# Provincial Nuclear Emergency Response Plan (PNERP)

# Implementing Plan for Fermi 2 Nuclear Power Plant

**Office of the Fire Marshal and Emergency Management**

**Ministry of the Solicitor General**

**December 2021**

Ontario

Ontario

**Executive Council of Ontario**
**Order in Council**

On the recommendation of the undersigned, the Lieutenant Governor of Ontario, by and with the advice and concurrence of the Executive Council of Ontario, orders that:

**Conseil exécutif de l'Ontario**
**Décret**

Sur la recommandation de la personne soussignée, la lieutenante-gouverneure de l'Ontario, sur l'avis et avec le consentement du Conseil exécutif de l'Ontario, décrète ce qui suit:

WHEREAS section 8 of the Emergency Management and Civil Protection Act, as amended, requires the Lieutenant Governor in Council to formulate an emergency plan respecting emergencies arising in connection with nuclear facilities;

AND WHEREAS pursuant to O.C. 2317/2017, the *Provincial Nuclear Emergency Response Plan (PNERP) Master Plan 2017* was adopted by the Lieutenant Governor in Council as an emergency plan respecting emergencies arising in connection with nuclear facilities formulated under section 8 of the Emergency Management and Civil Protection Act, as amended;

AND WHEREAS the *Provincial Nuclear Emergency Response Plan (PNERP) Master Plan 2017* provides for the adoption of a series of Implementing Plans to directly address emergencies in respect of specific nuclear facilities or radiological issues;

NOW THEREFORE the document entitled "Provincial Nuclear Emergency Response Plan (PNERP) – Implementing Plan for Fermi 2 Nuclear Power Plant" and dated December 2021, be adopted as an emergency plan under section 8 of the Emergency Management and Civil Protection Act.

AND THAT Order in Council O.C. 1251/2011 dated June 22, 2011 be revoked.

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ATTENDU QUE l'article 8 de la *Loi sur la protection civile et la gestion des situations d'urgence*, dans sa version modifiée, exige que le lieutenant-gouverneur en conseil établisse un plan de mesures d'urgence relatif aux situations d'urgence liées aux installations nucléaires;

ATTENDU QU'en vertu du décret 2317/2017, le *Plan provincial d'intervention en cas d'urgence nucléaire (PPIUN) - Plan directeur 2017* a été adopté par le lieutenant-gouverneur en conseil comme plan de mesures d'urgence relatif aux situations d'urgence liées aux installations nucléaires établi aux termes de l'article 8 de la *Loi sur la protection civile et la gestion des situations d'urgence*, dans sa version modifiée;

ET ATTENDU QUE le *Plan provincial d'intervention en cas d'urgence nucléaire (PPIUN) - Plan directeur 2017* prévoit l'adoption d'une série de plans de mise en œuvre visant à directement faire face à des situations d'urgence liées à certaines installations nucléaires ou à certains problèmes radiologiques;

EN CONSÉQUENCE, le document intitulé « *Plan provincial d'intervention en cas d'urgence nucléaire (PPIUN)* - Plan de mise en œuvre d'une intervention pour la centrale nucléaire Fermi 2 », daté du décembre 2021, est adopté en tant que plan de mesures d'urgence aux termes de l'article 8 de la *Loi sur la protection civile et la gestion des situations d'urgence*.

EN OUTRE, le décret 1251/2011, daté du 22 juin 2011, est révoqué.

**Recommended:** Solicitor General
**Recommandé par:** La solliciteure générale

**Concurred:** Chair of Cabinet
**Appuyé par:** Le président/la présidente du Conseil des ministres,

**Approved and Ordered:**
**Approuvé et décrété le:** DEC 0 9 2021

**Lieutenant Governor**
**La lieutenante-gouverneure**

# Table of Contents

# Tables and Figures

## Document History

This is version 1.0 of the 2021 Provincial Nuclear Emergency Response Plan (PNERP) Implementing Plan for Fermi 2 Nuclear Power Plant.

This version replaces the version last published in 2011.

Amendments to the current version can occur at any time. These will be recorded in the following table:

| Revision Number | Description of change | Date of Publication |
|---|---|---|
| 1.0 | Initial publication of 2021 version | December 2021 |

## Publications Management

This publication is subject to review and amendments. This process is the responsibility of the office of the Chief, Emergency Management, Office of the Fire Marshal and Emergency Management. Stakeholders are encouraged to review and evaluate this plan as they use it and to submit comments and suggestions.

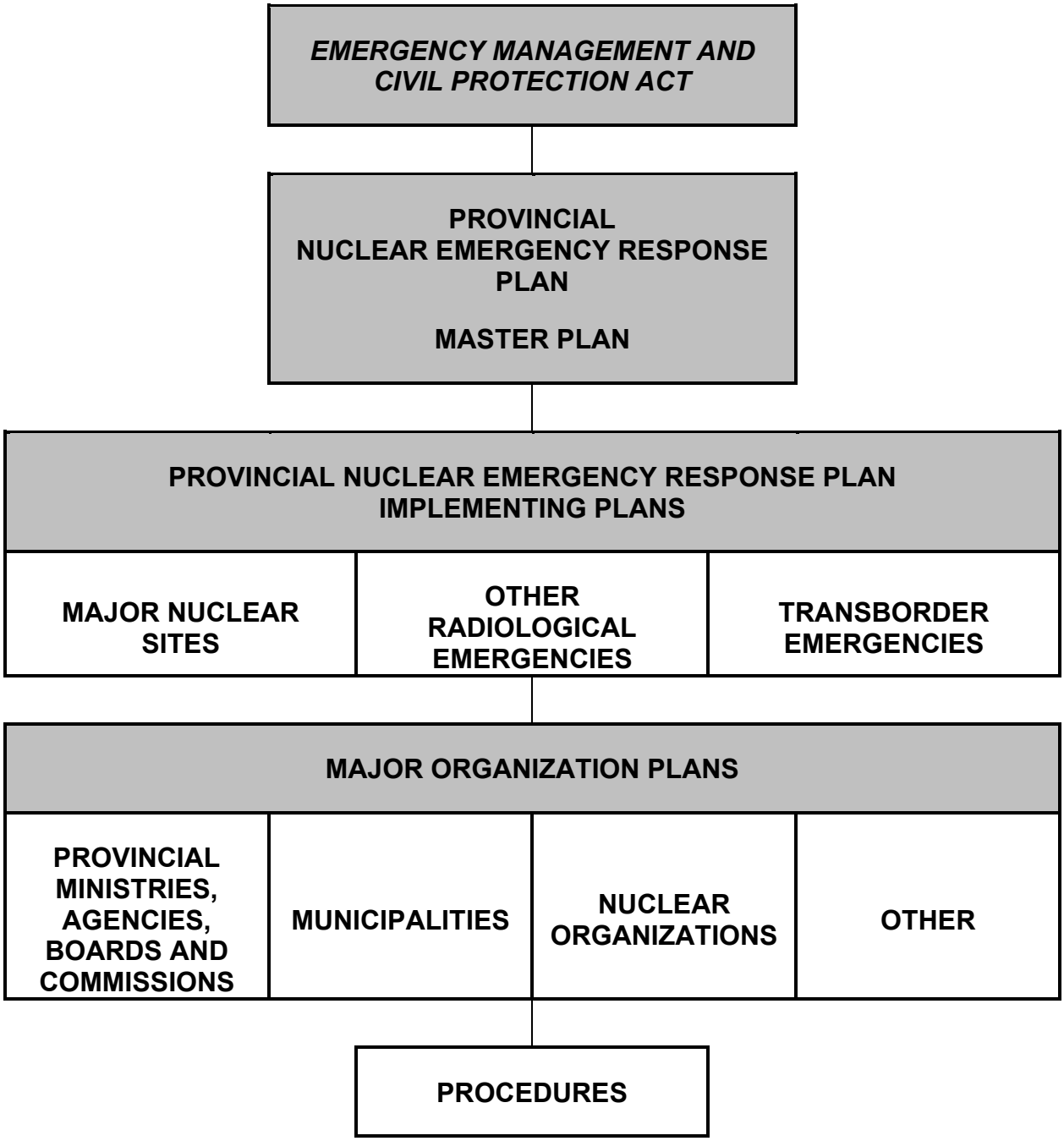
To make comments and suggestions relating to the Provincial Nuclear Emergency Response Plan, or to request it in a different format, please contact:

> Office of the Fire Marshal and Emergency Management
> Attn: Program Manager, Planning and Exercises
> Ref: Provincial Nuclear Emergency Response Plan
> 25 Morton Shulman Ave, Toronto, ON, M3M 0B1, Canada

E-mail via: AskOFMEM@ontario.ca

Website:
http://www.ontario.ca/emo (English)
http://www.ontario.ca/gdu (French)

## Figure I: Nuclear and Radiological Emergency Response Planning Structure



## Nuclear and Radiological Emergency Response Planning Structure

The structure for nuclear and radiological emergency response planning in Ontario, illustrated on the previous page, consists of the following components:

a) The Provincial Nuclear Emergency Response Plan (PNERP); developed pursuant to Section 8 of the *Emergency Management and Civil Protection Act* (*EMCPA)* and subject to Cabinet approval:

   - The Master Plan: sets out the overall principles, policies, basic concepts, organizational structures and responsibilities.

   - The Implementing Plans: the elements of the Master Plan are applied to each major nuclear site, transborder emergencies and other types of radiological emergencies, and detailed provincial implementing plans developed. The major organization plans (as per **Figure I**) should be consistent with the requirements of these implementing plans.

b) Major organization plans: Each major organization involved (e.g., provincial ministries, agencies, boards and commissions, municipalities, and nuclear organizations, etc.) develops its own plan to carry out the relevant roles, responsibilities and tasks agreed to by them and consistent with their mandate. These plans are based on and should be consistent with the PNERP and its Implementing Plans.

c) Procedures: Based on all of the above plans, procedures are developed for the various emergency centres to be set up and for the various operational functions required.

All emergency organizations involved in the preparation and implementation of the PNERP should employ common terminology. The terminology contained in the Glossary, **Annex D**, should be used for this purpose by all concerned. Further reference information can be found in the Incident Management System guidance at www.ontario.ca/ims.

# Chapter 1
# SCOPE AND AUTHORITY

## 1.1 Aim

The aim of the PNERP Implementing Plan for the Fermi 2 Nuclear Power Plant (Fermi 2) is to describe the measures that should be undertaken to respond to the off-site effects of a nuclear emergency at the Fermi 2 Nuclear Power Plant (NPP) located in Monroe County, Michigan, United States of America.

## 1.2 Scope

1.2.1 This implementing plan shall be read and applied in the context of the PNERP Master Plan.

1.2.2 In case of any apparent differences between the provisions of the PNERP Master Plan and this Implementing Plan, the latter being more detailed and specific is applicable.

1.2.3 Together, these two plans focus on provincial level actions and should therefore be supplemented by the appropriate municipal plans and other supporting plans and procedures (see **Sections 1.3** and **1.4** below).

1.2.4 The Office of the Fire Marshal and Emergency Management (OFMEM) shall provide guidance to stakeholders to assist them in ensuring their programs align with the PNERP Master Plan and this Implementing Plan.

## 1.3 Designated and Support Municipalities

1.3.1 Designated Municipalities

a) The Town of Amherstburg is the Designated Municipality in the Detailed Planning Zone (DPZ) with respect to Fermi 2 (PNERP Master Plan, Annex A).

b) The Town of Essex and the City of Windsor are designated host municipalities with respect to Fermi 2 (PNERP Master Plan, Annex A).

c) In this document the terms “municipal” and “municipality” shall include, unless the context indicates otherwise, the designated municipality, as well as the local police services and local boards whose area of operation includes the area covered by the municipal plans.

d) Pursuant to Section 3(4) of the *EMCPA*, as designated municipalities, the Town of Amherstburg, Town of Essex and the City of Windsor shall formulate plans to mitigate the off-site consequences of nuclear emergencies at Fermi 2.

e) Where applicable, these plans shall also contain arrangements for the provision of services and assistance by municipal departments, local police services, fire services, paramedic services, hospitals and local boards.

f) The plans prepared by the designated municipalities and by these other organizations, are collectively referred to as “municipal plans” in this document.

g) As required by Section 8 of the *EMCPA*, municipal nuclear emergency response plans shall conform to the PNERP and be subject to the approval of the Solicitor General. The Solicitor General may make such alterations as considered necessary for the purpose of coordinating the municipal plan with Ontario’s plan.

1.3.2 Support Municipalities

a) In the event of a declared emergency, the Lieutenant Governor in Council (LGIC) or the Premier may order a municipality to provide support or assistance to designated municipalities or to affected municipalities. Such orders, if made, would be authorized by Sections 7.0.2(4) or 7.0.3 of the *EMCPA*.

b) Support and assistance may include, but shall not be limited to, personnel, equipment, services and material.

## 1.4 Supporting Plans and Procedures

1.4.1 Other jurisdictions and organizations that have, or are assigned, some responsibility for responding to a Fermi 2 emergency should develop appropriate plans or procedures for carrying out their roles and tasks. They include:

a) Provincial ministries, including:

i. Ministry of Health (MOH) and the Radiation Health Response Plan

ii. Ministry of Transportation (MTO) and the Unified Transportation Management Plan

b) All other Ontario ministries with responsibilities as identified in Section 1.7.2 and Annex I of the PNERP Master Plan.

c) Municipal departments, local police services, local boards and other agencies assigned roles and responsibilities in the municipal plans.

d) The Fermi 2 operator’s nuclear emergency plan and emergency procedures.

e) The State of Michigan and the Michigan Emergency Management Plan.

1.4.2 Radiation Health Response Plan (RHRP)

a) The MOH issues the Radiation Health Response Plan as an organizational plan under the PNERP.

b) The Radiation Health Response Plan establishes the roles and responsibilities, operational concepts and response principles for coordinating the provincial response of health organizations during a nuclear emergency.

1.4.3 Unified Transportation Management Plan (UTMP)

a) The Fermi 2 Unified Transportation Management Plan, an organizational plan under the PNERP, shall be issued by the MTO, for the management of evacuating traffic in the DPZ as well as the traffic impact beyond it.

b) Representatives of the Ontario Provincial Police (OPP), Windsor Police Services-Amherstburg Detachment, road authorities and emergency services shall cooperate with MTO in the development and maintenance of the Unified Transportation Management Plan and in its implementation during a nuclear emergency response through the Unified Transportation Coordination Centre .

c) The Unified Transportation Management Plan shall be designed to meet the requirements of the provincial and municipal nuclear emergency plans. For specific guidance see the following:

i. **Paragraph 3.1.4** Unified Transportation Coordination Centre

ii. **Section 3.4** Telecommunications

iii. **Section 4.3.6** Internal Notifications

iv. **Section 4.6** Early Phase Response

v. **Section 5.3.1** Evacuation

vi. **Section 6.6** Entry Control

vii. **Section 6.7** Transportation Management

1.4.4 Environmental Radiation and Assurance Monitoring Group Plan

The Environmental Radiation and Assurance Monitoring Group Plan issued by SOLGEN shall describe the means by which the environment, water, milk and foodstuffs are sampled and analyzed during a nuclear or radiological emergency, to determine their safety.

# Chapter 2
# THE PLANNING BASIS

## 2.1 General

2.1.1 This implementing plan details the response to an emergency at the Fermi 2 Nuclear Power Plant (Fermi 2).

2.1.2 Fermi 2 is located at latitude 41° 58' north and longitude 83° 15' west, immediately to the north of Pointe Aux Peaux on the western shore of Lake Erie in Monroe County, Michigan, U.S.A. It is approximately 50 km southwest of Detroit.

2.1.3 The Fermi 2 reactor facility houses a General Electric Boiling Water Reactor (Unit 2) of 1093 MWe power with a pressure suppression Mark 1 containment. The site is also the location of the Fermi 1 reactor. Fermi 1 was an experimental fast-breeder reactor which was shut down in 1972 and has been undergoing decommissioning activities since that time.

2.1.4 **Figure 2.1** shows a schematic diagram of a Boiling Water reactor**.**

2.1.5 **Figure 2.2** shows the 10 (ten) mile Emergency Planning Zone and Protective Action Areas for the off-site response authorities in Michigan, USA. The Fermi 2 Protective Action Order Areas, Area 1-Area 7, correspond to default protective actions in Ontario (see **Table 4.3**).

## 2.2 The Hazard

2.2.1 If an accident were to occur at Fermi 2, the most probable result would be that its effects would be confined within the station boundary because the containment system in the Fermi 2 reactor is of a high-pressure, low-leakage design intended to prevent any release of radioactivity following an accident.

2.2.2 Much less probable is a Design Basis Accident which would result in a low to moderate level of fuel damage combined with some form of containment failure within six to 24 hours (or more) of the occurrence of the accident.

2.2.3 Nuclear emergency preparedness requires a planning basis which considers both design basis accidents, and significantly less probable beyond design basis accidents, including severe accidents.

2.2.4 Design Basis Accidents

a) The Design Basis Accidents release provides the main platform for detailed planning and is generally characterized by one or more of the following:

i. Station containment systems function normally allowing radiation to start decaying prior to a controlled release.

ii. Sufficient time would be available to alert the public and implement protective measures prior to a release.

iii. The main radiological hazard to people would be external exposure to, and inhalation of, radionuclides.

iv. Filter systems function to remove almost all of the radioactive particulate and radioiodine. As a result, the plume would be mostly composed of inert noble gases which would dissipate and do not pose a contamination hazard.

v. Radiation doses to the public would likely be below the generic criteria (GC) as defined in PNERP Master Plan, Annex E.

vi. Environmental contamination would be limited to very low levels.

vii. Low-level radioactive releases to the environment could occur on and off for some time (e.g., days or weeks).

b) An example of a design basis accident scenario is a Loss-of-Coolant Accident with the following typical progression:

i. The reactor building would “box-up” preventing any immediate releases. A “box-up” is a condition whereby all possible release pathways to the environment, such as ventilation stacks, are closed.

ii. The hold-up time in the reactor building would allow for decay of some short-lived radionuclides.

iii. If at any stage the pressure in the containment system nears atmospheric pressure, the contained radioactivity may be vented to the environment through a series of charcoal and HEPA filters that remove the majority of radioiodines and particulate radionuclides. Such venting could be intermittent or continuous but may last for weeks. The level of radioactivity being released would progressively decline with time.

iv. Suitable meteorological conditions may make it possible to vent some of this contained radioactivity through filters in a direction away from populated areas. It may be possible to do this several times.

