Provincial Nuclear Emergency Response Plan (PNERP) Master Plan

The PNERP Master Plan establishes a framework for the response to a nuclear or radiological emergency in Ontario.

2017
Prepared by Office of the Fire Marshal and Emergency Management
Ministry of Community Safety and Correctional Services
(Now Ministry of the Solicitor General)

Order in Council

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;

THEREFORE the document entitled "Provincial Nuclear Emergency Response Plan (PNERP) Master Plan 2017" be adopted 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 FURTHER that Order in Council O.C. 260/2009, dated February 11th, 2009, be revoked effective the date of this Order in Council.

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;

CONSÉQUEMMENT, le document intitulé « Plan provincial d'intervention en cas d'urgence nucléaire (PPIUN) – Plan directeur 2017 » est adopté comme plan de mesures d'urgence relatif aux situations d'urgence liées aux installations nucléaires visé à l'article 8 de la *Loi sur la protection civile et la gestion des situations d'urgence*, dans sa version modifiée.

O.C./Décret: 2317/2017

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EN OUTRE, le décret numéro 260/2009, daté du 11 février 2009, est révoqué à la date du présent décret.

Recommended: Minister of Community Safety and Correctional Services
Recommandé par: Ministre de la Sécurité communautaire et des Services correctionnels

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

Approved and Ordered: DEC 13 2017
Approuvé et décrété le:

Lieutenant Governor
La lieutenante-gouverneure

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Foreword

The province of Ontario's Nuclear Emergency Response Plan has been developed pursuant to **Section 8** of the *Emergency Management and Civil Protection Act*, R.S.O. 1990,

c. E. 9 (hereafter referred to as the *Emergency Management and Civil Protection Act or EMCPA*). The current edition of this plan supersedes and replaces all older versions which should be destroyed.

This Plan is administered by the **Minister of Community Safety and Correctional Services of Ontario**. All comments and suggestions relating to it should be directed to:

Program Manager, Planning and Exercises
Office of the Fire Marshal and Emergency Management
Ministry of Community Safety and Correctional Services
25 Morton Shulman Avenue
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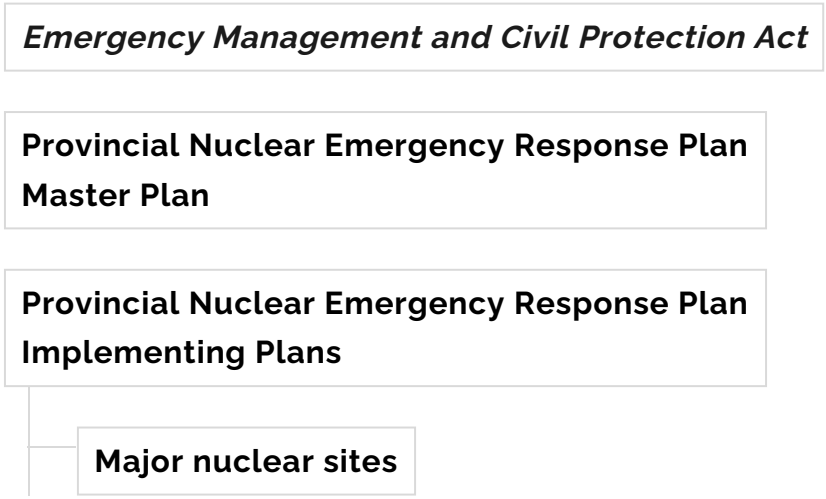
http://www.ontario.ca/emo (https://www.ontario.ca/emo) (English version)

http://www.ontario.ca/gdu (https://www.ontario.ca/gdu) (French version)

Nuclear and radiological emergency response planning structure

Figure I: Nuclear and radiological emergency response planning structure



- Other radiological emergencies
- Transborder emergencies

Major organization plans

- Provincial ministries, agencies, boards and commissions
- Municipalities
- Nuclear organizations
- Other

Procedures

Checklists

(PNG, 35 KB).

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

a) The *Emergency Management and Civil Protection Act* (*EMCPA*) requires and authorizes the formulation of the plan.

b) The **Provincial Nuclear Emergency Response Plan (PNERP)**; developed pursuant to **Section 8** of the 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** on page ii) should be consistent with the requirements of these implementing plans.

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

d) **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.

e) **Checklists:** The culmination of the planning process is the development of checklists based on the requirements of the procedures, e.g., individual position or function-specific checklists.

All emergency organizations involved in the preparation and implementation of the Provincial Nuclear Emergency Response Plan should employ common terminology. The terminology contained in the Glossary, **Annex K** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-k-nuclearradiological-glossary) , should be used for this purpose by all concerned. Words or phrases defined in the Glossary are italicized within the text of this document.

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

BNGS
Bruce Nuclear Generating Station

(Bq)
Becquerel

BWR
Boiling Water Reactor

CANDU
Canada **D**euterium **U**ranium (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 Standard Association

DBA
Design Based Accidents

DNGS
Darlington Nuclear Generating Station

DPZ
Detailed Planning Zone

ECCC
Environment and Climate Change Canada

ECI
Emergency Coolant Injection

EMCPA
Emergency Management and Civil Protection Act

ENERGY
Ministry of Energy

EIC
Emergency Information Centre

EOC
Emergency Operations Centre

EPZ
Emergency Planning Zone

EMST

Environmental Monitoring and Surveillance Team

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

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

MCSCS
Ministry of Community Safety and Correctional Services

MCSS
Ministry of Community and Social Services

MDU
Monitoring and Decontamination Unit

MEOC
Ministry Emergency Operations Centre

Met
Meteorology, meteorological

MLDP
Modèle Lagrangien de Dispersion de Particules

MMA
Ministry of Municipal Affairs

MNR
Ministry of Natural Resources and Forestry

MOECC
Ministry of the Environment and Climate Change

MOHLTC
Ministry of Health and Long-Term Care

MOL
Ministry of Labour

MOU
Memorandum of Understanding

MTO
Ministry of Transportation, Ontario

MW
Megawatts

NAADS
National Alert Aggregation and Dissemination System

NEMCC
Nuclear Emergency Management Coordinating Committee

NGS
Nuclear Generating Station

NIG
Nuclear Incident Group

NRCan
Natural Resources Canada

OIL

Operational Intervention Level

OMAFRA
Ontario Ministry of Agriculture, Food and Rural Affairs

OPP
Ontario Provincial Police

PAL
Protective Action Level

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

RD
Radiological Device

RDD
Radiological Dispersal Device

RED
Radiological Exposure Device

RHRP
Radiation Health Response Plan

RIMPUFF
Risø Mesoscale PUFF

URI
Unified RASCAL Interface

USA
United States of America

UTCC
Unified Transportation Coordination Centre

UTMP
Unified Transportation Management Plan

Chapter 1 Scope and authority

1.1 Aim

1.1.1 Pursuant to Section 8 of the Emergency Management and Civil Protection Act (*EMCPA*), the Lieutenant Governor in Council (LGIC) shall formulate an emergency plan respecting emergencies arising in connection with nuclear facilities.[1]

1.1.2 Pursuant to Section 8.1 of the EMCPA, the Solicitor General (Minister of Community Safety and Correctional Services) may, if considered necessary or desirable in the interests of emergency management and public safety, formulate plans respecting radiological emergencies[2] other than those arising in connection with nuclear facilities.

1.1.3 The province of Ontario (hereafter referred to as "the province") is primarily responsible for mitigating the off-site effects and coordinating the off-site response to a nuclear emergency.

1.1.4 Provincial responsibilities shall be executed by supporting and coordinating the efforts of organizations with nuclear emergency responsibilities as set out in this Provincial Nuclear Emergency Response Plan (PNERP). The province may issue operational directives and emergency orders (in the event of a declared provincial emergency), where warranted and appropriate, as further detailed in this Plan.

1.1.5 The aim of the province, in the event of a nuclear or radiological emergency, is the protection of the health, safety, welfare and property of the people of Ontario and the protection of the environment.

1.1.6 This PNERP provides the basis upon which off-site emergency management should be undertaken to achieve the above aim.

1.1.7 Nuclear and radiological emergency plans formulated by ministries, municipalities, operators of reactor facilities and nuclear establishments, and other agencies and organizations should conform to the PNERP so as to contribute to the achievement of this aim.

1.2 Guiding Principles

The following principles underlie the PNERP and, through it, guide all off-site nuclear and radiological emergency management in the province of Ontario:

1.2.1 The province, through its ministries, agencies, boards and commissions, has primary responsibility for the health, safety and welfare of all inhabitants of the province, and the protection of property and the environment.

1.2.2 The province shall support and coordinate the response to the off-site consequences of a nuclear emergency and may, where warranted and appropriate, issue operational directives and emergency orders (in the event of a declared provincial emergency) under the *EMCPA*.

1.2.3 In the event of a radiological emergency, the province's role may vary from providing support to coordinating the response.

1.2.4 Even though reactor facilities are designed and operated according to stringent safety standards, emergency preparedness and response must operate on the basis that

mechanical failure, human error, extreme natural events or hostile action can lead to nuclear or radiological emergencies.

1.2.5 All plans should be so devised as to be able to deal effectively with a broad range of possible emergencies, including severe reactor facility accidents.

1.2.6 The protection of public health and safety and the environment must be balanced with other important considerations to ensure that the response actions result in more benefit than harm.

1.2.7 Protective measures shall be implemented to prevent acute (deterministic) effects and should be implemented to prevent or reduce chronic (stochastic) effects in the public.

1.2.8 Exposure to radiation should be kept As Low as Reasonably Achievable (ALARA) within the context of the risks and costs of such avoidance.

1.2.9 As far as is practicable, preparedness activities should be undertaken in advance to enable a rapid, effective and efficient response to a nuclear or radiological emergency.

1.2.10Preparedness activities should include a program of public awareness and education for people who might be affected, to inform them of emergency plans, how they should prepare for an emergency and what they should expect or do in an emergency.

1.2.11 As far as practicable, operational measures (especially alerting and notification systems) and protective measures should be implemented to avoid significant radiation exposure.

1.2.12 A policy of truth and transparency should be followed in providing information to the public and media prior to and during a nuclear or radiological emergency.

1.3 Administration

1.3.1 Pursuant to Section 8 of the EMCPA, the approval authority for the PNERP is the Lieutenant Governor in Council (LGIC).

1.3.2 The PNERP is administered by the Minister of Community Safety and Correctional Services.

1.3.3 The PNERP shall be reviewed at least every five years. Applicable amendments shall be brought forward for LGIC approval, as required.

1.3.4 The purpose of the PNERP review process is to uphold the province's commitment to transparency and accountability, and to ensure that these plans reflect current emergency response directives, legislation, lessons learned and improvements to emergency management methodologies.

1.3.5 The review process for the PNERP shall include a documented review of the hazard identification, risk assessment, impact analysis, and planning basis (Annex L (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-l-pnerp-planning-basis-background)), as well as appropriate consultations with stakeholders and the public.

1.4 Nuclear and Radiological Emergencies

1.4.1 For the purposes of this plan, a nuclear emergency occurs when there is an actual or potential hazard to public health and property or the environment from ionizing radiation whose source is a reactor facility within or immediately adjacent to Ontario. Such a hazard may be caused by an accident, malfunction, or loss of control involving radioactive material.

1.4.2 For the purposes of this plan, a radiological emergency occurs when there is an actual or potential hazard to public health, property or the environment from ionizing radiation resulting from sources other than a reactor facility. Such a hazard may be caused by an accident, malfunction, or loss of control involving radioactive material.

1.4.3 Where a radiological emergency (as defined in 1.4.2 above) arises on-site at a reactor facility, the response shall be undertaken pursuant to the site-specific implementing plan for that reactor facility.

1.4.4 Nuclear and radiological emergencies may arise in Ontario under the following circumstances, among others (though not all such events would necessarily lead to such an emergency):

a) accidents or occurrences at reactor facilities, including some outside Ontario
b) accidents or occurrences at nuclear establishments
c) accidents or occurrences during the transportation of radioactive material
d) Radiological Dispersal Devices (RDD)/Radiological Exposure Devices (REDs)
e) Radiological Device (RD)
f) lost/stolen/orphan sources
g) satellite re-entry
h) nuclear weapon detonation

1.4.5 Once a reactor facility has been shut down and defueled, an assessment shall be undertaken by the province, in cooperation with additional authorities having jurisdiction, to determine the risks it may represent to the surrounding, off-site population. If it is determined that the reactor's new status poses no off-site hazard, this PNERP shall no longer apply to events originating from this reactor.

1.4.6 The following nuclear and radiological incidents would normally not need to be addressed by (fully or partially) activating the PEOC under the PNERP:

a) A nuclear accident in which the effects, both actual and potential, are expected to be confined within the boundaries of the reactor facility.

b) A radiological accident in which the effects are so localized that their impact can be satisfactorily dealt with by local emergency response personnel (police, fire, etc.) with possibly some outside technical assistance.

1.4.7 The province, through the Provincial Emergency Operations Centre (PEOC), may undertake certain measures, pursuant to this plan, before or in the absence of an emergency declaration made by the Lieutenant Governor in Council, or the Premier.

1.4.8 The province may issue operational directives for certain measures that are to be implemented, pursuant to the policy and guidance provided in this plan. This may include protective actions such as sheltering-in-place and evacuation, or operational measures such as ground and aerial monitoring. These actions shall be taken as necessary in order to protect public health and safety and the environment.

1.4.9 If the Lieutenant Governor in Council (LGIC) or the Premier declares an emergency (Section 1.5 below), the province may issue emergency orders pursuant to Section 7.0.2 of

the EMCPA that address the subject of operational directives that may have already been issued.

1.4.10 The LGIC or Premier may authorize operational or protective measure deviations from the PNERP if deemed appropriate. Additionally, the LGIC or Premier may authorize the necessary resources (human, physical, informational and financial) required to support the proposed deviation.

1.5 Declaration and Termination

1.5.1 Declaration

a) The *EMCPA* sets out provisions for emergency declarations, as follows:

i. The LGIC has the authority to declare a provincial emergency.

ii. The Premier may also declare a provincial emergency if the urgency of the situation requires that it be made immediately.

b) The following criteria must be met in order to declare a provincial emergency:

i. The emergency requires immediate action to prevent, reduce or mitigate the dangers posed by the emergency.

ii. The second criteria establish a threefold test:

- The resources normally available to the government (including legislative authorities) cannot be relied upon without risk of serious delay;
- The resources normally available to the government may be insufficiently effective to address the emergency; or
- It is not possible, without the risk of serious delay, to ascertain whether the resources normally available can be relied upon.

1.5.2 Termination of a Declaration

a) A declaration lasts for 14 days unless previously terminated. This declaration can be renewed for one further period of 14 days.

b) As often as required, the Legislative Assembly may, by resolution, extend the period of an emergency for additional periods of no more than 28 days.

c) An emergency declaration made by the Premier lapses after 72 hours, unless confirmed by the LGIC before it terminates.

d) An emergency declared under **Paragraph 1.5.1** above is terminated at the end of the 14th day following its declaration unless the Lieutenant Governor in Council, by order, declares it to be terminated at an earlier date.

1.6 Responsibilities

The following Emergency Response Organization responsibilities for nuclear and radiological emergencies under this PNERP are described in **Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations) :

a) provincial ministries (**Appendices 1-12** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations))

b) reactor facilities (**Appendix 13** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-12))

c) nuclear establishments (**Appendix 14** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-13))

d) Designated Municipalities (**Appendices 15-16** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-14))

e) federal departments and agencies (**Appendices 17-19** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-15))

1.7 Response Plans and International Arrangements

1.7.1 Provincial Nuclear Emergency Response Plan (PNERP)

a) The PNERP is a Cabinet approved document setting out the principles, concepts, organization, responsibilities, policies, functions and interrelationships, which shall govern all nuclear and radiological emergency management in Ontario.

b) The seven PNERP implementing plans apply the principles, concepts and policies contained in the master plan, in order to provide detailed guidance and direction for dealing with a specific nuclear or radiological emergency.

i. Implementing Plans for Site-Specific Nuclear Emergencies
Five separate emergency response plans are available to mitigate the consequences of accidents at the Pickering, Darlington and Bruce Nuclear Generating Stations, the Chalk River Laboratories (CRL) and the Fermi 2 installation in Monroe, Michigan, USA.

ii. Implementing Plan for Transborder Nuclear Emergencies
This plan addresses a nuclear emergency caused by any nuclear accident or event occurring outside Ontario that could affect the province, including one at a number of specified reactor facilities in the USA. These are combined in one document since many of the features will be the same for all such potential emergencies.

iii. Implementing Plan for Other Radiological Emergencies
This plan provides generic guidance for the mitigation of radiological emergencies caused by sources not covered by the other implementing plans. It would be applicable to accidents at nuclear establishments (including nuclear reactors that are smaller than 10 MWth), transportation (of radioactive goods) accidents, satellite (containing radioactive material) re-entry, Radiological Dispersal Devices (RDD), lost/stolen/orphaned sources, Radiological Devices (RD), Radiological Exposure Devices (REDs) and nuclear weapon detonations.

c) In case of any apparent difference between this master plan and the PNERP implementing plans, the latter being more detailed and specific should be applied.

1.7.2 Major Organization Plans

a) Ministry Plans

Provincial ministries, agencies, boards and commissions shall develop their own plans and procedures to fulfil the responsibilities as outlined in the appendices to **Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations) **.**

b) Municipal Plans

i. Pursuant to **Sections 3** and **8** of the *EMCPA*, municipal nuclear emergency response plans prepared by the designated municipalities in respect of reactor facility emergencies (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) shall conform to this PNERP and shall address the responsibilities outlined in **Annex I, Appendices 15-16** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-14) **.**

ii. Municipalities in close proximity to, or with nuclear establishments within their boundaries, should include in their emergency response plans the measures they may need to take to respond to a radiological emergency. This would include details on the relevant notifications to and from the involved organizations (see PNERP Implementing Plan for Other Radiological Emergencies). These municipalities are termed Designated Municipalities or Designated Host Municipalities in this plan.

iii. All municipalities which have a radiological incident identified as one of their potential risks within their Hazard Identification and Risk Assessment (HIRA) shall include, within their municipal emergency response plans, the measures they may be required to undertake to respond to such an emergency (see PNERP Implementing Plan for Other Radiological Emergencies).

iv. All municipal nuclear or radiological emergency response plans shall provide for the development of plans and procedures involving local boards (defined pursuant to the *Municipal Act*, 2001, S.O. 2001, c. 25) and police services operating in the area to provide necessary support and assistance required by such plans, or that which may be needed in an emergency.

c) Reactor Facility Plans

Reactor facilities shall have emergency plans to fulfil their on-site responsibilities as well as to discharge off-site responsibilities in accordance with the *Nuclear Safety and Control Act* and Regulations and with the responsibilities outlined in **Annex I, Appendix 13** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-12) **.**

d) Nuclear Establishment Plans
Nuclear establishments have plans and procedures for the control of radioactive material and for the notification of off-site authorities in the event of an accident, in accordance with the Nuclear Safety and Control Act, and its associated regulations, and with the responsibilities outlined in **Annex I, Appendix 14** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-13) **.**

e) Federal Nuclear Emergency Plan (FNEP)
The Government of Canada responds to major nuclear or radiological emergencies with interprovincial or international implications in accordance with the **FNEP**. This plan contains an Ontario Annex, which provides for a liaison with Ontario, the provision of federal assistance, and provisions for obtaining international assistance, should any be requested by Ontario.

1.7.3 International Arrangements[3]

Canada participates in a number of international arrangements, including:

i. Health Canada (HC) and the US Department of Energy developed a statement of intent supporting joint Canada-USA nuclear emergency preparedness and response capabilities with the objective to identify areas where coordination and cooperation, including information sharing and mutual assistance would be beneficial to nuclear emergency management programs and capabilities.

ii. Canada is a signatory of the IAEA's Convention on Assistance in the Case of a Nuclear Accident or Radiological emergency (1986), which sets out an international framework for co-operation among countries and with the IAEA to facilitate prompt assistance and support in the event of nuclear accidents or radiological emergencies.

iii. Canada is a signatory of the IAEA's Convention on Early Notification of a Nuclear Accident (1986), which establishes a notification system for nuclear accidents having the potential for international trans-boundary release that could be of radiological safety significance for another country.

1.8 Federal Legislative Authority

1.8.1 FederalRoles and Responsibilities

a) Health Canada administers the **Federal Nuclear Emergency Plan (FNEP)**, which can be activated to manage and coordinate federal response activities for a nuclear or radiological emergency requiring a multi-jurisdictional or multi-departmental off-site response. Health Canada responsibilities are outlined in **Annex I, Appendix 17** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-16) .

b) The Canadian Nuclear Safety Commission (CNSC), an independent agency of the Government of Canada, is the national regulator for the nuclear industry in Canada which includes any actions taken in response to the radiological or nuclear aspects of an emergency. In the event of a radiological or nuclear emergency, the CNSC shall monitor and evaluate the on-site response of the licensee, or in the case of an event with no identified licensee, the CNSC shall oversee and regulate the response activities of the responding organizations to ensure compliance with the *Nuclear Safety and Control Act* and Regulations, and ensure the health, safety and security of the response staff, the public and the environment, as well as maintain compliance with Canada's international obligations. In either case, the CNSC implements their CNSC Emergency Response Plan. CNSC responsibilities are outlined in **Annex I, Appendix 18** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-17) .

c) In the event of a nuclear emergency, the federal government (i.e., Public Safety Canada) will liaise with the provinces and territories as well as with neighbouring countries and the international community as outlined in **Annex I, Appendix 19** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-18) . The federal government will also manage nuclear liability issues and coordinate Canada's response, should Canadians be affected by a nuclear emergency in a foreign country.

1.8.2 *Constitution Act, 1867*

a) The regulation of nuclear energy has been deemed to be a matter of national concern that goes beyond local or provincial interests. Therefore, the federal government maintains exclusive jurisdiction over the regulation of nuclear energy in Canada.

b) The province has exclusive jurisdiction for matters of property and civil rights in the province and for all matters that affect the public health, safety and environment of the province.

1.8.3 *Emergencies Act, R.S.C. 1985, c.22 (4th Supp.)*

a) Pursuant to **Section 6**, the federal Governor in Council may declare a public welfare emergency, which includes an emergency caused by a real or imminent accident, pollution resulting in danger to life or property, social disruption or breakdown in the flow of essential goods and services, so serious as to be a national emergency.

b) Pursuant to **Section 14**, the Governor in Council must consult the provinces that are affected by the emergency before issuing a declaration of public welfare emergency. However, where the emergency is confined to one province, the Governor in Council may only issue a declaration of public welfare emergency or take other steps when the Lieutenant Governor of the province has indicated to the federal Governor in Council that the emergency exceeds the capacity of the province to deal with it.

c) Pursuant to **Section 8**, while a declaration of a public welfare emergency is in effect, the Governor in Council may make necessary orders or regulations that are necessary to deal with the emergency. The orders or regulations made by the Governor in Council should not unduly impair the ability of the province to take measures, under provincial legislation, for dealing with the emergency.

1.8.4 *Emergency Management Act, S.C. 2007, c.15*

a) This Act assigns responsibility to the Minister of Public Safety Canada for the coordination of emergency management activities including the development and

implementation of federal civil emergency plans in cooperation with other levels of government and the private sector.

b) Federal authorities also coordinate or support the provision of assistance to a province during or after a provincial emergency. Assistance could include financial assistance where the emergency has been declared to be of concern to the federal government and the province has requested assistance.

1.8.5 *Nuclear Safety and Control Act, R.S.C. 1997, c.9*

a) This Act establishes the Canadian Nuclear Safety Commission, which is responsible for regulating activities related to nuclear energy including the construction and operation of reactor facilities, and response to emergencies with radiological or nuclear aspects.

b) The Commission is given exceptional powers including the power to make any order in an emergency that it considers necessary to protect the environment or the health and safety of persons or to maintain national security and compliance with Canada's international obligations. [See **Section 47 (1)** of the Act].

1.8.6 *Nuclear Safety and Control Act, Class I Nuclear Facilities Regulations (SOR/2000-204)*

Licensed nuclear facilities (e.g. reactor facilities) are required to demonstrate proposed measures to prevent or mitigate the effects of accidental releases, including:

a) Assisting off-site authorities in planning and preparing to limit effects;

b) Notification of off-site authorities;

c) Reporting information to off-site authorities during and after a release;

d) Assisting off-site authorities in mitigating the effects of accidental releases.

1.8.7 *Nuclear Liability and Compensation Act S.C. 2015, c.4, s.120*

a) The federal Nuclear Liability and Compensation Act S.C. 2015, c.4, s.120, administered by Natural Resources Canada (NRCan), governs liability insurance conditions in Canada for nuclear emergencies.This legislation provides specific direction to address the following requirements:

   i. Operators of all nuclear facilities shall maintain mandatory insurance with the Nuclear Insurance Association of Canada to cover third-party liability.

   ii. A system of compensation is defined for victims of nuclear accidents, the NLCA providing compensation for injury, loss of life, loss of property, and damage resulting from loss of property or damage to property.

   iii. Victims could, in the event of a nuclear accident, either submit claims to the insurer which could assess and pay claims on behalf of the operator or, where it is deemed in the public interest to do so, the federal cabinet could establish the Nuclear Damage Claims Commission (NDCC).

b) If so directed, the Ontario Ministry of Municipal Affairs (MMA) shall liaise with the federal government and the Nuclear Insurance Association of Canada to ensure that any financial assistance provided by Ontario does not duplicate assistance provided under the federal legislation.

1.8.8 *Transportation of Dangerous Goods Act (S.C.1992, c.34)*

This legislation, administered by Transport Canada, governs the transportation of dangerous goods (including goods classed as radioactive). It mandates the development and implementation of regulations designed to protect public safety and the environment. It also mandates that emergency response capabilities must exist in the event of a transportation accident involving these goods.

1.9 Provincial Legislative Authority

1.9.1 Provincial Roles and Responsibilities

a) The provincial government has jurisdiction over public health and safety, property and the environment within its borders. In the event of a nuclear or radiological emergency, the province is primarily responsible for mitigating the off-site

consequences of the emergency, by supporting and coordinating the off-site response, and for directing the off-site response to those emergencies as detailed in this plan.

b) The provincial response to nuclear and radiological emergencies is coordinated through the PEOC.

c) All activities, actions and decisions regarding possession, handling, transport or storage of radioactive nuclear material associated with the off-site response must meet the requirements of the *Nuclear Safety and Control Act* and Regulations, or receive CNSC approval prior to possession, handling, storing or transporting such material.

1.9.2 *Emergency Management and Civil Protection Act R.S.O 1990, Chapter E.9*

a) The legislative authority for emergency management, planning and response for Ontario is the *Emergency Management and Civil Protection Act* (*EMCPA*).

b) The PNERP is formulated by the Lieutenant Governor in Council (LGIC) under **Section 8** of the *EMCPA*.

c) Emergency Orders

i. Once a provincial declaration of emergency has been made (see **Section 1.5** above), the LGIC has the power to make emergency orders and may delegate these powers to a Minister, to the Commissioner of Emergency Management (CEM), or designate. All emergency orders must be consistent with the Canadian Charter of Rights and Freedoms.

ii. A Minister to whom powers have been delegated may in turn delegate any of his or her powers to the CEM.

iii. Emergency orders are made only if they are necessary and essential, and they would alleviate harm and damage and are a reasonable alternative to other measures.

iv. Emergency orders must only apply to those areas where they are necessary and should be in effect only for as long as necessary.

d) Reporting Requirements

i. During an emergency, the Premier or a minister (delegated) is required to regularly report to the public with respect to the emergency.

ii. The Premier is required to submit a report in respect of the emergency to the Assembly within 120 days following the termination of the emergency. If the Assembly is not in session at that time, the Premier is required to submit a report within 7 days of the Assembly reconvening.

e) Liability for Action

i. Pursuant to **Section 11(1)** of the *EMCPA*, Ministers of the Crown, Crown employees, members of municipal councils and municipal employees are protected from personal liability for doing any act done in good faith under the Act or pursuant to an Order made under the Act.

ii. Emergency plans authorize crown and municipal employees to take action under those plans where an emergency exists but has not yet been declared to exist (**Section 9** of the *EMCPA*).

f) The authority, responsibilities, functions and tasks outlined in the PNERP and its implementing plans shall carry the following implications:

i. In the case of those assigned to an organization, it should be the responsibility of the operational or administrative head of the organization to ensure their implementation.

ii. In the case of those assigned to a position, implementation should also be the responsibility of any substitute, alternate or the person next in line of authority if the permanent incumbent of that position is absent or otherwise unable to take the necessary action.

1.9.3 Order in Council 1157/2009

The LGIC assigns responsibilities for formulating emergency plans in respect of specific types of emergencies to ministers (**Section 6** of the *EMCPA*). In addition to the obligation of Cabinet to formulate this plan, responsibilities for nuclear and radiological emergencies reside with the Minister of Community Safety and Correctional Services.

1.9.4 Ontario Drinking Water Quality Standards (O. Reg. 169/03)

Provincial standards for water quality are set out in Ontario Drinking Water Quality Standards (O. Reg. 169/03), a regulation under the Safe Drinking Water Act, 2002, S.O. 2002, c. 32. Operational Intervention Levels (OILs) (**Annex E, Appendix 2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-2)) for water quality are based on this standard.

1.10 Municipal Legislative Authority

1.10.1 Municipal Roles and Responsibilities

a) Pursuant to **Section 3(4)** of the *EMCPA*, municipalities have been designated to prepare plans in respect of nuclear emergencies.

b) Designated Municipalities preparing plans in respect of a nuclear emergency include:

   i. Municipalities located within a nuclear Detailed Planning Zone (DPZ).

   ii. Municipalities acting as a host community.

c) Designated Municipalities are listed in **Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities) .

d) **Annex I, Appendices 15-16** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-14) address the main responsibilities of the Designated Municipalities.

e) e) Municipalities in close proximity to, or with nuclear establishments within their boundaries, should include in their emergency response plans the measures they may need to take to mitigate the off-site consequences of a radiological emergency. This would include details on the relevant notifications to and from the involved organizations (see PNERP Implementing Plan for Other Radiological Emergencies).

f) All municipalities which have a radiological emergency identified as one of their potential risks, within their HIRA (pursuant to **Section 2.1(3)** of the *EMCPA*), should include, within their municipal emergency response plans, the measures they may

need to undertake to deal with such an emergency (see PNERP Implementing Plan for Other Radiological Emergencies).

