



BWXT Nuclear Energy Canada Inc.

## Peterborough Operations Preliminary Decommissioning Plan Summary

BWXT Nuclear Energy Canada Inc.'s (BWXT NEC) Peterborough operation assembles natural uranium fuel pellets into fuel bundles.

The facility can handle both natural and depleted ceramic uranium dioxide ( $UO_2$ ) fuel pellets for use in CANDU® (Canadian Deuterium Uranium) reactor fuel bundles.



### The Facility

Sintered fuel pellets are received from the BWXT NEC's Toronto facility. The fuel bundle manufacturing operations involve the loading of these fuel pellets into zirconium tubes, sealing, welding and machining of the tubes to produce fuel elements and the assembly of the fuel elements into fuel bundles. Details of fuel bundle design vary by reactor. However, fuel bundles currently manufactured at BWXT NEC in Peterborough generally consist of 28 or 37 fuel elements.

The Peterborough operations are located at 1160 Monaghan Road, Peterborough, Ontario. BWXT NEC operations occur within four buildings on the western side of the plant complex located between Monaghan Road and Park Street North. GE Canada retains ownership of the property and leases the structures to BWXT NEC under a lease agreement.

The main building for the nuclear fuel operations is Building 21, while Building 24 is used for fuel storage. There is also a Fuel Handling and Engineering Solutions business unit operating in Building 26. Building 28 is the main shipping and receiving area.



### Preliminary Decommissioning Plan Summary

The Preliminary Decommissioning Plan (PDP) and associated Decommissioning Cost Estimate (DCE) has been performed to determine the amount of the financial guarantee required in accordance with Canadian Nuclear Safety Commission (CNSC) Regulatory Guide G-206 Financial Guarantees for the Decommissioning of

Licensed Activities, and Regulatory Guide G-219 Decommissioning Planning for Licensed Activities.

### Strategy

The preferred decommissioning strategy for the BWXT NEC Peterborough operations is to release the entire licensed property (including land and buildings) from regulatory control for reuse or demolition of the structures. This decommissioning approach calls for the prompt removal and off-site disposal of radioactive contamination and other hazardous materials in excess of established clearance levels as required to meet the release criteria established by the CNSC for a Licence to Abandon.

### Hazards

There are potential radiological exposures associated with the handling of uranium dioxide. An effective radiation protection program is in place at the facility and radiation doses received by persons who work at the facility are a fraction of the applicable dose limit. With the facility shutdown, radiation doses would be further reduced and the radiation protection program would be maintained. Therefore, radiation hazards to workers during decommissioning would be similar to, or less than, radiation hazards present during normal operations.

Similarly, environmental releases and public dose during normal operations are both a very small fraction of the licensed release limit and public dose limit respectively. Emissions and public doses will be reduced even further during the decommissioning period.

Similarly, a beryllium safety program is in place for beryllium operations and will continue through decommissioning.

All decommissioning work will be completed with strict adherence to BWXT NEC's

Radiation Protection Manual, Beryllium Safety Manual, and Environmental Health and Safety Manual. Where required, these documents will be used as a benchmark for the design and implementation of decommissioning-specific programs, procedures and plans including:

- Radiation Protection.
- Beryllium.
- Hazardous Material Handling and Industrial Safety.
- Environmental Protection.
- Health and Safety.
- Utility Management.
- Fire Protection and Emergency Response.
- Training.

### Approach

The decommissioning of the site will take place in four phases. These phases include:

- Phase 1: Post Operational Shutdown and Completion of Characterization Survey;
- Phase 2: Completion of a Detailed Decommissioning Plan (DDP) and Submission to CNSC;
- Phase 3: Decommissioning of Property; and
- Phase 4: Completion of Final Surveys, CNSC Sign-Off and Application of Licence to Abandon.

During post-operational shutdown, an interior and exterior characterization survey will be completed at the site to determine the level of uranium impacts at the facility. The information collected will be used as input to the DDP.

All uranium area production machinery, together with associated ventilation and filtration equipment would either be disposed of as radioactive waste, decontaminated and disposed of as unrestricted waste or decontaminated for other use. Building

infrastructure in the uranium area (Heating, Ventilation, and Air Conditioning (HVAC), piping and light fixtures) would be removed and cleaned for unrestricted disposal, or disposal as Low Level Waste (LLW). A central washing area will be set up, so that effluent from equipment washing will be treated and any surfaces identified to be contaminated will be decontaminated before disposal. Decommissioning will start with the operating floor being gutted to a shell state, and the final work will consist of thorough vacuuming and washing. Contaminated equipment will be removed for disposal at the EnergySolutions Metal Melt facility in Oak Ridge, TN.

Similarly, beryllium area production machinery and associated ventilation equipment would either be disposed of as beryllium-contaminated hazardous waste, decontaminated and disposed of as unrestricted waste, or decontaminated for other use.

The offices in Building 21 will be cleaned.

The existing Radiation Protection Manual and Beryllium Safety Manual will form the basis for radiation and beryllium protection during decommissioning. All decommissioning work will be completed in strict adherence to BWXT NEC's Radiation Protection Manual and the Beryllium Safety Manual. Where required, further development of plans and protocols in support of radiation protection and personnel dosimetry, to ensure doses are kept as low as reasonably achievable, will be completed. Workers will be monitored for uranium and beryllium uptake, as are current production workers. They will be required to wear personal protective equipment at all times when in the working area. The existing change facilities, worker staircases, and lunch room facilities will be used as for current production workers.

## **Final End-State Objectives**

The end-state objective of the decommissioning strategy is the unrestricted release of the entire licensed property from regulatory control such that the facility lease agreement can be terminated. As such there is no predicted requirement for long-term institutional controls. Costs for refurbishment or demolition of the structures at the conclusion of the decommissioning and abandonment of the licence are outside the scope of the PDP.

## **Cost Estimate**

The cost estimate includes all labour, material, equipment, site operating expenses, CNSC regulatory fees, waste packaging, transportation and disposal costs required to decommission the facility to the end-state objective of unrestricted release for either reuse or demolition.

The total cost for decommissioning the site is estimated to be \$10,775,122 in 2024 Canadian dollars.

BWXT NEC has requested that the financial guarantee instrument be a combination of Surety Bond and Letter of Credit, with the first \$700,000 being satisfied by a Letter of Credit. The remaining obligation would then be satisfied by Surety Bonds.

Until such time as the updated PDP amounts and financial instruments are approved, BWXT NEC maintains the existing financial guarantee amounts in the form of an irrevocable Letter of Credit.

## **Conclusions**

BWXT NEC will undertake periodic reviews of the PDP and update it as required. The updates will reflect any changes to operations, conditions, evolving technologies and regulatory requirements, including the application for licence renewal.

Unless otherwise dictated by significant changes to the facility, the PDP will be updated every five years. The next planned update will be performed in 2024.

### **Contact Us**

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