2.2.5 Beyond Design Basis Accidents

a) One or more of the following may define a Beyond Design Basis Accident:

i. Station containment systems may be impaired leading to significantly reduced hold up time and decay of radioactive materials.

ii. An early release of radioactivity from a Beyond Design Basis Accident with limited warning time.

iii. An uncontrolled release of radioactivity from a Beyond Design Basis Accident with limited warning time.

iv. The plume could include radioiodine and particulates along with noble gases.

v. Radiation doses could potentially be high e.g., greater than 250 mSv (25 rem) beyond the site boundary.

vi. Environmental contamination could be quantitatively significant in both extent and duration.

vii. The area affected could extend beyond the DPZ.

b) Beyond Design Basis Accidents which go unmitigated may evolve into severe accidents involving fuel degradation in the reactor core.

c) The response to Beyond Design Basis Accidents, including severe accidents, is facilitated by diverse and flexible mitigation strategies (e.g., FLEX equipment) in addition to the measures already in place to respond to DBAs (see **2.2.4** above) and the ability to expand their function.

d) The following additional actions shall be conducted to mitigate the much less probable, but possibly more severe, off-site effects of Beyond Design Basis Accidents:

i. Pre-distribution of Potassium Iodide (KI) pills (see **Section 5.3.3)**

ii. Automatic, default actions to initiate public alerting (see **Section 6.2**)

iii. Directing the implementation of protective actions, including sheltering-in-place (see **Section 5.3.4**) and evacuation (see **Section 5.3.1**) as appropriate and based on recommendations for protective actions from Fermi 2.

iv. Timely dispatch of aerial and ground monitoring teams to determine areas of contamination (see **Section 4.7.3**)

v. Extension of protection actions to the Contingency Planning Zone (CPZ), if required, to reduce potential for exposure

vi. Radiation monitoring and, if necessary, decontamination of persons (see **Section 6.9**)

vii. Medical assessment, treatment and counselling as required (see **Section 6.9**)

2.2.6 Planning Times for Radioactive Emissions

a) The time interval between the occurrence of an accident at Fermi 2 and the commencement of an emission depends on the condition and functioning of the station containment system and on the effectiveness and timing of the actions taken by station operators to prolonging the holdup and decay of radioactive material within containment.

b) The containment system in the Fermi 2 reactor is designed to prevent any release of radioactivity to the environment following an accident. An emission would only occur if containment was impaired or bypassed. In such cases, radioactive emissions could commence within about six hours of the onset of the accident. The duration of the release, depending on the nature of the accident, could be from four to 24 hours.

c) When controlled venting is required, intermittent filtered releases of varying durations could continue for many weeks.

d) In the exceptional situation where the containment system was impaired, an emission could commence much earlier; in some cases, very soon after the accident and, the emission may be continuous.

## 2.3 Protective Actions

2.3.1 The protective actions available for minimizing the radiation hazard in a nuclear emergency include:

a) Precautionary measures

b) Exposure control measures

c) Ingestion control measures

2.3.2 These measures are listed in **Table 2.1** below and defined in the glossary (**Annex D**).

2.3.3 The Office of the Fire Marshal and Emergency Management (OFMEM) shall coordinate, in advance, the development of a strategy for Fermi 2 protective action decision-making with appropriate stakeholders. The strategy shall consider the following:

a) The timing and distance criteria for undertaking the Michigan-based exposure control protective measures throughout the emergency response.

b) The timing and distance criteria for undertaking the Michigan-based ingestion control protective measures in the early stage of the emergency, prior to the availability of Ontario environmental field monitoring data and analysis.

c) PEOC Scientific Section analysis of the Ontario environmental field monitoring results.

d) The operational situation in Ontario within which protective actions are to be undertaken.

e) Precautionary measures based on an assessment of all of the above.

2.3.4 Further detail is provided, as follows:

a) Phases of a nuclear emergency response (**Chapter 4**)

b) Protective action response strategy (**Chapter 5**)

c) Operational response (**Chapter 6**)

2.3.5 Responsibility for decision-making and directing of protective actions rests primarily with the PEOC Commander (KI ingestion decisions and direction rest with the Chief Medical Officer of Health (CMOH)). All references in this Plan to these responsibilities shall be assumed to apply to both the PEOC Commander as well as any person that is delegated PEOC Commander responsibility.

**Table 2.1 Protective Actions for a Nuclear Emergency Response**

| **Precautionary Measures** (see section 5.2) | **Exposure Control Measures** | **Ingestion Control Measures** |
|---|---|---|
| • Closing of beaches, recreation areas, etc.<br>• Closing of workplaces and schools<br>• Suspension of non-critical patient admissions in hospitals<br>• Entry control<br>• Consider evacuation of Bois Blanc Island (Boblo Island) | • Sheltering-in-place<br>• Iodine Thyroid Blocking<br>• Evacuation | • Milk control<br>• Water control<br>• Pasture control<br>• Produce and crop control<br>• Livestock control |

## 2.4 Planning Zones

2.4.1 Automatic Action Zone (AAZ)

a) The AAZ is a pre-designated area immediately surrounding a reactor facility. As such, there is no AAZ designated for Fermi 2 because of the distance between the Fermi 2 reactor facility and the shoreline of Essex County (approx.15 km).

2.4.2 Detailed Planning Zone (DPZ)

a) The DPZ is a pre-designated area surrounding a reactor facility where pre-planned protective actions are implemented as needed on the basis of reactor facility conditions, dose modelling, and environmental monitoring, with the aim of preventing or reducing the occurrence of stochastic effects.

b) The Fermi 2 DPZ is the area immediately surrounding the reactor facility extending out to an approximate radius of 16 kilometres (10 miles) which is consistent with the United States Nuclear Regulatory Commission (U.S. NRC) regulation for U.S. reactor facilities' plume exposure pathway emergency planning zones.

c) Although outside the 16km DPZ distance, Bois Blanc Island (commonly referred to as Boblo Island) has been included as a sector of the DPZ due to practical and logistical issues associated with an island evacuation. As such, in the event of an initial nuclear emergency notification from Fermi 2 resulting in the evacuation of the 16km sector, a precautionary evacuation of Bois Blanc (Boblo) Island should also be directed. However, as the emergency progresses and when time is available to undertake an assessment, the need for a Bois Blanc (Boblo) Island evacuation will be determined through consultation with applicable stakeholders, including the designated municipality.

d) The DPZ for Fermi 2 is shown in **Figure 2.3**. The exact boundaries of the zone can be determined from **Annex A**.

2.4.3 Contingency Planning Zone (CPZ)

a) The CPZ is a pre-designated area surrounding a reactor facility, beyond the DPZ (see **2.4.2 c)** above), where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective actions can be extended beyond the DPZ as required to reduce potential for exposure.

b) The Fermi 2 CPZ is shown in **Figure 2.3** and includes the area between 16 and 32 kilometres surrounding the reactor facility.

c) Additional CPZ guidance is provided in **Annex C**.

2.4.4 Ingestion Planning Zone (IPZ)

a) This Fermi 2 IPZ (see **Figure 2.4)** is the area immediately surrounding the reactor facility extending out to an approximate radius of 80 kilometres (50 miles) which is consistent with the United States Nuclear Regulatory Commission (U.S. NRC) regulation for U.S. reactor facilities' ingestion exposure pathway emergency planning zones. Provincial plans and arrangements are undertaken for this area in order to:

   i. Protect the food chain

   ii. Protect drinking water supplies

   iii. Restrict consumption and distribution of potentially contaminated produce, wild-grown products, milk from grazing animals, rainwater, animal feed

      Note: Wild-grown products can include mushrooms and game.

   iv. Restrict distribution of non-food commodities until further assessments are performed

b) The Fermi 2 IPZ encompasses Essex County, the City of Windsor, and an area of Chatham-Kent lying within an 80 km radius of Fermi 2. The IPZ includes the DPZ and CPZ. **Figure 2.4** also shows the sub-zones of the IPZ.

## 2.5 Response Sectors

2.5.1 The DPZ for Fermi 2 is three sectors as follows[1]:

| | | |
|---|---|---|
| Town of Amherstburg area | - | Sector F1 |
| Bois Blanc (Boblo) Island | - | Sector F2 |
| Lake Sector | - | Sector F3 |

2.5.2 The boundaries of the DPZ response sector are shown in **Figure 2.3**, and are detailed in **Annex A**.

[1] Numbering system includes the letter 'F' to represent 'Fermi' and to distinguish the Ontario sector numbers from those used in Michigan.

## 2.6 Planning Data, Interface and Support

### 2.6.1 Municipal Planning Data

Designated municipality nuclear emergency plans shall detail the planning data necessary to undertake an effective nuclear emergency response. This data should be organized according to planning zones, sub-zone and response sector, and include:

a) Population estimates (see **Annex B**)

b) Institutional data

c) Critical infrastructure

### 2.6.2 Evacuation Time Estimates

a) Evacuation time estimate studies shall be prepared by MTO and regularly updated to facilitate transportation planning and the management of transportation during a response.

b) Evacuation time estimates shall be based on current census data and future population growth projections until end of life of the reactor facility and take into consideration shadow evacuations[2].

c) The Town of Amherstburg shall provide planning data to assist MTO in the development of ETE studies.

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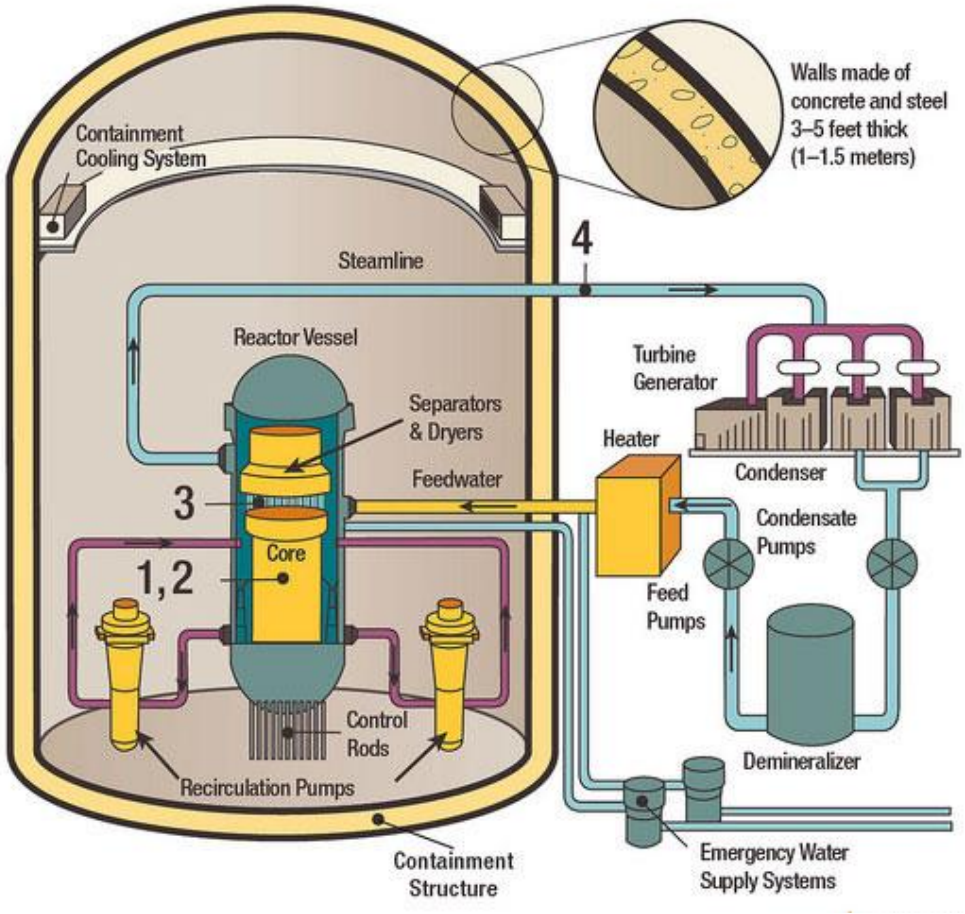
[2] "Shadow evacuation" is the term used to describe when people beyond the officially declared evacuation zone who are not directly affected by a nuclear emergency choose to voluntarily leave the area.

**Figure 2.1: Nuclear Generating Unit Schematic of a Boiling Water Reactor[3]**




[3] Nuclear Generating Unit Schematic – Boiling Water Reactor is a generic diagram. For more information on the design concept, including the numbers indicated on the diagram, visit: https://www.nrc.gov/reactors/bwrs.html

**Figure 2.2: 10 Mile Emergency Planning Zone and Protective Action Areas for Fermi 2 Nuclear Power Plant, Michigan, USA[4]**


[4] Reference: https://www.michigan.gov/documents/miready/FERMI_Guide_703714_7.pdf

**Figure 2.3: Detailed and Contingency Planning Zones**

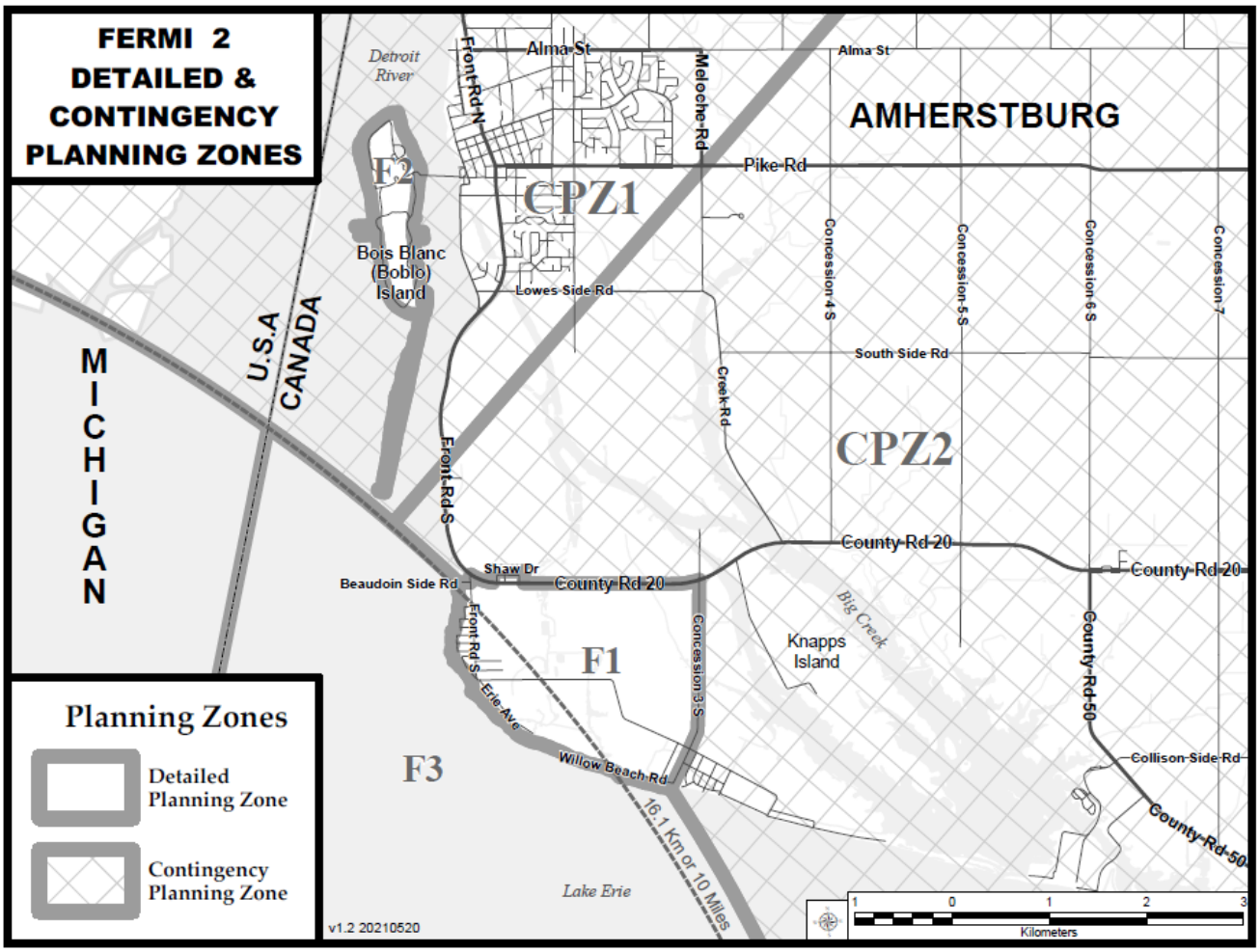
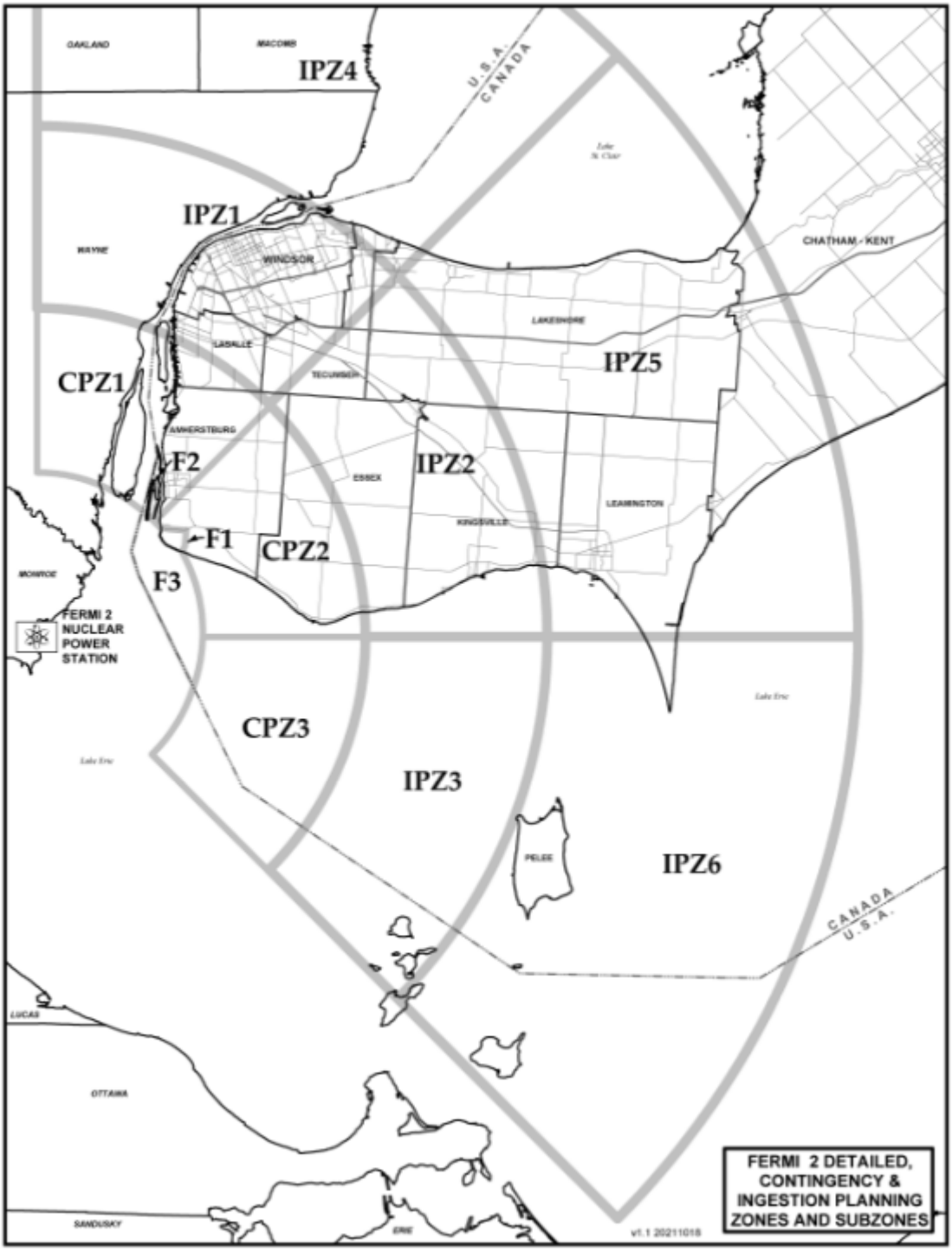