1.10.2 Designated Municipalities' Legislative Authority

a) Pursuant to **Section 3(4)** of the *EMCPA*, the Designated Municipalities shall formulate plans to deal with the off-site consequences of nuclear emergencies caused by the corresponding reactor facility (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)).

b) These plans should also contain, where applicable, arrangements for the provision of services and assistance by county departments, local police services, fire services, paramedic services, hospitals and local boards.

c) 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 (this function is fulfilled by the Minister of Community Safety and Correctional Services). The Solicitor General may make such alterations as considered necessary for the purpose of coordinating the municipal plan with the province's plan.

d) As required by **Section 5** of the *EMCPA*, plans of lower-tier municipalities shall conform to the plans of their Upper-tier Municipality.

e) Pursuant to **Sections 2(3)** and **3(4)** of the *EMCPA*, every Municipality, in developing their emergency management program, must identify and assess the various hazards and risks to public safety that could give rise to emergencies. Where a Municipality identifies radiological risks (as per PNERP Implementing Plan for Other Radiological Emergencies), the emergency plan for that Municipality must include provisions to deal with such an emergency.

1.10.3 Upper-Tier Municipal Involvement

Where the Upper-tier Municipality is not the Designated Municipality under this PNERP it may, with the consent of its Designated Municipalities, coordinate the nuclear emergency plans for those municipalities.

1.10.4 Support Municipalities

a) In the event of a declared emergency, the 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.

Chapter 2 The planning basis

2.1 The Hazard

2.1.1 This PNERP details the response to an ionizing radiation hazard arising as a result of:

a) a reactor facility accident (i.e., nuclear emergency)

b) a radioactive source which has either undergone an accident or over which control has been lost (i.e., radiological emergency)

2.1.2 The public is susceptible to radiation resulting from such accidents via the following exposure pathways:

a) external exposure to gamma radiation in the plume (i.e., cloudshine) or on the ground (i.e., groundshine)

b) inhalation of airborne radioactive materials

c) ingestion of drinking water, plant and animal products that may have been contaminated

d) contamination on clothing or skin leading to external exposure or absorption

e) inadvertent ingestion of contamination (e.g., contamination on face and hands, contaminated soil, etc.)

2.1.3 The primary health effect of chronic low doses of radiation could be the induction of various types of cancers with a latency period of 4 to 20 years (also known as cell modification or stochastic effects).

2.1.4 Far more unlikely is the potential for immediate effects of high doses of radiation including those associated with cell death or tissue reactions (also known as deterministic effects).

2.1.5 Radiological hazards may be measured in both Imperial and System International (SI) units. A unit conversion table is provided in **Annex J** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-j-conversion-table-radiological-units-imperial-units-and-systeme-international) .

2.2 Planning Basis for Nuclear Emergencies

2.2.1 A planning basis involves the identification of hazards that the nuclear emergency management program must address based on their impact on health and safety, property, and the environment. In a nuclear emergency, an ionizing radiation hazard could arise from an accident or event at a reactor facility.

2.2.2 Elements of the planning basis include:

a) the radiological hazard(s), i.e., the types of accidents planned for (**Section 2.2.3**)

b) the basis for protective action decision-making i.e., intervention levels (**Section 2.2.4**)

c) the potential effects on public health and safety i.e., potential radiation doses resulting from **a)** above

d) the geographical extent of consequences i.e., planning zones (**Section 2.2.5**) and planning zone distances (**Section 2.2.6**)

2.2.3 Reactor Facility Accidents

a) Nuclear emergency preparedness requires a planning basis which considers both design basis accidents and beyond design basis accidents (BDBAs) including severe accidents and multi-unit scenarios where applicable. For a detailed explanation regarding the basis for these reference accidents, refer to **Annex L** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-l-pnerp-planning-basis-background) - PNERP Planning Basis Background.

b) While the planning basis should include a wide range of accidents, the amount of detailed planning should decrease as the probability of the accidents' occurrence decreases. For this reason, the planning basis for managing a nuclear emergency must strike an appropriate balance.

c) Reactor facility safety analysis and risk assessments shall be used to inform the planning basis.

d) This PNERP has been prepared in conformity with national and international standards and guidance for nuclear emergency management and as such it:

i. Provides detailed planning and preparedness to mitigate the effects of Design Basis Accidents (DBAs) for which safety systems have been specifically designed to ensure that radiological releases are kept within authorized limits.

ii. Provides additional tools and mechanisms to mitigate the effects of Beyond Design Basis Accidents (BDBAs), including severe accidents, which are considered even more unlikely than Design Basis Accidents.

e) Design Basis Accidents (DBA)

i. The DBA release provides the main platform for detailed planning and is generally characterized by one or more of the following:

- Station containment systems function normally allowing radiation to decay prior to a controlled release.
- Sufficient time would be available to alert the public and implement protective measures prior to a release.

- The main radiological hazard to people would be external exposure to, and inhalation of, radionuclides.
- Filter systems function to remove almost all of the radioiodine. As a result, the plume would be mostly comprised of inert noble gasses which would dissipate and do not pose a contamination hazard.
- Radiation doses to the public would likely be below the Generic Criteria (GC) as defined in **Annex E** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels) .
- Environmental contamination would be limited to very low levels.
- Low-level radioactive releases to the environment could occur on and off for some time (e.g., days or weeks).

ii. Planning and preparedness shall be conducted in Ontario to mitigate the consequences of releases from Design Basis Accidents and provide a basis for expanding the response as required to mitigate severe accidents (**Section 2.2.3 f) ii** below).

f) Beyond Design Basis Accidents (BDBA)

i. One or more of the following may define a BDBA:

- Station containment systems may be impaired leading to significantly reduced hold up time and decay of radioactive materials.
- An early release of radioactivity from a BDBA with limited warning time.
- An uncontrolled release of radioactivity from a BDBA with limited warning time.
- The plume could include radioiodine and particulates along with noble gases.
- Radiation doses could potentially be high.
- Environmental contamination could be quantitatively significant in both extent and duration.
- The area affected could extend beyond the Detailed Planning Zone.
- A multi-unit accident (i.e., an accident involving more than one reactor).

ii. BDBAs which go unmitigated may evolve into severe accidents involving fuel degradation in the reactor core.

iii. The response to BDBAs, including severe accidents, is facilitated by the measures already in place to respond to DBAs (**Section 2.2.3 e)** above) and the ability to expand their function.

iv. The following additional planning and preparedness actions shall be conducted to mitigate the much less probable, but possibly more severe, off-site effects of BDBAs:

- Automatic, default actions to initiate public alerting and to direct the implementation of protective actions, including sheltering and evacuation.
- Priority evacuations for those closest to the hazard.
- Radiation monitoring and, if necessary, decontamination of persons.
- Pre-distribution of Potassium Iodide (KI) pills.
- Timely dispatch of aerial and ground monitoring teams to determine areas of contamination.
- Designation of a Contingency Planning Zone (CPZ).
- Medical assessment, treatment and counselling as required.

2.2.4 Intervention Levels – Generic Criteria and Operational Intervention Levels[4]

a) Protective action decision-making involves the comparison of radiation doses (actual or modelled) to internationally accepted Generic Criteria (GC) and Operational Intervention Levels (OILs).

b) The application of GC and OILs is dependent on timing and the availability of actual off-site radiation monitoring data:

i. Generic Criteria (GC) provides decision-makers with reference levels for the early stages of an emergency, when modelling is used to estimate projected doses. When the projected dose exceeds a GC level for a specific protective action, that action should be directed (subject to operational considerations) to protect the public from potential exposure to radiation. GC are expressed in terms of doses over a specified time period.

ii. Operational Intervention Levels (OILs) are derived from the Generic Criteria and allow decision-making based on actual, measured levels of radioactivity following a release. When the actual dose rate exceeds an OIL for a specific protective action that action should be directed (subject to operational considerations) in order to protect the public.

c) Numerical values for the Generic Criteria and Operational Intervention Levels are detailed in **Annex E** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels) .

2.2.5 Emergency Planning Zones (EPZ)

a) Planning zones define the areas beyond the boundary of a reactor facility, 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. Planning zones shall include the following:

- Automatic Action Zone (AAZ)
- Detailed Planning Zone (DPZ)
- Contingency Planning Zone (CPZ)
- Ingestion Planning Zone (IPZ)

b) While each of the above zones are distinct and do not overlap, when measures are initiated for the Ingestion Planning Zone, they should be implemented for all other zones noted in **Paragraph 2.2.5 a)** above.

c) Automatic Action Zone (AAZ)

i. 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.

ii. Additional planning and preparedness shall be undertaken for the AAZ to prevent or reduce deterministic effects for this zone, including the implementation of automatic, default protective measures during General Emergencies and some On-site Emergencies (e.g., evacuation, sheltering-in-place and Iodine Thyroid Blocking).

d) Detailed Planning Zone (DPZ)

i. 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.

ii. Detailed planning and preparedness shall be conducted for the DPZ to ensure that evacuations can be implemented and that the associated needs and requirements of the evacuated public can be met.

iii. Detailed planning and preparedness measures for the DPZ are described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) .

iv. The DPZ around a reactor facility shall be divided into a number of response sectors. All emergency response measures, both operational and protective, shall be planned and implemented in terms of these sectors.

v. The desirable pattern of response sectors in a DPZ is illustrated in **Figure 2.1**. Response sectors lie within two rings around the reactor facility: an inner ring (which lies beyond the Automatic Action Zone) and an outer ring. Within each ring it is desirable to have as few sectors as possible, while maintaining the need for flexibility and practicability in the application of the operational response strategy.

vi. The actual demarcation of the response sector boundaries shall be such that, as far as practical, they lie along clearly recognizable features, such as roads, waterways and railway tracks. Other factors to be taken into account shall be municipal boundaries, population densities, and availability of appropriate evacuation routes.

vii. These divisions are illustrated in **Figure 2.1**. Actual zones and response sectors for each reactor facility are shown in the appropriate site-specific Implementing Plan.

e) The Contingency Planning Zone (CPZ)

i. A pre-designated area surrounding a reactor facility, beyond the Detailed Planning Zone (see **Section 2.2.6**), 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.

ii. The planning measures undertaken in the CPZ are described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) **.**

iii. Plans and arrangements for this CPZ include considerations for:

- division into sub-zones
- population estimates for each sub-zone
- development of mechanisms, processes and procedures to provide for environmental radiation monitoring and data analysis by the PEOC Scientific Section
- familiarization sessions with impacted municipalities, as required
- identification of existing response centres that fall within the CPZ and development of a list of possible alternates located outside the CPZ
- Iodine Thyroid Blocking (ITB) requirements consistent with those stipulated for the Ingestion Planning Zone
- Public awareness and education requirements consistent with Ingestion Planning Zone requirements
- No requirement for designation of additional emergency response centres (e.g., EOCs, EIC, Reception and Evacuation Centres, personal monitoring and decontamination facilities, etc.) beyond those designated for Detailed Planning Zone
- No additional public alerting and communications requirements beyond those established for the Detailed Planning Zone

f) Ingestion Planning Zone (IPZ)

i. A pre-designated area surrounding a reactor facility where plans or arrangements are made to:

- protect the food chain
- protect drinking water supplies
- 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.

- restrict distribution of non-food commodities until further assessments are performed

ii. The IPZ is divided into concentric sub-zones in order to facilitate implementation of protective measures:

- Sub-zone A lies between the Contingency Planning Zone and 30 km.
- Sub-zone B lies between 30 km and 50 km.

iii. Ingestion Control Sub-Zones A and B are each divided into eight sub-zones.

iv. Ingestion control measures are further discussed in **Chapter 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) .

g) The divisions described above are illustrated in **Figure 2.2**. Actual zones and response sectors for each reactor facility shall be described in the appropriate site-specific Implementing Plan.

2.2.6 Planning Zone Distances

a) Planning zone distances for reactor facilities are established based on a number of factors including but not limited to, reactor design and the number of reactors on site. Consequently, planning zone distances may vary from site to site.

b) The outer radii of the planning zones surrounding the reactor facilities (listed in **Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)), as measured from the venting or release stacks, are as follows[5]:

Table with four columns and five rows including a header row showing the outer radii of the planning zones surrounding the reactor facilities as measured from the venting or release stacks.

Zones	Pickering, Darlington, Bruce	Chalk River Laboratories	Fermi 2
Automatic Action Zone	3 km	none	none
Detailed Planning Zone	10 km	9 km	16.1 km
Contingency Planning Zone	20 km	(See PNERP CRL Implementing Plan)	(See PNERP Fermi 2 Implementing Plan)
Ingestion Planning Zone	50 km	50 km	80 km

2.3 Planning Basis for Radiological Emergencies

2.3.1 Radiological emergencies arise as a result of:

a) Accidents or occurrences at nuclear establishments.

b) Accidents or occurrences during the transportation of radioactive material.

c) c)Radiological Dispersal Devices (RDD)/Radiological Exposure Devices (REDs)

d) Radiological Device (RD)

e) Lost/stolen/orphan sources

f) Satellite re-entry

g) Nuclear weapon detonation

2.3.2 Radiological Emergency Intervention Levels

Intervention levels described in **Section 2.2.4** above should be used as the basis for decision-making in a radiological emergency.

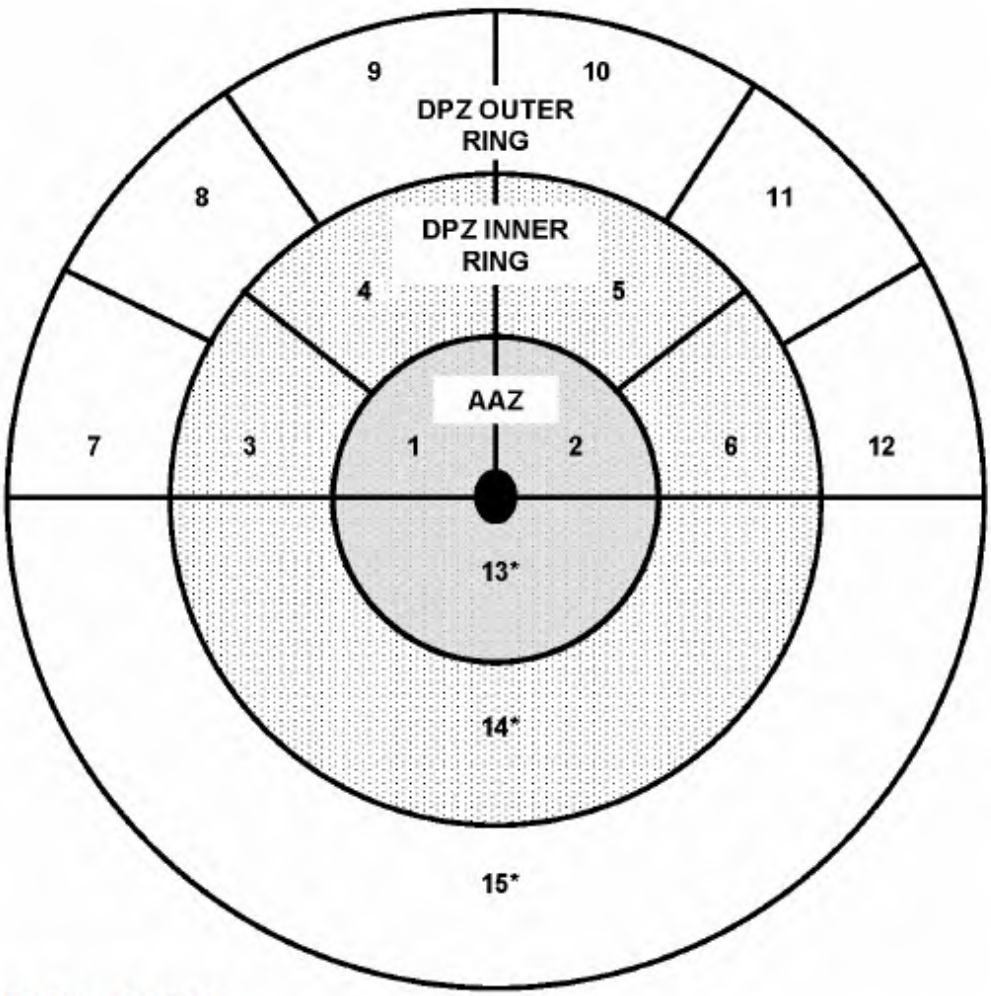
2.3.3 Radiological Emergency Zones

Field monitoring will inform the delineation of zones to be used as the basis for protective measures in a radiological incident (Note: zoning for radiological incidents arising on-site at a reactor facility shall be delineated pursuant to **Section 2.2.5** above):

a) The Restricted Zone is the area within which exposure control measures are likely to be required.

b) The Buffer Zone provides a buffer area beyond the Restricted Zone where limited measures of radioactivity are detected. This is the area within which ingestion control measures may be necessary.

c) The divisions described above are illustrated in **Figure 2.3**.



* Lake/River Sectors

Figure 2.1: Detailed Planning Zone and Response Sectors
(Diagrammatic - Not to Scale)

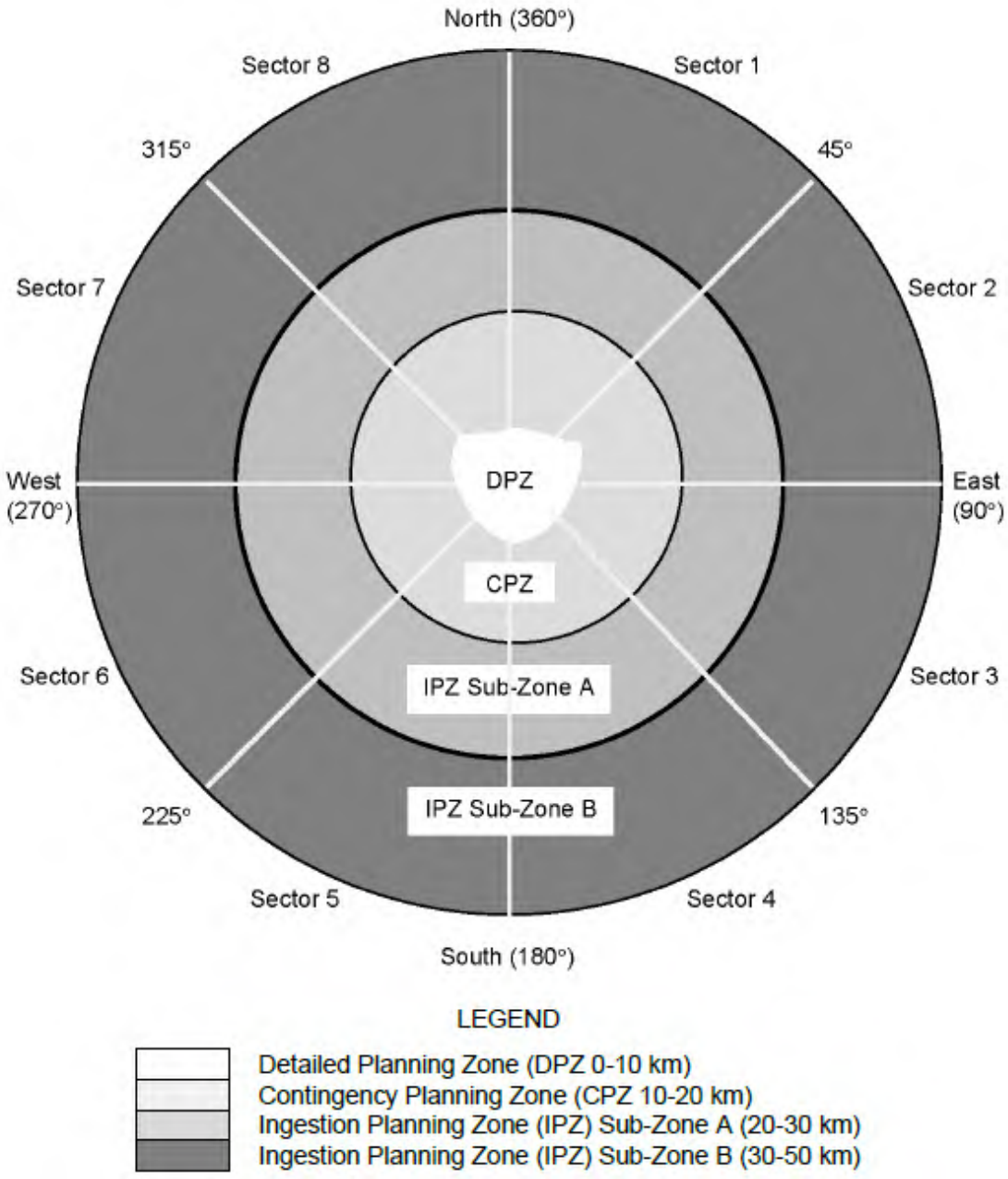


Figure 2.2: Ingestion Planning Zones

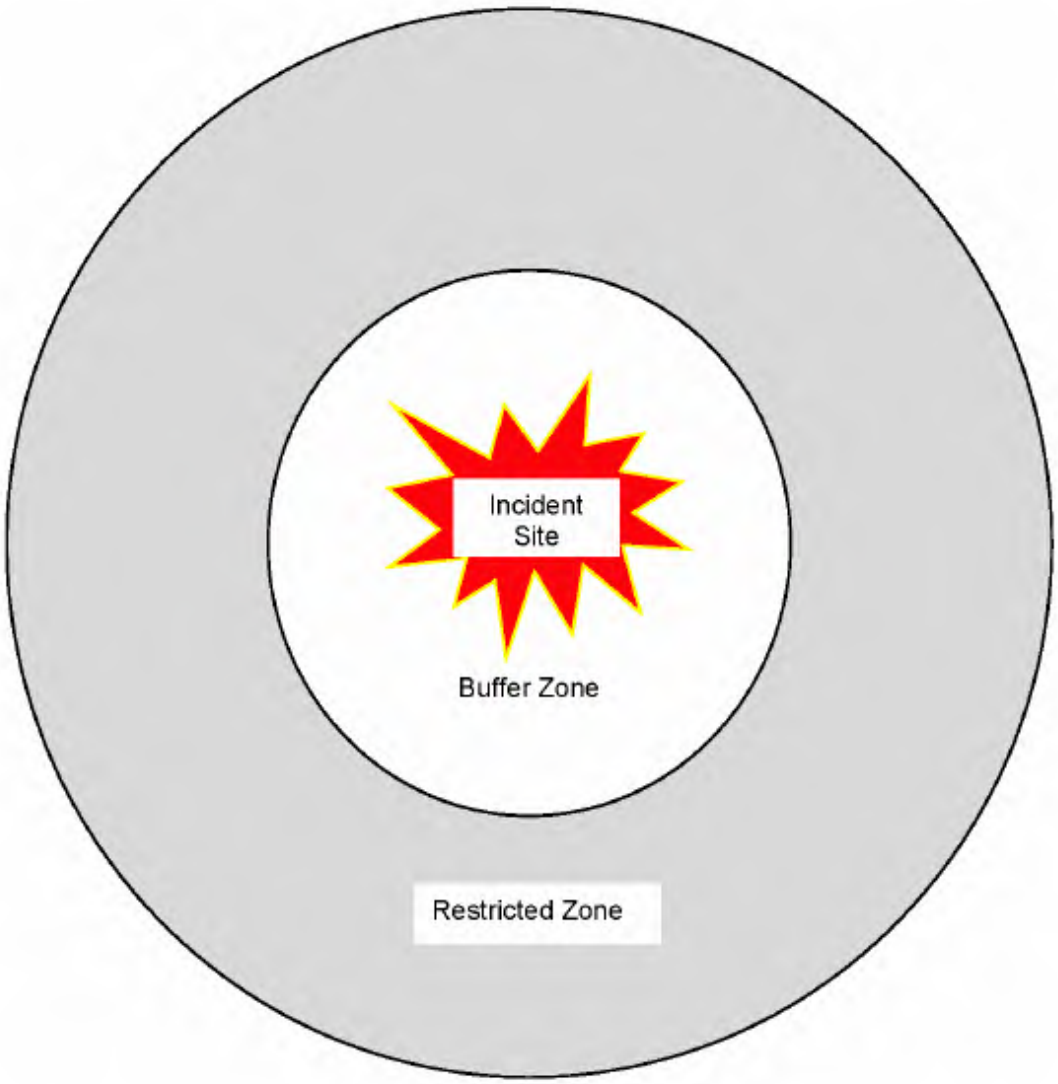


Figure 2.3 Radiological Emergency Planning Zones

Chapter 3 Preparedness

3.1 General

3.1.1 Preparedness is defined as actions taken prior to a nuclear emergency to be ready to respond and manage consequences.

3.1.2 An appropriate level of preparedness shall be developed and maintained to allow for a robust response to nuclear and radiological emergencies, should one occur.

3.1.3 The assigned responsibilities for nuclear and radiological emergency preparedness are set out in the appendices to **Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations) .

3.1.4 An emergency plan concept of operations is established as part of preparedness activities to ensure that all responding organizations share a common vision and support the development of an integrated response capability. The PNERP concept of operations in **Section 3.3** provides a brief overview of the planned response to a General Emergency resulting from a beyond design basis accident at a reactor facility.

3.1.5 Hazard-specific preparedness activities can be undertaken because the source of a nuclear emergency is known. As such, the details provided in this chapter are, for the most part, applicable to nuclear emergencies.

3.2 Components of Nuclear Emergency Preparedness

3.2.1 Program Management

a) Senior management of Stakeholder organizations should provide leadership and commitment, and assume overall responsibility, accountability, and authority for their emergency preparedness program.

b) Senior management of Stakeholder organizations should ensure that sufficient funding and resources are allocated to develop, implement, evaluate, and maintain their emergency preparedness program.

c) Stakeholder organizations should establish a planning cycle to plan, develop, implement, and maintain their nuclear emergency plans and procedures.

3.2.2 Planning Basis

a) Planning basis is the identification of hazards that the nuclear emergency management program must address based on their impact on health and safety, property, and the environment.

b) The EMCPA requires every provincial ministry and Municipality to identify and assess the various hazards and risks to public safety that could give rise to emergencies.

c) Emergency Response Organizations other than reactor facilities that are responsible for nuclear emergency planning shall align their plans with the PNERP and its planning basis which considers the risks and impacts to responders, the public, property, and environment within their organization's jurisdiction.

d) **Chapter 2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-2-planning-basis) provides a detailed discussion on the Planning Basis forming the foundation of this PNERP.

3.2.3 Communication

Accurate, co-ordinated and timely communications within and between stakeholder organizations and the public are critical to effective emergency response and recovery. As such, stakeholder emergency plans shall implement and maintain communication procedures which provide emergency data and information to the following as applicable:

a) individuals within or external to the stakeholder organization who require the data for decision-making purposes

b) the media

c) those affected or potentially affected by a nuclear or radiological emergency

d) international or trans-border authorities

3.2.4 Emergency Management Coordinating Committees

a) The province, through the OFMEM, shall establish a provincial level Nuclear Emergency Management Coordinating Committee (NEMCC) to ensure that an optimum state of nuclear emergency planning, preparedness, response and recovery is achieved and maintained in Ontario.

b) Goals of the NEMCC include:

i. collaboration with stakeholder organizations to ensure that their respective emergency plans are aligned and integrated with the PNERP

ii. discuss inter-organizational issues
Note: For example, inter-organizational issues can include issues related to, but not limited to program funding, resources, exercise design and scheduling, etc.

iii. conduct joint reviews subsequent to a nuclear emergency requiring an integrated response

c) Designated Municipalities shall establish coordinating committees to review and manage nuclear emergency management concerns.

d) Temporary sub-committees and standing sub-committees under the coordinating committees may be established as needed to provide specific information and advice.

e) Each coordinating committee and sub-committee shall develop and maintain terms of reference.

3.2.5 Organizational Structure

a) An appropriate organizational structure shall be designed to manage the various phases and aspects of the emergency. The outline of the provincial structure is described in **Chapter 4** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-4-emergency-response-structure-and-functions) of this plan.

b) Ministries, municipalities and other involved stakeholder organizations should develop and document the structure of their Emergency Response Organization in their nuclear emergency response plans.

3.2.6 Plans and Procedures

a) As the foundation for nuclear and radiological emergency response, the province and stakeholder organizations (see **Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations)) shall develop and maintain emergency plans and procedures to support the activation and execution of this PNERP.

b) The province and stakeholder organizations shall review their nuclear emergency plans and procedures at least every five years (see **Section 1.3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-1-scope-and-authority#section-2)) and revise them as necessary to ensure their continuing suitability, adequacy, and effectiveness.

c) The province and stakeholder organizations shall validate their nuclear emergency response plan and procedures (e.g., through exercises) to demonstrate that systems (i.e., equipment, procedures, and personnel elements) as designed meet the organization's response plan requirements.

d) As applicable to the organization, nuclear emergency response plan procedures should include, but are not limited to supporting the following functions:

   i. categorization and notification procedures

   ii. public alerting

   iii. emergency information

   iv. public direction

   v. transportation management (e.g., Ministry of Transportation (MTO))

   vi. reception and evacuation centres (e.g., Designated Municipalities)

   vii. long-term housing (e.g., multi-ministry and multi-jurisdictional planning group)

   viii. health issues (led by the Local Public Health Units and Medical Officers of Health in conjunction with Local Health Integration Networks and MOHLTC)

3.2.7 Facilities and Equipment

a) Stakeholder organizations shall establish, maintain and document the emergency facilities and equipment necessary to activate and implement their emergency plans. Examples include but are not limited to operations centres, information centres, other emergency centres, telecommunication facilities and equipment, computers and other technology, field monitoring vehicles and radiological surveying equipment, etc.

b) Stakeholder organizations shall conduct inspections, tests, or both, in accordance with manufacturer's recommendations, to confirm the functionality and readiness of critical emergency equipment systems and equipment.

3.2.8 Training

a) The *EMCPA* requires every provincial ministry and Municipality to include training in their emergency management program. As such, all stakeholder organizations should define and document their nuclear emergency training requirements to improve individual and team proficiencies.

b) The *EMCPA* requires every provincial ministry and Municipality to identify and assess the various hazards and risks to public safety that could give rise to emergencies. As such, where the Hazard Identification Risk Assessment (HIRA) identifies nuclear or radiological incidents as a hazard, stakeholder organizations shall develop and implement a training plan as part of the organization's emergency management program.

c) The training plan should ensure that:

i. Staff are provided with initial training to understand their emergency roles and responsibilities, and receive continuing training to maintain the knowledge, skills, and abilities.

ii. Staff are competent to carry out the organization's nuclear emergency procedures and perform their roles.

iii. Staff are qualified to use the tools and equipment associated with their role.

