



Nuclear Energy Canada Inc.

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## Toronto Nuclear Fuel Pellet Operations Fire Protection Program Summary

The primary goals of the fire protection program are to minimize the risk to the environment, members of the public, workers and the facility as a result of fire at BWXT Nuclear Energy Canada Inc. (BWXT NEC) in Toronto.

### The Facility

BWXT NEC's Toronto operation is licensed to produce natural and depleted uranium dioxide pellets under Nuclear Fuel Facility Operating Licence FFOL-3620.01/2020. Ceramic grade Uranium Dioxide ( $UO_2$ ) powder is received in Type IP-1 steel drums from the Cameco Port Hope Facility or alternate supplier. This powder is pressed into pellet-shape and sintered in hydrogen atmosphere furnaces at high temperature. The sintered pellets are hard and ceramic. Sintered pellets are ground to the required diameter, inspected and wrapped for shipment to BWXT NEC's Peterborough facility. In Peterborough, the pellets are loaded into zirconium sheaths and assembled into bundles for use in CANDU® (Canadian Deuterium Uranium) reactors.

The Toronto facility is located on the east side of Lansdowne Avenue, north of Dupont Street in Toronto, Ontario at 1025 Lansdowne Avenue, Toronto, Ontario. BWXT NEC's property comprises a parking

lot and two buildings, known as Building 7 and Building 9. GE Canada retains ownership of the property and leases the structures to BWXT NEC under a lease agreement.



Building 7 is municipally addressed as 1025 Lansdowne Avenue, Toronto, Ontario, and houses uranium dioxide pellet manufacturing operations on the first, second, and third floors. The fourth floor contains offices used for administration purposes and office space for BWXT NEC Toronto personnel. Building 7 houses one passenger elevator and one freight elevator. Building 9 is municipally addressed as 155 Brandon Avenue, Toronto, Ontario. It is used to temporarily store uranium wastes. The remaining portion of the property between the two buildings is used as a parking lot. In addition, a liquid hydrogen storage facility is located outside, to the northeast of Building 7. The hydrogen tank is in a fenced off area and installed on a concrete pad.

Access to the BWXT NEC site for firefighting is from Brandon Avenue. Firefighters' access to Building 7 is through the main entrance to the building off Lansdowne Avenue and the

employee entrance, which is located to the East side of the building. Firefighters' access to Building 9 is through the main entrance to the building, which is located on the West side of the building.

### **Emergency Response Plan**

The Toronto facility has a separate Emergency Response Plan that outlines the organization and methods to prepare for, respond to, and recover from emergencies. Summaries of the Emergency Response Plan can be found on the BWXT NEC website at [www.nec.bwxt.com](http://www.nec.bwxt.com).

### **Fire Response**

In the event of a fire emergency, employees are to follow these steps:

- Pull the fire alarm pull station from within Building 9 or 7 and call 911.
- If inside Building 7 and a fire alarm has sounded, all employees shall evacuate the building via the nearest safe exit and collect at the muster area located within the main southwest entrance of Building 9.
- If inside Building 9 and a fire alarm has sounded, all employees shall evacuate the building and proceed to Shipping in Building 7.
- A "Do Not Stray" instruction will be issued to all assembling employees to advise all employees to remain at the assembly point until given further instructions.

### **Facility Safety Features**

The following fire and life safety features are in place at the BWXT NEC Toronto facility to detect and respond to fires, and to facilitate life safety in the event of a fire:

**Fire Alarm System:** Building 7 and 9 are provided with single stage fire alarm systems

that are stand-alone and connect to a central station monitoring company.

**Automatic Sprinkler System Protection:** Building 7 is provided with wet-type automatic sprinkler protection. Building 9 is provided with dry-type automatic sprinkler protection. Both are equipped with a tamper switch, low pressure switch and a flow switch.

**Special Fire Suppression System:** CO<sub>2</sub> chemical extinguishing systems are located in some rooms in Building 7 and provides protection of the interior of some equipment. The systems are activated by heat detectors, operation of a manual dump station and operation of the local cylinder valve.

**Portable Fire Extinguishers:** There are multipurpose dry chemical portable fire extinguishers located in all areas of both Building 7 and 9. Additionally, there are Class D extinguishers in Building 7 and throughout Building 9 for zirconium fires.

**Exit Signs:** Illuminated exit signs are provided above doors providing emergency exiting from the building as well as along egress paths to provide direction to occupants to the closest exit.

