



Durham Nuclear Emergency Response Plan

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Durham Nuclear Emergency Response Plan

1.0 Introduction

Under the Provincial Nuclear Emergency Response Plan (PNERP), Master Plan (December 2017), Durham Region is a designated municipality with off-site nuclear emergency planning and preparedness responsibilities in the event of an emergency at the Darlington or Pickering Nuclear Generating Station. One of these responsibilities is the development and maintenance of the Durham Nuclear Emergency Response Plan (DNERP) that conforms to the PNERP and its Implementing Plans.

Durham Emergency Management (DEM) has implemented and maintains an ongoing nuclear emergency management program consisting of plans, training, exercises and public education to address this specific risk.

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

1.1 Overview of the Nuclear Plan Structure

The DNERP is a risk-specific plan under the Durham Region Emergency Master Plan (DREMP) and is supported by the following Nuclear Emergency Support Functions (NESFs):

- Public Alerting
- Nuclear Notification
- Emergency Workers Centres
- Evacuation & Reception Centres
- Evacuation & Shelter-In-Place
- Potassium Iodide (KI) Distribution
- Radioactive Liquid Emission (Tritium)

1.2 Purpose

The purpose of the DNERP is to protect the health, safety and welfare of the citizens of Durham Region in the event of a nuclear emergency at the Darlington or Pickering Nuclear Generating Station by establishing an effective system of emergency management to prepare for, respond to and recover from a nuclear emergency event.

1.3 Scope

The DNERP sets out the offsite emergency response actions to be taken in Durham Region in response to a nuclear emergency at the Darlington or Pickering Nuclear Generating Stations.

The DNERP outlines specific functional responsibilities to Regional departments, the Durham Regional Police Service (DRPS), local area municipalities, school boards, host municipalities and other agencies and is consistent with the PNERP. As required by the Emergency Management and Civil Protection Act (EMCPA) and the PNERP, the plans and procedures of the local area municipalities and local boards must conform to the DNERP.

The DNERP can also be used to respond to a radiological emergency as plans, notification procedures, public alerting and protective actions will likely be very similar. The Durham Region Emergency Master Plan is an all-hazards plan and includes the capabilities to respond to Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) emergencies when the radiological incident is not from a reactor facility.

1.4 Legal Basis and Requirement

In Ontario, governance for emergency management is led by the Ministry of the Solicitor General (SOLGEN) through the Office of the Fire Marshal and Emergency Management (OFMEM). Authority for the development of nuclear plans comes under Section 8 of the EMCPA, which states that the Lieutenant Governor in Council shall formulate a plan respecting emergencies arising in connection with nuclear facilities. OFMEM through the Provincial Emergency Operations Centre (PEOC) is primarily responsible for the off-site effects and response to a nuclear emergency and may issue operational directives or emergency orders.

Pursuant to Sections 3 and 8 of the EMCPA, the DNERP conforms to the PNERP Master Plan (December 2017), as well as the PNERP Implementing Plans for the Darlington and the Pickering Nuclear Generating Stations (January 2019).

The DNERP and its supporting documents have been developed under the authority of Regional Council as per By-law 37-2015.

1.5 Declaration of Emergency and Plan Activation

The Regional Chair and Mayors of local municipalities, or designated alternates, may declare an emergency in their respective jurisdictions in response to an emergency event under Section 4 of the EMCPA.

In response to an emergency at the Pickering or Darlington Nuclear Generating Stations, the Regional Chair may consider such a declaration whenever the Provincial and Durham Region nuclear emergency plans have been activated.

Upon declaring a Regional emergency, the Regional Chair shall inform the Solicitor General of Ontario, Regional Council and local municipalities, and issue a news release. The head of council of an area municipality affected by the nuclear accident should also consider declaring a municipal emergency.

The Regional Chief Administrative Officer (CAO), designated alternate, or the Director of Emergency Management for Durham Region may activate this Plan where such

action is considered necessary, until the Regional Control Group assembles or before the official declaration of the emergency by the Regional Chair, pursuant to Section 9 of the EMCPA.