3.2.9 Exercises

a) Exercises provide an opportunity to identify emergency response strengths and weaknesses, and can be used to validate and improve emergency plans and procedures.

b) The *EMCPA* requires every provincial ministry and Municipality to identify and assess the various hazards and risks to public safety that could give rise to emergencies. As such, where the Hazard Identification Risk Assessment (HIRA) identifies nuclear or radiological incidents as a hazard, exercises should be developed and run based on such scenario(s).

c) Regulations pursuant to the *EMCPA* require every provincial ministry and Municipality to conduct annual exercises.

d) Stakeholder organizations should develop and document their exercise program requirements and consider the following general objectives:

   i. Assess the effectiveness of all elements of the emergency plan within a five-year timeframe.

   ii. Assess the organization's performance.

   iii. Conduct exercises where there is no prior notice to the participants.

   iv. Conduct exercises that are initiated outside of normal working hours. and

   v. Conduct exercises that include more than one shift cycle.

e) Stakeholder organizations should communicate exercise schedules with each other as necessary to support planning for large scale multi-jurisdictional exercises.

3.2.10 Public Awareness and Education

a) Nuclear

   i. Populations likely to be affected in a nuclear emergency should be aware of the possible hazards and what they can do to minimize their effects. As such, the public living or working in the Detailed Planning Zone of reactor facilities shall be provided with specific instructions on measures to take in the event of a nuclear emergency.

   ii. Provincial ministries and stakeholder organizations shall support the development and delivery of a public awareness and education program as part of their

nuclear emergency management program as applicable.

iii. Public awareness and education responsibilities are outlined in **Annex C** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-c-public-awareness-and-education) .

b) Radiological
General public awareness and education programs form part of each community's emergency management program, pursuant to the *EMCPA*, and should cover all hazards, including radiological ones, according to its HIRA.

3.2.11 Alerting, Notification and Response Systems

Procedures shall be established to support the initial notification of off-site authorities, the notification of members of Emergency Response Organizations, appropriate responses to such notifications and the alerting and public direction of the affected population. Details on initial notifications are contained in **Section 5.2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response#section-1) .

3.2.12 Evacuation and Relocation Planning

Advance planning and preparedness shall be conducted for the following items in support of the Evacuation and Relocation protective measures:

a) transportation management (e.g., Ministry of Transportation)

b) Reception and Evacuation Centres (e.g., Designated Municipalities)

c) long-term housing (e.g., multi-ministry and multi-jurisdictional planning group)

d) health issues (led by the Local Public Health Units and Medical Officers of Health in conjunction with Local Health Integration Networks and MOHLTC)

3.2.13 Iodine Thyroid Blocking

a) Iodine Thyroid Blocking involves the ingestion of potassium iodide pills in order to prevent the uptake of radioactive iodine. As such, it is most effective if ingested prior to a radioactive release.

b) Stakeholder organizations must make arrangements in advance to ensure that the population that may be affected by the release of radioiodine has access to the pills in a timely manner.

c) Responsibilities and requirements to undertake this preparedness measure are further described in **Section 6.5.2**.

3.3 Concept of Operations

3.3.1 This section provides a description of the emergency response activities that would be undertaken in the event of:

a) A Reportable Event, Abnormal Incident and On-site Emergency notification from the reactor facility.

b) A General Emergency notification from the reactor facility.

3.3.2 Reportable Event, Abnormal Incident and On-site Emergency Notifications

a) The emergency begins with the occurrence of an abnormal operating condition at the reactor facility. Immediately, reactor facility operators and Shift Manager follow emergency procedures to diagnose and stabilize the event.

b) The reactor facility Shift Manager categorizes the event and, within 15 minutes, notifies the province and Designated Municipalities

i. In response to any nuclear emergency notification, the PEOC Duty Scientist from OFMEM would consult with staff at the reactor facility to obtain any necessary clarification or details.

ii. In response to a Reportable Event notification the PEOC Duty Commander should declare a Routine Monitoring response level until the situation has been resolved.

iii. In a scenario an Abnormal Incident or On-site Emergency notification is received, the process would progress as described below.

c) Within 15 minutes of receiving the notification from the reactor facility, the province notifies the off-site Emergency Response Organization of the Provincial Response Level which would, depending on the notification category, be either Enhanced Monitoring or Partial Activation. See **Annex D, Appendix 1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-d-initial-notification-and-response-system-nuclear-emergencies#section-7) for immediate provincial and municipal response actions.

d) Scientific staff immediately begin to assess the situation, based on conversations with, and information and data from, the reactor facility. Within a few hours the Scientific Section, along with the rest of the PEOC, is staffed as appropriate to the response level, and a business cycle for information gathering and decision-making is established to facilitate the response.

e) Protective action decision-making is undertaken by the PEOC Commander, based on the Scientific Section technical assessment and in light of the operational situation. Should protective actions, such as sheltering-in-place, be necessary, they are directed and undertaken prior to a radioactive release. This system of operational and technical awareness and decision-making would be repeated, according to the PEOC business cycle, until the emergency phase is terminated and recovery begins (recognizing that overlap in phases is possible).

f) Within hours of the initiation of the event, the media are briefed by a provincial spokesperson who may be supported by representatives from the reactor facility, and other organizations as necessary. A Joint Information Centre may be established to support media briefings to ensure the public are provided with timely and accurate information on:

i. the status of the emergency

ii. the hazards and areas affected

iii. precautionary and protective measures being directed or changed

iv. where to get more information

g) Within hours of being notified of a nuclear emergency, the full integrated emergency response capability of the reactor facility, plus municipal, provincial and federal organizations, has been activated with the province co-ordinating all off-site actions.

h) Within a day protective and ingestion control measures have been implemented as necessary to protect the public and ensure that all traded goods meet international standards.

3.3.3 General Emergency

a) The concept of operations below describes the response to a General Emergency notification from a reactor facility and may be adapted as required in response to local conditions.

b) A General Emergency notification may be applicable to an accident of varying severity, from DBA to a severe BDBA.

c) The emergency begins with the occurrence of an abnormal operating condition (e.g., loss-of-coolant accident) in the reactor facility which could lead to a release of radioactivity that would require off-site protective measures.

d) Immediately, reactor facility operators and Shift Manager follow emergency procedures to diagnose, stabilize and categorize the event.

e) Within 15 minutes of categorizing the event, the reactor facility Shift Manager notifies the province and Designated Municipalities of a General Emergency notification category. See **Annex D, Appendix 1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-d-initial-notification-and-response-system-nuclear-emergencies#section-7) for immediate provincial and municipal response actions.

f) The General Emergency notification to the province and municipalities will immediately and automatically trigger a number of default actions:

i. Within 15 minutes of receiving the notification from the reactor facility, the province notifies the off-site Emergency Response Organization of the Provincial Response Level, which shall be Full Activation.

ii. The Designated Municipalities initiate the public alerting system (e.g., sirens, telephone auto-dialer, etc.).

iii. Unless circumstances require a departure from this response, the PEOC Commander:

- Shall direct the implementation of evacuations in the AAZ

- May direct ITB in the AAZ
- Shall direct sheltering in the DPZ
- Shall direct precautionary measures in the AAZ and DPZ
- Shall issue an emergency bulletin advising the affected public of the above protective measures and where to get more information.

g) Following implementation of default actions in f) above, the PEOC shall determine if additional protective measures are required, including the need for additional evacuations. If so, they will be initiated in such a way that those areas at immediate risk or adjacent to the reactor facility are evacuated first before a radioactive release occurs. Eventually, if conditions warrant, the entire Detailed Planning Zone may need to be evacuated in all directions as winds will shift during the emergency.

h) The province provides the public in all emergency planning zones with direction on any required ingestion control measures. In those areas where there is a risk of contamination of food, water, milk, or commodities, the public may be advised to:

- Place grazing animals on stored (covered) feed.
- Protect drinking water supplies that directly use rainwater.
- Restrict consumption and distribution of non-essential local produce, wild-grown products (e.g., mushrooms and game), milk from grazing animals, rainwater, and animal feed.
- Restrict distribution of commodities until further assessments are performed.

i) Reception and Evacuation Centres are set up and staffed at pre-determined facilities outside of the Detailed Planning Zone. Additionally, mobile Monitoring and Decontamination Units (MDU) can be deployed where needed. These off-site facilities are established to register, process, and monitor and decontaminate evacuees as necessary.

j) Emergency Worker Centres (EWC) are also established at pre-determined facilities outside the Detailed Planning Zone. These facilities are used as an entry control point for all off-site municipal, provincial and federal response organizations involved in the response. Reactor facility staff provide a support function at the EWC to monitor and decontaminate emergency workers and helpers who require access to the affected area.

k) Once the radioactive emission (if any) has ended, the Field-based surveillance and monitoring team of the ERAMG is promptly dispatched to survey, identify and report to the province, the existence of any areas of contamination or hot spots both within and beyond the Detailed Planning Zone. The results of their surveys will be assessed by the province against pre-determined Operational Intervention Levels (OILs), to identify any areas where additional protective actions and other response actions are warranted or where measures can be rescinded where not necessary.

Chapter 4 Emergency response structure and functions

4.1 General

4.1.1 Ontario uses the Incident Management System (IMS), a standardized and co-ordinated approach to managing incidents that provides functional interoperability at all levels of emergency management.

4.1.2 IMS presents standardized organizational structure, functions, processes, and terminology:

a) The organizational structure provides for the chain of command and control.

b) The functions used for nuclear and radiological emergencies include Command, Operations, Planning, Logistics, Science, and Finance & Administration.

c) Processes allow all who respond to the same incident to formulate a unified Incident Action Plan to manage the incident.

d) IMS uses plain-language terminology to reduce the risk of miscommunication among responders.

4.1.3 The basic IMS organizational structure used for a provincial emergency response is illustrated in **Figure 4.1**.

4.2 LGIC and Premier

The LGIC and the Premier of Ontario provide overall direction to the management of the emergency response through the Commissioner of Emergency Management to the PEOC Commander.

4.3 Cabinet Committee

4.3.1 The mandate of the Cabinet Committee on Emergency Management (CCEM) is to ensure that the province is prepared to address emergency situations and assume other responsibilities, as Cabinet deems appropriate. The CCEM is the only Cabinet Committee for which membership has been specified by portfolio.

4.3.2 The CCEM works in conjunction with the Premier's Office, Cabinet Office, other affected ministries and Office of the Fire Marshal and Emergency Management to develop detailed plans for continued operations and constitutional governance in Ontario in the event of emergencies that could affect Ontario, regionally or provincially.

4.3.3 The Committee's main roles and responsibilities during an emergency can be summarized as follows:

a) Develop the overall provincial emergency management response strategy for the Government of Ontario.

b) Conduct high-level briefings and discussions of strategic issues with appropriate ministries.

c) Ensure management of strategic issues.

d) Ensure the continuity of critical government operations and services.

4.4 Cabinet Office and Minister MCSCS Office

Both the Cabinet Office and Minister MCSCS office support the CCEM and act as links to the Premier's Office.

4.5 Deputy Minister, Community Safety and Correctional Services (MCSCS)

The Deputy Minister MCSCS is responsible for:

a) Maintaining liaison between the Fire Marshal and Chief of Emergency Management and other Deputy Ministers involved in the emergency response; and

b) Leading the MCSCS Ministry Action Group (or doing so through a designate).

4.6 Commissioner of Emergency Management (CEM)

1. During an emergency or pending emergency situation, the CEM shall serve as the direct link between the CCEM and the PEOC (**Section 4.8** below)
2. The CEM shall ensure that strategic and operational information and decisions are relayed between the CCEM and PEOC in a timely and effective manner.

4.7 Emergency Information Section

4.7.1 The Provincial Chief, Emergency Information is responsible for the development and implementation of the Provincial Emergency Information Plan (PEIP) in cooperation with Cabinet.

4.7.2 Information shall flow in both directions to ensure that Command-identified emergency information issues are incorporated into the emergency information messaging and that the PEOC is made aware of any issues that may affect the overall response.

4.7.3 Where a local Emergency Information Centre (EIC) is set up, the Chief of the Emergency Information Section may provide liaison staff, if requested or deemed necessary, to ensure an appropriate level of coordination and provision of emergency information.

4.7.4 The main functions of the Emergency Information Section include:

a) Issue news releases and other public information products on behalf of the province, to the media and provide information on the emergency, and on measures the province is taking to manage it.

b) Co-ordinate news conferences on behalf of the province and provide supportive documents for provincial spokesperson.

c) Monitor media and public's perception of, and reaction to the situation and keep the PEOC Command Section and local Emergency Information Centre informed.

d) Provide information on the emergency, and the province's response to it, to ministries and other stakeholders not directly involved in the emergency response.

e) Identify rumours and counter them.

f) Provide key messages and information to activated call centres.

4.8 The Provincial Emergency Operations Centre (PEOC)

4.8.1 The Provincial Emergency Operations Centre (PEOC):

a) Provides overall coordination of the provincial response, based on the strategic direction from the PEOC Commander.

b) Provides timely support, information and analysis to the PEOC Commander to co-ordinate the provincial emergency response.

c) Assists communities in responding to nuclear and radiological emergencies by providing protective action direction, advice, assistance and support in coordinating the provision of additional resources.

d) May deploy personnel to assist in coordinating the emergency response.

4.8.2 Command Section

a) The role of the PEOC Command Section is to:

i. approve the Incident Action Plan

ii. identify and resolve response issues

iii. identify unresolved issues to be addressed by the Fire Marshal and Chief of Emergency Management (FM&CEM) and the CCEM

iv. provide advice, assistance and recommendations to the FM&CEM

v. implement direction provided by the PEOC Commander

vi. issue operational directives and guidance including emergency bulletins

vii. liaise with the command function of other Emergency Operations Centres (EOCs)

b) The Command Section may include technical experts and organizational representatives including the Chief Medical Officer of Health (CMOH), as requested by the PEOC Commander.

4.8.3 Command Staff

a) Safety
Safety staff are responsible for monitoring, tracking and ensuring the health and safety of all personnel working at the PEOC. Safety staff may also co-ordinate with other levels of response to ensure safe operations overall.

b) Liaison
Liaison staff act as the link between the Command Section and other command elements involved in emergency response.

c) Information
Information staff act as the link between Command and the Emergency Information Section that is responsible for the development and implementation of the Provincial Communication Plan. Information shall flow in both directions to ensure that Command-identified emergency information issues are incorporated into the emergency information messaging and that the PEOC is made aware of the Communication Plan, plan amendments, or issues that may affect the overall response.

4.8.4 Operations Section

a) The role of the PEOC Operations Section is to:

i. Implement the Incident Action Plan.

ii. The Operations Section Chief co-ordinates the functions of the section and provides operations input to the Command Section.

iii. The Operations Section should be comprised of representation from the following organizations, as appropriate:

- provincial ministries
- reactor facilities
- federal departments including Health Canada, Public Safety Canada, Department of National Defence and CNSC
- contiguous provinces
- State representatives from the U.S., as appropriate
- others as requested

b) Functions performed by PEOC Operations staff include:

i. providing operational input to the decision-making process

ii. implementing Command Section operational decisions by issuing advice or direction, as appropriate

iii. monitoring and coordination of deployed provincial resources

iv. identifying and coordinating the operational requirements of the response operation

v. sharing information between all members of the PEOC, as required

4.8.5 Planning Section

a) The Planning Section, led by the Planning Section Chief, prepares and documents the Incident Action Plan, including the Protective Action Response Planning Procedure

and oversees all incident-related data gathering and analysis regarding incident operations and assigned resources.

b) The Planning Section may include representation from the following organizations, as appropriate:

i. provincial ministries including OMAFRA, MOECC, MOHLTC, MCSS, MCSCS, MTO and MOL

ii. deployed provincial resources

iii. UTCC representative (via teleconference)

iv. municipal planning team representative (via teleconference) from Designated Municipalities, Designated Host Municipalities and support municipalities

v. others as needed (e.g., emergency information and scientific staff)

4.8.6 Logistics Section

Under the direction of the Logistics Section Chief, staff arrange for and co-ordinates all material, personnel services, equipment and resources required to manage and resolve the emergency.

4.8.7 Finance & Administration Section

Under the direction of the Finance and Administration Section Chief, staff perform administrative, financial and staffing duties specific to the emergency. This may include the capture of incident-related costs, maintenance and scheduling of support personnel, maintenance of appropriate support records, and administering procurement contracts as necessary.

4.8.8 Scientific Section

a) The Scientific Section is comprised of:

i. Nuclear Incident Group (NIG); and

ii. Environmental Radiation and Assurance Monitoring Group (ERAMG).

b) The Scientific Section organizational structure is illustrated in **Figure 4.2**.

c) In emergency situations, the Scientific Section is responsible for:

i. conducting dose assessments and modelling

ii. planning and conducting radiation monitoring, surveillance and sampling activities in areas surrounding the emergency site and throughout the province

iii. analysing and evaluating the collected monitoring, surveillance and sampling data

d) The results from b) above are used to formulate recommendations on the adoption of precautionary and protective measures as well as longer term measures or, the removal of such measures.

e) The Scientific Section utilizes data from a variety of sources to inform recommendations on protective and precautionary actions. Sources include:

i. ongoing monitoring and surveillance

ii. field-based monitoring and surveillance

iii. field-based sampling

iv. station parameters

v. v.source terms

vi. meteorological data and forecasts

vii. dose projections and modelling

viii. plume modelling

f) Nuclear Incident Group (NIG)

i. The NIG, consists of nuclear systems specialists, meteorologists, and health physicists from:

- HC
- CNSC
- MOECC

- others as requested (e.g., depending on the nature of the emergency, reactor facility operators may provide technical staff)

ii. The NIG provides the technical input into the pre-release decision-making process by:

- calculating projected off-site effects based on meteorological data, field monitoring data and source term estimates
- performing technical assessments of the developing situation
- making recommendations on protective measures where warranted
- assigning a safety status to response sectors (**Annex H** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-h-emergency-worker-safety))
- providing technical assistance to the Environmental Radiation and Assurance Monitoring Group

g) Environmental Radiation and Assurance Monitoring Group (ERAMG)

i. The ERAMG is a multi-jurisdictional group comprised of representatives from designated provincial ministries, the federal government and reactor facilities primarily focused on post-release activities such as:

- planning and conducting post-release surveillance and monitoring of the environment and sampling air, water, milk and foodstuffs in areas proximal to the incident as well as further afield (province-wide)
- analysing and interpreting the results of surveillance, monitoring and sampling activities
- formulating recommendations on the adoption or removal of protective and precautionary measures in accordance with the OILs specified in **Annex E, Appendix 2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3)
- confirming areas that are safe to continue agri-food operations, including the consumption and distribution of foodstuff and water

ii. The ERAMG includes representatives from:

- Ministry of Labour (MOL)
- Ministry of the Environment and Climate Change (MOECC)

- Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
- Ministry of Health and Long-Term Care (MOHLTC)
- Health Canada and federal **FNEP** partners
- CFIA
- Reactor facility operators

4.9 Other Emergency Operations Centres

4.9.1 Unified Transportation Coordination Centre (UTCC)

a) The Ontario Ministry of Transportation is responsible for the coordination of the development, maintenance, and implementation of the Unified Transportation Coordination Centre (UTCC) which may be a physical or virtual centre.

b) The UTCC is responsible for the management of all transportation aspects related to evacuation from affected areas, recovery to affected areas, as well as the transportation impacts beyond these areas.

c) The UTCC shall include representatives from MTO, OPP, Designated Municipalities and Designated Host Municipalities, local police, road and transit authorities, applicable provincial ministries, Metrolinx, and others as required.

d) Plans, procedures, roles, and responsibilities for the set-up, operation, and decommissioning of the UTCC shall be prepared in advance by UTCC members.

e) Reporting and notification structures under which the UTCC shall operate shall be prepared in advance by UTCC members.

f) Further guidance on site-specific functions and responsibilities of the UTCC shall be detailed further in the PNERP Implementing Plans and site-specific Unified Transportation Management Plans (UTMPs).

g) The UTCC shall be the entity responsible for the implementation of the UTMPs for nuclear and radiological emergency response and recovery.

4.9.2 Ministry Emergency Operations Centres (MEOCs)

The following ministries shall set up Ministry Emergency Operations Centres to carry out their respective responsibilities and to direct and co-ordinate provincial ministry actions (including their regional or area offices supporting the affected areas) according to the requirements of this Plan and the directions of the PEOC:

a) Ministry of Agriculture, Food and Rural Affairs
b) Ministry of the Attorney General
c) Ministry of Community and Social Services
d) Ministry of Community Safety & Correctional Services
e) Ministry of the Environment and Climate Change
f) Ministry of Energy
g) Ministry of Health and Long-Term Care
h) Ministry of Transportation
i) Ministry of Natural Resources and Forestry
j) Ministry of Northern Development and Mines
k) Ministry of Municipal Affairs
l) Ministry of Labour

4.9.3 Government Operations Centre (GOC)

The Government Operations Centre is set up by the federal government to co-ordinate federal activities in support of the Provincial Emergency Operations Centre or activities relating to areas of federal jurisdiction. This may include liaison with any other potentially affected provinces, the United States, other countries and, international agencies.

4.9.4 Reactor Facility

In the event of a nuclear emergency, the reactor facility shall make the necessary provisions to conduct their off-site responsibilities through their Emergency Operations

Facility. Responsibilities shall include:

a) provision of personnel to off-site provincial and municipal operations centres

b) provision of the necessary information and data to the Provincial Emergency Operations Centre including results of off-site monitoring

c) off-site activities such as field monitoring, emergency worker safety (**Annex H** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-h-emergency-worker-safety)), and personal monitoring

4.9.5 Community Emergency Operations Centres (CEOC)

The municipal emergency response is under the direction and coordination of the Head of Council at the Community Emergency Operations Centre, which in turn receives information, support and direction from the Provincial Emergency Operations Centre.

a) The structure of the municipal organization for undertaking emergency operations shall be defined in municipal emergency response plans. This organization shall provide for the following centres, as required:

   i. Community Emergency Operation Centre(s)[6]

   ii. Reception Centre(s)

   iii. Evacuation Centre(s)

   iv. Emergency Worker Centre(s)

   v. Emergency Information Centre(s)

b) Community Emergency Operation Centres (CEOC) shall also include representatives of appropriate upper- tier municipal departments and local boards such as boards of health, social services departments, school boards and police services. Such departments and boards shall also provide staff as required for the various other emergency centres to be established.

4.9.6 The PEOC may deploy resources to the Community Emergency Operations Centre to act as a link between the two centres. Information, and in some cases direction, to the

Community Emergency Operations Centre from the PEOC may be conveyed through provincially deployed staff.

4.9.7 Further guidance on the function and responsibilities of these centres is provided in the PNERP implementing plans.

4.10 Field Response

a) Organizations working in the field or responding directly to the incident include:

   i. staff operating pursuant to MOHLTC's Radiation Health Response Plan (RHRP), as defined in that plan

   ii. staff undertaking Environmental and Assurance Radiation Monitoring under the direction of PEOC Scientific Section

   iii. staff operating pursuant to the Unified Transportation Management Plan (UTMP)

   iv. staff operating in Reception, Evacuation and Emergency Worker Centres

   v. others as determined and authorized by the PEOC Commander

b) In the event of a nuclear emergency in Ontario, the reactor facility shall conduct their response as follows:

   i. On-site, to ensure that the reactor is in a safe shutdown mode, that radioactive releases are safely avoided if possible or ended and thereafter, to begin to restore conditions on-site back to normal;

   ii. On-site and off-site in the provision of monitoring data gathered by field teams (outside of the context of ERAMG, but also within the context of the ERAMG);

   iii. Off-site, in conjunction with the Designated Municipality, in the operation of Emergency Worker Centres to ensure that emergency workers are monitored for radioactive contamination (and decontaminated, if necessary); and

   iv. Off-site, in conjunction with the Designated Municipalities and host and support municipalities in the operation of Monitoring & Decontamination Units to ensure that the public that has been exposed to a radioactive release are monitored for contamination and decontaminated if necessary. Where deemed necessary by Command, the PEOC will co-ordinate the provincial field response.

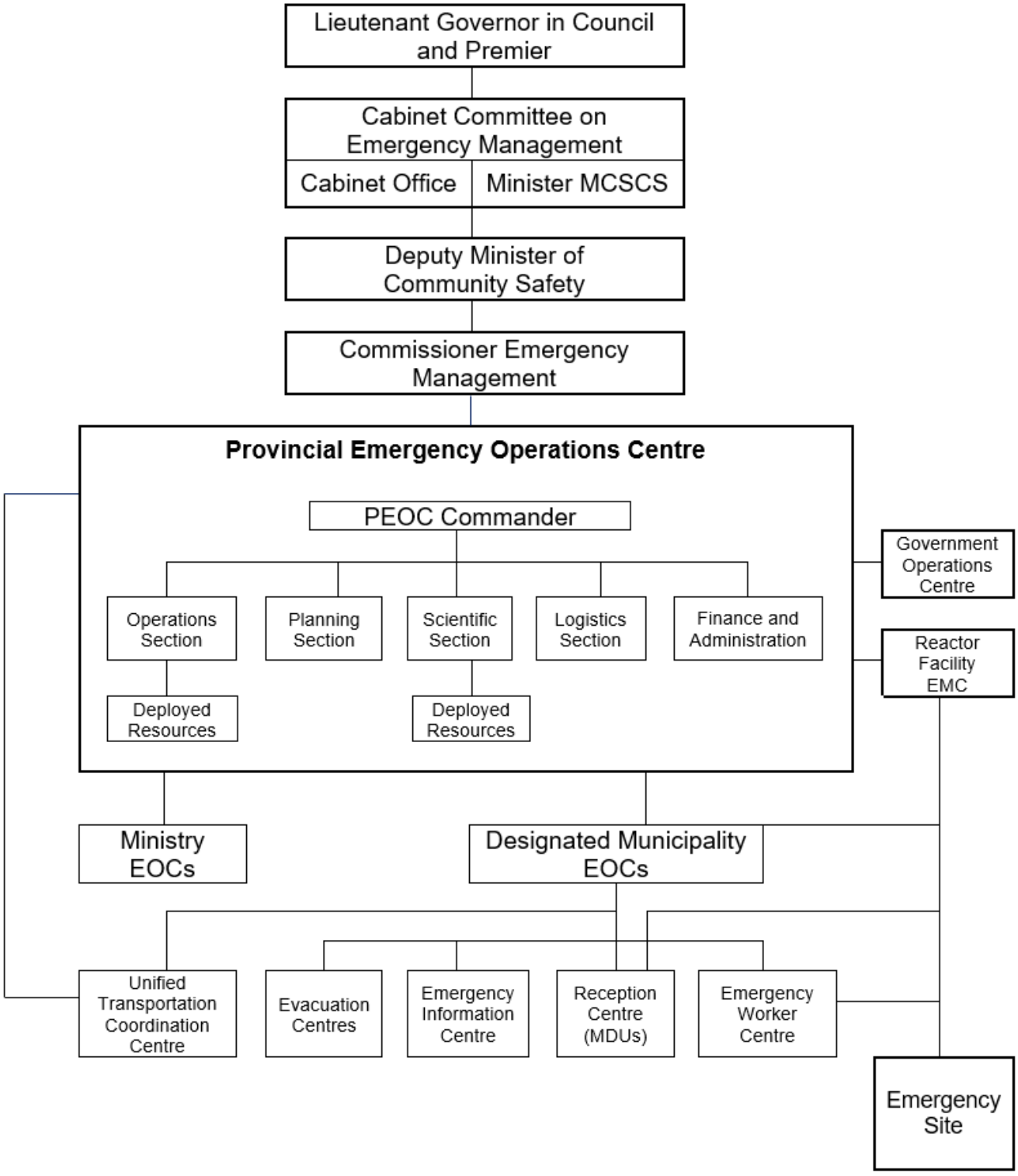
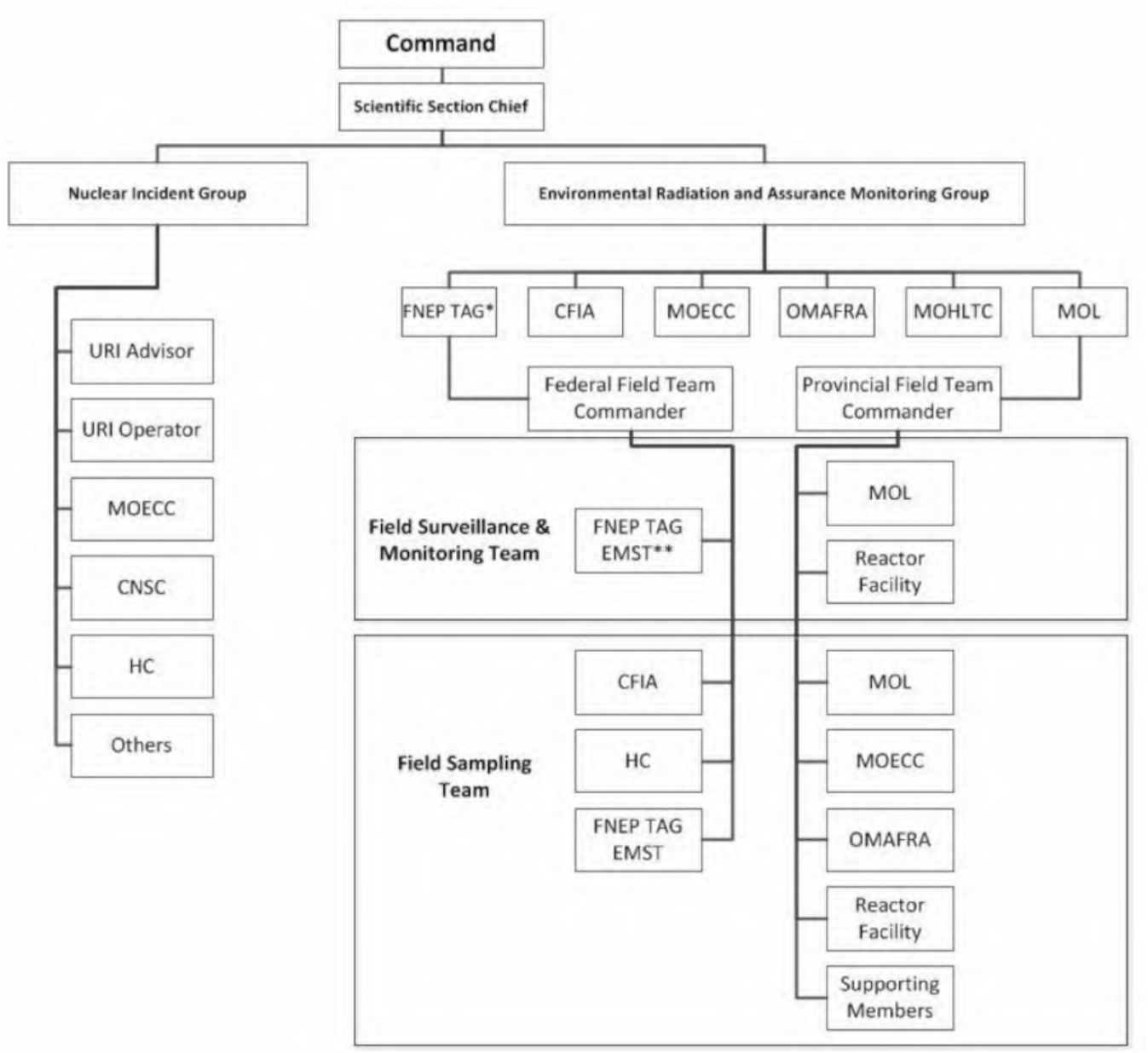


Figure 4.1: Provincial Nuclear and Radiological Emergency Response Organizational Structure



* FNEP TAG = Federal Nuclear Emergency Plan Technical Assessment Group. This group is composed of federal FNEP partners, including Health Canada.
** FNEP TAG EMST = FNEP TAG Environmental Monitoring and Surveillance Group, a subgroup of the FNEP TAG.

