



BWXT Nuclear Energy Canada Inc.

Peterborough Emergency Plan Summary

The purpose of the plan is to outline the organization and methods to prepare for, respond to, and recover from emergencies at BWXT Nuclear Energy Canada Inc. (BWXT NEC) in Peterborough.

Part I: Facility Description

The Facility

BWXT NEC's Peterborough operation assembles natural uranium fuel pellets into fuel bundles. The Peterborough operation is licensed to process a maximum of 150 Megagrams (150 tonnes) of uranium monthly under Nuclear Fuel Facility Licence FFL-3620.00/2030.

The facility handles both natural and depleted ceramic uranium dioxide (UO_2) fuel pellets for use in CANDU® (Canadian Deuterium Uranium) reactors.

Sintered fuel pellets are received from the BWXT NEC Toronto operation. 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. This takes place

primarily in Building 21 with storage of completed fuel bundles in Building 24.

BWXT NEC's Peterborough operation is located at 1160 Monaghan Road, Peterborough, Ontario. The Peterborough operation occurs within four buildings on the western side of the plant complex located between Monaghan Road and Park Street North.



Part II: Preparation

This section describes how BWXT NEC is administratively organized to prepare for, and react to, emergency events including coordination with off-site emergency response organizations and government agencies.

Normal Facility Organization

The BWXT NEC organization is detailed in licensing submissions to the Canadian Nuclear Safety Commission (CNSC). The President, BWXT NEC has overall responsibility for operations and safety. The Director, Fuel Operations reports to the President, BWXT NEC and has responsibility

for operations and safety including emergency response for BWXT NEC Peterborough.

At BWXT NEC Peterborough, fuel operations are led by the Production Manager. The Environmental, Health and Safety (EHS) and Quality departments report to the Director, Fuel Operations. The EHS department is responsible for occupational health and safety, environmental protection, and radiation protection.

During second, third shifts, weekends and holidays, a resource remains on-call via pagers for emergency response and support.

The Peterborough operation may be called upon to support an emergency in Toronto.

Onsite Emergency Organization

Emergency Organization (EO) is activated as required by designated individuals. The EO is made up of two groups; the Emergency Management Organization (EMO) which assembles in the Emergency Operations Center (EOC) under the direction of the Emergency Director (ED); and the Emergency Response Organization (ERO) which is dispatched to the scene of the emergency as directed by the EMO for the purpose of controlling and mitigating the emergency.

The EMO is supplemented by staff that may be located remotely (rEMO) that are connected to the EOC through a bridge (conference) call. These staff occupy a virtual or remote EOC (rEOC). The key personnel in each of these groups are described in the following paragraphs.

During first shift on weekdays, excluding holidays and plant shutdown, a representative for each of the EMO/rEMO positions is normally available. The EMO can be summoned to the EOC by activation of the Employee Notification System (ENS). EMO personnel not located at site during an emergency may join the rEOC until such time

as they arrive on site and transition to the EOC. The rEMO is summoned to the rEOC by the ENS.

Coverage by ERO personnel is normally available on weekdays during the three operating shifts. However, due to limited number of personnel available on site during second and third shifts not all ERO functions are immediately available. In this case, positions within the ERO are filled as necessary to respond to the emergency situation.

Emergency Management Organization (EMO)

Emergency Director (ED): The ED shall be the Fuel Production Manager or specific management designated as alternates. The ED has ultimate responsibility and authority for the conduct of all BWXT NEC response actions to events while the EO is activated. The ED has the responsibility to declare the EO active, to classify events, to declare the emergency terminated and deactivate the EO.

On-Scene Director (OSD): The OSD is responsible for:

- Interfacing with offsite response agencies;
- Command and control of all BWXT NEC personnel deployed to the scene; and,
- Acting as the focal point for communication between the EOC and the scene.

Accounting Director (AD): The AD reports to the ED and remains at the assembly area upon evacuation. The AD is responsible for performing personnel accounting and reporting results to the ED. The AD is also responsible for releasing personnel from the assembly area to the scene as directed by the ED.

Emergency Coordinators: Emergency Coordinators shall be the leaders or their designees of various functions. Emergency Coordinators shall provide the ED information and advice needed to assess and develop emergency response actions. Emergency Coordinators shall also be responsible for coordinating the emergency response actions of their respective function and personnel. There shall be an EHS Coordinator and an Engineering Coordinator.

Scribe: The Scribe is responsible for recording event progress and tracking actions to completion.