**Figure 2.4: Ingestion Planning Zone**



# Chapter 3
# EMERGENCY RESPONSE ORGANIZATION AND FACILITIES

## 3.1 Emergency Response Organization

3.1.1 The provincial Emergency Response Organization (ERO) for managing a nuclear emergency at Fermi 2 Nuclear Power Plant is shown in **Figure 3.1** and detailed in the PNERP Master Plan, Chapter 4.

3.1.2 Liaison Arrangements

a) To ensure liaison and coordination between different elements of the ERO, the following arrangements and agreements should be made:

i. The Canadian Nuclear Safety Commission (CNSC) will establish liaison with the United States Nuclear Regulatory Commission (US NRC) on behalf of the provincial ERO.

ii. Each federal department and provincial ministry with a role in the emergency response to provide a representative to join the PEOC.

iii. Deployment of provincial staff to the State of Michigan Emergency Operations Centre if operationally practical, or virtually.

iv. Deployment of provincial staff to Municipal Emergency Operations Centres.

v. Health Canada will establish liaison with the US Department of Energy (US DOE).

b) Role of Deployed Provincial Staff

i. Maintain close liaison with representatives in the municipal emergency operations centres.

ii. Transmit all relevant information to the PEOC and appropriate provincial agencies.

iii. Provide relevant information from the PEOC on developments in Ontario to the applicable emergency operations centre.

c) Deployed provincial staff may include any of the following:

i. OFMEM field officers

ii. Scientific Section staff

iii. Emergency information officers

iv. Others as appropriate to the situation.

3.1.3 Arrangement with Michigan State Police and DTE Energy

a) Ontario shall establish a Letter of Agreement for Notification and Information Sharing with Michigan State Police and DTE Energy (Fermi 2 operator).

b) This agreement shall include the following items:

i. Notification arrangements indicating initial notification point of contact.

ii. Exchange of information from Michigan and DTE Energy to the PEOC, both during an emergency and during the preparedness phase.

iii. Agreement to receive, accommodate and provide facilities to provincial staff deployed to other jurisdictions.

iv. Coordination of emergency information during an emergency.

3.1.4 Unified Transportation Coordination Centre

A Unified Transportation Coordination Centre shall be set up and staffed for a Fermi 2 emergency to implement the Unified Transportation Management Plan upon notification of either a partial or full activation response by the province. MTO and the OPP are co-responsible for the planning, activation and operations of the Unified Transportation Coordination Centre

3.1.5 Provincial Ministry Offices

The following regional, district and area offices of provincial ministries shall be prepared to respond to the emergency and provide the necessary assistance to the designated municipalities, as required by the PNERP Master Plan, Annex I and detailed in municipal plans or, as directed by their respective ministries:

a) Ministry of Agriculture, Food and Rural Affairs; Ridgetown Resource Centre

b) Ministry of the Solicitor General, OPP; Essex County Detachment, Chatham Detachment and Western Region Headquarters

c) Ministry of the Environment**,** Conservation and Parks; Windsor Area Office, Sarnia District Office, Southwestern Regional Office and Wheatley Provincial Park

d) MOH; Windsor Central Ambulance Communications Centre

e) Ministry of Labour, Training and Skills Development; Windsor Area Office and London Area Office

f) Ministry of Municipal Affairs and Housing; Western Region Municipal Services Office

g) Ministry of Northern Development, Mines, Natural Resources and Forestry; Chatham Area Office (Aylmer District)

h) MTO; Western Region

3.1.6 Designated and Host Municipality Organization

Emergency plans for the designated and host municipalities (i.e., the Town of Amherstburg, Town of Essex and the City of Windsor) shall describe their municipal emergency response organizations and how their plans are activated.

## 3.2 Contingency Provisions

3.2.1 The PEOC commander issues operational directives to the emergency management and response organization through the centres in the structure below (see **Figure 3.1**). However, if for any reason, any of these centres is not functioning or is not responsive, the PEOC commander may issue operational directives directly to any other element of the emergency management and response organization. The Chief Medical Officer of Health has the decision-making authority regarding iodine thyroid blocking.

## 3.3 Municipal Emergency Facilities

a) Designated and host municipalities' nuclear emergency plans shall identify the location of the following emergency facilities and shall include provisions for their selection, staffing and resourcing:

i. Municipal Emergency Operation Centre

ii. Reception Centres. Reception Centres should also be able to accommodate a monitoring and decontamination unit.

iii. Evacuation Centres (host municipalities)

iv. Emergency Worker Centres. These locations shall also be able to accommodate a monitoring and decontamination unit as well as a command post for environmental monitoring operations of the Environmental Radiation and Assurance Monitoring Group. Both of these components of the Emergency Worker Centres will be coordinated through the Province.

v. Emergency Information Centre

b) Municipal nuclear emergency plans shall also identify the location of alternate Municipal emergency facilities outside the CPZ.

c) OFMEM shall coordinate arrangements for the provision of equipment and trained staff to perform monitoring and decontamination activities at Reception Centres and Emergency Workers Centres, as outlined in PNERP Master Plan, Annex B Section 4.5. These arrangements shall be coordinated with the designated municipalities.

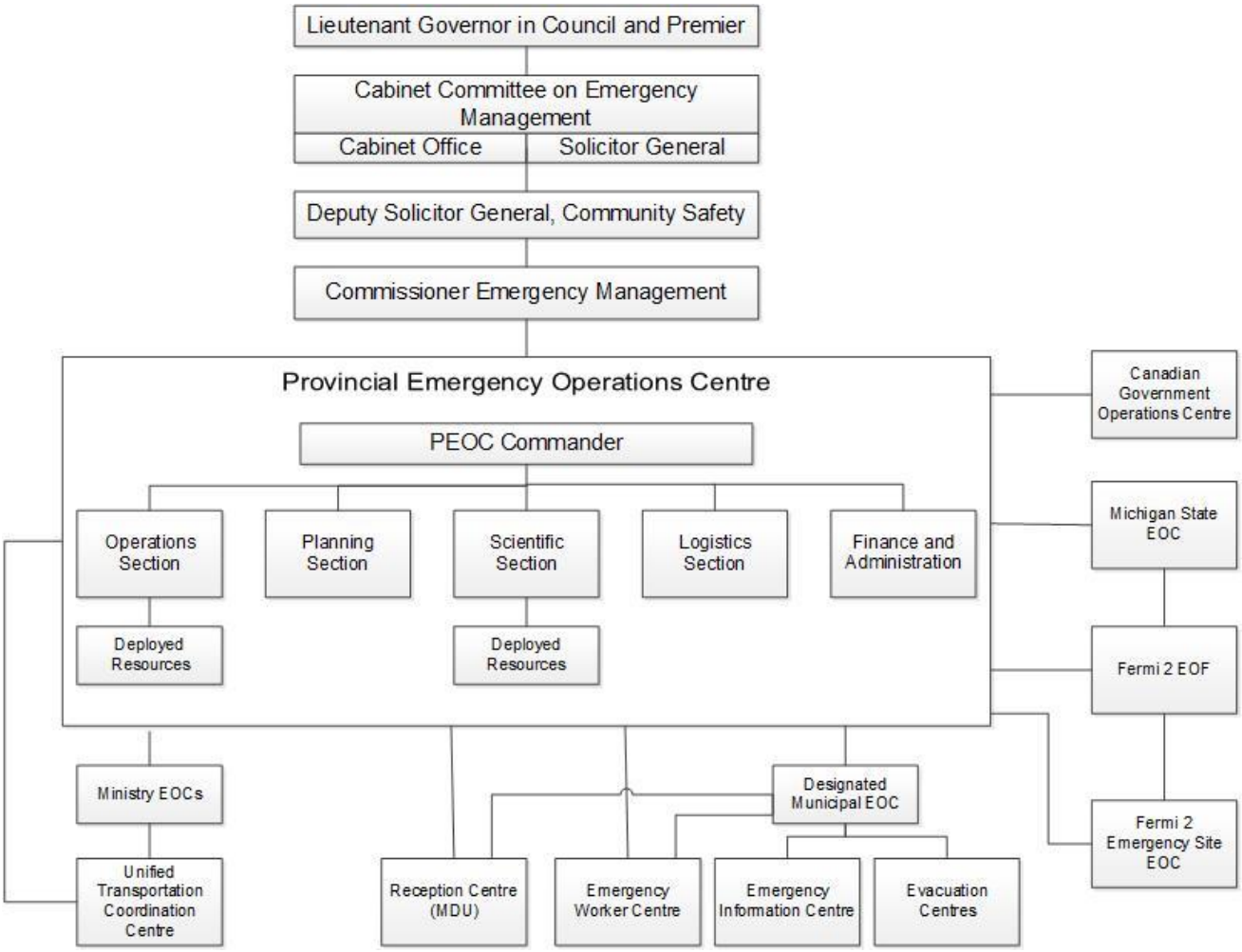
## 3.4 Telecommunications

3.4.1 All stakeholder emergency plans shall describe how their emergency centres and facilities are linked via primary and backup communication systems which enable email and transfer of emergency information.

3.4.2 The Fermi 2 operator should establish primary and backup communications between its Emergency Operations Facility (EOF) and the PEOC.

3.4.3 All organizations and agencies in Ontario involved in responding to a Fermi 2 nuclear emergency shall ensure the availability of backup telecommunications systems.

**Figure 3.1: Provincial Nuclear and Radiological Emergency Response Organizational Structure[5]**




[5] Refer to the PNERP Master Plan Chapter 4 for more information.

# Chapter 4
# NOTIFICATIONS AND RESPONSE

## 4.1 Initial Notification

4.1.1 Under agreement with the provincial government, Fermi 2 shall notify the PEOC and the Town of Amherstburg via the designated contact points as soon as conditions arise at the reactor facility, which require such initial notification under the criteria described in **Table 4.1** and, as incorporated in facility procedures.

4.1.2 Fermi 2 shall complete this initial notification, including a confirmatory telephone notification, to the PEOC within 15 minutes of classification of the emergency.

4.1.3 Michigan State shall issue both the initial notification and all subsequent notifications to the PEOC.

4.1.4 The emergency classification system followed by Fermi 2 and the corresponding initial provincial response levels to be adopted in Ontario are shown in **Table 4.1**. This emergency classification system is used by the station for initial notification and subsequently, throughout the course of the accident, for conveying information on onsite status to the offsite authorities.

4.1.5 The standard notification message, via the Nuclear Event Notification form and the Nuclear Event Plant Technical Data form, from Fermi 2 shall contain the following information relevant to Ontario:

a) Class of emergency (see **Table 4.1**)

b) Reason for Classification

c) Status of radiological release

d) Protective Action Recommendations for the State of Michigan

e) Meteorological Data (including the wind direction)

f) Type of Release: Airborne, Waterborne or Surface Spill

g) Radiological Release Data (Actual or Potential)

h) Calculated and measured offsite doses

4.1.6 A General Emergency notification (received by the PEOC Duty Officer) may result in the initiation of off-site protective measures. (See **Table 4.3)**

4.1.7 In accordance with regulatory US NRC requirements, the Fermi 2 operator shall continue to report the event classification and recommended default protective measures on a regular basis throughout the emergency to the Michigan State EOC who in turn will provide regular reporting to the designated provincial contact points. The PEOC commander should consider protective action recommendations from Fermi 2 in making protective action decisions for Ontarians.

4.1.8 Contact Points

a) Contact points and phone numbers shall be pre-determined and routinely validated to ensure availability.

b) The provincial emergency contact point shall be the PEOC duty officer.

c) The following municipal contact points shall be set out in the municipal plans:

i. A contact point to receive an initial notification anytime, 24 hours per day, seven days per week.

ii. A municipal emergency response staff person who can be contacted anytime 24 hours per day, seven days per week for passage of information and monitoring of the situation following the initiation of a notification.

## 4.2 Initial Provincial and Municipal Response

4.2.1 The initial provincial response to a notification from Fermi 2 shall depend on the classification (and other relevant information) contained in the notification message (see **Table 4.1**).

4.2.2 Within 15 minutes of the receipt of an initial notification, the PEOC Commander, or delegate, shall decide on the initial provincial response level to be adopted and inform the municipal contact point(s). This level should normally be the one linked to the classification of the notification received (see **Table 4.2**) unless another level is judged to be more appropriate.

4.2.3 The PEOC commander or delegate may adopt another provincial response level as appropriate due to operational considerations. All stakeholders shall be notified of any such change.

4.2.4 If the provincial response level is already set higher for a different emergency than what would be required under this plan, the PEOC commander shall include the following information in their notification to municipal contact points:

a) The provincial response level that would normally be directed for this nuclear emergency notification, for the purposes of undertaking initial municipal response actions as described in **Table 4.2** and municipal emergency plans;

b) The provincial response level that has been adopted for the other emergency(ies).

4.2.5 The initial (and any subsequent) response level to be adopted by the municipalities and other organizations shall be communicated by the PEOC commander (see **Paragraph 4.2.2** above) to all stakeholders as soon as reasonably achievable. The general municipal response actions for each level is outlined in **Table 4.2**; the specific response shall be described in the municipal plans.

## 4.3 Provincial Response Levels

4.3.1 The provincial response level adopted depends on the notification category received from Fermi 2 (see **Table 4.1**).

4.3.2 Unusual Event and Alert

a) In the event of an Unusual Event notification from Fermi 2 the provincial response level adopted should be Routine Monitoring, unless the PEOC commander decides otherwise.

b) In the event of an Alert notification from Fermi 2, the provincial response level adopted should be Enhanced Monitoring, unless the PEOC commander decides otherwise.

c) In these cases, the notifications and level of staffing shall proceed according to **Table 4.2**, unless the PEOC commander decides otherwise.

d) The PEOC commander shall ensure the applicable stakeholders are notified when a response to an Unusual Event or Alert has been terminated.

4.3.3 Site Area Emergency

A Site Area Emergency should normally result in a provincial response level of Partial Activation (see **Figure 4.1**), unless the PEOC commander decides otherwise.

4.3.4 General Emergency

A General Emergency notification from Fermi 2 shall result in a provincial response level of Full Activation (see **Figure 4.1**) as it denotes that an emission is possible resulting from core degradation or melting.

4.3.5 The remainder of this chapter therefore deals with the operational response to an accident at Fermi 2 which results in, or has the potential to result in, an emission of

radioactive material to the atmosphere, and therefore requires a partial or full activation response.

4.3.6 The partial and full activation response to a nuclear emergency is described below in relation to the three successive phases defined by the PNERP Master Plan, Section 5.9.

## 4.4 Internal Notifications

4.4.1 Each Canadian organization or agency required to respond to a nuclear emergency shall have an internal notification system to inform all concerned staff of the imminence or occurrence of an emergency under this plan, and of the appropriate response to the notification.

4.4.2 Each Canadian jurisdiction and organization receiving notification of the provincial response level of partial or full activation, shall issue an appropriate internal notification to its units and individuals who are required to respond. The notification shall indicate the provincial response level to be adopted.

4.4.3 The PEOC and each Canadian jurisdiction and organization required to respond and issue an internal or external notification (see **Section 4.5** below) shall prepare a notification procedure and list of recipients.