Figure 4.2: Scientific Section Organizational Structure

Chapter 5 Initiating an emergency response

5.1 General

This chapter provides an overview of the initial response to nuclear and radiological emergencies including initial notifications, activation of plans, operational lead, and the

different response phases.

5.2 Initial Notification for Nuclear Emergencies in Ontario

5.2.1 Federal legislation and associated regulations administered by the Canadian Nuclear Safety Commission (CNSC)[7],[8] require reactor facilities to have plans and arrangements in place to ensure off-site authorities are notified within 15 minutes of categorizing an event. As such:

a) The reactor facilities at Pickering, Bruce, Darlington and Chalk River shall make initial notifications according to the agreed to system and procedure detailed in **Annex D** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-d-initial-notification-and-response-system-nuclear-emergencies) and in the appropriate Implementing Plan.

b) The Fermi 2 nuclear station in Monroe, Michigan, USA notifies the province using the same criteria required to notify USA off-site authorities. The Initial Notification System is detailed in **Annex D** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-d-initial-notification-and-response-system-nuclear-emergencies) and is described in the Fermi 2 Implementing Plan.

5.2.2 Whenever the reactor facility initiates a nuclear emergency notification, the PEOC Operations Chief or Commander shall determine the appropriate response level to adopt and so notify the Emergency Response Organization. Normally, the default Provincial Response Level shall be as depicted in**Annex D, Appendix 1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-d-initial-notification-and-response-system-nuclear-emergencies#section-7) :

a) routine monitoring; PEOC duty staff monitor the situation, as usual

b) enhanced monitoring; PEOC staffing level increased to monitor a developing situation

c) partial activation, see **Section 5.5.4** below

d) full activation, see **Section 5.5.5** below

5.2.3 The PEOC, under direction of the Operations Chief or Commander may adopt a response level that is different from the default response described in **Paragraph 5.2.2** above as appropriate and may then notify the Emergency Response Organization on that basis.

5.2.4 Internal Notification

Each organization or agency required to respond to a nuclear emergency should 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.

5.2.5 External Notification

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. The responsibility for making such notification shall be described in the relevant Implementing Plans.

5.2.6 Initial Notification for Transborder Emergencies

Notifications for transborder emergencies are described in the PNERP Transborder Implementing Plan.

5.3 Initial Notification for Radiological Emergencies

5.3.1 The first indications of a radiological event may come from:

a) The Canadian Nuclear Safety Commission which, pursuant to the *Nuclear Safety and Control Act*[9] and its associated regulations, requires any licensed person or organization holding, using or transporting radioactive material to notify the CNSC in the event of an occurrence resulting in the release or loss of control of radioactive materials.

b) Another government department that may receive notification due to the circumstances of the event (e.g., Transport Canada for a transport accident; MOHLTC or Labour for an exposure incident, etc.)

c) A local Emergency Response Organization e.g., police, fire, emergency medical services, and notifications shall proceed according to local plans and procedures.

d) A community, which shall notify the PEOC when an emergency is declared or, whenever it activates its emergency response plan for a radiological emergency.

5.3.2 Pursuant to a memorandum of understanding[8] with the OFMEM, the CNSC shall notify the province (through the PEOC) of any report it receives from a licensee of an occurrence which has resulted, or has the potential to result in the receipt, by any member of the public, of a dose of ionizing radiation in excess of prescribed regulatory limits.

5.3.3 Upon receipt of a notification, from any source, of an occurrence of a radiological event whose effects have not been contained and/or which has the potential to affect public health and safety, the PEOC shall make notifications to the Emergency Response Organization as detailed in the PNERP Implementing Plan for Other Radiological Emergencies.

5.3.4 Where the incident is a result of a malevolent act, the Provincial Counter Terrorism Plan (PCTP) shall be activated to deal with the law enforcement aspect of protecting public safety. The purpose of the PNERP Implementing Plan for Other Radiological Emergencies is to co-ordinate the consequence management aspect of the radiological incident. This plan can coexist with the PCTP and coordination of the emergency response operations under

the two plans shall be undertaken through, and facilitated by, the Incident Management System structure.

5.3.5 Activation of this PNERP for a radiological emergency is described in **Section 5.5** below.

5.4 International Nuclear Event Scale (INES)

5.4.1 The International Atomic Energy Agency's (IAEA) International Nuclear Event Scale (INES) was put in place primarily to facilitate communication and understanding between the technical community, the media and the public on the safety significance of nuclear and radiological events.

5.4.2 In Canada, the CNSC is responsible for assigning INES ratings to Canadian events and to use it in its communications, as appropriate.[10]

5.4.3 In order to avoid confusion, the INES shall not be used by Ontario officials for the purpose of either notifications or communications.

5.5 Activation of Emergency Plans

5.5.1 This PNERP shall be activated for a nuclear or radiological emergency when required by the Fire Marshal and Chief of Emergency Management or designate on behalf of the Minister of Community Safety and Correctional Services[11].

5.5.2 The emergency response plans of all other organizations (see **Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations)) should be immediately activated as soon as they receive notification that the PNERP has been activated. Their level of activation (see below) should also align with that of the PNERP unless specified otherwise[12].

5.5.3 To enable an appropriately graduated response to a nuclear emergency, the activation response level shall provide for either partial or full activation, as outlined below.

5.5.4 Partial Activation

This level of activation is unique to a nuclear emergency and is appropriate to the situation where protective and operational measures are not immediately required, but may become necessary if the situation deteriorates. Partial activation of emergency response plans should permit detailed monitoring and assessment of the situation, as well as the ability to quickly go to full activation. As such, partial activation shall include the following:

a) Provincial and Municipal EOCs to be fully staffed;

b) Ministry Emergency Operations Centres and the Unified Transportation Coordination Centre to be staffed to the level appropriate for the situation, in order to monitor and assess the situation on a continuous basis and to implement associated plans as considered appropriate;

c) The local Emergency Information Centre to function on a continuous basis with an appropriate staffing level;

d) Other emergency centres to be readied to a level where they can become fully operational without undue delay when required and all other emergency response personnel to be placed on standby.

5.5.5 Full Activation

Full activation is appropriate when it is expected that protective and operational measures to mitigate the emergency are necessary immediately or, may be necessary in the near future. Full activation requires:

a) All emergency centres to be fully staffed and operational, unless specifically exempted by the appropriate jurisdiction authority;

b) All members of the Emergency Response Organization to immediately report to their places of duty, unless specifically exempted by the appropriate jurisdiction authority.

5.5.6 The detailed actions for, and response to the activation response level can be found in the following chapters and shall be further detailed in the relevant Implementing Plans as well as the emergency response plans and procedures of those organizations required to respond to a nuclear or radiological emergency.

5.6 Operational Lead

5.6.1 Whenever a nuclear emergency occurs or, whenever a radiological emergency occurs that requires the activation of this PNERP, the PEOC Commander, on behalf of the province is primarily responsible for leading the off-site response by supporting and coordinating the emergency response. The PEOC Commander may:

a) issue Operational Directives prior to a provincial emergency declaration (see **Paragraph 1.1.4**)

b) promulgate emergency orders in the event of a declared emergency under the EMCPA (see **Paragraph 1.5**)

5.6.2 The provincial response to a nuclear or radiological emergency shall be co-ordinated through the PEOC Commander.

5.6.3 When time permits, the PEOC Commander shall consult with the head of the Municipality (or their designate) when planning to issue operational directives or promulgate an emergency order for a protective measure within a municipal area.

5.7 Contingency Provisions

5.7.1 The PEOC Commander issues operational directives to the emergency management and response organization through the centres in the tier below. 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.

5.7.2 Similarly, response organizations are responsible for taking appropriate actions according to their respective plans, procedures and the requirements of the situation.

5.8 Declaration and Termination of an Emergency

5.8.1 Provincial

The authority for the declaration and termination of provincial emergencies pursuant to the *EMCPA* is described in **Section 1.5**.

5.8.2 Municipal

a) Pursuant to **Section 4(1)** of the *EMCPA*, the Head of Council of a Municipality can declare that an emergency exists in the Municipality or in any part thereof. The Head of Council should consider making such a declaration whenever the municipal nuclear emergency plan is activated.

b) When a radiological emergency occurs that requires activation of the local emergency plan, that Municipality should consider declaring an emergency.

c) Pursuant to **Section 4(3)** of the *EMCPA*, the Solicitor General must be notified whenever a municipal emergency is declared.

d) The Head of Council or the council of a Municipality may at any time declare that an emergency has been terminated.

5.9 Emergency Phases

Operations to deal with a nuclear or radiological emergency shall be conducted in three successive phases.

5.9.1 The Early Phase

a) The Early Phase begins with an initial notification and, in the event of a General Emergency notification from the reactor facility, requires urgent actions to deal with the immediate effects of radiation. Such actions may be based primarily on the preliminary status and prognosis of the nuclear or radiological emergency and rely on established plans, procedures and preparedness arrangements.

b) This early phase begins with the first warning that a significant problem exists and should normally transition to the Intermediate Phase after the radioactive release or source is brought under control (though not necessarily contained). This phase may last from hours to days.

c) During this early phase, the following protective measures may be required:

i. Exposure control protective measures

In the event of a General Emergency notification, automatic or default actions pursuant to the relevant Implementing Plan (e.g., Evacuation, Sheltering-in-place and Iodine Thyroid Blocking) should be directed. For notification categories of a lesser severity, the directing of protective measures should be based on plant (or emergency) conditions, operational realities and the Generic Criteria action levels (**Annex E, Appendix 1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-2)).

ii. Ingestion control protective measures

During the early phase, ingestion control measures may be imposed as a precaution.

iii. Emergency Worker protective measures

Protective actions (e.g., a dose management) may be required to prevent or reduce risks related to radiation exposure of Emergency Workers .

5.9.2 The Intermediate Phase

a) The intermediate phase begins once the radioactive release or source is brought under control (though not necessarily contained) and reliable environmental radiation monitoring information is available to be used as the basis for protective action decision-making. This phase may last for weeks to months and may overlap both the early and recovery phases.

b) The following protective action strategies shall be considered, and decisions made, based on the OILs as well as on the operational situation at that time:

i. exposure control protective measures

ii. ingestion control measures

iii. emergency workers protective measures

iv. population monitoring and medical management protective measures

c) Psychosocial support measures shall also be implemented as necessary during the intermediate stage.

5.9.3 The Recovery Phase

a) The recovery phase begins when short-term and long-term actions can be 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.

b) During the recovery phase, emergency management and response operations may continue to occur (e.g., ingestion control protective measures, restoration activities,

etc.).

c) Recovery phase actions may be described in a separate plan and may include:

   i. care for persons exposed and/or contaminated

   ii. psychosocial support

   iii. long-term relocation issues

   iv. the resettlement of and return of individuals affected by the nuclear emergency

   v. long-term support to the public living in contaminated areas

   vi. decontamination or reconstruction of property damaged as a result of the emergency and associated response activities

   vii. economic impact studies and studies on how to revive local business activity

5.9.4 Transitioning Between Phases

a) There may not be a clear distinction between phases given that emergency response operations may occur in all phases, and that planning for the recovery phase should commence as soon as practical.

b) Emergency Response Organization recovery plans should:

   i. Define a transition process from the nuclear emergency response phase to the recovery phase.

   ii. Identify the organizations involved in the recovery phase.

   iii. Include an action to assess the need for additional resources to support the transition process.

   iv. Identify a process to adjust protective actions as required.

Chapter 6 Protective action response strategy

6.1 General

This chapter examines the protective action response strategy which covers the available range of precautionary and protective measures as well as the evolution of

decision-making as the radiation event progresses.

6.2 Guiding Principles for Protective Action Decision-Making

6.2.1 Protective actions to mitigate nuclear emergencies and radiological emergencies include both precautionary measures (Section 6.4) and protective measures (Section 6.5).

6.2.2 Protective actions are complementary to each other, and may be applied in combination as a protective action response strategy, as appropriate to the situation, taking into account their respective efficacies and limitations.

6.2.3 Protective actions should be applied so as to prevent any increased public exposure to radiation. In practice, this may not always be justified as protective actions may entail risks and costs (e.g., psychosocial and economic). It is therefore necessary to justify and optimize (Section 6.9) the application of protective actions so as to minimize the total risk or detriment involved.

6.2.4 In a nuclear emergency, if a protective measure is warranted at any boundary of a response sector in the Detailed Planning Zone, it should be applied to the whole response sector.

6.2.5 In a nuclear emergency, if a protective measure is warranted in the Detailed Planning Zone, it should be applied to the entire ring of sectors in order to ensure protection when winds are shifting.

6.2.6 The PEOC Commander, as operational lead for the off-site response (Section 5.6), has the authority on behalf of the province for protective action decision-making and shall direct the implementation of protective measures as appropriate. Where a protective measure is warranted, the PEOC Commander shall issue an operational directive or, if an emergency is declared, the PEOC Commander shall promulgate an emergency order for the protective measure(s) and define the applicable area.

6.2.7 Detailed information regarding all of the protective measures detailed below shall be developed and communicated during the preparedness stage through public awareness and education (Section 3.2.10), and during the emergency phase through public direction (Section 7.3) and emergency public information (Section 7.4).

6.3 Protective Action Decision-Making for Nuclear Emergencies

6.3.1 Due to the nature of nuclear reactor emergencies, where the hazard and its location are known and, the extent of the hazard is verifiable, protective action decision-making can be categorized according to the following emergency phasing:

a) early phase

b) intermediate phase

c) transition to recovery phase

6.3.2 Early Phase

a) Protective measures should be instituted based on a conservative estimate of the situation because time or data may not be available to carry out a comprehensive assessment of imminent risk. These protective measures shall be detailed in the applicable implementing plan and may include sheltering-in-place, evacuation and Iodine Thyroid Blocking.

b) Decision-making, based on generic criteria (Annex E, Appendix 1 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-2)) should commence before exposure is expected to occur (e.g. when time and data are available) with an assessment of projected doses to determine the need for any protective and precautionary measure(s) listed in Table 6.1.

c) The additional measures listed below are not associated with a numerical intervention level or generic criteria and may also be directed in combination with any of the numerically associated protective and precautionary measures listed in Table 6.1:

   i. protective clothing

   ii. respiratory protection

   iii. self-decontamination

d) Precautionary measures (Section 6.4) should be directed in advance of, or in combination with protective measures, as appropriate, to facilitate implementation.

6.3.3 Intermediate Phase

a) The intermediate phase begins once uncontrolled releases have ended permitting environmental radiation monitoring to be undertaken.

b) Relocation is the preferred protective measure during the intermediate phase to prevent external exposure from deposited radioactive particles (e.g. ground contamination) as well as to prevent internal exposure from inhalation of radioactive particulates.

c) Ingestion control measures shall be directed as appropriate based on the results of environmental field monitoring of food, milk and water.

d) A technical assessment of actual radiation monitoring results and the application of Operational Intervention Levels (OILs) (Annex E, Appendix 2 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3)) should inform the decision-making process to determine the need for both ingestion and exposure control measures.

e) The developing situation should be continuously re-assessed and appropriate decisions made on applying protective measures as well as rescinding those no longer necessary.

f) All technical assessments should be evaluated in the context of operational factors and public policy (e.g. psychosocial and economic) considerations. Such considerations should provide an overall assessment of the risks and costs associated with various protective measures. The final decision on protective measures should be optimal and most appropriate for public safety and welfare (Section 6.9).

6.3.4 Transitioning to Recovery Phase

a) Emergency plans shall describe the process to transition from emergency response to recovery including the requirements to establish a recovery organization and to develop a recovery plan.

b) The transition to recovery may begin during the intermediate phase and may proceed independently of intermediate phase activities.

c) Recovery phase decision-making should focus on the revision or rescinding of protective measures imposed during the previous phases with the goal of reducing environmental radiation to acceptable levels, improving living conditions and ultimately restoring conditions back to normal.

d) Recovery phase decision-making should be based on the principle of optimization of the radiation situation (Section 6.9).

e) The imposition and rescinding of protective measures, as well as the distinction between the three phases, may not be uniform across the affected area as contamination levels in each sector may be different.

6.4 Precautionary Measures

6.4.1 Precautionary measures should be implemented during the early and intermediate phases, either in advance of, or in combination with exposure control protective measures to facilitate their implementation. Unlike protective measures, precautionary measures are not associated with a numerical intervention level.

6.4.2 The PEOC Commander shall direct precautionary measures as appropriate, in consultation with the affected Designated Municipalities where time permits.

6.4.3 Precautionary measures shall be directed via emergency bulletins (see Section 7.3.2) issued by the PEOC Commander to the affected public.

6.4.4 Precautionary measures include:

a) closing of beaches, recreation areas, etc.

b) closing of workplaces and schools

c) suspension of non-critical patient admissions in hospitals

d) entry control

e) clearing milk storages 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, and milk- and meat-producing animals

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

6.5 Protective Measures for Exposure Control

6.5.1 General

a) Protective measures can minimize exposure by:

i. reducing or avoiding exposure to a radioactive plume

ii. reducing or avoiding exposure to ground contamination (or re-suspended contamination)

b) Some or all of the protective measures may be implemented during a radiological emergency and are implemented, for the most part, during the early and intermediate phases of a nuclear emergency (Section 5.9 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response#section-8)).

c) The protective measures detailed below are associated with intervention levels (Annex E (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels)) to guide decision-makers on their implementation to protect public safety. Additional protective measures can be recommended to enhance public safety during a response, such as the use of protective clothing or respiratory protection. Such measures are discussed in Section 6.8 and listed in Table 6.1.

6.5.2 Iodine Thyroid Blocking

a) General

i. Iodine Thyroid Blocking involves the ingestion of potassium iodide (KI) pills to prevent the uptake of radioactive iodine by the thyroid gland during a radioactive release.

ii. Iodine Thyroid Blocking shall be directed by the CMOH as appropriate in coordination with the PEOC and the local Medical Officer of Health and is normally undertaken during the early or intermediate phase.

iii. Iodine Thyroid Blocking provides protection against just one radioisotope present in a radioactive release, radioiodine. As a result, this measure is optimally used in combination with other protective measures, such as sheltering-in-place or evacuation, in order to protect the whole body from all radioisotopes.

iv. KI pills should be ingested 2-6 hours prior to or just after exposure to radioiodine in order to optimize protection from radioiodine,

v. A single KI dose lasts approximately 24 hours and should be taken daily until the risk of significant exposure to radioiodine no longer exists. Note: certain

populations i.e., pregnant or breastfeeding women, and infants <1-month-old should only take one dose of KI.

vi. KI pill ingestion should be replaced, as a protective measure against radioiodine, by the implementation of ingestion control measures once the radioactive release has ceased.

vii. Iodine Thyroid Blocking should not normally be necessary in a radiological event involving detonation of a Radioactive Dispersal Device (RDD) due to the expected absence of radioiodine.

b) Responsibility

i. The CMOH, in coordination with the PEOC and the local Medical Officer of Health shall direct the use of KI as described in the RHRP's Potassium Iodide Guidelines Annex.

ii. Reactor facilities (except Fermi 2), pursuant to their responsibilities to assist off-site authorities under the Regulations of Class I Facilities (*Nuclear Safety and Control Act*) and operating licence requirements, shall provide the necessary resources and support to provincial and municipal authorities to ensure that the ITB related requirements of the PNERP and municipal plans are completed.

iii. The MOHLTC shall procure, in advance, adequate quantities of Potassium Iodide (KI) pill, for use by local authorities of the Fermi 2 Detailed Planning Zone and Ingestion Planning Zone populations during a nuclear emergency.

iv. The MOHLTC shall provide support to local authorities for the Fermi 2 Detailed Planning Zone and Ingestion Planning Zone populations to ensure that the ITB related requirements of the PNERP and municipal plans are completed.

v. Designated Municipalities and local authorities for the Fermi 2 Detailed Planning and Ingestion Planning Zones should perform periodic reviews of the local populations to assess the adequacy of their ITB distribution programs.

vi. Designated Municipalities for the Pickering, Darlington, Bruce and CRL reactor facilities, and local authorities for the Fermi 2 Detailed Planning and Ingestion Planning Zones, shall detail in their plans the means by which the availability of KI pills is facilitated for any resident of the Detailed Planning and Ingestion Planning Zones, including sensitive populations who may wish to possess a supply in advance of an emergency. This shall include:

- The pre-distribution of KI pills together with instructions on KI administration to Detailed Planning Zone residences, businesses, institutions

and for emergency centres (Emergency Worker, Reception and Evacuation Centres).

- The appropriate information and education related to the benefits, risks and usage instructions of KI pills.

vii. Other matters related to Iodine Thyroid Blocking (ITB) with stable iodine (KI), including the provision of guidance and advice to health stakeholders and local organizations, are detailed in the RHRP's Potassium Iodide Guidelines Annex.

6.5.3 Evacuation

a) General

i. Evacuation is the displacement of people from their homes for a period of approximately one week and would be undertaken during the early or intermediate phase to avoid or reduce short-term exposure to the plume or deposited radiation.

ii. Evacuation should be directed in areas where the projected or actual dose is expected to equal or exceed the evacuation generic criteria (Annex E, Appendix 1 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-2)) or OILs (Annex E, Appendix 2 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3)).

iii. In the off-site area immediately adjacent to the source of radiation, evacuation may be the best protective action unless:

- persons are unable to safely evacuate (e.g., vulnerable persons due to health issues)
- conditions exist which make the evacuation hazardous (e.g., inclement weather, road or transportation issues, consequences resulting from a natural hazard)
  In such cases, sheltering-in-place may be more appropriate followed by evacuation once the release has ceased.

iv. Evacuation is most effective at limiting exposures when completed prior to the radioactive release.

v. When evacuation is implemented during a radioactive release, radiation exposure could be increased. Therefore, if the release duration is known to be short, sheltering-in-place may be directed, to be followed by evacuation after the release.

vi. Evacuation can provide protection against exposure to radioactive groundshine, once the radioactive release has ceased where sheltering-in-place is not a viable option.

vii. Evacuation of the affected population should be directed when the projected or actual dose is expected to equal or exceed the Protective Action or Operational Intervention Levels respectively.

viii. Evacuation of the affected population should be considered for those areas where sheltering-in-place is expected to be required for more than 24 hours.

ix. Designated Municipalities and provincial institutions providing essential services (including facilities such as water treatment plants, hospitals and long-term care and nursing homes) shall develop plans for, and identify pre-designated special groups who cannot evacuate in the event of a nuclear emergency.

b) Responsibility

i. The PEOC Commander shall direct evacuations as appropriate in consultation with the affected Designated Municipalities where time permits.

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

- transportation management (e.g., Ministry of Transportation)
- reception and evacuation centres (e.g., Designated Municipalities)
- long-term housing (e.g., multi-ministry and multi-jurisdictional planning group)
- health issues (led by the Local Public Health Units and Medical Officers of Health in conjunction with the MOHLTC, Local health Integration Networks (LHINs) and Paramedic Services)

iii. Evacuation shall be directed using emergency bulletins issued by the PEOC Commander to the affected public (Section 7.3.2).

6.5.4 Sheltering-In-Place

a) General

i. Sheltering-in-place directs people to remain indoors for a relatively short period of time and is generally undertaken during the early or intermediate response phases

ii. Sheltering-in-place should be directed in areas where the projected or actual dose is expected to equal or exceed the sheltering generic criteria (Annex E, Appendix 1 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-2)) or OILs (Annex E, Appendix 2 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3)).

iii. The PEOC Commander and CMOH should normally consider directing sheltering-in-place together with a direction for Iodine Thyroid Blocking to provide maximum protection. However, exceptions may apply in cases where:

- Analysis of reactor facility plant data definitively indicates that iodine does not pose a hazard.
- The hazard from iodine is through the ingestion pathway for which ingestion control mechanisms are the appropriate protective action strategy.

iv. Sheltering-in-place is considered a very temporary measure, normally limited to a maximum of 2 days.

v. Sheltering-in-place can be an appropriate interim measure in areas where a release (resulting from a nuclear accident or a radiological dispersion device) is either expected imminently or is ongoing.

vi. Sheltering-in-place may be a preferable alternative to evacuation where circumstances prevent a safe and efficient evacuation:

- severe weather or environmental hazards
- uncertain contamination or groundshine levels
- vulnerable populations (e.g. hospitals, long-term care homes, etc.) for whom evacuation poses greater risks than that of the hazard itself
- essential services staffing requirements

- transportation impediments

vii. Large structures (e.g. shopping centres, schools, churches, commercial buildings, etc.) with high-density walls (e.g. concrete), generally provides greater radiation protection for sheltering-in-place than do small structures such as wooden single-family dwellings. Additionally, it is recommended to shelter in the basement or on middle floors, away from the walls or roof, of a multi-storey building.

b) Responsibility

i. The PEOC Commander, shall direct sheltering-in-place as appropriate, in consultation with the affected Designated Municipalities where time permits.

ii. Sheltering-in-place shall be directed through emergency bulletins (Section 7.3.2) issued by the PEOC Commander to the affected public.

6.5.5 Temporary Relocation

a) General

i. Temporary relocation is undertaken post-release, during the intermediate response phase, based on actual measured contamination levels.

ii. Temporary relocation 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 must be considered.

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

iv. The need for temporary relocation is determined following analysis of environmental radiation monitoring results and assessment against Operational Intervention Levels (OILs; Annex E, Appendix 2 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3)).

v. 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.

b) Responsibility

i. The PEOC Commander, shall direct temporary relocation as appropriate, in consultation with the affected Designated Municipalities and Designated Host Municipalities.

ii. Temporary relocation shall be directed through emergency bulletins (Section 7.3.2) issued by the PEOC Commander to the affected public.

iii. Relocation activities of the affected public should consider the planning and preparedness undertaken in advance, including:

- transportation management (e.g., Ministry of Transportation)
- reception and evacuation centres (e.g., Designated Municipalities)
- long-term housing (e.g., multi-ministry and multi-jurisdictional planning group)
- health issues (led by the Local Public Health Units and Medical Officers of Health in conjunction with the MOHLTC, Local health Integration Networks (LHINs) and Paramedic Services)

6.6 Protective Measures for Ingestion Control

6.6.1 Protective measures for ingestion control may include:

a) milk control

b) water control

c) pasture control

d) produce and crop control

e) livestock control

f) foodstuff control

g) land control[*]

h) environmental decontamination *

[*] Normally applicable only to the recovery phase.

6.6.2 The strategy for implementing ingestion control measures during a nuclear or radiological emergency should consider the following:

a) During the early phase, ingestion control measures may be directed as a precautionary measure (Section 6.4). The Detailed Planning Zone or larger area may be applicable for nuclear emergencies.

b) At the end of the early phase (or beginning of the intermediate phase), initiate environmental radiation and assurance monitoring (Section 7.6 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response#section-5)) within the entire Ingestion Planning Zone.

c) The PEOC Scientific Section Chief shall recommend the application, revision and rescinding of ingestion control measures as appropriate to the Command Section, based on their analysis of monitoring results from the environmental radiation and assurance monitoring field team.

d) Continue environmental radiation and assurance monitoring during the intermediate phase and through to the recovery phase to guide recovery decision-making.

6.6.3 The PEOC Commander, shall direct ingestion control measures as appropriate, in consultation with the affected Designated Municipalities where time permits.

6.6.4 Ingestion control measures shall be directed using emergency bulletins issued by the PEOC Commander to the affected public (Section 7.3.2).

6.7 Protective Action Decision-Making for Radiological Emergencies

6.7.1 Protective measures may have been implemented by first responders early in the event, before reliable radiological information was available (reference: PNERP Implementing Plan for Other Radiological Emergencies).

6.7.2 Once environmental monitoring teams are activated and data is received and analyzed, these protective measures can be adjusted or new ones directed, based on operational, technical (e.g. monitoring data applied against OILs, (Annex E, Appendix 2 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3))) and public policy considerations.

6.7.3 The PNERP Implementing Plan for Other Radiological Emergencies provides more detail on radiological emergency response phases. The nuclear emergency phases outlined in Section 5.9 (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response#section-8) above may not be applicable due to the variability of radiological emergencies.

6.8 Additional Measures to Protect the Public

6.8.1 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).

6.8.2 Detailed advice regarding these measures shall be developed and implemented in both the preparedness stage through public awareness and education (Annex C (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-c-public-awareness-and-education)) as well as for the emergency phase through the emergency bulletin process (Section 7.3.2).

6.9 Optimization of Protective Action Strategies

6.9.1 General

a) A system of optimization should be used to ensure that the most appropriate protective action strategy is implemented throughout all phases of an emergency.

b) Optimization extends beyond implementation of a protective action strategy to ensure that radiation doses are prevented or minimized when compared to intervention levels. When applied, optimization requires that the overall benefit of the strategy must be assessed to ensure that a suite of protective measures results in more benefit than harm. For example, the dose reduction achieved by relocating a large segment of the population may be of significance in absolute terms, however the relocation may result in significant psychosocial and economic disruptions without an associated observable reduction in expected latent cancers. In this example, the imposition of relocation as the protective action strategy may have a negative net benefit, and should be reconsidered.

c) Optimization becomes increasingly important as the emergency progresses and the protective action strategy should be reassessed as more information becomes available.