EOC Support: Personnel may be assigned to the EOC to support Emergency Coordinators. For example, the Engineering Coordinator may be supported by one or more engineers as required.

Remote Emergency Management Organization (rEMO)

EHS & Regulatory: Provides advice to the EMO. Coordinates notification to the CNSC and other regulatory bodies. Interfaces with BWXT Corporate EHS.

Communications: Coordinates development, approval and delivery of internal and public communications. Interfaces with BWXT Corporate Communications.

Director, Fuel Operations: Provides advice and resources. Communicates with BWXT Corporate. Identifies, mobilizes and provides resources from the Toronto operation to support as required. Is responsible for initiating the recovery plan as required.

Others (as required): Other senior leadership, Human Resources, Legal, etc.

Emergency Response Organization (ERO)

The ERO is deployed to the scene by the ED as required. Personnel deployed to the scene are under the immediate direction of the OSD.

The ERO consists of employees who are assigned duties as defined under the emergency response program commensurate with their training. These personnel assist in evacuation, perform first aid, support security, perform smoke watch, conduct personnel and equipment radiological surveys, assist in the shutdown of building services, etc.

Personnel employed in Environmental Protection, Radiation Protection, Health and Safety, Engineering and Plant Operations may be involved in emergency response and often are sources of information for their respective Emergency Coordinators.

Local Off-site Assistance

Through regular consultation and coordination, arrangements for emergency support are maintained with the Peterborough Fire Services (PFS). The type of support required is reviewed during coordination meetings.

Coordination with Government Agencies

During an emergency at the site coordination with the following local, provincial, and federal authorities may be necessary.

- a) The Canadian Nuclear Safety Commission (CNSC): The CNSC is the federal agency charged with the regulation of nuclear fuel facilities under the Nuclear Safety and Control Act. CNSC regulates BWXT NEC in Toronto and Peterborough through their Fuel Facility Licences. Under the Licences, the licensee is required to notify the CNSC concerning accidents in

accordance with the Licence and associated Licence Condition Handbook.

- b) The Ontario Ministry of Environment and Climate Change (MOECC): The MOECC shall be contacted in the case of unauthorized release of uranium or other hazardous substance into the environment. This includes release of water and releases to the air.
- c) City of Peterborough – Department of Public Works (water/sewer emergency): The City of Peterborough Department of Public Works shall be contacted in the case of unauthorized release of uranium or other hazardous substance into the sanitary or storm sewer.
- d) Employment and Social Development Canada (ESDC): ESDC shall be contacted as soon as feasible, but not later than 24 hours, of the events listed in the Canada Occupational Health and Safety Regulations paragraph 15.5.
- e) Canadian Transport Emergency Centre (CANUTEC): Transportation incidents involving hazardous materials are addressed under ERAP ERP2-0107.
- f) Technical Standards and Safety Authority (TSSA): A medical emergency related to an elevating device that resulted in the death or serious injury (i.e. requiring the services of a medical practitioner) to any person requires immediate notification. An injury not requiring the services of a medical practitioner require reporting within 24 hours.

Failures of the pressure boundary are described in TSSA's Guideline for Incident Reporting Criteria – Boilers and Pressure Vessels.

Emergency Equipment and Facilities

This section describes the equipment and resources maintained on site to identify, respond to, and manage emergencies.

Control Point

The EOC is activated for events in Peterborough. The EOC is a designated conference room in Building 21, and an alternate EOC is located in Building 26. This EOC provides shelter for EMO staff and infrastructure to facilitate response to emergencies. The EOC is climate-controlled and contains tables, chairs, whiteboard, site plans, reference material, a conference phone and communication equipment.

For transportation emergencies, the location of the lead site (Peterborough or Toronto) will be determined based on the location of the transportation accident and proximity to one site or the other. Where applicable, the selection of the lead site and activation of that site's EO will be declared as soon as possible.

The rEOC is a virtual space established through the initiation of a bridge (conference) call by the EOC and notification of rEMO through the ENS. The rEMO staff call in to the bridge (conference) call as required from their remote location(s).

The conference line access information is maintained within the ENS message.

Communications Equipment

On-site Communications: The primary means of communications on site during an emergency is by using handheld radios.

An alternative means of communication between the EOC and scene, assembly area and others is via the commercial landline and mobile telephone system.

External: Cellular or landline telephones are used for notification to the CNSC and other

agencies during emergencies. A commercial telephone system is available in the EOC for making notifications and requests for offsite assistance.