## 4.5 External Notifications

4.5.1 Additional organizations or agencies which might be affected by a nuclear emergency under this plan, or which may be required to assist in responding to it, should be notified at an appropriate stage by their links in the Emergency Response Organization. As such, upon adoption of an activation response (partial or full), external notifications shall be carried out as detailed below. The notification must indicate the level of activation being adopted.

4.5.2 PEOC Notifications

a) At Routine and Enhanced Monitoring, the PEOC will notify external stakeholders according to procedure.

b) If the PEOC is to be activated (whether partially or fully), then the PEOC commander shall issue an appropriate notification (including an indication of the level of activation) to at least one pre-designated contact point in each of the following jurisdictions and organizations:

i. PEOC staff

ii. Provincial Emergency Information Section staff

iii. Town of Amherstburg

iv. Host municipalities

v. Fermi 2 Nuclear Power Plant

vi. State of Michigan Emergency Operations Centre

vii. Each provincial-level organization required to respond to the emergency[6]

viii. The federal Government Operations Centre and the Federal Nuclear Emergency Plan (FNEP) duty officer who shall then complete the notifications listed in **Paragraph 4.5.3** below.

ix. The Province of Québec (Sûreté du Québec)

x. The State of New York Emergency Management Agency

xi. The State of Ohio Emergency Management Agency

xii. Canadian Coast Guard (which shall notify the US Coast Guard under agreed protocols)

xiii. Cision/National Alert Aggregation and Dissemination System (NAADS)

xiv. Bell Canada

xv. Wireless phone providers

4.5.3 As directed by Health Canada, the federal Government Operations Centre shall notify:

a) Natural Resources Canada (NRCan)

b) Royal Canadian Mounted Police (RCMP)

c) Privy Council Office (PCO)

d) Transport Canada (TC)

e) Department of National Defence (DND)

f) CNSC duty officer

g) Global Affairs Canada (GAC)

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[6] Refer to Annex I of the PNERP Master Plan for a full list of provincial organizations

h) Canadian Food Inspection Agency (CFIA)

i) Canada Border Services Agency (CBSA)

j) Indigenous Services Canada (ISC)

k) International organizations under existing agreements, conventions and departmental emergency plans.

4.5.4 Other agencies and organizations shall be notified by the following:

a) Transport Canada shall notify the following:

i. Air Traffic Control

ii. CN Rail

iii. CP Rail

iv. VIA Rail

b) Ministry of Agriculture, Food and Rural Affairs shall notify the Dairy Farmers of Ontario.

c) Ministry of Children, Community and Social Services shall notify the Red Cross, Ontario Zone.

d) Ministry of the Environment, Conservation and Parks shall notify the Essex Region Conservation Authority.

e) Municipal plans shall include provisions for the following *external* notification*s*:

i. Town of Essex

ii. City of Windsor

iii. Town of LaSalle

iv. Boblo Island Homeowners Association

v. Windsor-Essex County Health Unit

vi. Greater Essex District School Board

vii. Windsor-Essex Catholic District School Board

viii. Le Conseil Scolaire Des Écoles Catholique du Sud-Ouest

ix. Essex Region Conservation Authority

x. Local Industries

xi. Essex Terminal Railway

xii. Essex-Windsor Emergency Medical Services (Paramedic services)

xiii. local utilities (e.g., hydro, gas, water)

xiv. local branches of voluntary organizations

## 4.6 Early Phase Response

4.6.1 The early phase:

a) Begins with an initial notification of an emergency prior to, or during a radioactive release.

b) Lasts anywhere from hours to days and may involve the implementation of protective actions (see **Table 4.3** ).

c) Ends when the radioactive release is brought under control and reliable environmental radiation monitoring is available to be used for protective action decision-making. At this time, the early phase transitions to the intermediate phase.

4.6.2 The operational response in this phase differs depending on whether the initial provincial response level is partial or full activation.

4.6.3 Partial Activation

a) A PEOC partial activation response (see **Figure 4.1**) is adopted when it is expected that a radioactive release will occur at some point in the future and therefore protective or operational measures (other than monitoring and assessment of the situation) are not likely to be required within 36 hours.

b) When the PEOC is partially activated, initial actions include:

i. Notification of the emergency management organization and set up and full staffing of the PEOC and the municipal EOCs to monitor and assess the situation on a continuous basis.

ii. Activation of the ministry EOCs and Unified Transportation Coordination Centre and staffing.

iii. Activation of the Emergency Information Centres with staffing at an appropriate level in person and/or virtually. The Provincial Chief Emergency Information Officer (PCEIO) shall activate the Provincial Emergency

Information Section (PEIS) and deploy provincial staff to municipal Emergency Information Centres as required. Refer to **Section 6.4** for further details on emergency public information.

iv. All emergency response personnel not immediately required should be placed on standby. This provision should ensure that personnel can be quickly contacted when needed to report to their duty stations.

v. Other municipal emergency centres should be readied to a level where they can become fully operational without undue delay, when required. Specific levels of readiness shall be described in the municipal plans.

vi. Consideration shall be given to issuing an emergency bulletin(s) and news release(s).

c) The PEOC Scientific Section shall provide technical advice and assistance as appropriate to the PEOC commander on information provided by the reactor facility and/or the State of Michigan EOC.

d) PEOC Plans Section shall make recommendations to PEOC Command based on input from other PEOC sections in regard to any deviation from the default protective actions listed in **Table 4.2**.

e) The PEOC commander, in consultation with the PEOC Command Section and select stakeholder organizations (including MOH, designated municipalities and others deemed appropriate), shall consider and decide on the need for operational measures as well as future protective actions and ensure that all stakeholders are so informed.

f) If the emergency situation is resolved and the potential for off-site consequences is eliminated, the PEOC commander should downgrade the provincial response level, as appropriate.

g) Alternatively, the PEOC commander should upgrade the response level to full activation when a radioactive emission seems likely to occur in 36 hours or less or, as deemed appropriate.

4.6.4 Full Activation

a) A PEOC full activation response should be adopted as a result of:

i. An initial notification from Fermi 2 of a General Emergency, or

ii. An escalation of an existing emergency situation, where an emission is now expected in 36 hours or less

b) The following actions shall be initiated upon adoption of a full activation response:

i. All emergency operations centres, Emergency Information Centres, Reception Centres, Evacuation Centres, Emergency Worker Centres and Monitoring and Decontamination Units are fully staffed and operational.

ii. All emergency response personnel from **i** above immediately report to their places of duty.

iii. Public alerting is initiated and emergency bulletins issued concurrently (see **Sections 6.2** and **6.3**).

iv. Operational directives (or emergency orders) issued for protective actions per **c)** or **d)** below, as appropriate.

v. PEOC commander advises government of the need for a provincial emergency declaration (see PNERP Master Plan Section 1.5.1).

vi. PCEIO shall consider establishing a Joint Information Centre as necessary (**Paragraph 6.4.3 e)**).

c) Where the full activation response level is adopted as a result of an initial notification from Fermi 2 of a General Emergency requiring protective actions (see **Paragraph 4.6.4 a) i.** above), the actions noted in **Table 4.3** shall be implemented, unless there are good reasons for modifying the response. This default response is undertaken due to the potential lack of detailed information or plant data together with a lack of available time for analysis.

d) Where an escalating event results in the upgrade to a full activation response (see **Paragraph 4.6.4 a) ii.** above), the PEOC Command protective action decision making will be based on **Table 4.3**.

4.6.5 PEOC Technical Assessments for Fermi 2

Ontario does not normally assess the reactor hazard in developing its own protective measures for a nuclear emergency at Fermi 2. Protective measure decisions made by the PEOC commander should mirror the protective actions ordered by the State of Michigan for US jurisdictions (refer to **Table 4.3**).

4.6.6 Early Phase Protective Action Decision-Making

a) The PEOC Planning Section shall undertake an evaluation of the State of Michigan protective actions for US jurisdictions, taking into account operational and public policy considerations, and shall prepare a preliminary assessment regarding the need to implement these measures, proposed timings, and the area within which these measures should be taken in Ontario.

b) These assessments shall be continually updated and, as soon as a reasonably certain picture of the evacuation distance (and other protective measures) is achieved, the PEOC, through PEOC Command, shall consult with applicable stakeholders (e.g., the Town of Amherstburg, host and support municipalities, federal departments, etc.).

c) PEOC Command decisions on protective actions shall be based on the protective actions undertaken by Michigan State EOC (see **Table 4.3**) unless the operational situation requires alternative measures.

d) Command decisions shall be communicated to the emergency response organization and the applicable emergency bulletin(s) shall be issued.

## 4.7 Intermediate Phase Response

4.7.1 The intermediate phase begins once the radioactive release has been brought under control and reliable environmental radiation monitoring is available for use in protective action decision-making.

4.7.2 Following the radioactive emission, the PEOC Scientific Section's input into the protective action decision-making process shall be based on the tangible results of environmental radiation monitoring.

4.7.3 The PEOC Scientific Section shall undertake, and continuously update, the following assessments:

a) Off-site environmental radiation monitoring undertaken by the Environmental Radiation and Assurance Monitoring Group shall produce a picture of the contamination situation.

b) The PEOC Scientific Section chief shall make technical recommendations to PEOC Command for protective action (exposure and ingestion control measures) based on the results of the actual contamination levels as compared against the Operational Intervention Levels (OILs) (per the PNERP Master Plan, Annex E, Appendix 2).

c) The PEOC Scientific Section chief shall make recommendations to PEOC Command regarding sector safety status on behalf of emergency workers operating in the area.

d) The intermediate phase operations of the PEOC Scientific Section shall be detailed in the Scientific Section procedures.

4.7.4 Intermediate Phase Protective Action Decision-Making

a) The PEOC Planning Section shall undertake an assessment of these Scientific Section technical recommendations, in light of operational and public policy considerations, and shall prepare recommendations for the PEOC commander regarding the protective measures, areas where they should be implemented, and implementation timings.

b) These assessments shall be continually updated and, as soon as a reasonably certain picture of the evacuation (and other protective measures) distance is achieved, the PEOC commander shall advise all stakeholders of the protective action strategy to be undertaken. If time is available, the PEOC commander shall undertake prior consultation with applicable stakeholders on the protective action strategy recommendations.

c) Planning for the management of radioactive waste (see **Section 6.11**) generated by the emergency should preferably begin during the intermediate phase.

## 4.8 Transition to the Recovery Phase

4.8.1 During the recovery phase actions will commence to restore the affected area to pre-emergency conditions and to scale back the emergency response organization.

4.8.2 As there may not be a clear distinction between phases, with emergency response operations occurring in all three, planning for recovery should begin as soon as practical.

4.8.3 Stakeholder recovery plans should include measures to address the following as applicable to their organization:

a) Recovery organization structure

b) On-going population monitoring and medical management

c) Long-term relocation

d) Resettlement and return of evacuees

e) Long-term support for those living in contaminated areas

f) Decontamination and reconstruction of property damaged during the emergency

g) Economic impact issues and improvement plans

4.8.4 Stakeholder recovery plans should be prepared in advance and conform to the provincial recovery plan.

**Figure 4.1: Initial Provincial Protective Action Strategy Response to a Site Area or General Emergency Notification**

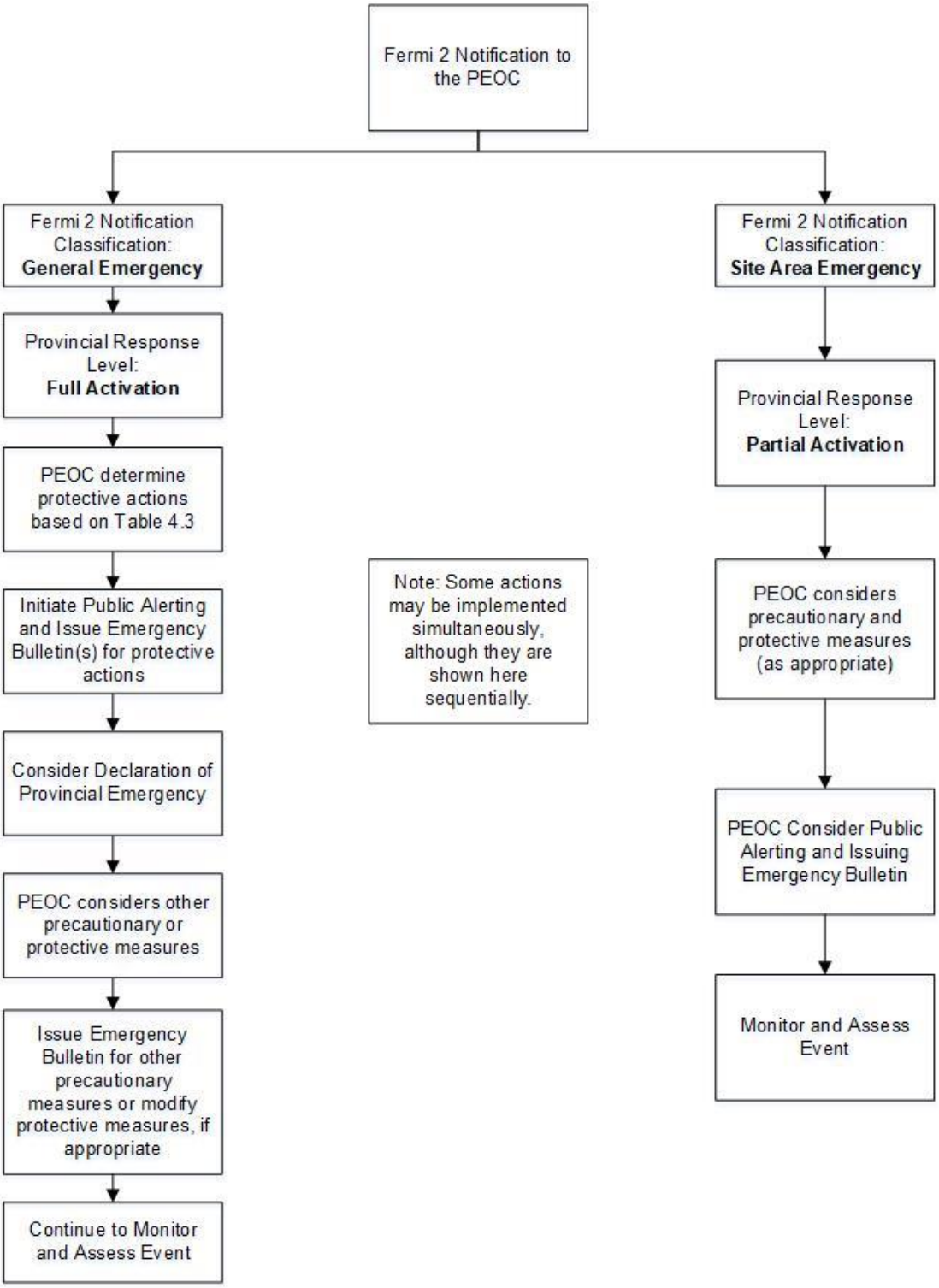

**Table 4.1: Emergency Classification System – Fermi 2 Nuclear Power Plant**

| EMERGENCY CLASSIFICATION | DEFINITION[7] | INITIAL PROVINCIAL RESPONSE |
|---|---|---|
| **UNUSUAL EVENT** | A situation is in progress or already completed which could potentially degrade the plant's level of safety or indicate a security threat to the facility. No releases of radioactive material requiring offsite actions are expected unless safety systems degrade further. | ROUTINE MONITORING |
| **ALERT** | Events are in progress or have occurred which have (or could) substantially degrade the plant safety; or, a security event that could threaten site personnel or damage to site equipment is in progress. Any offsite releases of radioactive material that could occur are expected to be minimal and far below limits established by the Environmental Protection Agency's (EPA) protective action guides (PAGs). | ENHANCED MONITORING |
| **SITE AREA EMERGENCY** | Events are in progress or have occurred which have caused (or likely will cause) major failures of plant functions that protect the public, or involve security events with intentional damage or malicious acts that could lead to the likely failure of (or prevent effective access to) equipment needed to protect the public. Any offsite releases of radioactive material are expected to remain below EPA PAG exposure levels beyond the site boundary. | PARTIAL ACTIVATION |
| **GENERAL EMERGENCY** | Events are in progress or have occurred which: a) have caused (or shortly will cause) substantial reactor core damage, with the potential for uncontrolled releases of radioactive material; or, b) involve security events that deny plant staff physical control of the facility. Offsite releases can be reasonably expected to exceed EPA PAG exposure levels beyond the plant site. | FULL ACTIVATION |