Table 6.1: Protective and Precautionary Measures

Early Phase (Section 5.9.1)		Intermediate Phase (Section 5.9.2)			Recovery Phase (Section 5.9.3)		
Precautionary Measures	**Protective Measures (Implementation Criteria)**	**Precautionary Measures**	**Exposure Control Measures**	**Ingestion Control Measures (based on OILs)**	**Precautionary Measures**	**Exposure Control Measures**	**Ingestion Control Measures (based on OILs)**
• Closing of beaches, recreati	• Sheltering-in-place (Default measure, as appropria	• Closing of beaches, recreati	• Sheltering-in-place (OILs, Annex E, Appendix 2 (ht	• Milk control • Water control	• Rescinded as appropria	• Rescinded as appropria	• Milk control • Water control

onareas, etc. • Closing of work places and schools • Sus	te; when projections available - Generic Criteria Annex E, Appendix 1 (https://www.ontario.ca/docume	onareas, etc. • Closing of work places and schools • Sus	tps://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-	• Pasture control • Produce and crop control • Livestock co	te	te	• Pasture control • Produce and crop control • Livestock co

pensionofnon-criticalpatientadmissionsinhospitals

nt/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3))

- Iodine Thyroid Blocking (OILs)
- Evacuation (OILs)
- Relocation

ntrol

- Foodstuff control

ntrol

- Foodstuff control
- Land control
- Environmental de

• Entry (access) control • Clearing milk storage soil dairy fa	ion-2)) • Iodine Thyroid Blocking (Default measure, as appropriate; when projections available -	• Entry control	(OILs) • Protective Clothing (as applicable) • Respiratory Protection (as applicable) • Staying indo					control amination

rms

- Banning consumption of excessed food stuff or w

Generic Criteria)

- Evacuation (Default measure, as appropriate; when projections available - Generic

ors (as far as practicable)

ater	Criteria) • Protective Clothing (as applicable) • Respiratory Protection (as applicable) • Self-Deco							

	nt am ina tio n (as ap pli ca ble) • Sta yin g in do or s (as far as pr act ica ble)						

Chapter 7 Operational response

7.1 General

7.1.1 This chapter provides an overview of the operational response strategies employed during a nuclear or radiological emergency to facilitate and complement the implementation of protective actions (**Chapter 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy)

) in a timely, appropriate and effective manner to ensure, as far as practical, public health and safety, and protection of the environment.

7.1.2 Detailed operational response strategies for mitigating the consequences of a nuclear emergency originating in Ontario are provided in the implementing plans for the Pickering, Darlington, Bruce Nuclear Generating Stations (NGS) and the Chalk River Laboratories research reactor.

7.1.3 Detailed operational response strategies for mitigating the consequences of a nuclear emergency originating outside of Ontario are provided in the Fermi 2 and Transborder Implementing Plans of this PNERP.

7.1.4 Detailed operational response strategies for a radiological emergency are provided in the Implementing Plan for Other Radiological Emergencies.

7.2 Guiding Principles for an Operational Response

7.2.1 In a nuclear or radiological emergency, the goals of an operational response are to:

a) Mitigate radiological and non-radiological consequences.

b) Ensure that designated municipal and affected federal government departments are kept apprised of the situation and, where time permits without threatening public health and safety, are consulted prior to any decisions being taken.

c) Keep the public informed.

d) Prepare for the resumption of normal social and economic activity.

7.2.2 The rest of this chapter is devoted to each of the operational response strategies employed during a nuclear or radiological emergency.

7.3 Public Direction

7.3.1 General

a) The aim of public direction is to communicate, directly to the affected public, the direction and guidance regarding protective measures they should take in order to ensure their safety and welfare.

b) Public direction shall be provided through the co-ordinated release of emergency bulletins issued from the PEOC and broadcast through the media and all other mechanisms normally available to provincial authorities.

c) Every effort shall be made to consult with Emergency Response Organizations as to the bulletin content, if time and circumstance permit.

d) Every effort shall be made to issue emergency bulletins in a timely manner to ensure that the affected public have the most up to date information as to the actions they may need to take.

e) Emergency bulletins for nuclear emergencies shall be pre-scripted, as far as practical. However, depending on the nature and progress of the emergency, some emergency bulletins may need to be prepared or revised during the emergency.

f) When a partial or full activation response is adopted (**Section 5.5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response#section-4)), the PEOC shall use the provincial public alerting system (**Section 7.7**), which includes the National Alert Aggregation and Dissemination System (NAADS), to issue an emergency bulletin informing the affected public of the following:

   i. that a problem exists

   ii. the area affected

   iii. to stay tuned to the media for further information

   iv. precautionary and protective measures being directed

iv. precautionary and protective measures being rescinded

g) The public awareness and education program for nuclear emergencies shall include information regarding the means by which public direction will be communicated.

7.3.2 Responsibility

a) In a nuclear emergency, the province is responsible for issuing emergency bulletins which are prepared by the PEOC Operations Section (**Section 4.8.4**) and authorized by the PEOC Commander.

b) In a radiological emergency, the province and the affected municipalities shall consult and decide on responsibilities for issuing emergency bulletins (Implementing Plan for Other Radiological Emergencies).

c) Emergency bulletins shall be authorized by the PEOC Commander for issue through established systems, such as:

i. radio and television

ii. social media

7.4 Emergency Public Information

7.4.1 General

a) The emergency information function during an emergency shall be carried out in accordance with the Provincial Emergency Information Plan (PEIP).

b) The PEIP describes the means by which prompt and co-ordinated information from the Ontario government is disseminated to the public, media, Members of the Provincial Parliament, other levels of government, Ontario ministries, Emergency Response Organizations and when appropriate, private sector organizations.

c) The Provincial Chief Emergency Information Officer (PCEIO) shall ensure that emergency information on the status of the emergency, the measures being taken to mitigate it, and actions to be taken by the public in response is accurate and provided in a timely manner.

d) Multiple jurisdictions (federal, provincial, municipal, other) are involved in the response and, as such, every effort shall be made to ensure that the information being developed is consistent in content and issued in a co-ordinated manner. In this regard, consideration shall be given to establishing a Joint Information Centre, co-ordinated by the Provincial Chief Information Officer, whenever the province adopts a partial or full activation response.

e) The PEIP shall be activated by the Chief Emergency Information Section of the PEOC to support a partial or a full activation response. The PEOC Commander may consider releasing emergency information upon adoption of an enhanced monitoring response, in which case the PEIP should be activated.

f) The PCEIO may dispatch provincial emergency information liaison officers to the local Emergency Information Centre as soon as the need for assistance arises or, when a partial or full activation response is implemented.

7.4.2 Responsibility

a) A Provincial Emergency Information Plan shall be developed in advance by the Provincial Chief Emergency Information Officer (PCEIO) and shall be implemented by the Emergency Information Section of the PEOC during a nuclear or radiological emergency. It shall contain a communications strategy to achieve the principles stated above.

b) Information relating to the emergency shall be issued through the Provincial Emergency Information Section (**Section 4.7**). Ministries of the province should channel emergency information related to their areas of responsibility, and information they wish to release to the public, through the Provincial Emergency Information Section.

c) Federal agency representatives in the Emergency Information Section should ensure coordination and consistency of any information being released by any federal agency, including the federal spokesperson in Ottawa, with Provincial emergency information.

d) The PCEIO may dispatch staff to the local Emergency Information Centre to provide assistance and to ensure that the information being issued locally remains consistent and co-ordinated with that being released by other jurisdictions.

7.5 Transportation Management

7.5.1 General

a) A transportation management methodology and plans shall be developed in advance to manage evacuations, as well as the transportation impact in the surrounding areas, during a nuclear or radiological emergency response.

b) The transportation management methodology shall provide the framework for the development of an overall, wide-ranging plan as well as for detailed site-specific Unified Transportation Management Plans (UTMP) developed for each nuclear area.

c) A site-specific transportation management plan shall be developed for each of the following areas:

   i. Pickering NGS

   ii. Darlington NGS

   iii. Bruce NGS

   iv. Chalk River Laboratories

   v. Fermi 2

d) The transportation management methodology shall inform decisions on public direction and emergency public information (**Sections 7.3** and **7.4**).

7.5.2 Responsibility

a) The Ontario Ministry of Transportation is responsible for coordinating the development, maintenance, and implementation of all-hazards evacuation transportation management methodology and site-specific Unified Transportation Management Plans (UTMPs) for nuclear and radiological emergency response and recovery.

b) Each site-specific UTMP, shall:

   i. Identify decision-making authorities.

   ii. Identify the roles and responsibilities of each participating organization.

iii. Identify notification, communication, and reporting structures and procedures.

iv. Identify strategies and mechanism that may be utilized to manage transportation aspects of evacuation and the transportation impacts in surrounding areas.

v. Ensure timely input to public direction and emergency information processes.

c) A Unified Transportation Coordination Centre (UTCC), either physically or virtually, shall be resourced to provide overall coordination of the transportation management function and implementation of the UTMPs.

d) A UTCC representative shall be tasked as the liaison between the UTCC and the MTO PEOC representatives within the PEOC Operations Section.

7.6 Environmental Radiation and Assurance Monitoring

7.6.1 General

a) The Environmental Radiation and Assurance Monitoring Group (ERAMG) Plan 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.

b) Environmental radiation and assurance monitoring shall be carried out by the ERAMG, a subgroup of the PEOC Scientific Section (see **Paragraph 4.8.8 g)** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-4-emergency-response-structure-and-functions#paragraph-4-8-8-g)).

c) The ERAMG is tasked with gathering and analyzing radiological data during a nuclear or radiological emergency and is composed of:

i. a PEOC- based unit; and

ii. two field-based units

7.6.2 Responsibility

a) The OFMEM is responsible for the development of the ERAMG Plan in coordination with the members described in c) below.

b) Scientific and technical direction is provided by Ministry of Labour (MOL) and Health Canada (HC) whose representatives shall report directly to the Chief of the Scientific Section.

c) The ERAMG includes representatives from the following organizations:

   i. Ministry of Labour (MOL)

   ii. Ministry of the Environment and Climate Change (MOECC)

   iii. Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

   iv. Ministry of Health and Long-Term Care (MOHTLC)

   v. Health Canada (HC)

   vi. Canadian Food Inspection Agency (CFIA)

   vii. Reactor facility operators:

   - Bruce, Pickering and Darlington NGS
   - Chalk River Laboratories

d) While Health Canada and the CFIA are the only federal organizations specifically named above, other federal departmentsmay be involved in accordance with the Federal Nuclear Emergency Plan.

e) The ERAMG may also include additional supporting members such as the Dairy Farmers of Ontario.

7.7 Public Alerting

7.7.1 General

a) Public alerting is undertaken using a sound signal system to inform the affected population that a nuclear emergency is about to occur.

b) Public alerting shall be accomplished within 15 minutes of initiation of the system in order to alert the population in the affected emergency planning zone(s) that they may be required to undertake default or immediate protective measures. The PNERP site-specific implementing plans shall include details on the emergency planning zones that may be so affected.

c) The timing of the public alerting sound signals should be co-ordinated with the public direction and emergency public information **(Sections 7.3** and **7.4**). 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.

d) Municipalities shall ensure an initial evaluation of any new public alerting system is completed to verify that the requirements under this PNERP have been met. Further, regular integrated testing of existing public alerting systems shall be included as a component of municipal exercise programs.

e) Populations requiring protective measures due to a transborder nuclear emergency or other radiological emergency may be alerted by community or Provincial public alerting systems, or both.

7.7.2 Responsibility

a) The designated municipalities in Detailed Planning Zones (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) shall have plans providing for public alerting systems meeting the requirements in **Section 7.7.1** above.

b) Pursuant to **Section 5** of the *EMCPA*, plans of lower-tier municipalities whose populations reside within the required alerting area shall conform to the plans in a) above.

c) The operators of the Pickering, Darlington and Bruce NGS and Chalk River Laboratories, pursuant to the Nuclear Safety and Control Act, shall provide resources and assistance to designated municipalities in their respective Detailed Planning Zones to establish and maintain a public alerting system in their Detailed Planning Zone.

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

e) OFMEM shall co-ordinate with appropriate stakeholders to establish public alerting arrangements for the Town of Amherstburg for a nuclear emergency at the Fermi 2 nuclear station.

7.8 Radiation Health Response Plan

7.8.1 General

a) The Radiation Health Response Plan (RHRP) shall set out a comprehensive, province wide approach to health sector planning and response for nuclear and radiological emergencies of deliberate or accidental nature.

b) The RHRP shall provide guidance to ensure the readiness, as far as practical, of the Ontario health sector to respond to a nuclear or radiological emergency so that the risk of illness and death is minimized, and health workers are protected.

c) The RHRP shall:

   i. Establish health sector roles and responsibilities during the planning, response, and recovery phases of a nuclear or radiological emergency.

   ii. Describe operational concepts and response principles.

   iii. Cover co-ordination related to the entire health system for planning, response, and recovery phases.

   iv. Describe the implementation of precautionary and protective measures for the health system.

   v. Provide public health response guidance for mitigating radiation exposure and contamination of the public.

   vi. Provide public health response guidance for mitigating the psychosocial impacts that may occur as an indirect consequence of the emergency.

7.8.2 Responsibility

The Ministry of Health and Long-Term Care is responsible for the development and maintenance of the RHRP to provide the necessary guidance to Ontario's health sector including:

a) Local Health Integration Networks (LHINs)

b) paramedic services

c) hospitals

d) cancer centres

e) public health units

7.9 Personal Monitoring and Decontamination

7.9.1 General

a) Personal monitoring determines the presence of contamination on members of the public, emergency workers, and their vehicles. If present, decontamination may reduce or remove contamination.

b) Facilities and provisions for personal monitoring and decontamination for members of the public, emergency workers and their vehicles shall be established (**Annex B** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-b-use-community-facilities-during-nuclear-or-radiological-emergency)) and resourced with specialized equipment and expertise to undertake this function (**Section 7.9.2**).

7.9.2 Responsibility

a) Personal monitoring and decontamination of the public, emergency workers and their vehicles shall be accomplished as follows:

b) The MOHLTC is responsible for coordinating the setup of monitoring and decontamination facilities whenever the province activates its Implementing Plan for Other Radiological Emergencies. Additional details on monitoring and decontamination facilities are provided in the **RHRP**.

c) The incident reactor facility, pursuant to the Regulations of Class I Facilities under the *Nuclear Safety and Control Act*, has responsibility for the radiation monitoring and decontamination activities at centres established for the public and emergency workers (**Annex B** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-b-use-community-facilities-during-nuclear-or-radiological-emergency)). This includes staffing, equipment, procedures, training and operation (**Annex I, Appendices 13** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-

organizations#section-12) and **16** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-15)).

d) Municipalities shall ensure that their municipal emergency plans include provisions for the establishment, administration and operation of the non-radiological components of centres housing the monitoring and decontamination facilities for the public and for emergency workers.

e) OFMEM shall co-ordinate with appropriate stakeholders to establish monitoring and decontamination arrangements for the Town of Amherstburg for a nuclear emergency at the Fermi 2 nuclear station.

7.10 Emergency Workers

7.10.1 General

Annex H (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-h-emergency-worker-safety) provides guidance for ensuring emergency worker safety in a nuclear emergency as well as dose limits for emergency workers during nuclear and radiological emergencies.

7.10.2 Responsibility

a) Emergency worker organizations should ensure the provision of equipment and training to their personnel, as appropriate, to enable them to respond to nuclear and radiological emergencies. The equipment should include personal dosimeters, and other Personal Protective Equipment (PPE) as required.

b) Emergency worker organizations may access the necessary equipment and training through mutual aid agreements or through the reactor facility, as necessary.

7.10.3 Emergency Worker Protective Action Strategy

a) General

i. Emergency organizations shall ensure that their emergency workers are equipped with the appropriate Personal Protective Equipment (PPE) to prevent contamination, including personal dosimeters as required.

ii. Generic criteria, administrative controls (e.g. turn-back limits, stay times) and PPE are detailed in **Annex H** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-h-emergency-worker-safety) and should be used to ensure emergency worker safety.

iii. One or more Emergency Worker Centre (**Annex B** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-b-use-community-facilities-during-nuclear-or-radiological-emergency)) shall be established to monitor and decontaminate emergency workers and to maintain their radiation records. Emergency workers shall be provided, as necessary, with:

- personal monitoring devices
- protective equipment

iv. Emergency Worker Centre staff shall advise emergency workers registered with them to not incur any exposure that would cause them to exceed exposure limits.

v. The Scientific Section in the PEOC shall periodically (as defined in Scientific Section Procedures) assign and communicate to all organizations, the safety status colour code of all sectors in which emergency workers may be required to operate.

vi. Dose rate criteria for determining safety status and the precautions associated with each status are described in **Annex H, Appendix 1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-h-emergency-worker-safety#section-0) .

vii. Safety status shall be determined as follows:

- Initially, as described in the relevant implementing plan.
- If the release is imminent or ongoing, the assignment of safety status should be done immediately.
- If the release is delayed, the assignment of safety status should be done approximately 2 hours prior to the release.
- Thereafter, periodically by the PEOC Scientific Section.

viii. Emergency workers should observe the precautions appropriate to the safety status of the sector they are working in.

b) Responsibility

i. The Minister of Labour has the mandate to ensure that employers fulfil their obligations for worker safety under the Occupational Health and Safety Act during nuclear and radiological emergencies (**Annex I, Appendix 8** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-7)).

ii. During a nuclear emergency:

- Designated municipalities shall include provisions in their municipal plans for the establishment of Emergency Worker Centres. Locations for these centres should ideally be able to accommodate the co-location of an ERAMG Command Post for field monitoring purposes.
- Reactor facilities shall support Emergency Worker Centres as described in **Annex I, Appendix 13** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations#section-12) Reactor Facility Responsibilities and according to provisions in their emergency plans and procedures.

iii. During a radiological emergency monitoring and decontamination of emergency workers shall be conducted as described in the Radiation Health Response Plan (MOHLTC).

7.11 Venting of Containment

Requirements for venting radioactivity from reactor containment systems, following a Pickering, Darlington or Bruce NGS accident, are described in **Annex G** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-g-venting-containment-during-nuclear-emergencies) .

7.12 Reception and Care of Evacuees

7.12.1 General

a) Reception Centres may be the first destination for evacuees who require assistance following evacuation from their homes and shall be set up to provide the following functions:

   i. registration & inquiry

   ii. accommodation allocations at evacuation centres

   iii. first-aid

   iv. monitoring and decontamination (co-location optional)

b) Evacuation Centres provide food, shelter and other services (e.g., family reunification and emergency social services) to people evacuated as a result of a nuclear or radiological emergency.

c) Reception and Evacuation Centres may be co-located or separately located.

7.12.2 Responsibility

a) In a nuclear emergency, emergency social service needs (e.g., reception, registration and inquiry, shelter, food, clothing and personal services) for members of the public who have been evacuated from their homes, shall be assessed and provided by:

   i. Host municipalities designated under this plan; or

   ii. Municipalities directed to provide support or assistance under a provincial emergency declaration (**Section 1.5**).

b) In a radiological emergency, emergency social service needs (e.g., reception, registration and inquiry, shelter, food, clothing and personal services) for members of the public who have been evacuated from their homes:

   i. May be provided under the provisions of existing municipal mutual assistance agreements; or

   ii. Shall be provided by municipalities ordered to provide support or assistance under a provincial emergency declaration (**Section 1.5**).

7.12.3 Population Monitoring and Medical Management Protective Action Strategy

a) General

i. Population monitoring and medical management may be required in the event of a radioactive release. Monitoring may be conducted in the absence of a release to provide assurances to the public.

ii. Guidance for population monitoring is provided in **Annex F** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-f-population-monitoring) to this plan as well as in the MOHLTC Radiation Health Response Plan.

iii. The MOHLTC Radiation Health Response Plan outlines the methods by which population monitoring, decontamination and medical management functions may be provided:

- by CBRNE teams at the site of a radiological incident
- at a hospital when there are contaminated casualties
- at personally determined evacuation destinations by undertaking self-decontamination
- at a Monitoring and Decontamination Unit (MDU)

iv. Operational Intervention Levels (OIL) for population monitoring and medical management are provided in **Annex E, Appendix 2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-e-intervention-levels#section-3) of this plan.

b) Responsibility

i. The PEOC Commander, shall direct population monitoring, decontamination, and medical management as appropriate, in consultation with the affected designated municipalities.

ii. Population monitoring, decontamination and medical management should be implemented by activating the monitoring and decontamination facilities administered by the designated municipalities and resourced by the reactor facilities as well as under the provisions of the MOHLTC Radiation Health Response Plan.

iii. Population monitoring, decontamination and medical management shall be directed via emergency bulletins issued by the PEOC Commander to the affected public (see **Section 7.3**).

7.13 Protection and Care of Animals

7.13.1 General

a) Pursuant to **Section 7.0.2. (4)** of the *EMCPA*, provincial evacuation orders can include animals under a declared provincial emergency.

b) Any emergency that affects humans may affect their animals whether these are raised for foodstuff production, kept as companion or service animals or for other purposes, such as in zoos.

7.13.2 Responsibility

a) Municipal emergency response plans should make provisions for the protection and care of all animals per **7.13.1 b)** above, including those left behind during an evacuation.

b) Designated municipalities should consult with the following for assistance in developing plans for the protection and care of animals:

   i. Ontario Society for the Prevention of Cruelty to Animals (OSPCA) (whose mandate is to protect all animals in Ontario)

   ii. OMAFRA (provincial lead on farm animal disease (OIC 1492/2005))

   iii. The Ministry of Natural Resources and Forestry (MNR) for issues pertaining to wildlife

c) During a nuclear or radiological emergency, the PEOC should provide assistance to the stakeholders above as required for the protection and care of animals.

7.14 Management of Radioactive Waste

7.14.1 General

a) The amount of radioactive waste generated as a result of nuclear and radiological emergencies is dependent on the methods used for decontamination of persons, vehicles, structures and the environment.

b) The management of radioactive waste resulting from the nuclear or radiological emergency depends on the magnitude of the waste's radioactivity, the availability of disposal sites and the level of waste they accept.

c) 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.

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

   i. proximity to the incident area

   ii. proximity to residential areas or commercial districts

   iii. proximity to transportation corridors

   iv. for newly designated sites, the existing level of contamination and potential for remediation

7.14.2 Responsibility

a) Planning for the management of radioactive waste generated by the emergency should preferably begin during the intermediate phase.

b) When appropriate, the PEOC Commander shall appoint a working group to develop a waste management plan, comprised of representatives of:

   i. provincial ministries (e.g., MOECC, ENERGY, MOL and MTO)

   ii. federal departments (e.g., CNSC, Environment, and NRC)

   iii. municipal public works departments

   iv. reactor facility environmental specialists

   v. private sector organizations, as applicable

c) The above organizations should identify, at the preparedness stage, available resources which may aid in this endeavour.

7.15 Liquid Emission Response

7.15.1 General

a) A liquid emission results from a release of radioisotopes to a water supply source such as a lake, river, groundwater, etc.

b) The response to a liquid emission will depend on:

   i. Whether it is occurring in conjunction with an airborne emission

   ii. The source of the liquid emission

c) The following guidance should be used in determining the response mechanism to be followed in the event of a liquid emission:

   i. Where a liquid emission has occurred at a reactor facility and has not occurred in conjunction with an event that meets the notification category system as detailed in the Implementing Plans (Pickering, Darlington, Bruce Power, CRL), it shall be dealt with under the Liquid Emission Response Procedure for the applicable reactor facility.

   ii. Where a liquid emission has occurred at a reactor facility in conjunction with an event that meets the notification category system as detailed in the Implementing Plans (Pickering, Darlington, Bruce Power, CRL), it shall be dealt with under the applicable PNERP Implementing Plan.

   iii. The Other Radiological Emergencies Implementing Plan to the PNERP shall be applied in the event of Liquid Emissions occurring as a result of:

   - Accidents or occurrences at nuclear establishments.
   - Accidents or occurrences during the transportation of radioactive material.
   - Radiological Dispersal Devices (RDD)/Radiological Exposure Devices (REDs)
   - Radiological Device (RD)
   - Lost/stolen/orphan sources
   - Satellite re-entry
   - Nuclear weapon detonation

7.15.2 Responsibility

a) The Provincial Liquid Emission Response Plan (PLERP) shall be developed and maintained by the Office of the Fire Marshal and Emergency Management (OFMEM) for each of the reactor facilities described under **7.15.1c)**.

b) Ministry of the Environment and Climate Change legislation for spills and other discharges to the environment, including Part X of the Environmental Protection Act, the Ontario Water Resources Act and the Safe Drinking Water Act, 2002, shall support the provincial response under the PLERP.

Annex A Reactor facilities and designated municipalities

(Reference: Paragraph 1.7.2 b))

Reactor facilities and designated municipalities

Pursuant to **Subsection 3(4)** of the *Emergency Management and Civil Protection Act*, R.S.O. 1990, c. E.9, the following municipalities are hereby designated as municipalities that must address nuclear emergencies in their municipal emergency plans: either for the purposes of protecting their citizens from the hazard or in the capacity of Host Municipality.

Reactor facilities	Designated municipalities	Designated host municipalities
Pickering Nuclear Generating Station	Regional Municipality of Durham City of Toronto	City of Peterborough
Bruce Nuclear Generating Station	Municipality of Kincardine	Town of Saugeen Shores
Darlington Nuclear Generating Station	Regional Municipality of Durham	City of Toronto City of Peterborough

Reactor facilities	Designated municipalities	Designated host municipalities
Chalk River Laboratories	Town of Laurentian Hills Town of Deep River	Town of Deep River
Fermi 2 Power Plant (Michigan, USA)	Town of Amherstburg	City of Windsor Town of Essex

Annex B The use of community facilities during a nuclear or radiological emergency

(Reference: **Paragraph 7.9.1 b)** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response#paragraph-7-9-1-b))

1.0 General Concept for Community Facilities

1.1 Community facilities such as community centres, schools and colleges may be used to support the response to a nuclear emergency, primarily as Reception Centres, Evacuation Centres or as Monitoring and Decontamination Units (MDUs) for citizens temporarily displaced by the event or as Emergency Worker Centres and ERAMG field command posts for emergency workers responding to the event. In considering the impact a nuclear emergency may have on these community facilities, it is important to note the following:

a) A nuclear emergency is a very unlikely event;

b) Should an event occur, evacuation should take place well before the release of radiation to the atmosphere, thus radioactive contamination is unlikely; and

c) If monitoring and decontamination activities result in the contamination of community facilities, then:

   i. Contamination should be confined to limited areas.

   ii. Facilities shall be restored to pre-emergency condition as soon as possible.

2.0 Legislation

2.1 The Provincial Nuclear Emergency Response Plan (PNERP) is formulated by the Lieutenant Governor in Council (LGIC) pursuant to **Section 8** of the *Emergency Management and Civil Protection Act* (*EMCPA*) and, pursuant to **Section 3 (4),** Designated Municipalities shall also prepare emergency plans which address nuclear emergencies. These plans shall conform to the PNERP.

3.0 Declaring an Emergency

3.1 Whenever the PNERP has been or is to be activated, and the criteria for declaring an emergency has been met, the LGIC or Premier may declare an emergency in that area.

3.2 Under the EMCPA (**Section 7.0.1 (1)**), the LGIC or Premier can declare that an emergency exists in the province, or any part of it.

3.3 Similarly, the Head of Council of a Municipality can declare that an emergency exists in the Municipality, or any part of it (**Section 4.2** below).

3.4 The purpose of an emergency declaration is to enable both the province and Municipality to take any lawful actions considered necessary to protect public safety. Provincially, this power includes the ability to require a selected Municipality to provide assistance to an emergency area (even if it is not within the emergency area).

4.0 Provincial Nuclear Emergency Response Plan (PNERP)

4.1 Under the PNERP, certain community facilities, such as centres to assist evacuated persons, are essential for fulfilling the emergency response mandate. These facilities are normally established in large institutions such as community centres, schools or colleges.

4.2 Municipal Roles and Responsibilities

a) Designated Municipalities are those in the vicinity of a reactor facility, which have been designated under the *EMCPA*, and are required to address a nuclear emergency in its emergency response plan (**Paragraph 2.1** above).

b) The PNERP specifies designated municipal roles and responsibilities that must be addressed in their municipal nuclear emergency plans.

c) Nuclear emergency plans for Designated Host Municipalities shall include provisions for the reception, care and shelter of people and animals (**Sections 7.12**

(https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response#section-11) and **7.13** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response#section-12)) evacuated from their homes. Further, if the nature of the emergency is such that evacuees may have been exposed to a radioactive plume, these municipalities' plans must also include provisions for accommodating the monitoring and decontamination function. Designated Municipalities (i.e., those within the Detailed Planning Zones of reactor facilities) may also act in a host Municipality capacity either for their own citizens or for citizens of a neighbouring jurisdiction.

d) Support Municipalities may be specified by Emergency Order and may be responsible for providing support and assistance to Designated Municipalities (**Section 1.10.4**).

4.3 Reception Centres

a) Municipal nuclear emergency plans shall identify the location of facilities that will be used for the reception, care and initial shelter of evacuees.

b) Evacuee monitoring and decontamination may be accomplished either in a Reception Centre that receives evacuees immediately upon leaving the emergency area or, may be set up separately.

c) A Reception Centre is the first destination for evacuees. It is organized to perform many of the following functions:

i. registration and inquiry

ii. allocation to Evacuation Centres

iii. first-aid

iv. monitoring and decontamination (co-location optional)

d) Host Municipalities shall resource Reception Centres for the first three functions listed in **Paragraph 4.3 c)** above.

e) In the event of a nuclear emergency, reactor facilities in Ontario shall provide the equipment and trained staff to perform monitoring and decontamination activities (pursuant to federal licensing requirements to provide off-site assistance).

f) OFMEM shall co-ordinate with appropriate stakeholders to establish arrangements for off-site assistance as outlined in **Paragraph 4.3 e)** above for the Town of Amherstburg.

g) Municipal nuclear emergency plans shall identify the roles and functions fulfilled by emergency workers at Reception Centres and include provisions for the selection, staffing and resourcing of these facilities.

