCan which represents the Government of Canada and oral and written submissions from ninety nine (99) interveners including the Municipality of Port Hope, local conservation authorities and residents from Port Hope.

The issuance of the WNSL with hold point to AECL set out clear requirements for completion of the transition Phase I and provided assurance for obtaining government funding for finalizing the technical documentation and moving to the implementation Phase II. The CNSC Commission directed AECL to come back before the Commission to present the technical information required prior to initiating Phase II construction or remediation activities.

Federal-Provincial Resolution of Clean-up Criteria

The original clean-up criteria were developed for the PHAI by AECL in consultation with public stakeholders, the Municipalities of Port Hope and Clarington, and provincial and federal authorities during the Environmental Assessment.

The PHAI clean-up criteria for soil were developed following protocols, guidance and regulatory practice set by the CNSC, the Ontario Ministry of the Environment (MOE), and Environment Canada. International practice was also considered. In cases where established clean-up criteria did not exist, criteria were created especially for the PHAI [4].

Clean-up criteria were selected for radioactive and non-radioactive contaminants of potential concern (COPCs) in LLRW and soil, in harbour sediments, in water and ground water, and in air including radon levels in houses. The COPCs present in LLRW are all natural elements in soil, but which occur in relatively high concentrations in historic LLRW associated with early operations of nuclear industry in the Port Hope area.

For radioactive COPCs, each criterion was derived in such a way as to limit the dose to persons to 0.3 mSv/a, which represents 30% of the 1 mSv/a dose limit set for protection of the general public. Furthermore, the criteria are used in a combining formula to ensure that the dose to persons resulting from exposure to all radioactive COPCs combined remains below 0.3 mSv/a. The ALARA (As Low as Reasonably Achievable, social and economic factors taken into consideration) approach will be applied during the cleanup operations. For non-radioactive COPCs, the cleanup criteria for soils affected by LLRW or industrial waste are generally the MOE standards for residential land use or, in locations where development constraints will be applied, the MOE standards for industrial/commercial land use.

Since the original clean-up criteria were developed, new provincial standards for cleanup of contaminated soil came into force in 2011. For sites without development constraints which include residential/parkland use, the originally developed project-specific clean-up criterion for uranium is 35 ppm. This value is below the CNSC exemption quantity for licensing under the *Nuclear Substance and Radiation Devices Regulations* and was accepted by MOE as protective for human health and ecological receptors. Due to pressure from the Municipality of Port Hope and following discussions with NRCAN, AECL decided to fully adopt the more restrictive value of 23 ppm as per the provincial generic standards specified in Ontario Regulation 153 amended in 2011.

The Federal Government decision to apply the provincial generic standards for the cleanup of residential and municipal properties in Port Hope eliminates any potential regulatory restrictions for using the remediated sites in the future and addresses the public concerns for not applying the more restrictive provincial standards.

CONCLUSIONS

The unique regulatory approach taken by the CNSC staff for licensing the Port Hope Project resulted in the successful transition of the project from planning to the implementation phase. The regulatory tools used during the process allowed for setting out specific licensing requirements for the project within the existing regulatory framework. Developing a Protocol for licensing activities and a licence with hold points set a precedent for using similar tools for other projects with complex licensing issues. The Federal-Provincial resolution of the project specific clean-up criteria in overlapping jurisdictions established a joint-regulatory group that will ensure on-going regulatory oversight during the implementation phase.

The Port Hope Project was presented to the CNSC Commission Tribunal for relicensing on October 24, 2012. The Waste Nuclear Substance Licence authorizing the implementation of Phase II - construction and remediation activities was issued on November 15, 2012.

REFERENCES

1. An Agreement for the Cleanup and the Long-Term Safe Management of Low-Level Radioactive waste Situate in the Town of Port Hope, the Town of Hope and the Municipality of Clarington, signed 2001 March, as amended 2006 October.
2. Government of Canada, Environmental Assessment Screening Report for the Port Hope Long-Term Low-Level Radioactive Waste Management Project, 2006 December.
3. CNSC, AECL, NRCAN, Protocol for the Port Hope Project Licensing Activities, 2010 April.
4. EcoMetrix Incorporated, Port Hope Area Initiative Cleanup Criteria, 2006, Revision 5.