**Emergency Lighting:** Emergency light unit packs and remote light fixtures are provided throughout the facility to illuminate exits and principal egress routes leading to exits. These units are equipped with dedicated battery backup power. The fixtures receive emergency power, upon loss of power to the building, via the closest remote emergency light unit pack.

### **Equipment and Materials**

Specific equipment and materials have been designated for use in responding to a fire or detecting a potential fire hazard, such as:

Fire Protection Equipment:

- Fire protection system;

- Fire extinguishers;
- Fire hydrant; and,
- Portable combustible gas detection meter.

#### Special Alarm Systems:

- O<sub>2</sub> gas alarm;
- H<sub>2</sub> gas alarm;
- CH<sub>4</sub> gas alarm;
- CO gas alarm;
- N<sub>2</sub> gas alarm;
- CO<sub>2</sub> chemical suppression alarm; and,
- Gas detection panels.

### Communication Equipment at Facility

Emergency red phones are located in both Building 7 and 9 and will work in the event of a power failure. Emergency phone numbers are provided to all staff. Two way radios are also available for use in the event of an emergency and are located in Building 9 and the Emergency Operations Centre (EOC) trailer. A paging system is available for communicating within Building 7 and 9 via internal and portable phones.

### Emergency Wardens

The National Fire Code requires the facility to have an approved Fire Safety Plan and appointment of trained supervisory staff who are responsible for carrying out the duties in the plan. BWXT NEC identifies these individuals as Emergency Wardens who have specific responsibilities for the areas where they work. The Emergency Wardens receive training on fire extinguisher use and are familiarized with the location of equipment and fire panels.

The Head Emergency Warden oversees the duties outlined in the plan and has specific responsibilities. At BWXT NEC in Toronto, the Head Emergency Warden duties are carried out by the following two positions: Accounting Director and On-Scene Director.

The Head Emergency Wardens maintain the list of Emergency Wardens and alternatives, performs annual reviews of the plan, participates in drill planning and critique, participates in post-incident review meetings following an emergency event and shares comments and observations, and ensures training is conducted.

### Inspections, Testing and Maintenance

**Fire Protection and Life Safety:** The Engineering department at BWXT NEC in Toronto are responsible for coordinating the inspection, testing and maintenance of the fire protection and life safety equipment and building facilities. These actions are implemented through an internal compliance tracking tool that is reviewed annually to verify requirements have been met.

**WSC Inspections:** Members of the Workplace Safety Committee (WSC) complete monthly inspections throughout the facility of fire protection and housekeeping items.

**Housekeeping Inspections:** Staff inspections are completed once a month and all employees are responsible for a daily inspection of their immediate area.

### Fire Protection Assessment

Third party reviews are conducted annually to review compliance with the National Fire Code and CSA N393-13. The objective of the review is to ensure that all aspects of the NFCC are covered and confirmed by visual inspection as required by CSA N393-13 and that the below requirements are met:

- Building and occupant safety;
- Indoor and outdoor storage;
- Flammable and combustible liquids;
- Hazardous process and operations, including hot work; and,
- Fire protection equipment.

The third party review is implemented through an internal compliance tracking tool.

Additionally, a fire hazard analysis (FHA) as outlined in CSA N393-13 has been completed for the BWXT NEC Toronto facility. The FHA is updated as necessary to reflect facility modifications, changes in fire hazards, and operating experience. The FHA requires updating or confirmation at least once every five years.

### **Housekeeping**

Housekeeping procedures are in place to minimize the probability of fire and the consequence resulting from a fire. All employees are responsible for maintaining a clean and clutter-free work area, and a decontamination department is in place which has additional housekeeping responsibilities. All egress and access routes are to be kept clear and transient materials shall be minimized and controlled in the facility and moved/removed when the activity is completed. Garbage is collected daily and cardboard is to be removed from the facility where practical.

### **Facility Modifications**

The facility Change Control Procedure ensures there is an Environmental, Health and Safety review system developed for all new or modified facilities, new processes, and new, modified or relocated equipment. The system provides a mechanism to verify the identification and control of environmental health and safety issues, and ensures compliance with applicable regulations, from the onset to the completion of the activity.

Facility changes, with the potential to impact protection from fire, require a third party review. Proposed modifications are required to be submitted for an independent third-party review for compliance, have the review carried out by one or more independent reviewers with specific expertise, and submit in writing, the results of the review to the CNSC prior to the modification.