4.4 Evacuation Centres

a) Evacuation Centres are facilities set up by designated Host Municipalities to provide shelter, food, and other (e.g., family reunification and emergency social services) services to people who have been evacuated as a result of a nuclear emergency.

b) Municipal nuclear emergency plans shall identify the location of facilities that will be used for Evacuation Centres.

c) Municipal nuclear emergency plans shall identify the roles and functions fulfilled by emergency workers at Evacuation Centres and include provisions for the selection, staffing and resourcing of these facilities.

4.5 Emergency Worker Centres

a) Emergency Worker Centres are facilities set up to monitor and control exposure of emergency workers to radiation.

b) Emergency workers are those who perform emergency services in support of an emergency response. Emergency workers include:

   i. those 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

   ii. those who are required to provide response outside the affected areas

   iii. helpers who are registered with an authorized responding organization

   iv. police, firefighters, paramedic services, emergency social services workers, and other essential services

   v. nuclear energy workers are not included in the definition of emergency workers

c) Municipal nuclear emergency plans shall identify the location of facilities that will be used as Emergency Worker Centres. These locations should also be able to accommodate a command post for environmental monitoring operations of the Environmental Radiation and Assurance Monitoring Group (ERAMG).

d) Municipal nuclear emergency plans shall identify the roles and functions fulfilled by emergency workers at Emergency Worker Centres and include provisions for the

selection, staffing and resourcing of these facilities.

e) In the event of a nuclear emergency, reactor facilities (except Fermi 2) shall provide the equipment and trained staff to perform monitoring and decontamination activities (pursuant to federal licensing requirements to provide off-site assistance).

f) OFMEM shall co-ordinate with appropriate stakeholders to establish arrangements for off-site assistance as outlined in **Paragraph 4.5 e)** above for the Town of Amherstburg.

4.6 Monitoring and Decontamination

a) Nuclear Emergency

i. Reactor facilities in Ontario are responsible for monitoring and decontamination of both evacuees and emergency workers. They are responsible for providing core staff and resources, and for staff training.

ii. Similarly, once the emergency functions have ceased to be necessary, the Ontario reactor facility is responsible for restoring the monitoring and decontamination portion of any facility used, to its pre-emergency state.

iii. OFMEM shall co-ordinate with appropriate stakeholders to establish arrangements for monitoring and decontamination of both evacuees and emergency workers as outlined in **Paragraph i)** above for the Town of Amherstburg.

b) Radiological Emergency

i. MOHLTC is responsible for coordinating the setting up of facilities to monitor and decontaminate the public.

Annex C Public awareness and education

(Reference: Section 3.2.10)

1.0 Program Objective

1.1 The objective of a nuclear and radiological emergency public awareness and education program is to:

a) a)Ensure that emergency information is made available to everyone living and working within the Detailed Planning Zones of reactor facilities, including residents,

businesses and institutions, regarding the actions they should take to effectively protect themselves prior to, and in the event of, a nuclear emergency.

b) b)Support municipal efforts to ensure that emergency preparedness information about the various ingestion control measures that may be required in a nuclear emergency is made available to residents, businesses, institutions, and agricultural producers within the Ingestion Planning Zones of reactor facilities.

1.2 Ensure that the Ontario public is made aware of the planning and preparedness in place to respond to all types of nuclear and radiological emergencies.

2.0 Program Requirement

2.1 A public awareness and education program shall be implemented in Ontario for the areas surrounding each reactor facility (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)).

2.2 Public education programs shall be co-ordinated by the Office of the Fire Marshal & Emergency Management (OFMEM) in close coordination with reactor facilities, Designated Municipalities and other stakeholders as appropriate.

2.3 Nuclear emergency public awareness and education program messages shall conform to the objectives and requirements of the PNERP.

2.4 A nuclear emergency public awareness and education subcommittee shall be formed for each reactor facility. A single subcommittee may address both the Pickering and Darlington Nuclear Generating Stations.

2.5 The membership of the nuclear emergency public awareness and education subcommittee should include, but is not limited to representatives from:

a) the reactor facility operator

b) Designated Municipalities

c) Designated Host Municipalities

d) MOHLTC

e) OMAFRA

f) OFMEM

2.6 Nuclear emergency public awareness and education subcommittees shall meet regularly and report annually to the Nuclear Emergency Management Coordinating Committee.

2.7 The public awareness and education program for the area surrounding each reactor facility should be documented as a strategic plan with a supporting action plan and program objectives. This documentation should be reviewed annually and updated as required by the subcommittees.

2.8 These programs should ensure that key nuclear emergency public awareness and education messages reach designated recipients with a regular frequency of at least once per year.

2.9 Nuclear emergency public awareness and education program activities should be ongoing throughout the year, utilizing social media and other public alerting tools to promote awareness.

3.0 Responsibilities

3.1 Nuclear emergency public awareness and education programs shall be designed, delivered and reviewed through the subcommittee structure outlined in **Section 2.5** above.

3.2 Municipal nuclear emergency plans shall include provisions for partnership with the province and reactor facility operators in the development and delivery of education programs.

3.3 Reactor facilities, pursuant to federal licensing requirements for providing off-site assistance, shall form partnerships with the province and Designated Municipalities in the development and delivery of public awareness and education plans and programs.

4.0 Program Recipients

4.1 The nuclear public awareness and education program shall target the following audiences:

a) a)residents, businesses and institutions in the Detailed Planning Zone of the reactor facility

b) b)agricultural producers within the Ingestion Planning Zone of the reactor facility

c) c)other target audiences (e.g. vulnerable populations, commercial, industrial, institutional and recreational populations)

5.0 Program Content

5.1 Nuclear emergency public awareness and education programs shall emphasize that while it is unlikely that a nuclear emergency will occur in Ontario, being prepared in advance and knowing what actions to take will better protect the personal safety of Ontario residents.

5.2 Nuclear emergency public awareness and education programs shall provide sufficient information to the recipients to enable them to effectively protect themselves in a nuclear emergency. As a minimum, this shall include:

a) Information on the possible radiological and non-radiological hazards including short-term and potential long-term effects.

b) How they should prepare, what to expect and how to respond during a nuclear emergency.

c) Identification of the Detailed Planning and Ingestion Planning Zones around each reactor facility.

d) The methods by which the public will be notified of a nuclear emergency.

e) The protective actions the public could be advised to take in a nuclear emergency (e.g., shelter-in-place, evacuate, take KI pills).

f) Details on KI pill pre-distribution and availability during an emergency as well as the benefits, risks and usage instructions.

g) The various ingestion control measures that agricultural producers may be required to implement in a nuclear emergency.

h) Information on how the needs of vulnerable populations will be met.

i) Where and how to access additional information and advice about general emergency preparedness actions the public can take to prepare for all emergencies (e.g., emergency survival kit, public alerting).

6.0 Program Delivery

6.1 The delivery of the program shall, as far as practical, ensure that:

a) All those who should receive the information, do in fact receive it.

b) Information provided is in an easily understandable form that is readily accessible to all members of the public including online.

c) Information is provided in a form that is readily accessible when needed.

d) Information is updated at least annually.

e) Newcomers into the target area, transients, and residents who have misplaced the information, can obtain hard copies.

f) Periodic reminders of the information are issued.

7.0 Program Review

7.1 The effectiveness of the nuclear emergency public awareness and education program shall be reviewed and revisions made as necessary (e.g., to incorporate operating experience, changing needs or circumstances, and lessons learned from real events).

7.2 Nuclear emergency public awareness and education programs will identify a timeline by which the program's effectiveness review will be completed.

Monitoring the effectiveness of the public awareness and education programs may include:

a) surveys

b) public meetings

c) public forums

d) focus groups

Annex D Initial notification and response system for nuclear emergencies

[13]

(Reference: Paragraph 5.2.1)

1.0 Initial Notification

1.1 Initial notification for a nuclear emergency is defined as the notification made by the reactor facility to designated off-site authorities whenever an event occurs or conditions arise, which require such notification under the prescribed criteria.

1.2 In Ontario, the designated off-site authority is the PEOC Commander on behalf of the province.

1.3 Initial notifications are also made to the Designated Municipalities within the Detailed Planning Zone and Canadian Nuclear Safety Commission.

2.0 Purpose

The purpose of the initial notification and response system is:

a) To inform off-site authorities of the fact that a notifiable event or situation has occurred at the reactor facility, and

b) To provide an indication to all stakeholders as to the appropriate initial off-site response in the initial stage (**Paragraph 4.8** below) of an emergency.

3.0 Application

The specific initial notification criteria and provincial response level for each reactor facility is described in the applicable site-specific implementing plan to this PNERP.

4.0 System Outline

4.1 In accordance with federal law and regulations under which they operate, the reactor facility's nuclear emergency response plan shall include provisions to:

a) Notify off-site authorities of an accidental release or the imminence of an accidental release.

b) Describe how these events are determined and categorized.

c) Describe the immediate notification process.

4.2 A site-specific initial notification and response system has been developed, in consultation with each Ontario nuclear operator, to facilitate a timely emergency notification categorization which corresponds to initial provincial and municipal response actions.

4.3 Whenever any of the notification criteria, as presented in the implementing plans, require it, the reactor facility shall make a notification to the designated provincial and municipal contact points within 15 minutes of categorizing the event.

4.4 The notification message from the reactor facility shall include the notification category. Where more than one criterion are applicable, the **highest category** triggered shall be reported in the notification. The notification message shall **not** be delayed to permit an accurate assessment of the applicable category.

4.5 Within 15 minutes of the receipt of the notification, the PEOC Commander shall decide on the initial response level to be adopted. This level should normally be the one linked to the notification category received (as indicated in **Appendix 1** to this Annex) unless another level is judged to be more appropriate.

4.6 The PEOC shall notify the Designated Municipality and other organizations as appropriate, as to the level of initial response. Contiguous states and provinces shall only be notified of an Abnormal Incident notification or higher (**Section 5.0** below).

4.7 If during the initial stage **(Paragraph 4.8** below) of an emergency, the assessment of the on-site situation changes to warrant a different category than the one initially notified, the reactor facility shall immediately issue a change to the notification category to the designated provincial and municipal contact points.

4.8 The initial stage of an emergency is defined as the earlier of:

a) The first 4 hours after the initial notification, or

b) Once ongoing reporting by the reactor facility EOC to the Scientific Section of the PEOC is established.

4.9 The PEOC Commander can, at any time, direct that a change be made to the Provincial Response level.

4.10 Reactor facilities cannot terminate or cancel a nuclear emergency notification once an initial notification has been made.

4.11 The PEOC Commander may terminate the nuclear emergency off-site response when appropriate and notify all stakeholders. At that time, any notifications made by the reactor facility shall lapse.

5.0 Ontario Notification Categories and Associated Response

5.1 The triggering criteria for the notification categories used by the reactor facilities are given in the relevant implementing plans. The notification category and default **initial** off-site response for each is given in **Appendix 1** to this Annex.

5.2 Reportable Event:

a) An event affecting the reactor facility which would be of concern to the off-site authorities responsible for public safety.

b) Provincial and municipal duty staff should respond as per routine monitoring.

5.3 Abnormal Incident:

a) An abnormal occurrence at the reactor facility which may have a significant cause, and/or may lead to more serious consequences.

b) Provincial and municipal emergency response staff should respond as per enhanced monitoring and monitor the situation from their respective emergency operations centres. Other provincial and municipal staff are notified to remain available to report for duty.

5.4 On-site Emergency:

a) A serious malfunction which results or may result in an atmospheric release of radioactive material or is likely to result in a release at a later time.

b) Provincial and municipal emergency response staff and emergency operation centres shall respond as per partial or full activation depending on the absence or presence of an ongoing or imminent release.

c) Municipal off-site centres shall be set up, then staffed as required.

d) The EIC, UTCC and municipal off-site centres shall be set up and staffed.

5.5 General Emergency:

a) An ongoing or imminent atmospheric release of radioactive material as a result of a more severe accident.

b) Response plans and organizations shall be fully activated and, if necessary, appropriate default protective measures are taken, as described in the applicable Implementing Plan. Full Activation.

6.0 USA Notification Categories and Associated Response

6.1 Unusual Event; criteria and response are as per Reportable Event **Section 5.2** above.

6.2 Alert; criteria and response are as per Abnormal Incident **Section 5.3** above.

6.3 Site Area Emergency; criteria and response are as per On-Site Emergency **Section 5.4** above.

6.4 General Emergency; criteria and response are as per General Emergency **Section 5.5** above.

7.0 Implementation of Notification and Response System

The Fire Marshal and Chief, Emergency Management, shall issue any detailed instructions necessary in order to ensure that this notification and response system is effectively implemented. The provincial response provisions of this system shall be reflected in the emergency plans and procedures of the organizations with responsibilities under this plan (**Annex I** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-i-responsibilities-organizations)).

Appendix 1 Initial provincial and municipal response levels

Response Level (and associated nNotification category)	**Provincial response**	**Municipal response**	**Emergency information / Emergency bulletin / Public alerting**
ROUTINE MONITORING (Reportable / unusual event)	1. Provincial Emergency Operations Centre (PEOC) informs Municipality (and others) of	Emergency response (ER) staff remains in touch with the PEOC, and monitors event.	If and when appropriate, the PEOC co-ordinates the issuance of news release(s).

Response Level (and associated nNotification category)	Provincial response	Municipal response	Emergency information / Emergency bulletin / Public alerting
	level of response to be adopted. 2. PEOC monitors event. 3. Scientific staff consulted, if appropriate.		
ENHANCED MONITORING (abnormal incident / alert)	1. PEOC informs Municipality (and others) of level of response to be adopted. 2. PEOC monitors event. 3. Scientific staff present in PEOC (ERAMG on standby). 4. Provincial EIS will co-ordinate news release, as appropriate.	ER staff monitor event, preferably from Municipal Emergency Operations Centre.	If and when appropriate, PEOC co-ordinates the issuance of news release(s).

Response Level (and associated nNotification category)	Provincial response	Municipal response	Emergency information / Emergency bulletin / Public alerting
PARTIAL ACTIVATION (On-site/site area emergency with no ongoing or imminent release)	1. PEOC issues notification informing municipalities and others, of level of response. 2. PEOC is fully staffed and monitors event. 3. Provincial EIS set up and staffed. 4. Ministry EOCs and Unified Transportation Coordination Centre (UTCC) set up and staffed as appropriate.	1. Issue notification placing municipal ER organization on standby. 2. Municipal EOC, EIC, and UTCC fully staffed and operational. 3. Other emergency centres readied to become operational without undue delay.	1. PEOC considers need to issue emergency bulletins. 2. Provincial Emergency Information Section issues news release as soon as feasible. 3. Follow-up news releases issued as and when appropriate.
FULL ACTIVATION (On-site/site area	1. PEOC issues notification activating	1. Issue notification activating	1. If and when appropriate, PEOC

Response Level (and associated nNotification category)	Provincial response	Municipal response	Emergency information / Emergency bulletin / Public alerting
emergency with ongoing or imminent release or a General emergency)	nuclear emergencyresponse plans and organization. 2. PEOC is fully staffed and monitors event. 3. Provincial EIS set up and fully staffed. 4. Ministry EOCs, and UTCC set up and fully staffed 5. Immediate protective measures ordered, as appropriate.	municipal ER organization. 2. Municipal EOC, EIC, UTCC and other centres activated and fully staffed and operational. 3. Implement protective measures, if ordered by PEOC.	directs initiation of public alerting. 2. Municipality initiates public alerting if so directed, or if necessary. 3. PEOC issues emergency bulletin. 4. Immediate news release issued by the Provincial Emergency Information Section.

Annex E Intervention levels

(Reference:Paragraph 4.8.8)

1.0 Generic Criteria

1.1 Generic Criteria (GC) are used in the early stages of an emergency, prior to the availability of actual radiation monitoring data, when technical staff in the PEOC Scientific Section undertake dose projection modelling. Generic Criteria values are calculated to reduce the risk of stochastic effects and are expressed in terms of equivalent dose and effective dose.

1.2 Generic Criteria are compared against the dose projections modelled in order to determine the need for implementation of protective measures for the purposes of:

a) Exposure control

b) Ingestion control

c) Population monitoring and medical management

d) Trade control of foodstuff and other commodities

e) Transitioning to existing exposure situation[14]

f) Emergency workers and helpers

2.0 Operational Intervention Levels

Operational Intervention Levels (OILs) are used once radiation monitoring data is available to determine the need to implement protective measures. OILs are classified as follows:

a) Ground Monitoring OILs are used to identify areas (beyond those for response actions that have been taken based on the emergency classification) where the ground deposition of radioactive material warrants protection of the public frequenting or living in the area and restriction of consumption, distribution or sale of food.

b) Skin Monitoring (gamma and beta) OILs are used to identify individuals with enough radioactive material on the skin to warrant response actions (such as decontamination). Only the public being evacuated or relocated is expected to possibly have sufficient radioactive material on the skin to warrant response actions, but OILs may be used with other members of the public as well.

c) Food, Milk and Drinking Water OILs are used to confirm and adjust initial restrictions on food, milk and drinking water restrictions that were enacted based on OIL 2.

d) Thyroid Monitoring OILs are used to identify individuals warranting registration and medical follow-up due to the intake of radioiodine (i.e., evacuated public or those that

ingested local produce, country foods[15], milk or rainwater etc.) in areas exceeding OIL 2. These may be used with members of the public as well.

Appendix 1 Generic criteria

Protective Action Strategy	Projected Dose	Protective Actions
Exposure Control Measures	50 mSv (5 rem) in the first 7 days (H_T[16])	Iodine Thyroid Blocking
	10 mSv (1 rem) in the first 2 days (E[17])	Sheltering
	100 mSv (10 rem) in the first 7 days (E)	Evacuation
Population Monitoring and Medical Management	100 mSv (10 rem) in one month (E)	Medical follow-up (health screening)

Protective Action Strategy	Projected Dose	Protective Actions
Ingestion Control Measures	1 mSv (100 mrem) per year for ingestion of any one of the food/beverage categories (E)	Restriction of distribution and ingestion of potentially contaminated: • Drinking water • Milk • Other foodstuffs and beverages
Trade Control of Foodstuff and Other Commodities	1 mSv (100 mrem) / year (E)	International trade restrictions on non-essential items
Vehicles, Equipment and Other Items	10 mSv (1 rem) per year (E)	Restriction of use for non-essential vehicles, equipment and other items from affected area.
Transitioning to existing exposure situation	20 mSv per year[18] (E)	Target dose to enable transition to existing situation.

Protective Action Strategy	Projected Dose	Protective Actions
Emergency Workers and Helpers	50 mSv (5 rem) over the duration of the response. Value may be exceeded voluntarily.	Restriction of activities for individual emergency workers and helpers.

Appendix 2 Operational Intervention Levels (OILs)

1.0 Ground monitoring

OIL	When	Ambient Dose Rate 1 m above ground	Protective Action Strategy	If OIL is exceeded and response action has been taken, proceed to:	If OIL is NOT exceeded, proceed to:

1	Intermediate Phase (within 24 hours following the end of the release)	(1000 µSv/hr)	Evacuation [19] IF safe to do so, and ITB, IF directed by MOHLTC (CMOH)	-Registration -Skin Monitoring (OIL 5a and 5b) -Thyroid Monitoring (OIL 8) -Decontam -Medical Screening	Adjust food, milk and drinking water restrictions as per OILs 5, 6 and 7.
2	Intermediate Phase (within 24 hours following the end of the release)	1 µSv/hr	Ingestion control	-Estimate dose from all pathways to determine if medical follow-up is necessary	
3	Intermediate Phase	100 µSv/hr for first 10 days after	Temporary Relocation	-Registration -Temporary Relocation	

	(0 – 10 days)	reactor shutdown		within a month -estimate dose from all pathways to determine if medical follow-up is necessary	
	Intermediate Phase/ Recovery Phases (10+ days to months)	25 µSv/hr later than 10 days after reactor shutdown or for spent fuel	Temporary Relocation		

2.0 Skin Monitoring – Gamma and Beta

Complex table with 6 columns and 3 rows, including a header row. The final two columns merge the two data rows into single cells below each header.

OIL	**When**	**Measurement**	**Protective Action Strategy**	**If OIL is exceeded and response action has been taken, proceed to:**	**If OIL is NOT exceeded, proceed to:**

4a	Intermediate Phase	Ambient dose rate, 10 cm from bare skin of hand or face * : 1 μSv/hr above background	Decontamination	-Registration -Additional Decon -Thyroid Monitoring (OIL 8) -Decon -Medical Screening -ITB, if advised by MOHLTC -estimate dose to determine if medical follow-up is necessary	OIL 8
4b	Intermediate Phase	Beta count rate, 2 cm from bare skin of hand or face * : 1000 cps	Decontamination		

* Measurement must be conducted in an area with a background of < 0.5 μSv/hr.

3.0 Food, Milk and Drinking Water Samples

OIL	When	Foodstuff Category	Gross Alpha (α) Activity	Gross Beta (β) Activity	Protective Action Strategy	If OIL is exceeded and response action has been taken, proceed to:	If OIL is NOT exceeded, proceed to:
5*	Intermediate Phase	Drinking Water (Tap)	1 (Bq)/L	10 (Bq)/L	Ingestion control -Restriction of distribution and sale of potentially contaminated drinking water, milk and other foodstuffs and beverages	OIL 6 and/or OIL 7 AND -restrict consumption, distribution and sale -estimate dose from all exposure pathways	No further restrictions
		Milk	1 (Bq)/kg	30 (Bq)/kg			
		Other	3 (Bq	30			

		Foodstuffs and beverages	)/kg	(Bq)/kg		to determine if medical follow-up is necessary	

* OIL 5 is intended to be used as a rapid screening tool in the field. In certain circumstances, it may be desirable to proceed directly from OIL 2 to OIL 6.

OIL	**When**	**Activity Concentration**	**Protective Action Strategy**	**If OIL for EITHER marker is exceeded and response action has been taken, proceed to:**	**If OIL is NOT exceeded, proceed to:**

6	Intermediate Phase	1000 (Bq)/kg of I-131 200 (Bq)/kg of Cs-137 NOTE: both 1-131 and Cs-137 must be assayed	- Ingestion control -Restriction of distribution and sale of potentially contaminated drinking water, milk and other foodstuffs and beverages	OIL 7 AND -restrict consumption, distribution and sale -estimate dose from all exposure pathways to determine if medical follow-up is necessary	No further restrictions

OIL of 7 for all the rows. Columns 2-6 contain no merged cells.">

OIL	**Radionuclide ***	**Symbol**	**Drinking water ((Bq)/L)**	**Milk ((Bq)/kg)**	**Other Foodstuffs and Beverages ((Bq)/kg)**
7	Strontium-89	^{89}Sr	300	300	1000
	Strontium-90	^{90}Sr	30	30	100

OIL	Radionuclide *	Symbol	Drinking water ((Bq)/L)	Milk ((Bq)/kg)	Other Foodstuffs and Beverages ((Bq)/kg)
	Ruthenium-103	^{103}Ru	1000	1000	1000
	Ruthenium-106	^{106}Ru	100	100	100
	Iodine-131	^{131}I	100	100	100
	Cesium-134	^{134}Cs	100	300	1000
	Cesium-137	^{137}Cs	100	300	1000
	Plutonium-238	^{238}Pu	1	1	3

OIL	Radionuclide *	Symbol	Drinking water ((Bq)/L)	Milk ((Bq)/kg)	Other Foodstuffs and Beverages ((Bq)/kg)
	Plutonium-239	^{239}Pu	1	1	3
	Plutonium-240	^{240}Pu	1	1	3
	Plutonium-242	^{242}Pu	1	1	3
	Americium-241	^{241}Pu	1	1	10

* The radionuclides included here are those which have biological and radiological properties which make them generally expected to provide the most significant dose from the ingestion of drinking water, milk and other foods and beverages following a nuclear emergency.

4.0 Thyroid Monitoring

OIL	When	Measurement	Protective Action Strategy	If OIL is exceeded and response action has been taken, proceed to:	If OIL is NOT exceeded, proceed to:
8	Intermediate Phase	Ambient Dose rate, 1 cm from skin: 2x to 10x background*	Population monitoring and medical management Decontamination	-Registration -ITB, to further reduce uptake if not already taken, AND if directed to do so by MOHLTC (CMOH) -medical screening -estimate dose from all exposure pathways	Registration and record of dose

* Must be measured post-decontamination

Annex F Population monitoring

(Reference: Section 7.12.3

1.0 Applicability

This strategy applies to the personal monitoring of members of the public during the response to a nuclear or radiological emergency where contamination has occurred.

2.0 General

2.1 Personal monitoring refers to the use of radiation monitoring devices to assess whether or not persons and their belongings, including vehicles, are contaminated with radioactive material, and if contaminated, the type and level of contamination.

2.2 This contamination could be caused by radioactive material released from a reactor facility accident, or as a result of some radiological incidents.

2.3 Certain reactor facilities have a filtered air discharge system (FADS) through which post-accident releases are routed. If the FADS function as designed, the amount of contamination off-site would be very limited, possibly even negligible.

2.4 Personal monitoring of members of the public, when required, can be conducted at a Monitoring and Decontamination Unit (MDU).

3.0 Responsibilities

3.1 Provincial Emergency Operations Centre (PEOC)

a) The PEOC Commander shall issue directions regarding the need for personal monitoring as appropriate per **Section 4.0** below.

b) Evacuees should be directed to either undertake personal decontamination or, to report to an MDU for this purpose.

3.2 Designated Host Municipality

a) Designated Host Municipalities shall be responsible for arranging the necessary space and facilities for the accommodation of a Monitoring and Decontamination Unit (MDU).

b) Where MDUs are located within Reception Centres, municipal nuclear emergency plans shall include provisions to ensure:

i. That the Reception Centre procedures and the MDU procedures are co-ordinated to ensure effective and expeditious processing of evacuees; and

ii. Municipal appointment of a Manager of the Reception Centre who shall, during an emergency, have overall responsibility for the efficient functioning of the Reception Centre.

3.3 MOHLTC and Reactor Facilities

a) The MOHLTC Radiation Health Response Plan describes the scenarios in which the setting up of personal monitoring and decontamination systems should be

considered in the event of a radiological emergency.

b) The reactor facility is responsible for setting up a personal monitoring and decontamination system in the event of a nuclear emergency.
Note: OFMEM shall co-ordinate with appropriate stakeholders, to establish arrangements for monitoring and decontamination for the Town of Amherstburg, for a nuclear emergency at the Fermi 2 nuclear station.

c) Emergency plans of the above organizations shall:

i. Be co-ordinated to ensure compatibility and mutual support.

ii. Ensure that a personal monitoring and decontamination system meets the requirements specified in this annex.

iii. Ensure that adequate resources are in place to monitor and decontaminate the affected population, as far as practical; and

iv. Ensure that adequate resources are in place to undertake monitoring and decontamination of the facility housing the MDU.

4.0 Selection of Evacuees for Monitoring

4.1 The guidance below may be used to select which evacuees should be monitored for contamination.

4.2 Evacuees should not be directed to report to an MDU for monitoring and decontamination if it is estimated that the evacuees can exit the affected area before a release occurs.

4.3 Evacuees may be directed to report to a MDU for monitoring and decontamination if they are unable to exit the affected area before a release occurs:

a) In the case of a filtered release, evacuees from affected sectors in the Automatic Action Zone and DPZ inner ring should be directed to report to an MDU. Evacuees from affected sectors in the DPZ outer ring should be instructed how to conduct basic self-decontamination of their bodies, equipment and vehicles after evacuating.

b) In the case of an unfiltered release, evacuees from all affected sectors should be directed to report to an MDU, if available. Otherwise evacuees should be instructed how to conduct basic self-decontamination as per a) above. Follow-up monitoring should be provided in accordance with the RHRP.

5.0 Special Cases

5.1 Motorists travelling through the affected area and exposed to a release may be directed (through appropriate broadcasts and social media) to report for monitoring.

5.2 Any train passing through the affected area and exposed to a release may be directed to stop at an appropriate station to enable monitoring of passengers.

5.3 Marine craft in the affected area shall be treated on the same basis as evacuees under **Section 4.3** above. When required, marine craft may be directed to report to an appropriate harbour or landing for monitoring.

5.4 When MDUs are not available or, where the population density is such that all evacuees could not be processed in a reasonable amount of time, evacuees should be directed to proceed to a destination of their choosing and self-decontaminate.

5.5 The PEOC Commander shall advise the federal Government Operations Centre (GOC) of any known or potential impacts to marine, air and rail travel.

Annex G Venting of containment during nuclear emergencies

(Reference: Section 7.11)

1.0 General

1.1 The considerations herein are applicable to the venting of radioactive material from the containment systems at the Pickering, Bruce and Darlington nuclear stations, following an On-site Emergency or General Emergency notification.

1.2 The Pickering, Bruce and Darlington Nuclear Generating Stations are equipped with sub-atmospheric containment systems designed to hold up, for some time, radioactive material released from failed nuclear fuel in an accident.

1.3 In some reactor accident scenarios, released radioactive materials may be drawn into the vacuum building. The nominal venting strategy approved by the CNSC and followed by these nuclear stations, is to commence venting through the filtered air discharge system shortly before the vacuum building repressurizes to atmospheric pressure, and to continue venting at a rate just sufficient to keep containment sub-atmospheric.

1.4 In other accident scenarios, the vacuum building may not necessarily be activated. Any released radioactivity will be confined to other parts of the containment system, and vented through other exhaust systems, such as the contaminated exhaust stack, which contains equipment capable of removing most of the radioactive materials from the exhaust.

2.0 Aim of Venting Strategy

2.1 The ability to control (within certain limits) the venting of radioactivity from containment systems within a venting window could be useful to allow prior implementation of protective actions before the release takes place.

2.2 Any decision to use an alternate venting strategy (i.e., other than the nominal venting strategy outlined in **Paragraph 1.3** above) should be taken only after consultation among the province, CNSC, Health Canada, the reactor facility and affected municipalities.

3.0 Containment Venting Responsibilities

3.1 Reactor facility emergency response plans shall specify that:

a) A designated person with the authority for venting is on-site at all times.

b) The PEOC Commander is consulted before undertaking any venting activity, unless venting must be performed in an urgent manner to protect the structural integrity of containment.

c) Time estimates of when venting will be required are reported to the province.

d) If venting must be performed in an urgent manner to protect the structural integrity of containment, the reactor facility shall inform the PEOC Commander, as early as possible.