1.6 Liability for Action

Pursuant to Section 9 of the EMCPA, employees of the Region and other boards and services with responsibilities under this plan are hereby authorized to take action to implement this Plan where such action is considered necessary, even though an emergency has not yet been formally declared.

Pursuant to Section 11 of the EMCPA, members of Council, Regional and local municipal employees are protected from personal liability for any act done in good faith in the implementation or the intended implementation of this emergency plan.

1.7 Plan Maintenance and Administration

DEM shall be responsible for the implementation and administration of the DNERP. The DNERP will be reviewed at least every 5 years and revised as necessary in concert with provincial review schedules. A variety of exercise types and scenarios will be exercised regularly with both internal and external stakeholders. Any amendments to legislation and lessons learned from exercises and emergency responses will be incorporated in subsequent revisions of the DNERP and its supporting documents.

Durham Region By-Law 36-2015 established the Durham Emergency Management Program Committee (DEMPC) to provide the Region with a coordinating body to facilitate inter-departmental and municipal level cooperation regarding emergency management policy. The DEMPC is chaired by the Regional CAO. The PNERP requires that each designated municipality under the plan form a Nuclear Emergency Management Coordinating Committee. The DEMPC will consider nuclear emergency planning and preparedness as part of its mandate and thus will meet the obligations of the Provincial plan.

The province, through OFMEM, has established 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. A Regional representative will participate in any inter-organizational Emergency Management Coordinating Committees set up under the PNERP to ensure collaboration and an integrated response.

2.0 Nuclear Emergency Planning Basis

2.1 Radiation Hazard

While the probability is low, a nuclear reactor accident could result in radiation exposure and radioactive contamination of people (external and internal) and/or the environment.

Radiation exposure pathways are as follows:

- External exposure to gamma radiation in the plume (i.e. cloudshine) or on the ground (i.e. groundshine).
- Inhalation of airborne radioactive materials.
- Ingestion of drinking water, plant and animal products that may have been contaminated.
- Contamination on clothing or skin leading to external exposure or absorption.
- Inadvertent ingestion of contamination (e.g. contamination on face and hands, contaminated soil, etc.).

The primary health effect of chronic low doses of radiation could be the induction of various types of cancers with typical latency periods of 4 to 20 years.

2.2 Planning Objective

The purpose of nuclear offsite emergency planning is to consider all of the principal exposure pathways and prevent or minimize the radiation dose which the public could potentially receive. The aim is to ensure, to the extent possible, that no person offsite will be exposed to intolerable levels of radiation as a result of an accident.

2.3 Planning Basis – Design Basis Accidents

Formal risk analysis of nuclear reactor accidents indicates that there is generally an inverse relationship between the probability of occurrence of an accident and the severity of its likely consequences.

If an accident were to occur at either Nuclear Generating Stations (NGS), the most probable result would be that the effects would be confined within the station boundary.

The Design Basis Accident (DBA) release provides the main platform for detailed planning and is 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 gases which would dissipate and do not pose a contamination hazard.
- Radiation doses to the public would likely be below the Generic Criteria (GC).

- 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).

An example of a DBA scenario is a loss of coolant accident, with the following typical progression:

- The reactor building would “box-up” preventing any immediate release and whereby all possible release pathways to the environment are sealed,
- Ducts connecting the reactor building to the vacuum building would open, drawing all radioactive material from the damaged reactor fuel into the vacuum building,
- During a retention period in the vacuum building, some of the radioactivity would decay,
- Given suitable meteorological conditions, the contained radioactivity would be vented through filters in a direction away from populated areas, and
- Once the pressure in the vacuum building nears normal atmospheric pressure, venting could be intermittent or continuous and could last for weeks. The level of radioactivity being released would progressively decline with time.

2.4 Planning Basis – Beyond Design Basis Accidents

Notwithstanding the above, an accident could occur that results in more severe offsite effects. The probability of a Beyond Design Basis Accident (BDBA) is assessed to be very low. A more severe accident would be defined by one or more of the following:

- 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).

2.5 Emergency Planning Zones and Response Sectors

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 include the following:

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

Automatic Action Zone (AAZ)

- A pre-designated area immediately surrounding a reactor facility extending out to a radius of 3 kilometres, 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.
- Additional planning and preparedness are 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). If required, priority evacuations will be undertaken within this area.