Emergency Response Equipment

Fire Fighting Equipment: The Peterborough operation maintains portable fire extinguishers suitable for the hazards present, including Class ABC as well as Class D metal extinguishers. Fire extinguishers are inspected on a scheduled basis. Additionally, the facility is equipped with automatic sprinkler systems.

Rescue Equipment: Stretchers are maintained on site. Automatic External Defibrillators (AED) are available in each building.

Hazardous Material Response Equipment: Spill control equipment has been placed throughout the facility where hazardous materials such as acids are used or stored.

Medical Treatment Equipment and Facilities

First aid kits and emergency eye wash stations are located throughout the facility. Several areas are provided with shower stalls, which may be used in an emergency.

Meteorological Monitoring

Meteorological data can be obtained from Environment Canada. The Environment Canada webpage gives current and predicted temperatures, wind speed and direction, probability of precipitation, as well as an extended forecast.

Maintenance of Emergency Preparedness State of Readiness

Emergency Plan Work Instructions: Written work instructions implement the requirements of the Emergency Plan. These work instructions are included in the Emergency Preparedness Manual (EPM).

The Emergency Plan and EPM are maintained on an electronic document system available to personnel assigned responsibility for the duties described in the plan. Emergency Plan work instructions are reviewed, approved and issued in accordance with the Business Management System (BMS) for EHS documents.

Training: Training is developed in accordance with the Systematic Approach to Training (SAT) methodology.

Local Off-site Support Organizations: The following offsite response organizations are offered facility familiarization tours and awareness training on facility hazards and radiation awareness on an annual basis:

- Peterborough Fire Services
- Peterborough Police Service

Drills and Exercises: Drills that involve activation of the EO and include activation of the EOC shall be conducted annually. An evacuation drill shall be conducted annually. Annual evacuation drills will be evaluated for adequacy of alarms and evacuation routes and time taken for evacuation. An EO drill and the annual evacuation drill may be held jointly to test the integrated response and personnel accounting capability of the EO. Triennially, a full-scale exercise shall be conducted for the Peterborough operation. The CNSC and emergency response organizations necessary to mitigate the consequences of the exercise scenarios shall be invited to participate.

Critiques: All drills and exercises shall be critiqued. The critiques shall evaluate the appropriateness of the Emergency Plan, EPM, facilities, equipment, personnel, training, and overall effectiveness of the EO. Deficiencies shall be tracked through the Gensuite Action Tracking System (ATS) or equivalent, and used to improve the Emergency Plan and EPM.

Verification of Telephone Numbers:

Emergency phone numbers will be maintained on-site in accordance with EPM work instructions. Off-site response agency and regulatory body notification telephone numbers are verified annually by telephone contact.

Classification System

Alert: An alert is defined as an incident that has led or could lead to a release to the environment of radioactive or other hazardous material, but the release is not expected to have off-site consequences. An alert reflects mobilization of the EO, either in a standby mode that will activate some portions of the organization or full mobilization, but does not indicate an expectation of off-site consequences. However, an alert may require off-site response organizations to respond to onsite conditions such as a fire.

Site Area Emergency: A site area emergency is an incident that has led or could lead to a significant release to the environment of radioactive or other hazardous material and that could have off-site consequences.

The CNSC Duty Officer must be notified within 15 minutes of activation of the Emergency Organization and within 15 minutes of categorizing the event.

Part III: Activation

This section outlines the steps that the site EO shall use to respond to emergencies. Work instructions are maintained detailing each of the following emergency measures.

Emergency Measures

Activation of Emergency Organization

The EO is activated as required by designated individuals through the ENS. The EO is activated in the event of a significant fire, explosion, or significant hazardous chemical release.

During scenarios with no immediate danger or required actions at the scene, EO activation may only involve deployment of EMO staff to the EOC to manage the event without the ERO. Severe weather, and some transportation emergencies are examples of these events.

Emergency pagers/cellular telephones are assigned to designated personnel for response after hours. The assigned pager responder shall respond when the pager is activated. The emergency pager is activated as a result of the automatic or manual sounding of the audible fire alarm or by calling the pager number manually.

After hours, the pager responder determines if activation of the EO is required and if so, activates the EO via the ENS.

Protective Actions

Based on an assessment of the emergency event, the ED shall determine the risks posed to personnel located on site, the environment and neighbouring population.