3.2 The PEOC Commander, as operational lead for the off-site response (**Section 5.6**) should initiate the following ancillary measures as appropriate:

a) Institute the appropriate protective measures in any populated area before venting is carried out which could affect that area. The population in this area, as well as the community/municipal Emergency Response Organization, must also be notified in advance of such venting.

b) Notify and restrict air traffic, marine traffic and boaters on the adjacent Great Lake before venting initiated.

c) Confirm through the federal liaison officers in the PEOC that the Federal Government has consulted with the affected jurisdictions in the United States of America (USA) before venting is initiated.

3.3 The Federal Government (i.e., Health Canada) shall consult with the affected jurisdictions in the USA before venting is initiated, as appropriate.

3.4 Nuclear emergency response plans of stakeholders in **Paragraph 2.2** above should identify how venting decisions are established, documented, approved, and communicated.

Annex H Emergency worker safety

(Reference:Section 4.9.4)

Appendix 1 Guidelines for assigning sector safety status

Sector Status Colour	Dose Rate
Green	Up to 1 μSv/h or Up to 0.1 mrem/h
Yellow	1 μSv/h - 25 μSv/h or 0.1 mrem/h – 2.5 mrem/h
Orange	25 μSv/h - 1000 μSv/h or 2.5 mrem/h – 100 mrem/h
Red	>1000 μSv/h or > 100 mrem/h

Appendix 2 Precautionary measures for each safety status

Safety status	Precautionary measures for emergency workers and helpers
Green	No precautions necessary. No limit on stay period.
Yellow	Restriction of drinking water, milk and other foodstuffs and beverages.
Orange	a) Pregnant workers shall not enter the sector. b) Report to the Emergency Worker Centre (EWC) before entering the sector. c) Carry personal monitoring devices and observe all precautions prescribed by the EWC. d) Dosimetersshould be checked every hour. Exit from the sector if the reading reaches 40 mSv (4rem), or any lower personal limit prescribed by the EWC. e) If duties permit, remain under shelter or inside a vehicle. If working outside, wear an outer garment such as a plastic raincoat. f) Stay in the sector shall be limited to 4 hours, or the time prescribed by the EWC. g) Report again to the EWC on leaving the sector.
Red	a) Pregnant emergency workers and helpers shall not enter the sector. b) Report to the Emergency Worker Centre (EWC) before entering

Safety status	Precautionary measures for emergency workers and helpers
	the sector. c) Enter the sector accompanied by a qualified escort provided by the reactor facility and shall carry personal monitoring devices. They shall observe any precautions prescribed by the EWC. d) Dosimetersshould be checked every 30 minutes. Exit from the sector if the reading reaches 40 mSv (4 rem), or any lower personal limit prescribed by the EWC. e) If duties permit, remain under shelter or inside a vehicle. If working outside, wear an outer garment such as a plastic raincoat. f) Stay in the sector shall be limited to one hour, or the time prescribed by the EWC. g) Report again to the EWC on leaving the sector.

Appendix 3 Dose limits for off site emergency workers and helpers

DEFAULT Effective Dose limit during emergency for non-licensee Off-site Emergency Workers and Helpers	**VOLUNTARY* Effective Dose Limit for non-licensee Off-site Emergency Workers and Helpers**
50 mSv (5 rem) over the duration of the response.	100 mSv (10 rem) over the duration of the response.

*Voluntary requires documented informed consent.

(Source: Health Canada, *Canadian Guidelines for Protective Actions during a Nuclear Emergency* (Draft 2016))

Annex I Responsibilities of organizations

(Reference:Section 1.6)

Responsibilities of organizations for nuclear and radiological emergency response and for the purposes of implementing this plan are designated in the following appendixes:

Provincial Responsibilities

Appendix 1 Minister of Agriculture, Food and Rural Affairs

Appendix 2 The Attorney General

Appendix 3 Minister of Community and Social Services

Appendix 4 Minister of Community Safety and Correctional Services

Appendix 5 Minister of Energy

Appendix 6 Minister of the Environment and Climate Change

Appendix 7 Minister of Health and Long-Term Care

Appendix 8 Minister of Labour

Appendix 9 Minister of Municipal Affairs

Appendix 10 Minister of Natural Resource and Forestry

Appendix 11 Minister of Northern Development and Mines

Appendix 12 Minister of Transportation

Reactor Facilities and Municipalities Responsibilities

Appendix 13 Reactor Facilities

Appendix 14 Nuclear Establishments

Appendix 15 Designated Municipalities

Appendix 16 Designated Host Municipalities

Federal Responsibilities

Appendix 17 Health Canada

Appendix 18 Canadian Nuclear Safety Commission

Appendix 1 Minister of Agriculture Food and Rural Affairs

The Minister, having the support of the Ministry of Agriculture, Food and Rural Affairs, has formulated an emergency plan pursuant to **Section 6** of the EMCPA, R.S.O. 1990, c. E. 9, as amended, and it associated Order in Council, O.C. 1492/2005. To the extent that the circumstances in a nuclear emergency may permit, the Ministry shall endeavour to:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Assist in the development and implementation of a public awareness and education program for farmers and food processors prior to a nuclear emergency.
3. Prepare plans together with the Canadian Food Inspection Agency (CFIA) to provide information and advice to farmers and food processors in the Detailed Planning Zone of each reactor facility (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) for the initial stages of an emergency prior to the same. This includes the preparation of advisories covering different situations.
4. Before a nuclear emergency, plan and prepare ingestion control measures in the Detailed Planning Zone of each reactor facility as a protective measure to minimize the radiation hazard (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)). This should include arrangements for clearing milk storages of dairy farms in the Detailed Planning Zone at the first practicable opportunity following a nuclear emergency.
5. Before a nuclear emergency, participate in the preparation of plans and procedures for Environmental Radiation and Assurance Monitoring for nuclear and radiological emergencies.
6. Before a nuclear emergency, prepare operating procedures for the Ministry Action Group, and making necessary organizational and administrative arrangements to enable it to execute its functions.

7. Before a nuclear emergency, maintain an information database relating to agricultural and food facilities, producers, marketing organizations, etc. for use in nuclear and radiological emergency planning and management. The nuclear data shall be organized to allow access to information for the Detailed Planning Zone and each sub zone of the Ingestion Planning Zone around each reactor facility (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)).

Provision of Personnel

8. Provide suitable Ministry personnel for staffing various positions in the province's emergency management organization, including the Environmental Radiation and Assurance Monitoring Group.
9. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

10. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
11. Act as the main Ministry through which food (excluding water) ingestion control operations shall be conducted by the PEOC at the first practicable occasion during a nuclear emergency.
12. Establish a Ministry Action Group to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
13. Execute a sampling program and other assigned actions required under the ERAMG plan at the first practicable occasion during a nuclear emergency.

14. Liaise with Agriculture and Agri-Food Canada and CFIA at the first practicable occasion following a nuclear emergency to assist in securing agricultural commodities, such as animal feed to affected areas.
15. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

16. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
17. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 2 The Attorney General Ministry of the Attorney General (MAG)

In the event of a provincial nuclear emergency, the Minister, together with the Ministry and its agencies, boards and commissions, shall execute its emergency response plan and shall have the following responsibilities consistent with the responsibilities under the *Ministry of the Attorney General Act* and its specifically assigned OIC responsibilities issued pursuant to the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Ensure that the administration of Ontario's public affairs is in accordance with the law.
3. Superintend all Government legislative matters.
4. Ensure the administration of the courts in partnership with the constitutionally independent judiciary and superintend all matters connected with judicial offices.

Provision of Personnel

5. Support the Attorney General's mandate and role as Chief Law Officer of the Crown and member of the Cabinet Committee on Emergency Management.

6. Conduct all Provincial Crown prosecutions.
7. Conduct and regulate all litigation for and against the Crown or any provincial ministry or agency of Government in respect of any subject within the authority or jurisdiction of the Legislature.
8. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

9. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
10. Advise Government upon all matters of law referred to it including the constitutionality and legality of emergency response emergency issues.
11. Represent the personal and property rights and obligations of children in the civil justice system.
12. Provide court-based assistance services to the most vulnerable victims and witnesses of crime.
13. Provide guardianship services to vulnerable and incapable adults.
14. Provide legislative drafting services to Ministers of the Crown, Members of the Legislature and applicants for private bills and drafting services for regulations.
15. Co-ordinate the response to legal issues that arise.
16. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

17. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
18. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 3 Minister of Community and Social Services

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Ensure that any 24/7 institutions operated by the Ministry and lying within the Detailed Planning Zone of designated reactor facilities (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) have plans for implementing the various protective measures.
3. Liaise with non-governmental emergency social service organizations, including the Canadian Red Cross Society, on their role in a nuclear and radiological emergency.
4. Prepare operating procedures for the Ministry Action Group, and make the necessary organizational and administrative arrangements for the establishment of the Ministry Action Group to enable it to execute its functions.

Provision of Personnel

5. Provide Ministry representatives, when requested, to assist in relevant operations in the PEOC.
6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. Activate the Ministry Emergency Operations Centre (MEOC) and its associated processes, including, activating the Ministry Action Group to direct and co-ordinate provincial ministry action, and engaging in the appropriate notification and communication protocols.
9. Liaise, as required, between the PEOC and non-governmental emergency social service organizations, including the Canadian Red Cross Society, in the delivery of emergency social services.
10. Assist affected municipalities in the delivery of emergency social services, including emergency shelter, food and clothing, registration and inquiry and personal services when their capacity is exceeded and a provincial response is required.
11. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

12. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
13. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 4 Minister of Community Safety and Correctional Services

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the EMCPA.

1.0 The Office of the Fire Marshal and Emergency Management (OFMEM) shall:

1.1 Preparedness

a) Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

b) Review the PNERP at least every 5 years.

c) Administer the PNERP and oversee its implementation.

d) Monitor, co-ordinate and assist in the development of the nuclear emergency response programs of provincial ministries (and agencies, boards and commissions), nuclear facilities and designated and host municipalities.

e) Issue, or arrange for the issuance of, procedures and other documents needed to ensure effective implementation of the PNERP.

f) Ensure the establishment of an adequate alerting, notification and response system for nuclear emergencies.

g) Liaise with MOHLTC to develop and maintain a strategy for the distribution of KI pills within the IPZ as necessary during an emergency.

h) Ensure that the infrastructure required to implement the PNERP is available and is kept in operational readiness.

i) Ensure that the planning database required to implement the PNERP is available and is kept up-to-date.

j) Monitor and assess the operational readiness and effectiveness of all elements of the Emergency Response Organization, including those of municipalities, provincial ministries and agencies, nuclear facilities and facility operators, and make recommendations for improvement, where necessary.

k) Co-ordinate the development and implementation of the public awareness and education program for populations likely to be affected by a nuclear emergency.

l) Ensure the continuity of government services through the Continuity of Operations Program (COOP) which requires ministries to develop Plans to ensure the delivery of time-critical and non-time-critical services to the public.

m) Review the ongoing maintenance and progress of ministries' COOP development including incorporating lessons learned from exercise participation.

n) Ensure the Divisions and Branches of the Ministry of Community Safety and Correctional Services co-ordinate and make plans, and preparations for implementing any protective measure ordered during a nuclear emergency in any of its facilities or operations situated inside the Detailed Planning Zone of a reactor facility (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) and for those that may be affected by a radiological emergency.

o) Ensure suitable provincial ministry representatives are recommended to fill required positions in the emergency management organization.

1.2 Response

a) Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

b) Ensure that the PEOC co-ordinates and supports the response to a nuclear or radiological emergency. Provide recommendations to the government regarding declaration and termination of an emergency.

c) Co-ordinate with Ministries through the PEOC to ensure continuity of provincial government services through the implementation of Ministry Continuity of Operations Plans.

d) Provide information to CCEM and Cabinet Office regarding the provincial activities related to emergency response and continuity of government services during an emergency.

e) Work with Ministry Emergency Operations Centres to assist in the emergency response and continuity of government services.

f) Activate the MCSCS Ministry Emergency Operations Centre to implement and monitor Ministry-level nuclear response activities.

g) Channel emergency information for public release through the Provincial Emergency Information Section.

1.3 Provision of Personnel

Provide administrative support and a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

1.4 Study and Research

a) Arrange, through the NEMCC structure, for studies and research to be carried out in the area of nuclear emergency effects, planning, management and response.

b) Remain abreast of the "state of the art and science" in this area.

1.5 Training and Exercises

a) Prepare and issue a training and exercise program for the emergency management organization.

b) Conduct the assigned training and exercises as required under the program (including for nuclear and radiological emergencies).

c) Monitor and assess the training of the emergency management organization.

d) Co-ordinate the participation of the MCSCS Ministry Action Group (MAG) primary and alternate members in all required nuclear and radiological emergency training and exercises.

e) Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.

f) OFMEM staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

2.0 Ontario Provincial Police (OPP) shall:

2.1 Preparedness

a) Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

b) Ensure that it maintains appropriate plans and preparations to execute its operational role in a nuclear emergency, including participation in the development of Unified Transportation Management Plans.

2.2 Response

Ensure the provision of assistance and resources in support of the emergency response, and as required by Unified Transportation Management Plans made under this Plan.

2.3 Training & Exercises

a) Ensure participation by all required staff in nuclear and radiological emergency training and exercises.

b) OPP staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

3.0 On behalf of the Ministry or the Province, Communications Branch shall:

3.1 Preparedness

a) Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

b) Develop and maintain a Provincial Emergency Information Plan.

c) Develop plans and procedures to ensure the co-ordination of emergency information from ministries and other stakeholders.

d) Assist Designated Municipalities in the co-ordination of emergency information in the event of a nuclear emergency.

e) Develop plans and procedures to assist any Municipality that may have to respond to a radiological emergency to co-ordinate emergency information.

3.2 Response

a) Direct and support emergency information activities in the PEOC during a nuclear or radiological emergency.

b) Ensure that all provincial ministry emergency information is co-ordinated during an emergency response.

c) Ensure, as far as possible, the coordination of emergency information being released by all jurisdictional levels involved in the emergency response.

d) Assist municipalities in their emergency information operations during an emergency response to help ensure that all emergency information is being handled in a timely, consistent and accurate manner.

e) Establish a Provincial Emergency Information Section to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion following a nuclear emergency.

3.3 Training & Exercises

a) Ensure participation by all required staff in nuclear and radiological emergency training and exercises.

b) Communications Branch staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP

Appendix 5 Minister of Energy

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Assist the Ministry of Community Safety and Correctional Services in ensuring that the corporate head offices of designated reactor facilities (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) execute their responsibilities under this plan (**Annex I, Appendix 13**).
3. Ensure that the Ontario Electricity Emergency Plan is consistent with the PNERP. This shall be done through the Independent Electricity Systems Operator, which shall co-ordinate the preparation and implementation of electricity emergency plans, to mitigate the impact of a nuclear emergency on the reliability of the bulk electricity system.

4. Develop operating procedures for the Ministry Action Group aligned with the PEOC's notification protocol to ensure that the Minister of Energy is kept fully informed of all aspects of the provincial response to a nuclear emergency, including the actions being taken by the operator of the reactor facility, the CNSC, OFMEM, and others to ensure public health and safety.

Provision of Personnel

5. Provide suitable Ministry representatives to serve in the Operations Section of the PEOC. If requested, also provide suitable Ministry personnel for staffing positions in the province's emergency management organization.
6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. Establish a Ministry Action Group to direct and co-ordinate Ministry actions consistent with those of the PEOC, to provide advice to the PEOC, and to keep the Minister informed of emergency information on a regular and timely basis.
9. Maintain liaison with the Independent Electricity Systems Operator as required to address matters affecting electricity supply.
10. Respond to specific requests from the Ministry of Community Safety and Correctional Services in the course of meeting Ministry of Energy (ENERGY) Order in Council specified responsibility as a result of an emergency at a nuclear generating station.
11. Channelemergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

12. Participate in nuclear and radiological emergency training and exercises that simulate impacts on electricity supply.
13. Ministry staff nominated to various elements of the emergency management organization shall participate in the associated training.
14. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
15. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 6 Minister of the Environment and Climate Change

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Prepare and maintain an Annex to the Ministry's Emergency Response Plan to guide Ministry actions under PNERP including the activation of a Ministry Action Group to direct Ministry response activities.
3. Develop Ministry procedures for carrying out the collection and delivery of samples, and other assigned actions, as required under the Environmental Radiation and Assurance Monitoring Group (ERAMG) Plan.
4. Assist the Ministry of Labour in maintaining an environmental radiation database.

Provision of Personnel

5. Provide suitable Ministry personnel for staffing various positions in the province's emergency management organization including the Operations Section, Scientific

Section (including the ERAMG) and waste management planning working group (if requested by the PEOC Commander).

6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. Activate a Ministry Action Group (MAG) when the PNERP is activated. Under overall direction from the PEOC, the MAG shall direct and co-ordinate the Ministry's response to ensure the Ministry is able to:
    a) Provide meteorological and hydrological support to the PEOC,
    b) Identify municipal and non-municipal drinking water systems regulated under O. Reg. 170/03 (Drinking Water Systems), a regulation under the Safe Water Drinking Act, 2002, S.O. 2002, by sub-zones in any affected zone as required,
    c) Identify drinking water systems in First Nation communities by sub-zones in any affected zone as required,
    d) Provide support, either directly or through the PEOC, to local Medical Officers of Health regarding the implementation of drinking water precautionary and protective measures, and
    e) Support drinking water systems as needed during the recovery phase.
9. The MAG shall also keep the Minister of the Environment and Climate Change informed of actions taken.

10. Carry out the sampling program and other assigned activities required under the ERAM Plan and as directed by the ERAM Group.
11. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

7. Participate in nuclear and radiological emergency training and exercises.
8. Ensure Ministry staff who participate in various elements of the nuclear emergency management organization participate in relevant training sessions.
9. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
10. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Study and Research

16. Assist in studies and research on meteorology and hydrology as applicable to nuclear and radiological emergencies, especially in the fields of meteorological and radionuclide dispersion forecasting.

Appendix 7 Minister of Health and Long Term Care

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

The Ministry of Health and Long-Term Care (MOHLTC) is responsible for leading and coordinating the health response, and maintaining health services during nuclear and radiological emergencies. These activities are detailed in the Radiation Health Response Plan that the MOHLTC is responsible for developing and maintaining.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-

plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

2. Undertake, assist in and oversee the preparations necessary to ensure the effective implementation of the RHRP.
3. Promote awareness and understanding of the RHRP to health stakeholders and municipalities
4. Prepare operating procedures for the Ministry Emergency Operations Centre to enable it to execute its functions.
5. Advise and assist Medical Officer of Health, health stakeholders, and the Designated Municipalities (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)) in making emergency plans and arrangements for implementing precautionary and protective measures for the public.
6. Provide guidance and advice to health stakeholders and local organizations on matters related to Iodine Thyroid Blocking (ITB) with stable iodine (KI) (detailed in the **RHRP's Potassium Iodide Guidelines Annex**).
7. The MOHLTC shall procure, in advance, adequate quantities of Potassium Iodide (KI) pill, for use by local authorities of the Fermi 2 Detailed Planning Zone and Ingestion Planning Zone populations during a nuclear emergency.
8. The MOHLTC shall provide support to local authorities for the Fermi 2 Detailed Planning Zone and Ingestion Planning Zone populations to ensure that the ITB related requirements of the PNERP and municipal plans are completed.
9. Liaise with OFMEM to develop and maintain a strategy for the distribution of KI pills within the IPZ as necessary during an emergency.
10. Provide guidelines for handling contaminated persons as well as those exposed to high levels of radiation as outlined in the RNRP.

Provision of Personnel

11. Provide suitable MOHLTC representatives to serve in the Planning, Operations, Communications and Scientific Sections of the PEOC as available and as appropriate.
12. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-

plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

11. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
12. Activate the Ministry's Emergency Operations Centre to direct and co-ordinate MOHLTC and health system actions, under the general direction of the PEOC.
13. Support the process and procedures as outlined in the Radiation Health Response Plan as appropriate during nuclear and radiological emergencies in conjunction with the PEOC.
14. Support the Chief Medical Officer of Health (CMOH) in deciding, in coordination with the PEOC and the local Medical Officer of Health, whether and when to direct ITB using KI.
15. Provide advice, either directly or through the PEOC, to local authorities and Medical Officers of Health regarding the implementation of the CMOH recommendations for ITB using KI and other precautionary and protective measures.
16. Channel emergency information for public release through the Provincial Emergency Information Section.
17. Provide support to health stakeholders providing medical care to potentially exposed and contaminated persons.
18. Provide support for the delivery of public health activities and health services at Reception and Evacuation Centres.
19. Identify small drinking water systems regulated under O. Reg. 319/08 (Small Drinking Water Systems), a regulation under the Health Protection and Promotion Act, by sub-zones in any affected zone as required.

20. Provide support, either directly or through the PEOC, to local Medical Officers of Health regarding the implementation of drinking water precautionary and protective measures.
21. During restoration operations oversee the required arrangements for follow-up medical monitoring, care and rehabilitation for those with significant irradiation exposure.

Training and Exercises

24. Participate in nuclear and radiological emergency training and exercises.
25. Provide guidance regarding training for health stakeholders and care settings as outlined in the RHRP
26. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
27. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.**ANNEX I**

Appendix 8 Minister of Labour

The Minister, has the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Prepare and maintain plans for completing the responsibilities of the Assurance Monitoring Group and General Province-Wide Monitoring Group in the PNERP.
3. Prepare and maintain the appropriate notification lists, operating procedures, and technical manuals for the groups indicated above.
4. Maintain an environmental radiation database.

Provision of Personnel

5. Provide suitable Ministry personnel for staffing various positions in the province's emergency management organization, including qualified personnel for the ERAMG of the PEOC.
6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. The Minister of Labour shall ensure that provincial employers meet their obligations under the Occupational Health and Safety Act during a nuclear emergency.
9. Provide or arrange the required radio-analysis to support the PNERP.
10. Carry out the radiation monitoring activities required under this plan.
11. If requested, provide technical assistance to the Emergency Response Organization responding to a nuclear or radiological emergency not being mitigated under this Plan.
12. Monitor radioactivity in the environment around all reactor facilities in Ontario and notify the PEOC of any abnormal (above ambient background) results.
13. Establish a Ministry Action Group to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
14. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

15. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
16. Participate in nuclear and radiological emergency training and exercises.
17. Arrange appropriate training of MOL staff involved in the scientific section of the PEOC.
18. Provide administrative support for radiation monitoring during planning, training or emergency operations.
19. Audit Emergency Worker Centres for compliance with the Occupational Health and Safety Act.
20. Audit radiation safety training programs (for compliance with the Occupational Health and Safety Act (OHSA) provided to first responders and emergency workers, as appropriate.
21. Audit designated nuclear response hospitals for compliance with the act and regulations for healthcare and residential facilities with attention to worker protection and training under the Radiation Health Response Plan (MOHLTC).
22. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Infrastructure

23. Provide or arrange laboratory facilities for radio analysis of samples of air, water, soil, herbage, milk, foodstuffs, etc.
24. Equip, maintain and operate an adequate network of fixed radiological monitoring sites in the Ontario portions of Ingestion Planning Zones.

Study and Research

25. Participate in studies and inter-comparisons in the area of radiation monitoring and analysis.

Appendix 9 Minister of Municipal Affairs

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

Provision of Extraordinary Financial Assistance

2. Throughout the emergency and recovery period, the Ministry shall co-ordinate extraordinary provincial expenditures associated with the province's response to the emergency.
3. If so directed, by the LGIC, the Ontario Ministry of Municipal Affairs shall:
    a) Lead development and implementation of disaster financial assistance programs, in consultation with other ministries as required.
    b) Liaise with the federal government and the Nuclear Insurance Association of Canada to ensure that any financial assistance provided by Ontario does not duplicate assistance provided under the federal legislation.

Provision of Personnel

4. Provide suitable Ministry representatives to serve in the Operations Section of the PEOC. If requested, also provide suitable Ministry personnel for staffing positions in the province's emergency management organization.
5. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

6. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-

plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

7. If called upon to do so, the Ministry of Municipal Affairs shall support the PEOC by providing:
    a) a)Advice and assistance regarding the provision of long-term emergency shelter.
    b) b)Financial assistance to Designated Municipalities, host municipalities and supporting municipalities for their eligible response, emergency shelter and long-term emergency shelter costs, as directed by the government.
    c) c)Financial assistance to impacted residents for eligible costs not covered by the Nuclear Liability and Compensation Act, as directed by the government.
8. Establish a Ministry Action Group to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
9. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

10. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
11. Participate in nuclear and radiological emergency training and exercises.
12. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 10 Minister of Natural Resource and Forestry

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

2. Establish procedures to notify and evacuate Provincial Parks that lie within the Detailed Planning Zones of the designated reactor facilities (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)). Establish procedures to notify Conservation Authorities that lie within the Detailed Planning Zones of the designated reactor facilities (**Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)).
3. Accord priority to mapping and air photography requirements for nuclear emergency planning and management.
4. Provide maps and topographical data as required.

Provision of Personnel

5. Provide suitable Ministry personnel for staffing various positions in the province's emergency management organization.
6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. Carry out the notification, evacuation and closing of any of the parks etc. mentioned in **Paragraph 2** above when so ordered by the PEOC Commander, or if required by this Plan.
9. Provide aircraft, telecommunications, and other resources, if required by the PEOC Commander.

10. Activate a Ministry Action Group to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
11. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

12. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.
13. Participate in nuclear and radiological emergency training and exercises.
14. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 11 Minister of Northern Development and Mines (MNDM)

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.

Provision of Personnel

2. Establish a Ministry Action Group to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
3. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

4. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
5. Execute the provincial ministry emergency response plan, which could include among other things the actions outlined below.
6. Provide emergency inorganic material analysis, conduct quality assessment of 3rd party laboratory tests of inorganic materials, and other laboratory support services to local authorities or the PEOC.
7. Support emergency response operations in Northern Ontario, whether co-ordinated by the PEOC or another provincial ministry that has been assigned lead responsibility.
8. Provide intelligence, including geo-science information and data, to the PEOC and other ministries, as appropriate.
9. Channel emergency information for public release through the Provincial Emergency Information Section.
10. Assist in communicating information and government messages to northern communities.
11. Assist with communications between local emergency response units, the PEOC and other ministries, as appropriate.
12. Provide personnel, equipment and material to support emergency response operations in Northern Ontario, as required and available.
13. Provide expert geo-scientific information on the nature of surficial materials to help determine impact on groundwater, anthropogenic or natural sources of possible inorganic elements concentrations, or transport and migration of groundwater and inorganic elements through the near surface and subsurface geological environment.

Training and Exercises

14. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry

staff.

15. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 12 Minister of Transportation

The Minister, together with the agencies, boards and commissions operating to assist the Ministry, have the following responsibilities consistent with the planning responsibilities assigned by Order in Council under **Section 6** of the *EMCPA*.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Ministry of Transportation shall coordinate the development of the transportation management function of evacuation plans for nuclear emergencies with participation of the Nuclear Emergency Management Coordinating Committee (NEMCC), the NEMCC Transportation Management Sub-Committee, OPP, Metrolinx, Designated Municipalities and Designated Host Municipalities (including local police, road and transit authorities), applicable provincial ministries and others, as required.
3. Ministry of Transportation shall lead the development of a Unified Transportation Coordination Centre (UTCC) to manage transportation aspects of evacuation planning and to ensure the operationalization of Unified Transportation Management Plans (UTMPs). Site-specific UTMPs shall be developed for each area covered by a site-specific nuclear PNERP Implementing Plan and shall be developed in accordance with **Section 7.5.2** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response#section-7-5-2) .
4. Operating procedures related to the transportation management function shall be established and provided to the Ministry Action Group (MAG) to ensure their operational readiness.

Provision of Personnel

5. Ministry of Transportation shall ensure suitable personnel for staffing various positions in the province's emergency management organization.

6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
8. Convene the Ministry Action Group (MAG) to direct and co-ordinate Ministry actions under the direction of the PEOC at the first practicable occasion during a nuclear emergency.
9. The Ministry of Transportation shall provide assistance and resources for response as directed by the PEOC Commander, and as required by the Unified Transportation Management Plans (UTMPs).
10. The Ministry of Transportation shall inform the PEOC immediately upon the closing of any provincial roads which might be earmarked as evacuation routes, and suggest alternatives as per the transportation management function methodologies and plans.
11. If required, the Ministry of Transportation will correspond with the PEOC and other transportation organizations as needed to employ an "all routes out" strategy by arranging for route clearance, road maintenance, diversions, etc. on provincial roads.
12. The Ministry of Transportation shall manage the transportation function during recovery, if required.
13. Channel emergency information for public release through the Provincial Emergency Information Section.

Training and Exercises

14. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of Ministry staff.

15. Ministry of Transportation shall co-ordinate and participate in nuclear evacuation transportation management training and exercises, with transportation stakeholders across the province, to ensure the efficiency and effectiveness of the UTCC and UTMPs.

16. Ministry of Transportation staff working within the PEOC should have knowledge of their Ministry's overall emergency plans, the PNERP and UTCC plans and procedures.

Infrastructure

17. Accord priority to maintaining and keeping open provincial highways (if possible), earmarked as evacuation routes and diversions in the Unified Transportation Management Plans (UTMPs).

Study and Research

18. Ministry of Transportation shall lead the development and maintenance of site- specific Unified Transportation Management Plans (UTMPs) for reactor facilities in Ontario under the advisement of the NEMCC Transportation Management Sub-Committee.

Appendix 13 Reactor facilities

Pursuant to the *Nuclear Safety and Control Act* and **Section 6** of the Regulations for Class 1 Nuclear Facilities, and based upon agreements made with the province, reactor facilities have the following responsibilities:

Notes:

1. Reactor facilities are listed in **Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities) .

2. Because of its special circumstances, the method of completing Fermi 2 responsibilities, shall be subject to negotiation and agreement between the province (Ministry of Community Safety and Correctional Services) and the facility.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Set up and maintain the organization, equipment and procedures necessary to fulfil their functions and responsibilities under this plan.
3. Assist the province and the Designated Municipalities in their planning and preparedness for a nuclear emergency.
4. Assist in the development and implementation of the public awareness and education program (**Annex C** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-c-public-awareness-and-education)).
5. On an annual basis, provide the province with the most current data from their Radiological Environmental Monitoring Program.