[7] Source: U.S Nuclear Regulatory Commission

**Table 4.2: Initial Provincial and Municipal Response**

| INITIAL NOTIFICATION | INITIAL PROVINCIAL RESPONSE | INITIAL MUNICIPAL RESPONSE |
|---|---|---|
| **UNUSUAL EVENT** | ROUTINE MONITORING<br>1. Provincial Emergency Operations Centre (PEOC) should maintain Routine Monitoring and shall notify the municipal contact point(s), Michigan State EOC, and others as appropriate, and shall monitor the situation.<br>2. PEOC Scientific staff is consulted, if appropriate.<br>3. If and when appropriate, Emergency Information Section (EIS) staff issues news release(s). | Emergency response staff remain in contact with the PEOC, and monitor event. |
| **ALERT** | ENHANCED MONITORING<br>1. PEOC should adopt Enhanced Monitoring and shall inform the municipal contact point(s), Michigan State EOC, and any other organizations affected.<br>2. External notifications to New York, Ohio and Quebec are made.<br>3. PEOC to set up a duty team consisting of operations staff, scientific staff, EIS staff, and others as required.<br>4. If and when appropriate, EIS staff shall issue news release(s).<br>5. Provincial staff are notified to remain available to report in for duty. | Emergency response staff monitor event, preferably from Municipal Emergency Operations Centres (EOCs). |
| **SITE AREA EMERGENCY** | PARTIAL ACTIVATION<br>1. PEOC should adopt partial activation response (for details, see Section 4.6.3), and shall initiate the appropriate internal and external notifications (Section 4.4 and Section 4.5 respectively), including the municipal contact points and the host communities. The PEOC shall be fully staffed.<br>2. If a reactor emission is expected to occur in 36 hours or less, PEOC should consider adopting full activation response and consider the need to implement immediate measures per Table 4.3.<br>3. Consideration shall be given to issuing an emergency bulletin (Section 6.4**)**, news release or both.<br>4. Ministry EOCs and Unified Transportation Coordination Centre (UTCC) to be established and appropriately staffed. | 1. Issue notification placing municipal Emergency Response Organization on standby.<br>2. Municipal EOCs fully staffed.<br>3. Emergency Information Centres (EICs) to be established.<br>4. Other emergency centres readied to become operational without undue delay. |

| INITIAL NOTIFICATION | INITIAL PROVINCIAL RESPONSE | INITIAL MUNICIPAL RESPONSE |
|---|---|---|
| **GENERAL EMERGENCY** | FULL ACTIVATION<br>1. PEOC shall notify and ensure that the municipal contacts have activated the public alerting system (Section 6.2).<br>2. PEOC shall issue the appropriate emergency bulletin (Section 6.4).<br>3. PEOC shall issue operational directives implementing the appropriate protective measures based on the State of Michigan's Protective Action Orders (see Table 4.3).<br>4. PEOC shall adopt full activation (Section 4.6.4), and shall initiate the appropriate internal and external notifications (Section 4.4 and Section 4.5 respectively), including the host community.<br>5. The PEOC shall be fully staffed with provincial deployments as appropriate.<br>6. PEOC shall assess the situation for further action.<br>7. PEOC shall issue further emergency bulletins, as appropriate (Section 6.4).<br>8. EIS staff shall issue news releases, as appropriate.<br>Ministry EOCs and UTCC to be established. | 1. Initiate public alerting.<br>2. Issue notification activating municipal Emergency Response Organization.<br>3. Municipal EOCs, EICs and other centres activated and fully staffed.<br>4. Implement operational directives, as issued by the PEOC. |

**Table 4.3: Guidelines for Implementing Protective Measures in Ontario**

| **Michigan State Protective Action Order**<br>(As indicated on the initial Event Notification Form) | **Ontario Protective Measures** |
|---|---|
| 1. **Evacuate** any of Michigan Areas 1,2,3 + Shelter rest of the Emergency Planning Zone (EPZ) | • Suspension of road, rail, marine and air traffic throughout the DPZ<br>• Precautionary measures in the DPZ as applicable<br>• **Shelter** DPZ Sectors F1 and F2 |
| 2. **Evacuate** Michigan Areas 4 and/or 5 and there is no imminent/ongoing emission | • Suspension of road, rail, marine and air traffic throughout the DPZ<br>• Precautionary measures in the DPZ as applicable<br>• Precautionary evacuation of Bois Blanc (Boblo) Island DPZ Sector F2<br>• **Evacuate** DPZ Sector F1 |
| 3. **Evacuate** Michigan Areas 4 and/or 5 and there is an imminent/ongoing emission | • Suspension of road, rail, marine and air traffic throughout the DPZ<br>• Precautionary measures in the DPZ as applicable<br>• Precautionary evacuation of Bois Blanc (Boblo) Island DPZ Sector F2<br>• **Evacuate** DPZ Sector F1<br>• **Consider Iodine Thyroid Blocking** in the DPZ |

# Chapter 5
# PROTECTIVE ACTION RESPONSE STRATEGY

## 5.1 Protective Action Response Strategy

5.1.1 During the response to a nuclear emergency, the PEOC shall implement a protective action response strategy to protect the public and responding emergency workers from the effects of a radioactive emission. Protective actions include:

a) Precautionary measures

b) Exposure control protective measures

c) Ingestion control protective measures

d) Additional measures to protect the public

5.1.2 The strategy for Fermi 2 protective action decision-making is based on the following considerations:

a) The Michigan-based exposure control protective measures throughout the emergency response.

b) The Michigan-based ingestion control protective measures in the early stage of the emergency, prior to the availability of Ontario environmental field monitoring data and analysis.

c) PEOC Scientific Section analysis of Ontario environmental field monitoring data.

d) The operational situation in Ontario within which protective actions are to be undertaken.

e) The need for precautionary measures.

## 5.2 Precautionary Measures

5.2.1 The PEOC commander shall direct as appropriate, any or all of the following precautionary measures in the DPZ and adjacent areas (e.g., CPZ). Consideration shall also be given to the most suitable timing for the measures (in the case of a delayed emission it may be appropriate to delay the application of some of them) and issue the necessary bulletin(s) and directions for their implementation. These measures are:

a) Closing of beaches, recreation areas, etc.

b) Closing of workplaces and schools

c) Suspension of admissions of non-critical patients in hospitals (per Ministry of Health direction)

d) Entry control (see **Section 6.6**)

e) Clearing the milk storage of dairy farms

f) Banning consumption of any item of food or water that may have been exposed outdoors

g) Banning consumption and export of locally produced milk, meat, produce, milk-and meat-producing animals

h) Removing milk- and meat-producing animals from outside pasture and exposed water sources

i) Evacuating Bois Blanc (Boblo) Island (based on practical and logistical considerations)

## 5.3 Exposure Control Protective Measures

5.3.1 Evacuation

a) If available, evacuation time estimates (see **Section 2.6.2**) should be used by the PEOC Commander to inform decision-making regarding the implementation of evacuation strategies.

b) Shadow evacuations may occur spontaneously in areas contiguous to the DPZ and are considered within the evacuation time estimates.

c) Contamination

i. In the event evacuations are necessary and are completed prior to an emission, evacuees are not expected to be contaminated nor require monitoring and decontamination.

ii. In the event of an ongoing or imminent emission, evacuees exposed to the radioactive emission can be expected to have varying levels of contamination.

iii. Contamination, where found, would be in the form of loose particulate on people, their belongings and vehicles.

iv. Internal contamination may be present in individuals exposed to a radioactive emission.

v. Self-decontamination may be a means of decontamination, if required.

vi. Monitoring and decontamination facilities are required for evacuees who have been exposed to a plume, as well as for those who desire assurance monitoring.

d) Transportation

i. During a nuclear emergency, traffic density and volume on major arterial roads and highways are significantly increased and therefore, travel times in all directions are significantly longer than normal.

ii. To ensure that evacuations can proceed as smoothly as possible, integrated and multi-modal transportation management shall be coordinated by the UTCC (see **Sections 6.6** and **6.7**).

e) Family Reunification Prior to Evacuation

i. Families will want to reunite and evacuate together, as far as practical.

ii. The feasibility of family reunification depends on the time of day at the onset of the emergency and on the urgency for evacuation*s* to proceed (i.e., timing of the emission).

iii. Factors affecting family reunification include workplace location, school children, residents of hospitals, long-term care homes or other institutions, etc.

iv. If it is not safe for families to reunite before evacuating, reunification should be managed by the Host Municipality at the reception centre.

f) Mass Care

i. The majority of evacuees will make their own arrangements for care and lodging. The Town of Essex and the City of Windsor, as the designated Host Municipalities, are responsible for making mass care arrangements for those evacuees without such resources.

g) Protection and Care of Animals

i. Pursuant to Section 7.0.2. (4), of the *EMCPA*, provincial evacuation orders can include animals under a declared provincial emergency. As such, municipal emergency response plans should make provisions for the protection and care of all animals, including those left behind during an evacuation.

ii. Designated municipalities should request assistance as necessary from the following to develop plans for the protection and care of animals:

- Ontario Ministry of the Solicitor General (mandate for Animal Welfare in Ontario)
- Ontario Ministry of Agriculture, Food and Rural Affairs (provincial lead on farm animal disease (OIC 1157/2009))
- Ontario Ministry of Northern Development, Mines and Natural Resources and Forestry for issues pertaining to wildlife

iii. The PEOC should provide assistance to the stakeholders above as required for the protection and care of animals.

h) Directing Evacuations

i. Directives to evacuate should include information detailing the boundaries of the evacuation area by readily identifiable roads or landmarks.

ii. Evacuees who may have been exposed to an emission shall be directed to proceed to a Monitoring and Decontamination Unit (MDU). Information on locations for monitoring shall be provided at the time of the emergency.

iii. Evacuees who are not at risk of being contaminated shall be instructed to leave the DPZ and not be directed to an MDU.

iv. Detailed information for the evacuating public will be included in the emergency bulletins issued by the PEOC.

v. Responsibilities for the expeditious movement of evacuees via the transportation networks are identified in the Unified Transportation Management Plan.

vi. The Unified Transportation Coordination Centre shall monitor the transportation network utilized by evacuees and inform the PEOC commander of any issues impacting the evacuation.

i) Evacuation Arrangements

i. Municipal plans for the Town of Amherstburg shall include arrangements for mass evacuation transportation.

ii. The evacuation of the affected public should be facilitated by the planning and preparedness undertaken in advance, including:

- Transportation management (e.g., MTO)
- Reception and evacuation centres (e.g., designated host municipalities)
- Long-term housing (e.g., multi-ministry and multi-jurisdictional planning group)
- Health issues and medical transfers (led by the local public health units and medical officers of health in conjunction with the MOH, Ontario health regions, and paramedic services as appropriate)

iii. Medical assistance required during an evacuation is the responsibility of the emergency medical services and hospitals in coordination with health partners and other evacuation efforts.

iv. Designated municipalities and designated host municipalities shall include provisions for the reception and care of evacuees in their emergency plans.

v. Emergency plans of the schools in the DPZ, if any, should provide for the movement of staff and students to pre-arranged host schools and, if necessary, to Monitoring and Decontamination Units for prior monitoring and decontamination. Evacuated students are the responsibility of their school staff until collected from the host school by their guardians, or parents.

vi. Emergency plans of hospitals, long-term care homes, and other institutions in the DPZ, if any, should include provisions for the transfer of staff/residents/patients to an appropriate facility outside the DPZ, with which prior arrangements have been made per the Radiation Health Response Plan. Provisions should also be made to take staff/residents/patients to Monitoring and Decontamination Units, if necessary.

vii. As it may not be possible or desirable to evacuate some of these persons, special arrangements shall be made for the care of staff/residents/patients remaining behind, as identified in the organizational plans.

5.3.2 Temporary Relocation

a) Temporary relocation:

i. Is the displacement of people from their homes for a period beyond one week and up to one year to avoid chronic exposure to radiation, usually from ground contamination. Beyond one-year, permanent resettlement should be considered.

ii. Can be directed post-release, during the intermediate response phase, based on actual measured contamination levels.

iii. Can be directed as a subsequent measure to evacuation, or sheltering-in-place, or as a separate measure.

iv. Is determined following analysis of environmental radiation monitoring results and assessment against Operational Intervention Levels (OILs; PNERP Master Plan Annex E, Appendix 2).

b) The evacuation arrangements described in **Section 5.3.1 i)** above shall be considered and applied as appropriate for the implementation of temporary relocation.

c) The PEOC should consider socioeconomic factors before recommending temporary relocation as the potential impacts of this action may not be justified in areas where the OIL for relocation is minimally exceeded.

5.3.3 Iodine Thyroid Blocking

a) The Town of Amherstburg shall detail in their plan the means by which they and Windsor- Essex County Public Health Unit facilitate:

i. The pre-distribution of KI pills together with instructions on KI administration to DPZ residences, businesses, institutions and for emergency centres (e.g., Emergency Worker, Reception and Evacuation Centres).

b) Windsor-Essex County Public Health Unit and Chatham Kent Public Health Unit shall detail in their plans the means by which they will facilitate the following within their respective jurisdictions:

i. Availability of KI pills for any resident of the CPZs and IPZs, including vulnerable populations who may wish to possess a supply in advance of an emergency.

c) The MOH shall procure, in advance, adequate quantities of Potassium Iodide (KI) pill, for use by local authorities of the Fermi 2 DPZ, CPZ and IPZ populations during a nuclear emergency (PNERP Master Plan, Annex I, Appendix 7).

d) The Ministry of Health shall provide support to local authorities for the Fermi 2 DPZ, CPZ and IPZ populations to ensure that the ITB related requirements of the PNERP and municipal plans are completed (PNERP Master Plan, Annex I, Appendix 7).

e) The Town of Amherstburg and the local health units previously identified should perform periodic reviews of the local populations to assess the adequacy of their ITB distribution programs.

f) Other operational responsibilities regarding iodine thyroid blocking (stocking, distribution and administration) are described in the Radiation Health Response Plan, as prepared by MOH.

g) The Chief Medical Officer of Health shall decide when to administer KI in consultation with the PEOC Commander and affected local medical officer(s) of health.

5.3.4 Sheltering-in-Place

The need for any future sheltering-in-place as a protective measure should be broadcast through the emergency bulletin as soon as that need is identified. The timing to actually issue an operational directive for sheltering-in-place (or, in the event of a declared emergency, advise that emergency orders have been made) shall be ultimately made by the PEOC commander (as a general guidance, however, the emergency bulletin to direct this protective measure should be issued at least 4 hours prior to the expected emission time) following escalation to a full activation response.

## 5.4 Ingestion Control Measures

5.4.1 Before an emission commences, appropriate ingestion control measures should be directed by the PEOC commander as a precaution within an area that matches ingestion control measures put in place by the State of Michigan.

5.4.2 After an emission commences, precautionary ingestion control measures should be reviewed by the PEOC Scientific Section and adjusted as necessary by the PEOC commander once environmental monitoring results become available.

5.4.3 If environmental monitoring indicates the need, appropriate ingestion control measures should be considered in areas known or suspected to be contaminated.

5.4.4 Based on the data produced by ground monitoring, additional ingestion control measures should be considered, where necessary, while the original precautionary measures may be lifted where appropriate.

## 5.5 Additional Measures to Protect the Public

5.5.1 The PEOC commander may recommend other, practical dose reduction measures to the public. Such measures may be implemented in combination with the measures described above or, may simply be recommended to provide an additional level of protection against possible radionuclides present in the air or on the ground but which do not meet the generic criteria or OILs. Such measures include:

a) Respiratory protection, such as covering of the nose and mouth with available material that can filter particulates when present in the air.

b) Self-decontamination, including removing and bagging contaminated clothing, showering, and decontaminating surfaces of critical areas and objects.

c) Staying indoors to the extent that it is practical, e.g., only conducting outdoor tasks when necessary (e.g., seeking medical attention, buying foodstuff and necessities).

5.5.2 Detailed advice regarding these measures shall be provided for in public awareness and education materials produced by The Office of the Fire Marshal and Emergency Management (OFMEM), in coordination with the Town of Amherstburg and other stakeholders (refer to the PNERP Master Plan Annex C).

5.5.3 Detailed instructions to the public for any of these measures directed shall be provided by the PEOC Commander in emergency bulletins.

# Chapter 6
# OPERATIONAL RESPONSE

## 6.1 General

6.1.1 Operational response strategies are employed during a nuclear emergency response in order to facilitate the implementation of protective measures against the effects of a radioactive emission.

6.1.2 Responsibility and strategies for operational response implemented during a Fermi 2 emergency are described below.

## 6.2 Public Alerting

6.2.1 Public Alerting System Activation and Responsibilities

a) Whenever the public alerting system is to be activated, the PEOC commander shall concurrently issue an emergency bulletin (see **Section 6.3**) to the broadcast media. The bulletin shall contain specific instructions on what actions the public should take and where to get more information. Emergency bulletins should be consistently repeated.

b) In case of a General Emergency initial notification from Fermi 2 stating that an emission is ongoing or imminent, the municipal contact points for the Town of Amherstburg should immediately activate the public alerting system. Reference to any other authority is not required.

c) In all other cases, the PEOC commander shall decide when to activate the public alerting system and issue the necessary instructions to the Town of Amherstburg.

d) The all-hazards municipal alerting system in place in the Town of Amherstburg may be used for a nuclear emergency.

e) The provincial Alert Ready program shall also be used to alert all Canadian populations within and beyond the DPZ[8].

6.2.2 Public alerting systems used to implement this PNERP shall conform to the following principles:

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[8] The provincial Alert Ready program ensures that emergency bulletins are broadcast in a timely manner via radio, television and mobile devices.

a) The Town of Amherstburg and the province shall include provisions in their nuclear emergency response plans to coordinate the timing of public alerting, public direction and emergency information. This should ensure that the population receives timely and accurate information on what protective measures to take once they have been alerted of an emergency.

b) The Town of Amherstburg's nuclear emergency response plan shall describe how the public alerting system has the capability to issue a public alert to the population in the DPZ.

c) Regular integrated testing of existing public alerting systems shall be included as a component of municipal exercise programs.

d) Such a public alerting system, coupled together with emergency bulletins, should ensure that the population within the DPZ is notified in an effective and timely manner.

## 6.3 Public Direction - Emergency Bulletins

6.3.1 The responsibility for issuing emergency bulletins rests with the PEOC commander and may be delegated to the PEOC Operations chief.

6.3.2 The aim of public direction is to communicate, directly to the affected public through emergency bulletins, the direction and guidance regarding protective actions they should take in order to ensure their safety and welfare. Public direction principles are described in the PNERP Master Plan, Section 7.3.

6.3.3 Emergency bulletins issued during a partial activation response level should be informative and permissive, whereas emergency bulletins issued once a full activation response has been adopted should be increasingly directive.

6.3.4 While the need for future sheltering should be broadcast through emergency bulletins as soon as that need is identified, the actual sheltering directive should be made, via emergency bulletin, at least four hours prior to the expected emission time if known.

6.3.5 At a partial activation response, the emergency bulletin shall include the following information, as applicable:

a) Date and time of expected emission, if known

b) Sectors (by geographical description) which may be affected

c) Applicable precautionary and protective measures for the affected sectors or area and applicable timings (if appropriate).