On-site: If building evacuation has not already been initiated, the ED can initiate evacuation of any building by activation of the fire alarm system through a pull station. A site-wide evacuation can be initiated by the ED through direction to the EOC, On-scene Director, and Accounting Director.

Personnel evacuating directly from controlled areas are segregated at the assembly area and surveyed prior to release (unless they are released directly back to a controlled area). If contamination is detected, the area along the path to the assembly area is also surveyed when available. Decontamination of personnel can be accomplished in or adjacent to the assembly area if necessary.

Search and rescue operations are initiated at the direction of the ED as soon as they can be performed without danger to the

responding personnel. Search and rescue may be performed by site personnel if the building has not been evacuated and it is safe to enter, or by Peterborough Fire Services under all other conditions.

If the building has been evacuated, then BWXT NEC personnel shall not re-enter until advised it is safe to do so by the Peterborough Fire Services and then only as directed by the ED.

Off-site: Notification shall be made to the Peterborough Fire Services Incident Commander should the ED determine that personnel located off site are at risk as a result of an emergency at the site. Off-site Protective Action Recommendations (PAR) shall be made. EPM work instructions provide methods for selecting and communicating PARs to the Toronto Fire Services.

Exposure Control

Peterborough Fire Services is offered annual facility familiarization sessions. Health effects and control principles for radiation exposure is included in these sessions.

External Radiation Exposure Control: There is no risk of acute external radiation exposure at BWXT NEC in Peterborough and no risk of exceeding a public dose limit by an emergency responder due to external radiation as uranium has a low specific activity.

Internal Radiation Exposure Control: In a fire or explosion, use of Self-Contained Breathing Apparatus (SCBA) by responders is recommended to protect from this hazard.

Radiological Decontamination: Work instructions detailing radiation decontamination of personnel and equipment are maintained.

Medical Treatment

First aid facilities exist on site for emergency response. Transportation to off-site medical facilities via Peterborough County-City Paramedics ambulance shall be provided as necessary.

Coordination with Off-site Response Organizations

The interface between BWXT NEC and Peterborough Fire Services is documented and maintained.

Off-site responders access the site during an emergency through the main vehicle gate accessed from Monaghan Road. The security guard will open the gate to admit the off-site responders. At the incident scene, the On-Scene Director (OSD) will coordinate with the off-site responders.

Off-site responders shall be permitted site access when responding to an emergency or as part of an emergency exercise.

Notification of Government Agencies

Notifications to government agencies begin immediately following the declaration of an Alert or Site Area Emergency. Updates shall be provided on an as-needed basis or on an agreed upon frequency.

Canadian Nuclear Safety Commission: Notification of an emergency event to the CNSC is required upon activation of the EO and upon classification of a Site Alert or Site Area Emergency.¹

The CNSC Duty Officer must be notified within 15 minutes of activation of the Emergency Organization and within 15 minutes of categorizing the event.

Other Government Agencies: Notification of an emergency event to other regulatory agencies (i.e., Ontario Ministry of the

¹ CNSC REGDOC-2.10.1 Section 2.2.2.

Environment, Conservation and Parks, City of Peterborough, ESDC, etc.), shall be based on the particular nature of the event. The appropriate information shall be reported to the various regulatory agencies within the required time period as dictated by those agencies' requirements. These requirements are detailed in a work instruction.

Part IV: Recovery

Recovery, Plant Restoration, and Event Termination

The activities of the EO shall be terminated after the emergency event has been mitigated to the point where there is no further danger to the workers, public, environment, or facility. Event termination will occur after the EMO has reviewed plant status, identified actions necessary to restore damaged facilities and equipment, assigned responsibility for restart approval, ensured the provisions have been made to restore emergency equipment to readiness status and an investigation team (classified emergencies only) has been assigned.

A formal declaration of stand-down from Site Alert and Site Area Emergency is required. Upon such stand-down, the CNSC and any other relevant regulatory agencies notified over the course of the event shall be notified of stand-down from the Alert/Site Area Emergency and event termination.

The requirements for plant recovery and event termination are described in work instructions contained in the EPM.

Emergency Event investigation

Emergency events that require classification as Alert or Site Area Emergency shall be investigated to identify root causes, deficiencies in the EO and capabilities, and corrective actions to prevent recurrence of the emergency incident in accordance with work instructions. The personnel assigned to investigate the incident shall be assigned

prior to event termination. Required corrective actions will be tracked to completion.

Emergency Event investigation

The ED is responsible for declaring the emergency terminated and standing down the EO.

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