



BWXT Nuclear Energy Canada Inc.

Fuel Assembly Operation Preliminary Decommissioning Plan Summary - 2023 (rev 1)

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

The facility can possess both natural and depleted ceramic uranium dioxide (UO₂) fuel pellets, which are used to produce 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 stacking and 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 fuel assembly operation is 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 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) have been produced to determine the amount of the financial guarantee required in accordance with Canadian Nuclear Safety Commission

(CNSC) regulatory documents REGDOC-2.11.2 *Decommissioning* and REGDOC-3.3.1 *Financial Guarantees for the Decommissioning of Nuclear Facilities and Termination of Licensed Activities*.

In order to ensure the PDP and associated decommissioning cost estimate are maintained current, the CNSC requires these to be updated, and revised financial guarantees approved by the CNSC Commission, at least every five years. The revision of these preliminary decommissioning plans is therefore routine, and do not imply any intention to decommission the facility at this time, nor does it imply any changes to the operations at the facility. Should BWXT wish to transition from operations to decommissioning in the future, this would require the development of a detailed decommissioning plan and would require issuance of a licence to decommission from the CNSC.

It is noted that in its 2020 decision and subsequent issuing of the facility licence, the CNSC included within the licensing basis the production of fuel pellets at the Peterborough facility, subject to certain conditions. BWXT does not at this time produce pellets at the Peterborough facility and, as a result, the pelleting process is not included in the PDP scope. Should pelleting be conducted in Peterborough in the future, that change would involve the update to a number of program documents, and an update to the PDP would be required at that time.

Strategy

The preferred decommissioning strategy for the BWXT NEC Fuel Assembly Operation is for decommissioning of all licensed areas to a condition wherein it can be released from regulatory control under a Licence to Abandon issued by the CNSC. This entails the removal of all contaminated equipment for disposal and remediating the site and

structures of uranium/beryllium contamination.

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 shut down, 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 and, as a result, no adverse effects are expected to human health or to non-human biota (i.e., the environmental receptors).

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, waste and materials in inventory will be removed and 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 removal of materials and equipment from the

operating floor, and the final work will consist of thorough vacuuming and washing.

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 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.

Decommissioning activities are anticipated to generate approximately 160 m³ of uranium impacted, beryllium impacted, and other hazardous waste.

Waste routes currently in use for normal operations are anticipated to be used for wastes arising from decommissioning activities. These are commercially available waste vendors, and the cost estimate does not include or rely on any on-site disposal, or disposal of wastes at any other BWXT facility location.

Final End-State Objectives

The end-state objective of the decommissioning strategy is the unrestricted release of the entire licensed property from regulatory control. 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 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.

It is the licensee's responsibility to bear the costs of facility decommissioning at the end of life. In the case that the licensee is incapable of fulfilling that responsibility, the CNSC requires that financial guarantee instruments be maintained to cover the full costs of decommissioning. These funds are available to the CNSC, and this ensures that sufficient funds are always available for facility decommissioning.

The total cost for decommissioning the site is estimated to be \$10,069,695 in 2027 Canadian dollars.

BWXT NEC has requested that the financial guarantee instrument be a combination of Surety Bond and Letter of Credit, with the first \$516,904 being satisfied by a letter of credit. The remaining obligation would then be satisfied by surety bond.

Until such time as the updated PDP amounts and financial instruments are approved, BWXT NEC maintains the existing financial guarantees.

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.

Unless otherwise dictated by significant changes to the facility, the PDP will be updated every five years.

Contact Us

For further information, please contact:

Phone: 1.855.696.9588

Email: questions@bwxt.com

Web: nec.bwxt.com

BWXT Nuclear Energy Canada Inc.
1160 Monaghan Road
Peterborough, ON K9J 0A8