Detailed Planning Zone (DPZ)

- A pre-designated area surrounding a reactor facility extending out to a radius of 10 kilometres, incorporating the AAZ, 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.
- Detailed planning and preparedness are 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.
- The DPZ around a reactor facility is divided into a number of response sectors. All emergency response measures, both operational and protective, are planned and implemented in terms of these sectors. Public alerting is in place for the 10 kilometre range.

Contingency Planning Zone (CPZ)

- A pre-designated area between 10 and 20 kilometres surrounding a reactor facility, beyond the DPZ, where contingency planning and arrangements are made in advance, so that during a nuclear emergency, protective actions can be extended beyond the DPZ as required to reduce potential for exposure.

Ingestion Planning Zone (IPZ)

- A pre-designated area within 50 kilometres 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.

2.6 Darlington NGS – Emergency Planning Zones

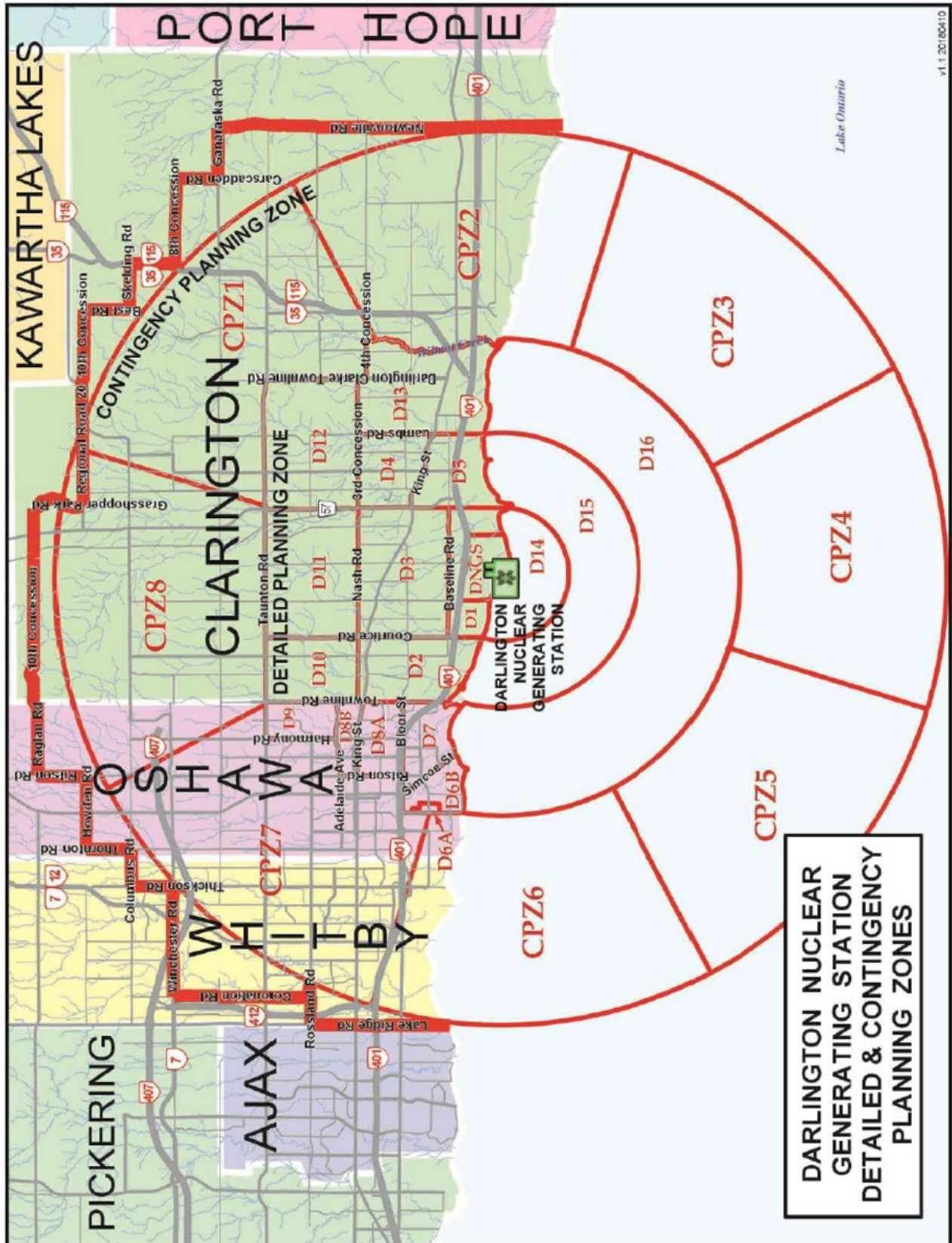
The DPZ for the Darlington NGS is shown in Figure 2. The boundaries are described in Table 1. The DPZ is divided into 16 response sectors which are located in the following rings around the Darlington NGS:

- Automatic Action Zone
 - D1 and Lake Sector D14.
- Detailed Planning Zone Inner Ring Sectors
 - D2, D3, D4, D5, and Lake Sector D15.
- Detailed Planning Zone Outer Ring Sectors
 - D6A, D6B, D7, D8A, D8B, D9, D10, D11, D12, D13, and Lake Sector D16.

Estimates of the population by sector are shown in Table 2.

The Contingency and Ingestion Planning Zones for the Darlington NGS encompasses parts of Durham Region, the City of Toronto, York Region, the City of Kawartha Lakes, Northumberland County and Peterborough County. The Ingestion Planning Zones with its sub-zones are shown in Figure 3.

Figure 1 - Darlington Detailed Planning and Contingency Planning Zones Map



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Table 1 - Darlington Response Sector Boundaries

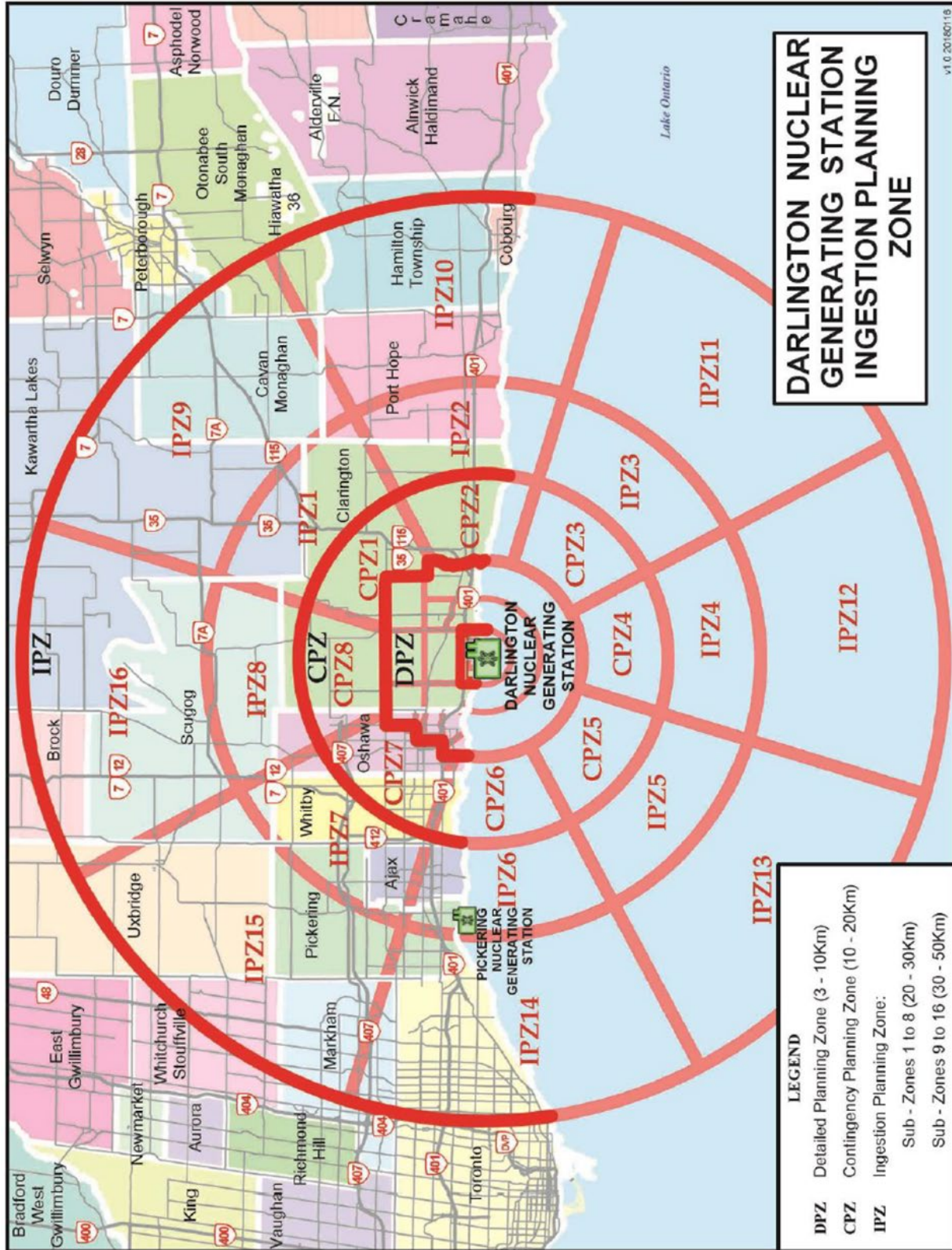
Sector	Sector Boundary (North; East; South; West)
D1	Baseline Road; Martin Road; Lake Ontario; Courtice Road
D2	Nash Road; Courtice Road/RR 34; Lake Ontario; Townline Road/RR 55
D3	Nash Road; Martin Road/RR 57; Baseline Road; Courtice Road/RR 34
D4	Concession Rd #3; Lamb's Road; Highway 2; Martin Road/RR 57
D5	Highway 2; Lambs Road; Lake Ontario; Martin Road/RR 57
D6A	General Motors Parking Lot
D6B	Bloor Street/RR 22; Simcoe Street/RR 2; Lake Ontario; Park Road/RR 54
D7	Bloor Street/RR 22; Townline Road/RR 55; Lake Ontario; Simcoe St/RR 2