Fire safety must be maintained and considered during work activities. During contractor activities, a safe work plan is initiated to address any risks, including fire hazards, associated with the scope of their work. All work activities and control transient materials shall be planned and managed to ensure that egress paths are not obstructed, access paths to firefighting equipment are not obstructed, firefighting activities are not compromised and potential impacts from fire are evaluated and minimized.

### **Impairments to Fire Protection System**

In the event of a planned impairment, necessary parts and personnel shall be assembled prior to the removal of the fire protection system(s) from service and an attempt to minimize impact of inoperative equipment should be made. In the event of an unplanned impairment or a system discharge, the repair work or fire protection system restoration shall be expedited. Post testing shall be performed by a qualified person to ensure system functionality.

### **Ignition Source Control**

Ignition sources at the BWXT NEC Toronto facility are managed and minimized. No smoking is allowed on site and the use of electrical extension cords is minimized. Electrical equipment and wiring are installed in accordance with applicable electrical codes.

Hot work permit procedures are followed when a potential of an ignition source is introduced in the facility. This ensures that fire safety is managed during the hot work activities and provides assurance that all reasonable and appropriate safeguards have been taken to prevent fire or explosion from such activities. Anyone working within the Toronto facility that is introducing an ignition source outside of the Maintenance Weld Shop must complete a hot work permit. Hot work is not permitted if the sprinkler system

(or any part of it) is inoperable, unless the hot work is directly related to a sprinkler impairment, in which case approval is required by the Director, Fuel Operations.

### **Design Requirements**

Design requirements are in place at the BWXT NEC Toronto facility to prevent and mitigate fire and includes requirements related to fire prevention and combustible material.

**Fire Prevention:** The facility is subdivided into separate fire areas or compartments by fire separations for the purpose of limiting the spread of fire, protecting personnel and limiting damage to the facility. Piping, tubing, wiring, cables, raceways and other equipment that penetrates a fire separation are sealed by a firestop system to provide a fire-protection rating equivalent to the fire separation in accordance with the National Building Code of Canada requirements.

**Minimization and Management of Combustibles:** Inspection procedures and Change Control programs are in place to minimize and manage combustibles. The below elements are included but not limited to the following:

- Minimizing the use of building fixtures containing combustible materials;
- No accumulation of combustible waste in work areas;
- Minimizing the use of combustible materials in electrical equipment and cables;
- Minimize and control transient materials;
- Limit the location of, and reduce content inventory of flammable liquids to those necessary for operation;
- Handle, use and store flammable and combustible liquids as well as combustible gases in accordance

with National Fire Code of Canada (NFCC) requirements; and,

- Store, use, maintain and inspect compressed gases in portable containers, cylinders or tanks in accordance with NFCC requirements.

### **Firefighting Water Control**

BWXT NEC's Toronto facility has measures in place to prevent firefighting and sprinkler water from escaping the facility.

### **Contamination Control**

Fire department personnel and equipment must be monitored for contamination before they leave the BWXT NEC Toronto site.

### **Heating, Venting and Air Conditioning**

Air handling ducts, duct connectors and plenums shall be made of non-combustible material. High Efficiency Particulate Air filters shall meet the combustibility requirements of ANSI/UL 586 and ANSI/UL 900.

### **Fire Protection Training**

All employees complete fire protection training upon hire and are required to refresh training every two years. Emergency Wardens are trained every two years and complete hands-on fire extinguisher training. Employees with roles and responsibilities related to the fire protection program review the procedure and complete an assessment on the contents. Visitors, contractors and new employees are informed of emergency signals and appropriate emergency response actions by EHS through the EHS orientation video. Training is tracked and maintained by the EHS department.

Fire and emergency drills are coordinated and when possible, outside emergency personnel are involved. Annually, BWXT NEC meets with the Toronto Fire Services to provide information about the facility and familiarization tours.

## **Fire Incidents**

Fire incidents at the facility are investigated and in most cases require notification to the CNSC. BWXT NEC is able to identify and trend fire incidents and determine corrective actions taken. Where deficiencies are identified, action plans are developed and implemented to prevent the occurrence of similar incidents.

All fire incidents are investigated by a qualified person and fire experts are solicited when required. Appropriate authorities are notified for a fire or uncontrolled combustion event that causes injury or property damage and has the potential to result in severe consequences.

## **Program Review**

A fire protection program audit is conducted every three years on each program element to confirm compliance with CSA N393 and other applicable codes, standards and industry best practices in fire protection. Quality Assurance programs apply to verify that the fire protection systems are designed, fabricated, implemented, tested, maintained and operated as intended.

## **Contact Us**

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