6.3.6 Once a full activation response level has been adopted an emergency bulletins should include directions regarding:

a) Date and time of expected emission, if known

b) Precautionary measures directed in the applicable zone(s)

c) Protective measures and the affected sectors or zones

d) Reception/Evacuation Centres which can receive evacuees who have no alternate accommodation.

e) KI pill ingestion details and availability information, as applicable

6.3.7 Marine Notification and Public Direction

a) The Canadian Coast Guard is notified whenever the PEOC receives a notification (partial or full activation) under this plan (see **Paragraph 4.5.3**) and they, in turn, shall notify the U.S. Coast Guard.

b) In the case of a full activation response, the Canadian Coast Guard shall broadcast an emergency message through their radio stations to marine craft on the marine radio channel. The message should notify all marine craft in the vicinity of the emergency and direct them to remain clear of the DPZ.

c) The Municipal Plan shall detail how notification and evacuation assistance will be provided to the marine craft (with and without radios) on the Ontario side of the Detroit River and Lake Erie. Such detail shall include any arrangements with the local OPP detachment.

6.3.8 The Office of the Fire Marshal and Emergency Management (OFMEM) shall provide advice and assistance regarding the nuclear content of the Town of Amherstburg's emergency public awareness and education programs and OFMEM shall coordinate with other stakeholders as appropriate (see PNERP Master Plan Annex C). The Town of Amherstburg's nuclear public awareness and education program shall include information regarding the means by which public direction will be communicated.

## 6.4 Emergency Public Information

6.4.1 For clarity, emergency bulletins issued to the public are issued by the PEOC commander as per **Section 6.3.** Emergency bulletins are not news releases.

6.4.2 Lower Level Response

When the off-site response adopted is Routine Monitoring or Enhanced Monitoring, (see **Table 4.2**), all news releases or posts for social media pertaining to the event

and prepared on behalf of the province, shall be issued by the SOLGEN Communications Branch. The SOLGEN communications director acts as the PCEIO.

6.4.3 Higher Level Response

a) When the off-site response adopted is partial activation or full activation, (see **Table 4.2**), the director of communications, SOLGEN, assumes their role as PCEIO, establishing the provincial Emergency Information Section, on behalf of the province.

b) The Town of Amherstburg, and the federal governments each have their own emergency information operations.

c) In order to ensure the coordination and consistency of all emergency information issued to the public, all stakeholders should inform the provincial Emergency Information Section if they plan to issue news releases or other emergency information materials.

d) Stakeholders should coordinate the release and content of emergency information for public release with the provincial Emergency Information Section.

e) Stakeholder emergency plans should include provisions for supporting the operation of a Joint Information Centre if established by the PCEIO (e.g., public affairs/spokesperson).

6.4.4 The Provincial Emergency Information Section (PEIS)

a) The PEIS, located in Toronto or operating virtually as determined by the PEOC, shall ensure that the province's emergency information is coordinated with the emergency information produced and disseminated by the designated municipalities, nuclear operator, federal partners and other stakeholders to ensure consistent messaging.

b) The PEIS shall deploy a liaison officer, either in-person or virtually, to the PEOC.

c) Stakeholders should share emergency information prior to release wherever possible and practicable.

d) The PEIS functions include:

   i. Coordinating all the provincial communications related to the nuclear emergency.

ii. Coordinating information and communication on behalf of the province with the State of Michigan and DTE Energy.

iii. Developing and issuing news releases and social media posts and arranging media briefings.

iv. Providing notices and public service announcements to broadcasters.

v. Answering media and public inquiries.

vi. Monitoring media and social media, correcting inaccuracies and dispelling rumours.

vii. Providing communications advice to the PEOC commander and the Commissioner of Emergency Management.

viii. Providing information to the Premier's Office via Cabinet Office.

ix. Sharing and coordinating emergency information with Municipal EICs to ensure continuity and uniformity of messaging.

x. Sharing copies of all news releases, fact sheets, and other public information materials with EICs prior to release to the public, if or when possible.

xi. Deploying (in-person or virtually) a liaison officer(s) to the municipal EICs, if so requested.

6.4.5 Municipal Emergency Information Centre (EIC)

a) The Town of Amherstburg emergency plan shall describe how an EIC is established at a partial or full activation response.

b) The EIC is responsible for the collection, dissemination and monitoring of local emergency information.

c) The functions of the municipal EIC include:

i. Issuing news releases and other public information documents to the local media and residents describing the emergency and response measures.

ii. Keeping the PEIS informed regarding the development and distribution of news releases and other public information documents to local residents and media.

iii. Keeping the EIS apprised of local public perceptions, rumours, and reactions.

iv. Monitoring local media to ensure that local news is being accurately transmitted to the public by the media and confirming this with the PEIS.

v. Informing the PEIS about the development and distribution of news releases and other documents for the local media and residents and, as a courtesy, share such documents with the PEIS.

vi. Informing the PEIS about the context, tone and reaction of the media, the public and other major stakeholders.

vii. Assisting media covering the emergency.

viii. Arranging media briefings, as required, to communicate “key messages” to the public.

ix. The EIC operation will be amalgamated into a JIC if one is activated in the local area.

6.4.6 Public Inquiries

a) Provincial public inquiries shall be coordinated by the PEIS and include use of the Service Ontario Call Centre.

b) The designated municipalities shall be responsible for establishing their own public inquiry operation.

## 6.5 Technical Assessments - PEOC Scientific Section

6.5.1 The PEOC Scientific Section is responsible for assessing the radiological consequences of the nuclear emergency through the operations of its Nuclear Incident Group (NIG) and the Environmental Radiation Assurance and Monitoring Group (ERAMG).

6.5.2 In the early phase of the emergency the majority of the assessments are undertaken by the NIG (**Section 4.6.5**) for Ontario-based reactor facilities. Due to the difference in the boiling-water reactor technology of Fermi 2 compared to CANDU technology of Ontario-based reactors, the NIG does not undertake technical assessments from Fermi 2. The ERAMG shall be focused on ensuring the availability of baseline radiation information.

6.5.3 Once the emission has ceased, the ERAMG shall begin operations to determine the level and extent of radioactive contamination (**Section 4.7.3**).

## 6.6 Entry Control

6.6.1 Entry control is the prevention of non-essential persons from entering a potentially dangerous area.

6.6.2 In the event of an ongoing emission or one that is imminent, the PEOC Commander should consider the following entry control measures and notify the proper authorities for implementation as appropriate:

a) Suspension of through traffic on County Road 20 and Essex Terminal Railway.

b) Suspension of marine traffic in Lake Erie and the Detroit River.

c) Aircraft should be kept clear of the DPZ.

6.6.3 Management of the main transportation routes shall be coordinated by the Unified Transportation Coordination Centre (UTCC). Activities and operations required for effective entry control shall be described in the Unified Transportation Management Plan developed by MTO and OPP (see **Section 6.7**).

6.6.4 As Part of Protective Measures

a) Lake and River Sector

Whenever it is likely that a radioactive emission will take place as the result of an emergency at Fermi 2, operational directives should be issued to evacuate Lake Sector F3 of vessels (or, in the event of a declared emergency, advise that such orders have been made), and entry control imposed on them through the Canadian Coast Guard and the local OPP Marine Unit.

b) Evacuated Sectors

Entry control shall be implemented for sectors that have been evacuated. However, access will be allowed to emergency workers who have tasks to perform in such a sector. This entry control shall be the responsibility of the appropriate police service, under the Unified Transportation Management Plan.

c) Sheltered Sectors

Entry control should be implemented for sectors where sheltering-in-place is ordered.

## 6.7 Transportation Management

6.7.1 A Unified Transportation Management Plan shall be developed for the DPZ as well as the arterial roads that provide access to this zone. During an emergency, the Unified Transportation Coordination Centre (see **Paragraph 3.1.4**) shall be responsible for implementing the Unified Transportation Management Plan.

6.7.2 The Unified Transportation Coordination Centre shall operate in coordination with the Municipal Emergency Operations Centres (EOCs), and the Provincial Emergency Operations Centre (PEOC).

6.7.3 The Unified Transportation Management Plan shall be designed to allow implementation in incremental stages consistent with the agreed upon evacuation time estimate data and the provincial emergency response levels. For example, a staged approach may include:

a) Stage 1: The aim in this stage could be to keep traffic flowing smoothly on the main evacuation routes and ensure that these routes remain open.

b) Stage 2: Unified Transportation Management Plans s could prevent traffic from entering the DPZ and divert traffic around it. However, access should be allowed for emergency workers who have tasks to perform in the DPZ. Stage 1 measures should continue.

c) Stage 3: Could be initiated when it appears that particular sectors beyond the DPZ are likely to be evacuated. Additional resources should be deployed to ensure that evacuation proceeds smoothly beyond the DPZ boundary. Stages 1 and 2 measures should continue.

6.7.4 The timing and order of Ontario sector evacuations shall be determined by the PEOC commander, in coordination with the UTCC.

6.7.5 Operational directives implementing evacuations (or emergency orders issued in the event of a declared emergency) shall be accompanied by emergency bulletins issued by the PEOC commander.

## 6.8 Emergency Worker Safety

6.8.1 At the commencement of an emergency resulting in the activation of this plan, the DPZ[9] shall be assumed to carry the following default safety status (PNERP Master Plan, Annex H), based on the category of the notification initiated by Fermi 2:

a) General Emergency notification: ORANGE

b) All other notification categories: GREEN

6.8.2 The PEOC Scientific Section chief shall make recommendations on sector safety status to the PEOC commander for approval and update recommendations as data becomes available.

6.8.3 The PEOC Commander shall reassign safety status to the DPZ and update it periodically as soon as relevant data is available.

6.8.4 During the course of an emission over land, safety sector status updates shall be done on an hourly basis and promptly communicated by the PEOC commander to all stakeholders.

6.8.5 It is the responsibility of each organization with emergency workers operating or required to operate in the DPZ to ensure that they are kept apprised of the current safety status of the DPZ.

6.8.6 The municipal plan shall provide for the setting up of Emergency Worker Centres (EWCs), as appropriate (PNERP Master Plan, Paragraph 7.10.3). This includes administrative responsibilities and location facility.

6.8.7 The PEOC will co-ordinate the monitoring and decontamination aspect of EWCs as soon as notification of a Site-Area or General Emergency at Fermi 2 is received by the PEOC Duty Office. The Province of Ontario is responsible for coordinating the resourcing and maintaining the monitoring and decontamination function of the EWC.

a) The initial monitoring and decontamination support provided to the EWC will be provided by Windsor Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE) team, which operates under the City of Windsor Fire and Rescue Services. Additional provincial CBRNE teams will be deployed as required.

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[9] Sector Safety Status is only assigned to the DPZ. All other zones are green unless otherwise indicated by the PEOC Commander.

b) The PEOC should enter into agreements with the Ontario-based reactor facilities and the federal government to support the deployment of additional monitoring and decontamination resources as required throughout the emergency.

6.8.8 Emergency workers who need to enter a sector shall first report to an EWC, where they will be provided with personal dosimeters and briefed on the health risks and precautions they should observe and any maximum time limit on their stay in the sector (see **Paragraph 6.8.1** above).

6.8.9 If an emission is ongoing, emergency services (e.g., police, fire and paramedic services) required to operate in the impacted sectors (before an Emergency Worker Centre is functioning) should be equipped with the following:

a) Personal protective equipment

b) Dosimetry

c) Potassium iodide tablets

d) A card listing the default safety status of sectors (see **Paragraph 6.8.1** above) and the precautions to be taken for each safety status (PNERP Master Plan, Annex H)

6.8.10 The Municipal plan shall detail how these emergency services obtain these items, appropriately store them, and maintain such equipment so that it is readily available when needed.

## 6.9 Monitoring and Decontamination

6.9.1 OFMEM is responsible (PNERP Master Plan, Annex B Section 4.6) for coordinating, in advance of a Fermi 2 emergency, arrangements for monitoring and decontamination for evacuees and for emergency workers. This shall be accomplished through engagement and agreement with applicable stakeholders and other organizations, as required, with the appropriate expertise to resource and undertake the following:

a) Selection of pre-designated sites (in coordination with designated municipalities)

b) Resourcing fixed and/or mobile Monitoring and Decontamination Units (MDUs)

c) Provision of core staff and resources

d) Transport of staff and resources

e) Staff training

f) Drills and exercises

6.9.2 Fixed and mobile MDUs shall provide for those evacuees who either require or desire it upon evacuating the DPZ.

6.9.3 Mobile MDUs can also be deployed to support fixed MDUs if additional capacity is required at those locations.

6.9.4 During the early phase of an emergency at Fermi 2, the PEOC shall coordinate the implementation of the monitoring and decontamination arrangements as described in **Section 6.9.1**.

## 6.10 Population Monitoring and Medical Management

6.10.1 The Ministry of Health (MOH) is responsible for leading and coordinating the health response and maintaining health services during nuclear and radiological emergencies. As such and per the Radiation Health Response Plan (RHRP), the MOH shall develop arrangements in coordination with hospitals, the Town of Amherstburg, the coordinator of the MDU(s) (refer to **Section 6.9.1**) and public health units, to track evacuees for the purposes of assessing contamination and dose (internal and external) and to provide follow up with those affected.

6.10.2 The RHRP shall be fully activated through the MOH EOC when it seems likely that the incident may result in high radiation exposures to some persons necessitating medical management.

## 6.11 Management of Radioactive Waste

6.11.1 For large waste volumes and high radioactive levels, existing disposal facilities may be insufficient or unsuitable, thereby necessitating alternative means of disposal, including the potential for construction of new facilities.

6.11.2 The following factors should be considered in the determination of waste disposal siting (existing or new):

a) Proximity to the incident area

b) Proximity to residential areas or commercial districts

c) Proximity to transportation corridors

d) For newly designated sites, the existing level of contamination and potential for remediation

e) Consistency with national and international standards and practices for the management and control of radioactive waste; and

f) Solutions to protect the health and safety of persons and the environment

6.11.3 When appropriate, the PEOC commander shall appoint a working group to implement a waste management plan, including representatives from:

a) Provincial ministries (e.g., MECP, NDMNRF, MLTSD and MTO)

b) Federal departments (e.g., CNSC and Health Canada)

c) Municipal public works departments

d) Reactor facility specialists as available

e) Private sector organizations, as applicable

# ANNEXES

**ANNEX A: RESPONSE SECTOR BOUNDARIES**

**ANNEX B: POPULATION DATA**

**ANNEX C: CONTINGENCY PLANNING ZONE GUIDANCE**

**ANNEX D: NUCLEAR / RADIOLOGICAL GLOSSARY**

# ANNEX A
# RESPONSE SECTOR BOUNDARIES

(Reference: **Section 2.4.2**)

| SECTOR | MUNICIPALITY | SECTOR BOUNDARY (north; east; south; west) |
|---|---|---|
| F1 | Town of Amherstburg | • South of Shaw Drive and south of County Road 20 from Front Road S. to Concession 3 S;<br>• West of Concession 3 S. from County Road 20 to Willow Beach Road;<br>• North and East Lake Erie Shoreline from County Road 20 along Front Road S., Erie Avenue and Willow Beach Road. |
| F2 | Bois Blanc (Boblo) Island | Entire island |
| F3 | Detroit River/Lake Erie | Detroit River south of Bois Blanc (Boblo) Island; Essex County shoreline; a line drawn at 215o from the east end of Sector F1 to the international boundary. |

# ANNEX B
# POPULATION DATA

(Reference: **Paragraph 2.6.1**)

| SECTOR | POPULATION[10] | SCHOOLS (ENROLMENT) | CHILD CARE FACILITY & NURSERY SCHOOLS | RETIREMENT HOMES | LONG TERM CARE FACILITY |
|---|---|---|---|---|---|
| F1 | 1700 (486 households) | 0 | 0 | 0 | 0 |
| F2 | 700 (200 households) | 0 | 0 | 0 | 0 |
| TOTALS | 2400 | 0 | 0 | 0 | 0 |

[10] Population estimates based on the Town of Amherstburg, May 2021

# ANNEX C
# CONTINGENCY PLANNING ZONE GUIDANCE

(Reference: **Section 2.4.3**)

**General**

1. The Contingency Planning Zone (CPZ) is a pre-designated area surrounding a reactor facility, beyond the Detailed Planning Zone (DPZ), where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective measures can be extended beyond the DPZ as required to reduce potential for exposure.

2. The CPZ included within the PNERP Master Plan and Implementing Plans is aligned with new standards and guidance documents, including the Canadian Standards Association's (CSA) *N1600 General Requirements for Nuclear Emergency* Management Programs**,** International Atomic Energy Agency's (IAEA) *General Safety Requirements (GSR) Part 7*.

3. The CPZ is intended to be used as necessary in the event of very low probability, severe accident situations where the area affected could extend beyond the DPZ.

4. The CPZ does not require the same level or type of detailed arrangements as the DPZ, in so far as there are no default or pre-planned protective measures associated with the CPZ.

5. Response activities within the CPZ may occur in the event of a limited and localized radiological release and based on the results received from environmental radiation monitoring activities.

6. The distribution of iodine thyroid blocking pills should be undertaken in a manner consistent with the processes established for the Ingestion Planning Zone (IPZ).

7. Public education requirements are consistent with the processes stipulated for the IPZ.

8. The designation of additional primary emergency facilities beyond those designated in the DPZ is not required (e.g., Emergency Operations Centres (EOCs), Emergency Information Centres (EICs), Reception Centres, Evacuation Centres, MDU facilities, etc.). However, municipalities are required to identify and document in their municipal plans, those sites that could be used as a back-up or alternative location in the event that the primary emergency facility becomes unavailable.

**Operational Response Activities Within the CPZ**

9. Operational response activities within the CPZ should unfold using the planning, communication, assessment and command and control mechanisms set out in this document and the PNERP Master Plan. For example, public alerting and emergency communications would be conducted using existing processes and systems as established for the IPZ.

10. Operational response activities within the CPZ would be focused on monitoring dose rates from deposition (e.g., groundshine) in order to determine which specific locations or areas beyond the DPZ may require the imposition of exposure control measures (e.g., evacuation, temporary relocation etc.).