D8A	King St; Townline Rd/RR 55; Bloor St/RR 22; Ritson Rd/RR 16
D8B	Adelaide Ave/RR 58; Townline Road/RR 55; King St; Ritson Road/RR 16
D9	Taunton Rd/RR 4; Townline Rd/RR 55; Adelaide Ave/RR 58; Harmony Rd/RR 33
D10	Taunton Road/RR 4; Courtice Road/RR 34; Nash Road; Townline Road/RR 55
D11	Taunton Road/RR 4; Martin Road/RR 57; Nash Road; Courtice Road/RR 34
D12	Taunton Rd/RR 4; Darlington-Clarke Townline/RR 42; Concession #3; Martin Road/RR 57
D13	Concession Rd #3 and #4; Wilmot Creek; Lake Ontario; Lambs Road
D14 - D 16	Lake Ontario Sectors

Table 2 - Population* Estimate for Darlington Sectors

Sector	Population (Maximum)
D1	90
D2	18,450
D3	9,840
D4	22,130
D5	8,390
D6A	General Motors Parking Lot
D6B	13,180
D7	4,510
D8	22,220
D9	13,180
D10	7,560
D11	1,830
D12	1,360
D13	2,240
DNGS	1,400
TOTAL	126,580

* Population estimates based on the 2016 Canada Census data.

Figure 2 - Darlington Ingestion Planning Zone Map



2.7 Pickering NGS – Emergency Planning Zones

The DPZ for the Pickering NGS is shown in Figure 4. The boundaries are described in Table 3. The DPZ is divided into 25 response sectors which are located in the following rings around the Pickering NGS:

- Automatic Action Zone
 - P1, P2 and Lake Sector P23.
- Detailed Planning Zone Inner Ring Sectors
 - P3 to P14 and Lake Sector P24.
- Detailed Planning Zone Outer Ring Sectors
 - P15 to P22 and Lake Sector P25.