Provision of Personnel

6. Provide suitable personnel for staffing various positions in the province's emergency management organization, as identified in **Chapter 4** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-4-emergency-response-structure-and-functions) and in implementing plans and procedures.
7. Provide a corporate liaison representative to join the PEOC Operations Group.
8. Provide a technical support staff to support the PEOC NIG if requested and resources are available.
9. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

10. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7**

(https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

11. Provide personnel and resources for off-site personal monitoring as well as field monitoring services as specified in this PNERP and in the Implementing Plans and procedures.
12. Provide a radiation monitoring service to the Environmental Radiation and Assurance Monitoring Group.
13. Pickering, Bruce and Darlington: Carry out post-accident venting of containment according to the guidance contained in **Annex G** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-g-venting-containment-during-nuclear-emergencies) .
14. Assist the province and the Designated Municipalities mitigating the emergency.
15. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

16. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of reactor facility staff.
17. Ensure that its personnel required to perform any of the tasks within its responsibilities are suitably trained.
18. Assist the province and Designated Municipalities in the development and acquisition of training aids, as appropriate.
19. Implement and participate in nuclear emergency training and exercises.
20. Where appropriate, arrange or participate in emergency response exercises with the local public safety authorities or municipal response organization.
21. Reactor facility staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Infrastructure

22. Provide and maintain reliable telecommunication links for the facility and specified off-site centres.
23. Provide resources for and assist the Designated Municipalities to set up and maintain a public alertingsystem pursuant to this PNERP.
24. Provide and maintain the equipment and facilities required to execute their responsibilities under this Plan and its implementing documents.

Study and Research

25. Carry out and sponsor studies on risk abatement, risk assessment, and the enhancement of on-site and off-site safety, as agreed.
26. Assist the province in carrying out studies to enhance public safety during nuclear emergencies.

Appendix 14 Nuclear establishments

Nuclear establishments have the following responsibilities pursuant to the *Nuclear Safety and Control Act* and its regulations and based upon agreements made with the province:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Consult with the province as necessary to ensure emergency plans and procedures are established for executing their responsibilities under this plan and meeting license requirements.

Provision of Personnel

3. Establish liaison and make arrangements with the local public safety authorities for notifying them, when necessary.

Response

4. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6**

(https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

5. Notify the province, affected municipalities and CNSC whenever there is an actual or potential hazard to public health, property or the environment from radiation or radioactive material originating from or belonging to the facility.
6. Carry out all necessary measures on-site to contain and nullify the hazard.
7. Assist the public safety authorities in containing and neutralizing the hazard off-site.
8. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

9. Execute the applicable training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of facility staff.
10. Staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Appendix 15 Designated municipalities

Municipalities designated pursuant to **Section 3(4)** of the *EMCPA* as municipalities in nuclear Detailed Planning Zones have the following responsibilities:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Prepare a municipal plan for mitigating nuclear emergencies, based on and in conformity with the PNERP. This municipal plan shall include:
    a) Establishment of a municipal contact point to receive and act upon an initial notification from the reactor facility on a 7-day, 24-hour basis (**Chapter 5**

(https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response)).

b) Establishment of detailed arrangements and procedures for implementing precautionary or protective measures (**Chapter 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response)).

c) Planning data concerning the Municipality to include demographic data, institutional data, resource inventory, etc.

d) Details regarding a public alerting system meeting the requirements of **Section 5.7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response#section-6) **.**

e) Details regarding a nuclear public awareness and education program (**Annex C** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-c-public-awareness-and-education)).

f) Details regarding the provision of emergency information (**Chapters 4** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-4-emergency-response-structure-and-functions) and **5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response)).

g) Arrangements to receive and accommodate evacuees, including liaison arrangements with other host municipalities, as appropriate.

Provision of Personnel

3. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

4. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-

plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

5. Implement the municipal emergency plan for nuclear emergencies (prepared pursuant to this PNERP and the *EMCPA*).
6. Carry out the required emergency response under the guidance and support of the province prior to a declaration of a provincial emergency.
7. Implement the directions of the province following an emergency declaration, and pursuant to any orders which may be made by the province (**Section 7.0.2** of the *EMCPA*).
8. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

9. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of municipal staff.
10. Ensure that all municipal personnel assigned any functions under emergency plans for nuclear emergencies are suitably trained for their tasks.
11. Implement and participate in nuclear emergency training and exercises.
12. Municipal staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Infrastructure

13. Ensure availability of the essential facilities, emergency centres, resources and equipment required by municipal agencies to mitigate a nuclear emergency.
14. OFMEM shall co-ordinate with appropriate stakeholders to establish arrangements for resources and equipment for the Town of Amherstburg for a nuclear emergency at the Fermi 2 nuclear station.

Appendix 16
DESIGNATED HOST MUNICIPALITIES

Municipalities designated pursuant to **Section 3(4)** of the *EMCPA* as municipalities acting as host municipalities, have the following responsibilities:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Prepare a municipal plan for mitigating nuclear emergencies in conjunction with the lead Designated Municipalities, which includes:
    a) Arrangements to receive and accommodate evacuees from the Designated Municipalities.
    b) Coordination of reception plans and procedures with the reactor facility's monitoring & decontamination arrangements.
    c) Establishment of a municipal contact point, which can receive and act upon an initial notification from the provincial contact point on a 7-day, 24-hour basis.
    d) Liaison arrangements with the Designated Municipality (in reactor facility Detailed Planning Zones) officials and with the PEOC to ensure appropriate communication during an emergency.
    e) Detailed arrangements with various municipal departments, including social services, public health, police, fire, paramedic services and volunteer agencies which would be involved in staffing and security arrangements for the Reception and Evacuation Centres.
    f) Arrangements for the provision of emergency information on Reception and Evacuation Centre issues.
    g) This municipal emergency plan shall be based upon the PNERP, and shall conform to it.

Provision of Personnel

3. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

4. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
5. Implement the municipal emergency plan for nuclear emergencies (prepared pursuant to this PNERP and the *EMCPA*).
6. Carry out the required emergency response under the guidance and support of the province prior to a declaration of a provincial emergency.
7. Implement the directions of the province following an emergency declaration, and pursuant to any orders which may be made by the province (**Section 7.0.2** of the *EMCPA*).
8. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training & Exercises

9. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of municipal staff.
10. Ensure that all municipal personnel assigned any functions under emergency plans for nuclear emergencies are suitably trained for their tasks.
11. Implement and participate in nuclear emergency training and exercises.
12. Municipal staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Infrastructure

13. Ensure availability of the essential facilities, emergency centres, resources and equipment required by municipal agencies to mitigate a nuclear emergency.

Appendix 17 Health Canada (HC)

Health Canada has agreed to the following responsibilities:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Provide the province with technical advice and assistance in formulating its off-site safety plans and preparations.
3. Ensure that federal and provincial nuclear emergency management activities are supported and co-ordinated in conjunction with the **Provincial Nuclear Emergency Response Plan (PNERP)** and **Federal Nuclear Emergency Plan (FNEP)** and its **Ontario Annex**.
4. Work with the province and other supporting organizations to put in place appropriate safety measures to protect the public and emergency workers from immediate and delayed health effects that may result from a nuclear or radiological event, and to mitigate the impacts of such an event on property and the environment.
5. On an annual basis, provide the province with the most current data from their Radiological Environmental Monitoring Program.

Provision of Personnel

6. Provide Health Canada personnel for staffing other identified positions in the PEOC.
7. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

8. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-

plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

9. In the event of a nuclear emergency requiring a coordinating Government of Canada response, the Minister of Public Safety Canada shall be responsible for overall federal coordination unless otherwise specified. The federal technical support and coordination would be led by Health Canada as per the **FNEP** and the Ontario Annex.
10. During the course of a nuclear or radiological emergency, ensure coordination and communication between the Scientific Section and the **FNEP** TAG, including the provision of off-site assessments to support situational awareness.
11. The **FNEP** TAG members of the PEOC shall provide technical information (e.g., health physics) and advice to the Scientific Section to assist in performing its functions.
12. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

13. Execute the training and exercise responsibilities described in **Sections 3.2.8** and **3.2.9** prior to a nuclear or radiological emergency to ensure appropriate training of HC staff.
14. Participate in training and exercises held by the province according to a mutually agreed schedule.
15. HC staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Study and Research

16. Make available to the province the results of studies and research, which affect off-site safety. Within available resources, participate in such studies and research undertaken by the province.
17. Provide the province with, or assist the province in obtaining information, studies and research, having a bearing on off-site safety, from international agencies, other countries, and other provinces of Canada.

Appendix 18 Canadian Nuclear Safety Commission (CNSC)

In 2015, the CNSC and OFMEM entered into a Memorandum of Understanding (MOU) to cooperate in carrying out their respective mandates under the federal *Nuclear Safety and Control Act* (NSCA) and the provincial *EMCPA* with respect to nuclear safety regulation, public safety and protection of the environment in the province of Ontario. Many of the articles impacting preparedness, provision of personnel, response, training and exercises are reflected below.

Additionally, the CNSC adheres to the following principles regarding nuclear emergency management:

a) The top priorities in managing a nuclear emergency are health, safety, security and the environment;

b) Nuclear emergencies are managed in accordance with **Section 9** of the NSCA, which outlines the mandate of the Commission;

c) A risk-informed approach is used; and

d) Activities are co-ordinated with relevant stakeholders.

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. The CNSC maintains a Nuclear Emergency Response Plan, along with supporting procedures and guidelines, to address the CNSC's response to a nuclear emergency.
3. Pursuant to MOU article 3, the CNSC and OFMEM:
    a) Consult on the development and implementation of Commission regulations as they affect nuclear safety, regulation, public safety and the protection of the environment within Ontario as well as nuclear events and issues occurring outside, particularly as they affect Class I nuclear facilities.
    b) Consult on the evolution and implementation of this PNERP as well as the Commission's Nuclear Emergency Plan.
    c) Facilitate contact with other federal, provincial, municipal or non-governmental organizations.
    d) Facilitate contact with foreign governments and international organizations recognizing that OFMEM maintains contact with contiguous U.S. states regarding

nuclear emergency preparedness and response.

4. Pursuant to MOU article 4, provide OFMEM with annual reports of radiological environmental monitoring.

Provision of Personnel

5. Pursuant to MOU article 7:
    a) Provide staff for the PEOC Operations Section to liaise with the CNSC EOC and technical personnel to work in the PEOC scientific section during an emergency.
    b) Exchange current contact numbers for duty personnel and operations centres.

6. Provide a suitable representative to participate on inter-organizational Emergency Management Coordinating Committees set up under this Plan (**Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness)) to ensure alignment and address inter-organizational issues.

Response

7. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.

8. The CNSC maintains the capability to receive notice of actual or potential nuclear emergencies, and ensures that its Nuclear Emergency Response Plan can be activated at any time.

9. Pursuant to MOU article 7, provide OFMEM with timely notification of actual or potential nuclear and other related emergencies.

10. The CNSC's Emergency Operations Centre (EOC) is activated in the event of a nuclear emergency.

11. The CNSC activates its EOC and assembles staff who have a role to play in order to provide assurance that appropriate actions are taken by the licensee and response

organizations, to limit the risk to health, safety, security of the public and the environment.

12. For nuclear emergencies involving licensed facilities and substances, the CNSC:
    a) Performs regulatory oversight of the licensee's activities (monitoring the response actions, evaluation of protective action recommendations, and, when appropriate, direction in the form of directives and orders).
    b) Performs an independent assessment of the onsite conditions and potential offsite consequences, to provide or confirm the licensee's recommendations concerning any protective measures that may be needed.
13. In addition, the CNSC plays a supporting role to the response under the **FNEP**. This includes (but is not limited to) providing technical assistance and support to the lead organization, in accordance with CNSC's authorities and responsibilities.
14. The CNSC also provides support to the whole-of-government response for nuclear emergencies involving non-licensees, such as foreign emergencies and malevolent acts.
15. During a nuclear emergency, the CNSC co-ordinates its activities with stakeholders and, as appropriate, shares information to enable informed, efficient decision-making. Where necessary, the NEO advises the CNSC in making timely regulatory decisions related to the emergency.
16. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

17. The CNSC may participate in training and exercises held by the province.
18. CNSC staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.
19. Pursuant to MOU article 6, the CNSC and OFMEM:
    a) Exchange information on training, drill and exercise schedules at least once per year.
    b) Identify mutual training opportunities.
    c) Support each other during drills and exercises.

Appendix 19 Public Safety Canada

Public Safety Canada has agreed to the following:

Preparedness

1. Execute the applicable preparedness responsibilities described in **Chapter 3** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-3-preparedness) prior to a nuclear or radiological emergency.
2. Confirm that federal and provincial nuclear emergency management activities are supported and co-ordinated in conjunction with **Provincial Nuclear Emergency Response Plan (PNERP)** and **Federal Nuclear Emergency Plan (FNEP)**.
3. Confirm threats, alerts and advisories are issued to the PEOC to communicate information about potential, imminent or actual threats that endanger public health and safety.

Provision of Personnel

4. Provide Public Safety Canada representatives for staffing in the PEOC.

Response

5. Execute the applicable responsibilities described in **Chapters 5** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-5-initiating-emergency-response) **, 6** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy) **and 7** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-7-operational-response) at the first practicable occasion during a nuclear emergency.
6. Confirm that the Government Operations Centre is notified, to facilitate the coordination of federal activities relating to areas of federal jurisdiction. This may include liaising with any other potentially affected province, with United States, any other country and, international agencies.
7. Notify the province, as soon as possible, of any report received of an occurrence, which has resulted, or has the potential to result, in the receipt by any person off-site (in Ontario) of a dose of ionizing radiation in excess of prescribed regulatory limits.
8. Coordinate the release and content of emergency information for public release with the Provincial Emergency Information Section.

Training and Exercises

9. Participate in training and exercises held by the province.
10. Ministry staff working in the PEOC should have an overall knowledge of their emergency plans and PNERP.

Study and Research

11. Provide the province with, or assist the province in obtaining information, studies and research, having a bearing on off-site safety, from international agencies, other countries, and other provinces of Canada.

Annex J Conversion table for radiological units, imperial units and Système International (SI) units

(Reference: Section 2.1.5)

Imperial Units and Système International (SI) Units

From Curie to Becquerel	From Becquerel to Curie
Kilocurie (kCi) ≈ 37 terabecquerel (TBq)	1 terabecquerel (TBq) ≈ 27 curie (Ci)
Curie (Ci) ≈ 37 gigabecquerel (GBq)	1 gigabecquerel (GBq) ≈ 27 millicurie (mCi)
Millicurie (mCi) ≈ 37 megabecquerel (MBq)	1 megabecquerel(MBq) ≈ 27 microcurie (m Ci)
Microcurie (mCi) ≈ 37 kilobecquerel (kBq)	1 kilobecquerel (kBq) ≈ 27 nanocurie (nCi)

From Curie to Becquerel	From Becquerel to Curie
Nanocurie (nCi) ≈ 37 becquerel (Bq)	1 becquerel (Bq) ≈ 27 picocurie (pCi)
Picocurie (pCi) ≈ 37 millibecquerel (m(Bq))	

From Rem to Sievert	From Sievert to Rem
Kilorem (krem) = 10 sievert (Sv)	1 sievert (Sv) = 100 rem (rem)
Rem (rem) = 10 millisievert (mSv)	1 millisievert (mSv) = 100 millirem (mrem)
Millirem (mrem) = 10 microsievert (mSv)	1 microsievert (mSv) = 100 microrem (mrem)
Microrem (mrem) = 10 nanosievert (nSv)	1 nanosievert (nSv) = 100 nanorem (nrem)

Prefixes	
Tera (T) = x 10^{12}	Pico (p) = x 10^{-12}
Giga (G) = x 10^{9}	Nano (n) = x 10^{-9}
Mega (M) = x 10^{6}	Micro (m) = x 10^{-6}

Prefixes	
Kilo (k) = x 10^{3}	Milli (m) = x 10^{-3}

Annex K Nuclear/radiological glossary

(Reference:Pg. iii (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/nuclear-and-radiological-emergency-response-planning-structure#reference-glossary))

(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
SeeProduce 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.nbsp; 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 **Annex A** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/annex-reactor-facilities-and-designated-municipalities)).

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.

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, ambulance 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.

Environmental Decontamination
See Decontamination.

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.nbsp; 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 federal government organization located in the National Capital Region which directs the mobilization and delivery of national support to the affected province in the case of an event in or near Canada, or which co-ordinates federal actions in the case of an international event.

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
Anbsp;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.nbsp; 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. nbsp; 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 specialised 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. (See **Table 6.1** (https://www.ontario.ca/document/provincial-nuclear-emergency-response-plan-pnerp-master-plan/chapter-6-protective-action-response-strategy#section-9)).

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 alsoPlume).

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, which provides or arranges for further emergency social services, humanitarian assessments and support.
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 nursing homes, handicapped persons and prison 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 EMPCA, 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; or

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; or

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 L PNERP planning basis background

(Reference: Paragraph 1.3.5)

1.0 General

The PNERP is regularly reviewed relative to changing international best practices and lessons learned from actual events. As such, the 2017 update was motivated and informed by the following:

a) The release of 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** and the Health Canada **Canadian Guidelines for Protective Actions During a Nuclear Emergency** (DRAFT 2016).

b) Lessons learned from three full scale nuclear emergency response exercises held in Ontario (Exercise Huron Challenge 2012, Exercise Unified Response 2014 and Exercise

Huron Resolve 2016).

c) Analysis and lessons learned from the Fukushima Daiichi nuclear disaster in March 2011 in Japan, including the **Levels and Effects of Radiation Exposure Due to the Nuclear Accident after the 2011 Great East-Japan Earthquake and Tsunami** report published by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) in 2013.

d) The Canadian Nuclear Safety Commission's (CNSC) **Post-Fukushima Action Plan** recommendation that provincial authorities undertake a review of the accident scenarios on which their off-site plans are based, (i.e., the planning basis) for the purposes of off-site arrangements.

e) The discussion paper **Provincial Nuclear Emergency Response Plan, Planning Basis Review and Recommendations** released by OFMEM in May 2017.

The remainder of this Annex provides a summary of the principles, assessments and conclusions reached by this discussion paper. For a more fulsome overview of the planning basis determination, the discussion paper itself should be consulted.

2.0 Principles

In the May 2017 PNERP Planning Basis Discussion Paper, the Office of the Fire Marshal and Emergency Management (OFMEM) analyzed historical and contemporary reports, studies and technical analyses. Severe accident assessments were selected in collaboration with key stakeholders, some of whom also provided assistance in the form of modelling to determine dose versus distance data[20].

The planning basis determination was undertaken in alignment with internationally accepted principles, including:

- Emergency plans should aim to prevent deterministic effects and minimize the stochastic effects which possibly could result from severe, low probability nuclear accidents[21].
- While emergency plans should be based on a wide range of accidents, the amount of detailed planning should decrease as the probability of the accidents occurrence decreases.[22]

The planning basis determination has been elucidated in terms of the emergency planning zones, including the new Contingency Planning Zone, which have been incorporated into this PNERP Master Plan. These zones were adopted to better align

the Plan with the principles and requirements of national and international standards (CSA N1600 and IAEA GSR 7), and each is defined in terms of the level and extent of planning and preparedness required to prepare for a nuclear emergency:

a) 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.

b) Detailed Planning Zone (DPZ): 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.

c) 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.

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

   i. protect the food chain

   ii. protect drinking water supplies

   iii. restrict consumption and distribution of potentially contaminated produce, wild-grown products[23], milk from grazing animals, rainwater, animal feed

   iv. restrict distribution of non-food commodities until further assessments

The discussion paper was also based on the concept that while planning and preparedness measures are required to facilitate the implementation of exposure control measures in the AAZ and DPZ, detailed planning is, in fact, not required in order to undertake the implementation of all exposure control measures. For example:

- Sheltering can be implemented through existing public alerting mechanisms, advising the population to stay indoors.
- ITB requires an effective distribution program based on population data and accident assessment thyroid dose results.

In contrast, the implementation of evacuations must include detailed planning and preparedness arrangements for:

- Transportation and traffic
- Monitoring and decontamination
- Short-term accommodation
- Long-term accommodation
- Health, economic, trade, education, psychosocial, etc. issues

As such, the Detailed Planning Zones for the CANDU stations are delineated to accommodate the projected effective dose at which the evacuation generic criterion is reached. And, further to this concept, the sheltering and ITB distances were therefore not the defining point for determination of the DPZ.

3.0 BDBA Accident Assessment and Conclusions: CANDU Reactors

The Canadian Nuclear Safety Commission (CNSC) provided OFMEM with source term information based on a Station Blackout (SBO) scenario with three (3) releases as detailed in OPG's **Darlington NGS Level 2 Probabilistic Safety Assessment (PSA) Report** (from the 2012 refurbishment project). Health Canada and Environment and Climate Change Canada (ECCC) staff provided assistance in the form of dose modelling using the Accident Reporting and Guidance Operational System (ARGOS) application.

The CNSC advised OFMEM that it is reasonable to assume that the Operator could stop the accident to prevent the second and third releases and therefore only the first release of the SBO accident was considered. The first release is an International Nuclear Events Scale (INES) Level 7 event.

While the severe accident assessment involves accident progressions that are considered to be highly unlikely, it should also be noted that the Level 2 Darlington PSA was performed prior to the Fukushima event. Consequently, the accident progression does not take into account the post-Fukushima implementation of such station improvements as emergency mitigating equipment, which would halt the accident progression.

The precaution offered by Health Canada in the report should be noted as it accurately reflects the basic principles integral to this discussion paper:

> When interpreting the results, it should be acknowledged that the scenarios are hypothetical and that there are inherent uncertainties associated with this type of predictive modelling as well as specific limitations associated with the approach used. While these results may provide some useful information, they should not serve as the sole source of information for nuclear emergency preparedness activities.[24]

3.1 Protective Measures for Inhalation (Plume)

The MEAN and MAXIMUM doses with distance for protective measures against inhalation were generated from 9 individual runs using the Modèle Lagrangien de Dispersion de Particules (MLDP) modelling and detailed weather patterns for each day in the period between July 10 and July 18, 2016.

MEAN dose values were generated by averaging all of the doses at each radial distance. MAXIMUM dose values represent the highest dose reported at each radial distance from the nuclear power plant. These doses are measured against Health Canada's "**Dosimetric Criteria for Nuclear Emergency Planning and Response (Draft 2017)**" Generic Criteria for evacuation (100 mSv) which aligns with the IAEA **GSG-2 Guidance for evacuation and sheltering**).

The doses are reproduced below taking into account the assumptions, pursuant to **CSA N288.2-14**[25] that a sheltering dose reduction factor be applied and that the representative individual for emergency planning purposes should be an adult.

3.1.1 Evacuation Criteria using Risø Mesoscale PUFF (RIMPUFF[26]) Modelling

Evacuation Criteria (Total Effective Dose)	Adult		5 Year-Old Child	
	MEAN Dose	MAX Dose	MEAN Dose	MAX Dose
100 mSv (as per Health Canada and IAEA Guidance)	2 km	4 km	3 km	6 km

3.1.2 Evacuation Criteria using Modèle Lagrangien de Dispersion de Particules (MLDP[27]) Modelling

Evacuation Criteria (Total Effective Dose)	Adult		5 Year-Old Child	
	MEAN Dose	MAX Dose	MEAN Dose	MAX Dose
100 mSv (as per Health Canada and IAEA Guidance)	< 1 km	< 1 km	< 1 km	< 1 km

3.1.3 Iodine Thyroid Blocking using MLDP Modelling

Iodine Thyroid Blocking Criteria (Thyroid Equivalent Dose)	Adult		5 Year-Old Child	
	MEAN Dose	MAX Dose	MEAN Dose	MAX Dose
50 mSv (Health Canada and	7 km	33 km	21 km	63 km

Iodine Thyroid Blocking Criteria (Thyroid Equivalent Dose)	Adult		5 Year-Old Child	
	MEAN Dose	MAX Dose	MEAN Dose	MAX Dose
IAEA Guidance)				

3.2 Protective Measures for Ingestion using MLDP Modelling

Food Product	MEAN Dose with Distance	MAX Dose with Distance
Root vegetables	7 km	17 km
Leafy greens	19 km	38 km
Grains	30 km	72 km
Milk	26 km	57 km

3.3 Conclusions for CANDU Reactors

a) Evacuation:
Evacuations are not required beyond the Detailed Planning Zone boundary.

b) Iodine Thyroid Blocking:
Based on the 50 mSv intervention level and the N288.2-14 standard that adult doses be considered for emergency planning purposes[28]:

- The MEAN dose for Adults indicates that ITB may be required within the Detailed Planning Zone.

- The MAX dose for Adults indicates that ITB may be required out to a distance of 33 km (within the Ingestion Planning Zone) in the direction of plume passage.

c) Ingestion Control:

Based on Health Canada guidance for ingestion control purposes[29]:

- The MEAN results indicate that food restrictions may be required in all directions from the facility up to distances of approximately 30km. Therefore, the 50km radius for the Ingestion Planning Zone is generally appropriate for detailed ingestion control planning.
- The MAX results indicate that food restrictions may be required at distances up to approximately 70 km, in the direction of plume passage and would be dependent on the type of food being produced.

d) Critical in the consideration of the nuclear emergency planning zones is the understanding that limitations to resources and standardized assumptions are being applied for PLANNING purposes to optimize protective action planning for low probability severe nuclear accidents. However, ACTUAL EMERGENCY RESPONSE for all scales of nuclear accidents will be undertaken with the necessary resources AND in consideration of the most vulnerable populations, to ensure the province's aim of protecting public health and safety and the environment.

And, on this basis, the PNERP has been developed to ensure that the appropriate organizational structures, linkages and processes are in place to enable a scalable response regardless of the severity of the nuclear accident.

4.0 Accident Assessment and Conclusions: Chalk River Laboratories (CRL)

4.1 Two technical studies were examined to provide recommendations for the CRL planning basis:

a) **Analysis Report for KI Pill Intervention Planning for CRL**, Candesco (2016)

b) **International Safety Research Inc. (ISR) Independent Study** (2004)

4.2 Analysis Report for KI Pill Intervention Planning for CRL

CRL undertook an assessment to determine the KI pill pre-stocking requirement beyond its Primary Zone (i.e., Detailed Planning Zone) boundary, as directed by CNSC REGDOC 2.10.1.

The Candesco report describes an assessment of Iodine releases that might result from an 8E-7 beyond design basis accident (BDBA) to determine the distance from the CRL site within which Iodine Thyroid Blocking (ITB) would be justified.

The Candesco report determined that, for the BDBA analyzed, the projected thyroid dose for an exposed individual at the 9 km Primary Zone boundary would be 0.81 mSv, which is 60 times below the Thyroid Blocking Protective Action Level (PAL) of 50 mSv. When considering even lower probability BDBAs, the projected thyroid dose remains substantially less (2-3 times) than the 50 mSv Thyroid Blocking PAL. It is therefore not anticipated that KI ingestion would be required for the public, even in the event of a severe nuclear emergency at CRL.

CRL indicated that CNSC staff has agreed that the BDBA scenarios used for the purposes of this study were sufficiently severe.

4.3 ISR Study (2004)

A re-examination of the 2004 ISR independent study was undertaken to ensure consistency in application of emergency management best practice principles.

The results of the ISR study found that under severe accident conditions, only the sheltering protective action would be required in the Primary Zone (i.e., Detailed Planning Zone) and, using the 2009 PNERP PALs, that this measure would likely be limited to the 8 km radius from the CRL stack (using the lower Sheltering PAL). Evacuations would be limited to a radius of 3 km (using the lower Evacuation PAL) which falls within the boundaries of the CRL 6 km Exclusion Zone.

During the PNERP review for the 2009 PNERP Master Plan and 2011 Implementing Plan for CRL, the decision was made to delineate a 9 km Primary Zone on the following basis:

- It maintains a degree of consistency with the other PNERP nuclear areas and a high level of public safety.
- It results in a minimal reduction from the previous 10 kilometre Primary Zone requirement.
- Although it would not need to be implemented in a condensed timeframe as for the other sites, a potential for evacuation persists if sheltering is required for longer than 1-2 days.

Application of the draft Health Canada's **Dosimetric Criteria for Nuclear Emergency Planning and Response (Draft 2017)** would result in an evacuation radius of less than 2 km and a sheltering radius of less than 3 kilometres, both of which are well within the exclusion area of the CRL facility.

4.4 Conclusions for CRL

a) The CRL NRU reactor is scheduled for shutdown on March 31, 2018, after which an assessment will determine the risks the shutdown reactor may represent to the surrounding offsite population.

b) The planning basis for the NRU reactor at CRL has historically been based on the areas defined for CANDU reactors. In 2009, the Primary Zone was reduced from 10 km to 9 km. While no requirement for evacuation in this area was predicted, the Primary Zone delineation was essentially maintained (although diminished), based solely on the need for sheltering.

c) Based on the 2004 and 2016 severe accident studies and using the Health Canada Guidelines, only the sheltering protective action would be required offsite, i.e., beyond the CRL Exclusion Zone.

d) Although none of the accident scenarios (including severe accidents) associated with this facility result in the need for offsite evacuations, thereby removing the need for detailed planning, the planning zones for the CRL National Research Universal (NRU) reactor will remain as identified in the 2011 PNERP Implementing Plan for CRL.

5.0 Conclusions: Fermi 2

5.1 The Ontario Primary Zone (i.e., Detailed Planning Zone) for the Fermi 2 reactor facility in Michigan varies in extent from 16 to 23 kilometres in radius. This delineation dates back to the early 1980's and while the exact rationale for its extent is not known, it did have a basis in the pre-amalgamation involvement of three separate municipalities – the Towns of Amherstburg, Anderdon and Malden. The U.S. equivalent of Ontario's Primary Zone, the Emergency Planning Zone, is a standard 10 miles (16 kilometres) for all U.S. based nuclear facilities.

5.2 Planning Zones for Fermi 2

As with the CRL facility (**Section 4.0** above), the planning zones associated with the Fermi 2 nuclear generating station in Michigan (across the Detroit River from Ontario)

differs from the Bruce, Pickering and Darlington nuclear generating stations due to different technologies.

The revised PNERP will reflect the American nuclear regulatory agency's (U.S. NRC) requirements for planning zones. Specifically, the following PNERP Planning zones will be delineated for the Fermi 2 site:

a) No Automatic Action Zone (the area lies within a 3 km radius around the nuclear station).

b) The Detailed Planning Zone will be reduced to a radius of 16 km to align with the American standard (10 miles).

c) The Contingency Planning Zone distance will be determined during the Fermi 2 Implementing Plan development and consultation.

d) The Ingestion Planning Zone will be maintained at 80 km to align with the American standard (50 miles) for the Fermi 2 reactor technology.