11. In the event of a radiological release, the PEOC would undertake the following functions:

    a) The PEOC would determine and advise stakeholders on the direction of the radioactive plume and likely radioactive material deposition locations.

    b) The PEOC would direct field surveillance teams and sampling teams to measure for radioactive material deposition in suspected locations.

    c) The PEOC Scientific Section would employ its existing mechanisms, processes and procedures to assess environmental radiation monitoring results and analyze the data received from the field surveillance teams and sampling teams to identify the size and boundaries for the response activities within the eight CPZ sub-zones (see **Figure 2.3**) and to make protective action recommendations to the PEOC Commander, consistent with the results received and in line with the PNERP Master Plan's guiding principles (PNERP Master Plan, Section 1.2).

    d) The PEOC commander would promulgate protective actions using existing communication methods specified in this Implementing Plan.

12. Municipalities would be required to identify any emergency facilities that may be at risk of exposure to a radioactive plume during the emergency. Municipalities and the PEOC would then collaborate to determine which previously identified alternate facilities would be used to support the response. In the event of an emergency where all previously identified alternative facilities are unavailable, the PEOC will identify and source appropriate alternate facilities and communicate the location of these facilities to the Emergency Response Organization.

13. The emergency information function would be engaged to advise the public and stakeholders which areas of the CPZ have been impacted and what protective actions are required.

# ANNEX D
# NUCLEAR / RADIOLOGICAL GLOSSARY

(Reference: **Paragraph 2.3.2**)

(For other references see Provincial Glossary)

**Abnormal Incident:** An abnormal occurrence that may have a significant cause and/or may lead to more serious consequences. (Source: CNSC Glossary)

**Accident:** Any unintended event, including operating errors, equipment failures or other mishaps, the consequences or potential consequences of which are significant from the point of view of protection or safety. With respect to nuclear criticality safety, the term accidents or accident sequences means events or event sequences, including external events that lead to violation of the sub-criticality margin (that is, to exceeding the upper subcritical limit). (Source: CNSC Glossary)

**Activation:** Decisions and actions taken to implement a plan, a procedure or to open an emergency operations centre. (Source: Provincial Glossary)

**Alerting:** Informing the population, by means of an appropriate signal, that a nuclear emergency has occurred or is about to occur.

**As Low As Reasonably Achievable (ALARA):** A principle of radiation protection that holds that exposures to radiation are kept as low as reasonably achievable, social and economic factors taken into account. (Source: CNSC Glossary)

**Automatic Action Zone (AAZ):** A pre-designated area immediately surrounding a reactor facility where pre- planned protective actions would be implemented by default on the basis of reactor facility conditions with the aim of preventing or reducing the occurrence of severe *deterministic effects*. (Source: Canadian Standards Association (CSA) *N1600, General requirements for nuclear emergency management programs*)

**Becquerel (Bq):** The International System of Units (SI) unit of radioactivity. One becquerel (Bq) is the activity of a quantity of radioactive material in which one nucleus decays per second. In Canada, the Bq is used instead of the non-SI unit curie (Ci). (Source: CNSC Glossary)

**Beyond Design Basis Accident (BDBA):** An accident less frequent and potentially more severe than a design-basis accident. Note**:** For a reactor facility, a beyond-design-basis *accident* may or may not involve fuel degradation. (Source: CNSC Glossary)

**Boiling Water Reactor (BWR):** A common type of light-water reactor, where water is allowed to boil in the core, generating steam directly in the reactor vessel to generate electrical power. (Source: CNSC Glossary)

**Buffer Zone:** An area beyond the Restricted Zone, where limited areas of radioactivity are detected. The buffer zone is initially delineated based on results of preliminary environmental

radiation monitoring. Ingestion control measures may be applied within this zone, based on guidance provided by the Operational Intervention Levels (OILs) and, in accordance with direction provided by the Environmental Radiation and Assurance Monitoring Group (ERAMG).

**CANDU Reactor:** A Canadian-invented pressurized heavy-water reactor that uses heavy water (deuterium oxide) for moderator and coolant and natural uranium for fuel. “CANDU” is short for CANada Deuterium Uranium. Also called CANDU. (Source: CNSC Glossary)

**Cloudshine:** Gamma radiation from radioactive materials in an airborne plume.

**Communications:** Advisories, directives, information and messages that are transmitted. (Source: Provincial Glossary)

**Community:** A generic term that includes both municipalities and First Nations. (Source: Provincial Glossary)

**Containment (System):** A series of physical barriers that exist between radioactive materials contained in a reactor facility and the environment. Containment usually refers only to the reactor and vacuum buildings, and integral systems such as dousing.

**Contamination:** Contamination refers to nuclear or hazardous substances on surfaces, or within solids, liquids or gases (including the human body), where their presence is unintended or undesirable, or to the process giving rise to their presence in such places. (Source: CNSC Glossary)

**Contingency Planning Zone (CPZ):** A pre-designated area surrounding a reactor facility, beyond the Detailed Planning Zone, where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective actions can be extended beyond the Detailed Planning Zone as required to reduce potential for exposure. (*Source: CSA N1600, General requirements for nuclear emergency management programs*)
Note: The actual CPZ for each reactor facility is specified in the relevant implementing plans of the *Provincial Nuclear Emergency Response Plan*.

**Crop Control**: *See* **Produce and Crop Control**.

**Declaration of Emergency:** A signed declaration made in writing by the Head of Council or the Premier of Ontario in accordance with the *Emergency Management and Civil Protection Act*. This declaration is usually based on a situation or an impending situation that threatens public safety, public health, the environment, critical infrastructure, property, and/or economic stability and exceeds the scope of routine community emergency response.
Notes:
1 Municipal Declaration of Emergency: a declaration of emergency made by the Head of Council or a Municipality, based on established criteria.
2 Provincial Declaration of Emergency: a declaration of emergency made by the Lieutenant Governor of Council or the Premier of Ontario, based on established criteria.
(Source: Provincial Glossary)

**Decontamination:** Reduction or removal of radioactive contamination in or on materials, persons or the environment.

**Design Basis Accident (DBA):** Accident conditions against which a facility is designed according to established design criteria, and for which the damage to the fuel and the release of radioactive material are kept within authorized limits. (Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Designated Host Municipality:** The Municipality assigned responsibility in the Provincial Nuclear Emergency Response Plan for the reception and care of people evacuated from their homes in a nuclear emergency.

**Designated Municipality:** A Municipality in the vicinity of a reactor facility which has been designated under the *Emergency Management and Civil Protection Act*, as one that shall have a nuclear emergency plan (for list *see* PNERP Master Plan, Annex A).

**Detailed Planning Zone:** A pre-designated area surrounding a reactor facility, incorporating the Automatic Action Zone, where pre-planned protective actions are implemented as needed on the basis of reactor facility conditions, *dose* modelling, and environmental monitoring, with the aim of preventing or reducing the occurrence of stochastic effects. (Source: Modified from *CSA N1600, General requirements for nuclear emergency management programs*)

**Deterministic Effects:** Radiation-induced health effects including changes to cells and tissues that are certain to occur in an individual exposed to a radiation dose greater than some threshold dose, with a severity that increases with increasing dose. Now referred to as tissue reactions. (Source: Health Canada Glossary)

**Disaster:** A serious disruption to an affected area, involving widespread human, property, environmental and / or economic impacts, that exceed the ability of one or more affected communities to cope using their own resources. (Source: Provincial Glossary)

**Dose:** A measure of the radiation received or “absorbed” by a target. The quantities termed absorbed dose, organ dose, equivalent dose, effective dose, committed equivalent dose or committed effective dose are used, depending on the context. The modifying terms are often omitted when they are not necessary for defining the quantity of interest.

**Dose Management:** Includes administrative controls to limit *doses*, monitor *doses* and record *doses* received by emergency workers while fulfilling their duties related to nuclear emergency response.

**Dose Projection:** The calculation of projected dose (*see Projected Dose*).

**Dose Rate:** The amount of radiation dose which an individual would receive in a unit of time. In the context of this plan, the measurement units are multiples or submultiples of the Sievert (or rem) per hour.

**Dosimeter:** An instrument for measuring and registering total accumulated exposure to ionizing radiation.

**Dosimetry Types**: The methods used for measuring radiation dose in or excreted from a body or in radioactive atmospheres.

a) **External dosimetry** is usually employed for photon (that is, X and gamma) radiation, but may also be used for beta and neutron radiation sources outside of the body.
b) **Internal dosimetry** involves bioassay in the form of either in vitro monitoring, in vivo monitoring, or a combination of the two.
c) **Radioactive atmosphere** is usually measured by air monitoring techniques. Typical measurements are for radon progeny and radioactive dusts in uranium mines. (Source: CNSC Glossary)

**Drill:** Supervised instruction intended to test, develop, maintain, and practice the skills required in a particular emergency response or recovery activity.
Note: A drill can be a component of an exercise. (Source: *CSA N1600, General requirements for* nuclear emergency *management programs*)

**Effective Dose (E):** A quantity calculated by multiplying the equivalent dose received by irradiated tissues, by a tissue specific weighting factor that reflects the risk of radiation-induced cancer to that tissue. The effective doses can then be summed to obtain the effective dose absorbed by the body.

**Emergency:** A situation or an impending situation that constitutes a danger of major proportions that could result in serious harm to persons or substantial damage to property and that is caused by the forces of nature, a disease or other health risk, an accident or an act whether intentional or otherwise (*EMCPA*). (Source: Provincial Glossary)

**Emergency Action Level:** Pre-determined criteria related to on-site conditions (e.g., plant parameters) which trigger the implementation of protective actions, particularly in the Automatic Action Zone. (Source: Health Canada Glossary)

**Emergency Bulletin**: Directions to the public on appropriate protective and other measures to be taken during a nuclear or radiological emergency, which are issued by the province and broadcast through the media.

**Emergency Information (EI):** Information about an emergency that can be disseminated in anticipation of an emergency or during an emergency. It may provide situational information or directive actions to be taken by the public. (Source: Provincial Glossary)

**Emergency Information Centre (EIC):** A designated facility that is properly equipped to monitor and co-ordinate emergency information activities including the dissemination of information to the public. (Source: Provincial Glossary)

**Emergency Response Organization:** A group (public, private or volunteer), trained in emergency response that may be called upon to respond to an emergency situation. (Source: Provincial Glossary)

**Emergency Worker:** A person performing emergency services to support emergency response.
Notes**:**

1 Emergency workers can include the following: nuclear emergency workers required to remain in, or to enter, areas affected or likely to be affected by radiation from a nuclear emergency, and for whom special safety arrangements are required; emergency workers required to provide response outside the affected areas.
2 This does not include nuclear energy workers.
3 Emergency workers can include police, firefighters, paramedic services and emergency social services workers, and other essential services.
(Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Emergency Worker Centre:** A facility set up to monitor and control radiation exposure to emergency workers.

**Entry Control:** The prevention of non-essential persons from entering a potentially dangerous area.

**Equivalent Dose:** The absorbed dose multiplied by a weighting factor for the type of radiation giving the dose. Weighting factors for use in Canada are prescribed by the Canadian Nuclear Safety Commission. This term is also sometimes called weighted dose. Expressed in terms of Sievert (or rem).

**Evacuation:** A directed protective action for the controlled displacement of the population from an area which has been or might become contaminated by radioactive substances to avoid exposure. (Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Evacuation Centre:** A centre which provides affected people with basic human needs including accommodation, food and water. (Source: Australian Emergency Management Glossary)

**Exclusion Zone:** A parcel of land within or surrounding a reactor facility on which there is no permanent dwelling and over which a licensee has the legal authority to exercise control. (Source: CNSC Glossary)

**Exercise:** A simulated emergency in which players carry out actions, functions, and responsibilities that would be expected of them in a real emergency. Exercises can be used to validate plans and procedures, and to practice prevention, mitigation, preparedness, response, and recovery capabilities.

**Exposure:** The act or condition of being subject to irradiation. Exposure can be either external exposure (irradiation by sources outside the body) or internal exposure (irradiation by sources inside the body).

**Exposure Control:** Emergency operations aimed at reducing or avoiding exposure to a plume or puff of radioactive material. Measures to deal with surface contamination and re-suspension might also be included.

**Exposure Pathways:** The routes by which radioactive material can reach or irradiate humans.

**External Notification:** The notification of organizations and agencies (not directly part of the emergency management organization) which may be affected by a nuclear emergency, or which may be required to assist in responding to it.

**Far Incident:** A transborder nuclear accident or event anywhere in the world which could affect Ontario, other than a Near Incident (see Near Incident).

**Food Control:** Measures taken to prevent the consumption of contaminated foodstuffs and control of including the supply of uncontaminated foodstuffs. Where appropriate, such control may include foodstuff storage to permit radionuclide decay, diversion of foodstuff to non-human, non-foodstuff chain use or disposal of unusable stocks.

**Foodstuff:** Food or drink intended for human consumption, including (a) an ingredient of food or drink intended for human consumption or (b) any animal or plant, or any of its parts, from which food or drink, or an ingredient of food or drink, intended for human consumption may be derived.

**Fuel Failure:** Any rupture of a fuel sheath such that fission products may be released. (Source: CNSC Glossary)

**Gamma Radiation:** Penetrating electromagnetic radiation emitted from an atom's nucleus. Also called gamma rays. (Source: CNSC Glossary)

**General Emergency:** Events at a nuclear power plant or onboard a nuclear-powered vessel resulting in an actual or substantial risk of a release of radioactivity or radiation exposure which warrants the implementation of protective actions off site. (Source: Health Canada Glossary)

**Generic Criteria:** Expressed as a projected dose, over a specified time period, above which protective actions are recommended to reduce the risk of stochastic effects.

**Government Operations Centre:** The Government Operations Centre (GOC) provides an all-hazards integrated federal emergency response to events (potential or actual, natural or human-induced, accidental or intentional) of national interest. It provides 24/7 monitoring and reporting, national-level situational awareness, warning products and integrated risk assessments, as well as national-level planning and whole-of-government response management. During periods of heightened response, the GOC is augmented by staff from other government departments/agencies (OGD) and non-governmental organizations (NGO) who physically work in the GOC and connect to it virtually.

**Gray (Gy):** The International System of Units (SI) unit of measurement used to express absorbed dose. One gray is defined as the absorption of 1 joule of ionizing radiation by 1 kilogram of matter. For gamma and beta radiations, the gray is numerically equal to the Sievert. (Source: CNSC Glossary)

**Groundshine:** Gamma and/or beta radiation from radioactive material deposited on the ground.

**Guaranteed Shutdown State:** A reactor is considered to be in this state when there is sufficient negative reactivity to ensure sub-criticality in the event of any process failure, and approved administrative safeguards are in place to prevent net removal of negative reactivity.

**Helper:** Member of the public who willingly and voluntarily helps in the response to a nuclear or radiological emergency. (Source: *IAEA General Safety Requirements (GSR) Part 7*)

**Hostile Action:** Any deliberate action, or threat of action, which could cause a nuclear emergency.

**Imminent Release:** A radioactive emission that will occur in 12 hours or less.

**Ingestion Control:** Emergency response operations in which the main aim is to avoid or reduce the risk from ingestion of contaminated foodstuff and water.

**Ingestion Planning Zone:** A pre-designated area surrounding a reactor facility where plans or arrangements are made to:

a) Protect the food chain;
b) Protect drinking water supplies;
c) Restrict consumption and distribution of potentially contaminated produce, wild-grown products, milk from grazing animals, rainwater, animal feed; and
   Note: Wild-grown products can include mushrooms and game.
d) Restrict distribution of non-food commodities until further assessments

(Source: CSA N1600, General requirements for nuclear emergency management programs)

**Initial Notification:** The notification made by a reactor facility to Provincial and/or municipal authorities upon the occurrence of an event or condition which has implications for public safety or could be of concern to these authorities. The criteria and channels for making such notification are usually described in emergency plans.

**Internal Notification:** The notification by an organization to its personnel who are required to respond to an emergency.

**Intervention Level:** A radiation dose above which a specific protective action is generally justified. (Source: Health Canada Glossary)

**Iodine Thyroid Blocking:** The reduction or prevention of the absorption of radioiodine by the thyroid gland, which is accomplished by the intake of a stable iodine compound (such as potassium iodide) by people exposed or likely to be exposed to radioiodine.

**Ionizing Radiation:** For the purposes of radiation protection, radiation capable of producing ion pairs in biological material(s). Ionizing radiation is constantly present in the environment and includes the radiation that comes from both natural and artificial sources, such as cosmic rays, terrestrial sources (radioactive elements in the soil), ambient air (radon), and internal sources (food and drink). (Source: CNSC Glossary)

**Joint Information Centre:** A joint centre for the province, Designated Municipality, federal government and the reactor facility or nuclear establishment that is responsible for providing information on the emergency to the media and the public.

**Land Control:** Control on the use of contaminated land for growing food products or animal feed.

**Livestock Control:** Quarantine of livestock in the affected area to prevent movement to other areas. Slaughter of such animals for food may be banned.

**Loss-of-Coolant Accident (LOCA):** A type of reactor accident that results from a loss of coolant due to a break in the primary heat transport system. (Source: CNSC Glossary)

**Lower-tier Municipality:** A Lower-tier Municipality is the most basic unit of local government and includes townships, towns, and cities within a county or region, but excludes Single-tier Municipalities. (Source: Provincial Glossary)

**Malevolent Act:** An illegal action or an action that is committed with the intent of causing wrongful harm. (Source: CNSC Glossary)

**Megabecquerel:** $10^6$ becquerels. (Source: CNSC Glossary)

**Microsievert (µSv):** One-millionth of a sievert. (Source: CNSC Glossary)

**Milk Control:** Preventing the consumption of locally produced milk in the area affected by a nuclear emergency, and its export outside the area until it has been monitored. Collection of contaminated milk, its diversion to other uses, or its destruction, may also be involved.