Estimates of the population by sector are shown in Table 4.

The Contingency and Ingestion Planning Zones for the Pickering NGS encompasses parts of Durham Region, the City of Toronto, York Region, Peel Region and the City of Kawartha Lakes. The Contingency and Ingestion Planning Zones are shown in Figure 5.

Note that sectors P3, P15, P16, P17, P18 and P19 fall outside the Regional boundary and are the responsibility of the City of Toronto, as are Lake Sector P25 and the western portion of Lake Sector P24.

Figure 3 - Pickering Detailed and Contingency Planning Zones Map

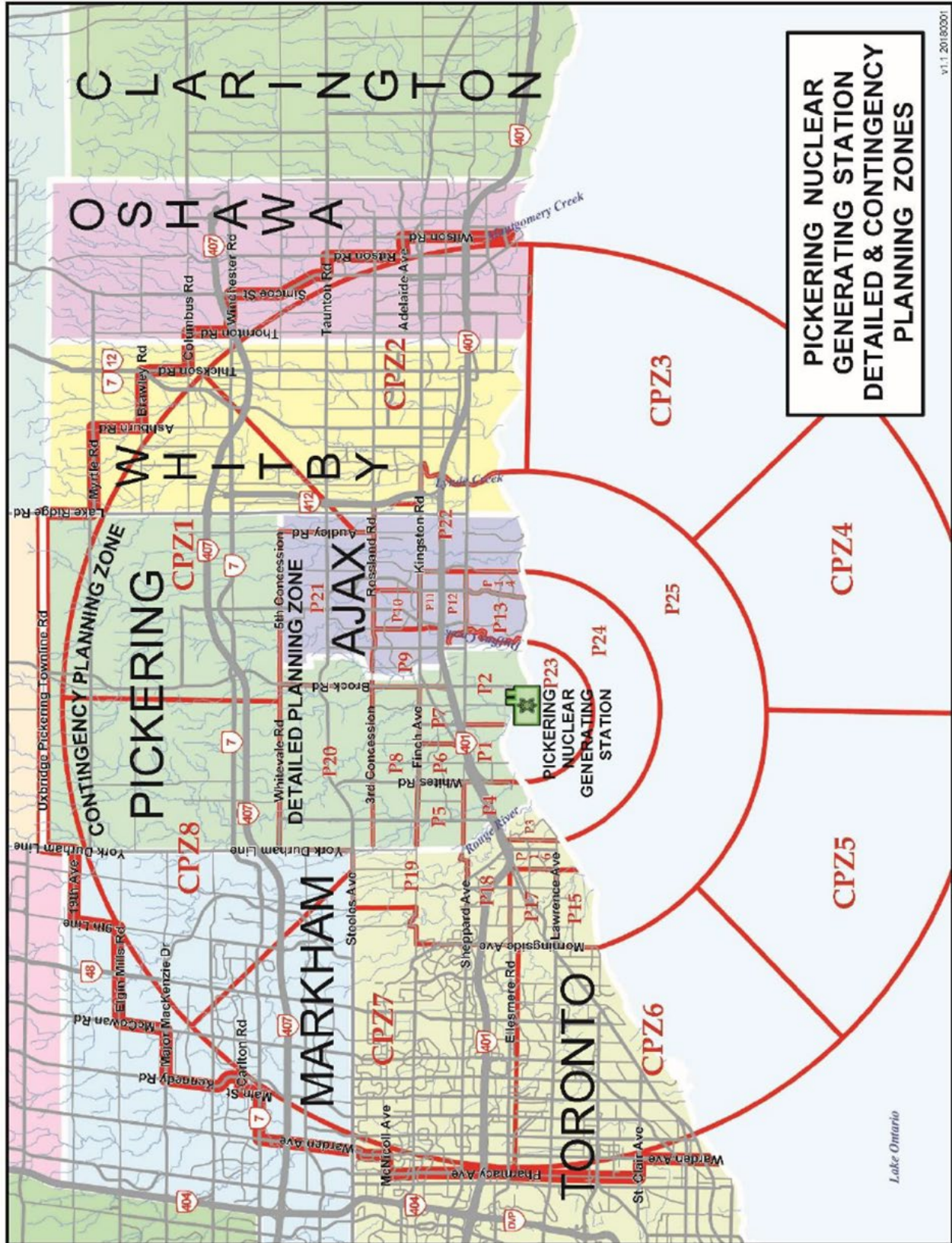


Table 3 - Pickering Response Sector Boundary Description

Sector	Sector Boundary (north; east; south; west)
P1	Highway 401; Liverpool Road; Lake Ontario; Whites Road/RR38
P2	Highway 401; Duffin's Creek; Lake Ontario; Liverpool Road
P3	Highway 401; Rouge River; Lake Ontario; East Avenue
P4	Sheppard Avenue; Whites Road/RR 38; Lake Ontario; Rouge River
P5	Finch Avenue/RR 37; Whites Road/RR 38; Sheppard Avenue; Scarborough-Pickering Townline Road/RR 30
P6	Finch Avenue/RR 37; Dixie Road; Highway 401; Whites Road/RR 38
P7	Finch Avenue/RR 37; Brock Road/RR 1; Highway 401; Dixie Road
P8	3 rd Concession (Rossland); Brock Road/RR 1; Finch Avenue/RR 37; Scarborough-Pickering Townline/RR 30
P9	3 rd Concession (Rossland); Ravenscroft/Rotherglen Roads; Highway 401; Brock Road/RR 1
P10	3 rd Concession (Rossland); Old Harwood Avenue; Kingston Road/Highway 2; Rotherglen/Ravenscroft Roads
P11	Kingston Road/Highway 2; Pickering Beach Road; Highway 401; Rotherglen Road

Sector	Sector Boundary (north; east; south; west)
P12	Highway 401; Pickering Beach Road; Bayly Street/RR 22; Duffin's Creek
P13	Bayly Street/RR 22; Harwood Avenue/RR 44; Lake Ontario; Duffin's Creek
P14	Bayly Street/RR 22; Pickering Beach Road; Lake Ontario; Harwood Avenue/RR 44