**Millisievert (mSv):** One-thousandth of a sievert. (Source: CNSC Glossary)

**Ministry Action Group (MAG):** The Ministry Action Group (MAG) is composed of the deputy minister or designate of the ministry, the senior ministry official appointed to the ministry's emergency management program committee, the ministry's emergency management program coordinator; and such other ministry employees as may be appointed by the minister. The group shall direct the ministry's response in an emergency, including the implementation of the ministry's emergency plan. (Source: Provincial Glossary)

**Mitigate:** Actions taken to reduce the adverse impacts of an emergency or disaster. Such actions may include diversion or containment measures to lessen the impacts of a flood or a spill. (Source: Provincial Glossary)

**Municipality:** "Municipality" means a geographic area whose inhabitants are incorporated (Municipal Act). (Source: Provincial Glossary)

**Near Incident:** A transborder nuclear accident or event at a site within 80 km of Ontario.

**Notification:** Conveying to a person or an organization, by means of a message, warning of the occurrence or imminence of a nuclear emergency, usually includes some indication of the measures being taken or to be taken to respond to it.

**Nuclear Emergency:** An emergency that has led to or could lead to the release of radioactive material, or exposures to uncontrolled sources of radiation, which pose, or could pose, a threat

to health and safety, property, and the environment. (Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Nuclear Establishment:** A facility that uses, produces, processes, stores or disposes of a nuclear substance, but does not include a reactor facility. It includes, where applicable, any land, building, structures or equipment located at or forming part of the facility, and, depending on the context, the management and staff of the facility.

**Nuclear Facility:** A generic term covering both nuclear establishments and reactor facilities.

**Nuclear Substance:** As defined in the (Federal) *Nuclear Safety and Control Act*.

**Off-site:** Off-site refers to the area outside the boundary (fence) of a reactor facility.

**On-site:** On-site refers to the area inside the boundary (fence) of a reactor facility.

**Operational Directive:** Direction given by the Emergency Response Organization to implement operational measures.

**Operational Intervention Level (OIL):** A calculated value, measured by instruments or determined by laboratory analysis that corresponds to an intervention level.
Notes**:**
1 OILs are typically expressed in terms of dose rates or of activity of radioactive material released, time integrated air concentrations, ground or surface concentrations, or activity concentrations of radionuclides in environmental, food, or water samples.
2 An OIL is a type of action level that can be used immediately by default and directly (without further assessment) to determine the appropriate protective actions and other response actions on the basis of an environmental measurement.

(Source: Based on *CSA N1600, General requirements for nuclear emergency management programs*)

**Operational Measures:** Measures undertaken by the Emergency Response Organization to deal with the emergency, including measures to enable or facilitate protective action for the public, e.g., public alerting, public direction, activation of plans, traffic control, emergency information, etc.

**Operator:** Holder of a subsisting licence issued pursuant to the *Nuclear Safety and Control Act* for the operation of a reactor facility.

**Optimization:** The process of determining a level of protection and safety that makes exposures and the probability and magnitude of potential exposures as low as reasonably achievable, with economic and social factors being taken into account.

**Pasture Control:** Removing milk- and meat-producing animals from pasture and from access to open water sources, and supplying them with uncontaminated feed and water.

**Personal Monitoring:** The use of radiation monitoring devices to assess whether persons, and their belongings, including vehicles, are contaminated or not, and, if contaminated, the type and level of contamination.

**Personal Protective Equipment:** Clothing or other specialized equipment provided to an off-site emergency worker to prevent or reduce their exposure to radioactive material. (Source: Health Canada Glossary)

**Planning Zone:** The area in which implementation of operational and protective actions are or might be required during a nuclear emergency, in order to protect public health, safety, and the environment.
Note**:** See definitions for Automatic Action Zone, Detailed Planning Zone, Contingency Planning Zone, and Ingestion Planning Zone.
(Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Plume:** A cloud of airborne radioactive material that is transported in the direction of the prevailing wind from a reactor facility. A plume results from a continuing release of radioactive gases or particles. (This term may also be used for waterborne radioactive material resulting from a liquid emission. Where the context does not make it clear, this will be referred to as a waterborne plume).

**Population Monitoring and Medical Management:** The protective action strategy which includes population screening, decontamination, internal contamination assessment and medical follow-up. The purpose of this Protective Action Strategy is to reduce *exposures* to individuals. (Source: Health Canada Glossary)

**Precautionary Measures:** Measures which will facilitate the application and effectiveness of protective measures.

**Preparedness:** Actions taken prior to an emergency or disaster to ensure an effective response. These actions include the formulation of emergency response plans, business continuity/continuity of operations plans, training, exercises, and public awareness and education. (Source: Provincial Glossary)

**Prevention:** Actions taken to stop an emergency or disaster from occurring. Such actions may include legislative controls, zoning restrictions, improved operating standards/procedures or critical infrastructure management. (Source: Provincial Glossary)

**Probability:** The likelihood of an event occurring that may result in an emergency, disaster or service disruption. (Source: Health Canada Glossary)

**Produce and Crop Control:** Restrictions on the harvesting or processing of potentially or actually contaminated crops, vegetables and fruits. Measures include: embargoing export outside the affected area; storage to allow radionuclide decay; diversion to non-food chain use; destruction and disposal of contaminated produce.

**Projected Dose:** The highest committed effective equivalent dose, or committed equivalent dose to a specified organ or tissue, likely to be received through all applicable exposure pathways by the most exposed member of the critical group in the area for which the projection is being made.

**Protective Measures:** Measures designed to protect against exposure to radiation during a nuclear emergency.

**Provincial Emergency Operations Centre (PEOC**): A fully equipped facility maintained by the Office of the Fire Marshal and Emergency Management (OFMEM) that can be activated in response to, or in anticipation of, emergencies. The PEOC is staffed with appropriate representatives from ministries that have been delegated responsibilities for specified emergencies as well as OFMEM staff, and other stakeholders/partners in emergency management. It serves as a coordinating point-of-contact for the affected Municipality, provincial, and federal interests. (Source: Provincial Glossary)

**Provincial Nuclear Emergency Response Plan** (**PNERP):** A Cabinet approved emergency response plan for reactor facility emergencies mandated under the Emergency *Management and Civil Protection Act* and maintained by the province of Ontario. (Source: Provincial Glossary)

**Public Alerting:** See Alerting.

**Public Awareness and Education Program:** A program that provides focused information to a target audience to educate about protective actions to reduce the risk of life and property damage, in the event of an emergency. (Source: Provincial Glossary)

**Puff:** A plume of short duration. The distinction between a puff and a plume is a matter of time. The upper limit on the duration of a puff is half an hour (See also **Plume**).

**Radiation:** The emission by a nuclear substance, the production using a nuclear substance, or the production at a reactor facility of, an atomic or subatomic particle or electromagnetic wave with sufficient energy for ionization. (Source: Health Canada Glossary)

**Radioactive Material:** For purposes of nuclear security, any material that emits one or more types of ionizing radiation, such as alpha or beta particles, neutrons or gamma rays. (Source: CNSC Glossary)

**Radioiodine:** A substance containing radioactive iodine in a chemical form that has a metabolic pathway similar to iodide, such as inorganic compounds and metabolic forms of organic iodine that are broken down in a living organism. Some examples are the radioisotopes iodine-125 and iodine-131. (Source: CNSC Glossary)

**Radioisotope:** A variation in the form of atoms, of the same chemical element, which are distinguished by the number of neutrons in the nucleus. The number of protons remains the same, but the number of neutrons differs. For example, uranium has 16 different isotopes. (Source: CNSC Glossary)

**Radiological Emergency:** Emergency caused by an actual or environmental hazard from ionizing radiation emitted by a source other than a reactor facility.

**Radiological Device (RDs):** Could be lost or stolen radioactive sources which may be in locations resulting in radiation exposure and/or contamination of the public, contamination of a site and/or contamination of foodstuff and water supplies.

**Radiological Dispersal Device (RDDs):** A device that causes the dissemination of radioactive material.

**Radionuclide** (or radioactive isotope or radioisotope): A naturally occurring or artificially created isotope of a chemical element having an unstable nucleus that decays, emitting alpha, beta and/or gamma rays until stability is reached.

**Reactor Facility:** A facility producing greater than 10 megawatts gross thermal energy from nuclear fuel and consisting of one or more reactor units.
Note: This includes nuclear power plants and research reactors greater than 10 megawatts gross thermal energy.

**Reception Centre:** Locations for the initial reception, monitoring, decontamination, and registration of evacuated members of the public, and arranging for further humanitarian and emergency social service assessments and supports deemed necessary
Notes:
1) A public Reception Centre is typically located in an existing facility, such as a community centre. Public Reception Centres should be beyond the Detailed Planning Zone boundary.
2) Examples of emergency social services include emergency shelter, food, clothing, victim registration and inquiry and personal services.
3) Examples of humanitarian support include, but are not limited to housing and family reunification. (Source: *Modified IAEA Safety Guide GS-G-2.1.)*

**Recovery:** The short-term and long-term actions taken in order to restore, to an acceptable level, both the organizations involved in, and the communities affected by, the nuclear emergency and the associated response activities. (Source: CSA N1600, General requirements for nuclear emergency management programs)

**Release:** In the context of this plan, release refers to the emission of radioactive material to the environment from a reactor facility in the form of either an airborne or a liquid emission.

**Representative Individual:** An individual that due to his/her characteristics, habits and location of residence, is representative of the more highly exposed individuals in the population. May also be referred to as Representative Person. (Source Health Canada Glossary)

**Response:** The actions taken during a nuclear emergency to reduce the magnitude of the hazard and manage its consequences, including the impact of the hazard on people, property, and the environment. (Source: CSA N1600, *General requirements for nuclear emergency management programs*)

**Response Sectors:** The Detailed Planning Zone is subdivided into Response Sectors to facilitate the planning and implementation of protective measures.

**Restoration:** Operations to restore conditions to normal after a nuclear emergency.

**Restricted Zone:** The area, within which exposure control measures are likely to be needed, based on the results of field monitoring. (Source: Provincial Glossary)

**Risk:** The product of the probability of the occurrence of a hazard and its consequences. (Source: Provincial Glossary)

**Severe Accident:** A beyond design basis accident involving fuel degradation in the reactor core or wet storage bay.

**Shall:** Is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to conform to the PNERP.

**Shelter-in-place:** A directed protective action to take immediate refuge in an enclosed structure for protection from an airborne plume, deposited radionuclides, or both.
Notes**:**
1) Shelter-in-place is a protective action which uses the shielding properties of buildings and their potential for ventilation control to reduce the radiation dose to people inside. Shelter-in-place has varying degrees of effectiveness depending on the type of building construction.
2) Shelter-in-place should typically not extend beyond two days.
3) Shelter-in-place is utilized as a protective action if there is insufficient time to safely evacuate an area; if the dose projected for an area is so low that evacuation is not required; or the risks of evacuation are higher than shelter-in-place (e.g., severe weather inhibits safe evacuation).

(Source: *CSA N1600, General requirements for nuclear emergency management programs*)

**Should:** Is used to express a recommendation or that which is advised but not required in order to conform to the PNERP.

**Shutdown State:** A subcritical reactor state with a defined margin to prevent a return to criticality without external actions. (Source: CNSC Glossary)

**SI:** International System of Units. (Source: CNSC Glossary)

**Sievert:** The International System of Units (SI) unit of equivalent dose and effective dose, equal to 1 joule/ kilogram. (Source: CNSC Glossary)

**Source Term**: A generic term applied to the radioactive material released from a reactor facility. It includes the quantity and type of material released as well as the timing and rate of its release. It could apply to a release that was currently occurring, or one which had ended, or one which could take place in the future.

**Special Group**: A group for which special constraints arise in the application of a protective measure, such as intensive care patients in hospitals and institutions, bedridden patients in long-term care homes, people with disabilities and/or special needs and inmates.

**Stakeholder:** A person, group, community, or organization that has a role in the management of a nuclear emergency. (Source: Based on CSA N1600, *General requirements for nuclear emergency management programs)*

**Stochastic Effects:** Radiation-induced health effects, such as cancer and heritable diseases, which are associated with a statistical risk and where no threshold has been established. The probability of occurrence is proportional to the dose (the higher the dose the higher the probability of occurrence) but the severity of the effect is independent of dose. (Source: Health Canada Glossary)

**Support Municipality:** Pursuant to **Section 7.0.2 (4)** of the *EMCPA*, the LGIC may, by order, specify a Municipality to act in a support capacity to provide assistance to Designated Municipalities.

**Transborder Emergency:** A nuclear emergency involving a reactor facility or nuclear accident or event outside the borders of Ontario that might affect people and property in the province.

**Upper-tier Municipality:** An upper-tier Municipality is a county or region. Upper-tier Municipality means a Municipality of which two or more Lower-tier Municipalities form part for municipal purposes (Municipal Act). (Source: Provincial Glossary)

**Venting:** The release to the atmosphere of radioactive material from the containment of a reactor facility through systems designed for this purpose.

**Vulnerable populations:** Members of the public who have additional needs before, during, and after a nuclear emergency in one or more functional areas.
Notes**:**

1) Functional areas can include, but are not limited to, the following:
    a) Maintaining independence
    b) Communication
    c) Transportation
    d) Supervision
    e) Medical care
2) Individuals in need of additional assistance could include those who:
    a) Have disabilities
    b) Are from diverse cultures
    c) Have limited to no proficiency in the local official language
    d) Are transportation disadvantaged

(Source: CSA N1600, *General requirements for nuclear emergency management programs*)

**Water Control:** Measures taken to avoid the contamination of drinking water supplies and sources, and to prevent or reduce the consumption of contaminated water.

**Weighted Dose:** See Equivalent Dose. Expressed in terms of Sievert (or rem).

# ANNEX E ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAZ | Automatic Action Zone |
| ALARA | As Low As Reasonably Achievable |
| ARGOS | Accident Reporting and Guidance Operational System |
| BDBA | Beyond Design Basis Accident |
| Bq | Becquerel |
| BNGS | Bruce Nuclear Generating Station |
| BWR | Boiling Water Reactor |
| CANDU | Canada Deuterium Uranium (reactor) |
| CCEM | Cabinet Committee on Emergency Management |
| CEOC | Community Emergency Operations Centre |
| CFIA | Canadian Food Inspection Agency |
| CMOH | Chief Medical Officer of Health |
| CNSC | Canadian Nuclear Safety Commission |
| CPZ | Contingency Planning Zone |
| CRL | Chalk River Laboratories |
| CSA | Canadian Standards Association |
| DBA | Design Basis Accidents |
| DNGS | Darlington Nuclear Generating Station |
| DPZ | Detailed Planning Zone |
| ECC | Emergency Core Cooling |
| ECCC | Environment and Climate Change Canada |
| ECI | Emergency Coolant Injection |
| EIC | Emergency Information Centre |
| EMCPA | Emergency Management and Civil Protection Act |
| EME | Emergency Mitigating Equipment |

| | |
|---|---|
| EMST | Environmental Monitoring and Surveillance Team |
| ENERGY | Ministry of Energy |
| EOC | Emergency Operations Centre |
| EOF | Emergency Operations Facility |
| EPZ | Emergency Planning Zone |
| ERAMG | Environmental Radiation and Assurance Monitoring Group |
| FADS | Filtered Air Discharge System |
| FNEP | Federal Nuclear Emergency Plan |
| FNEP TAG | FNEP Technical Assessment Group |
| GC | Generic Criteria |
| GOC | Government Operations Centre |
| Gy | Gray |
| HC | Health Canada |
| HIRA | Hazard Identification Risk Assessment |
| IAEA | International Atomic Energy Agency |
| IMS | Incident Management System |
| INES | International Nuclear Event Scale |
| IPZ | Ingestion Planning Zone |
| ITB | Iodine Thyroid Blocking |
| KI | Potassium Iodide |
| km | Kilometre |
| LGIC | Lieutenant Governor in Council |
| LOCA | Loss-of-Coolant Accident |
| MCCSS | Ministry of Children, Community and Social Services |
| MDU | Monitoring and Decontamination Unit |
| MECP | Ministry of the Environment, Conservation and Parks |

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| MEOC | Ministry Emergency Operations Centre |
| Met | Meteorology, meteorological |
| MLDP | Modèle Lagrangien de Dispersion de Particules |
| MLTC | Ministry of Long-Term Care |
| MLTSD | Ministry of Labour, Training and Skills Development |
| MMAH | Ministry of Municipal Affairs and Housing |
| MOH | Ministry of Health |
| MOU | Memorandum of Understanding |
| MTO | Ministry of Transportation |
| MW | Megawatts |
| NAADS | National Alert Aggregation and Dissemination System |
| NDMNRF | Ministry of Northern Development, Mines, Natural Resources and Forestry |
| NGS | Nuclear Generating Station |
| NIG | Nuclear Incident Group |
| NPP | Nuclear Power Plant |
| NRCan | Natural Resources Canada |
| OIL | Operational Intervention Level |
| OMAFRA | Ontario Ministry of Agriculture, Food and Rural Affairs |
| OPP | Ontario Provincial Police |
| PAR | Protective Action Recommendation |
| PCEIO | Provincial Chief Emergency Information Officer |
| PEOC | Provincial Emergency Operations Centre |
| PLERP | Provincial Liquid Emission Response Plan |
| PNERP | Provincial Nuclear Emergency Response Plan |
| PNGS | Pickering Nuclear Generating Station |
| PPE | Personal Protective Equipment |

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| RD | Radiological Device |
| RDD | Radiological Dispersal Device |
| RED | Radiological Exposure Device |
| RHRP | Radiation Health Response Plan |
| RIMPUFF | Risø Mesoscale PUFF |
| SAMG | Severe Accident Management Guidelines |
| SOLGEN | Ministry of the Solicitor General |
| URI | Unified RASCAL Interface |
| US NRC | United States Nuclear Regulatory Commission |
| USA | United States of America |
| UTCC | Unified Transportation Coordination Centre |
| UTMP | Unified Transportation Management Plan |