P15	Lawrence Avenue; Centennial Road; Lake Ontario; Morningside Avenue
P16	Highway 401; East Avenue; Lake Ontario; Centennial Road
P17	Ellesmere Road; Centennial Road; Lawrence Avenue; Morningside Avenue
P18	Sheppard Avenue; Little Rouge River; Ellesmere Avenue; Morningside Avenue
P19	Old Finch and Steeles Avenue; Scarborough-Pickering Townline/RR 30; Sheppard Avenue; Morningside Avenue
P20	Whitevale Road; Brock Road/RR 1; 3 rd Concession (Rossland); Markham-Pickering Townline/RR 30
P21	Whitevale Road; Audley Road; 3 rd Concession (Rossland); Brock Road/RR 1
P22	3 rd Concession (Rossland); Hall's Road and Lynde Creek; Lake Ontario; Pickering Beach Road and Harwood Avenue

Table 4 - Population* Estimate for Pickering Sectors

Sector	Population (maximum)
P1	8,900
P2	4,740
P3	5,675 (City of Toronto)
P4	8,330
P5	17,190
P6	11,140
P7	15,900
P8	15,620
P9	17,810
P10	16,190
P11	9,150
P12	3,670
P13	8,810
P14	9,420
P15	10,898 (City of Toronto)
P16	7,224 (City of Toronto)
P17	14,604 (City of Toronto)
P18	19,407 (City of Toronto)
P19	9,541 (City of Toronto)
P20	1,830
P21	36,450
P22	25,630

Sector	Population (maximum)
PNGS	4,500
Region of Durham TOTAL	215,280
TOTAL DPZ (incl. Toronto)	282,629

* Population estimates based on the 2016 Canada Census data.

2.8 Containment Hold Up Time Estimates

The timing of any release of radioactivity following an accident at a nuclear station depends on the characteristics of the accident as well as the containment system. The containment design for Darlington and Pickering NGS involves the use of a vacuum building to control any release of radioactive contaminants.

Over time, the vacuum will become depleted which will require a controlled, filtered discharge to the atmosphere. The normal procedure would be to vent through the filtered air discharge system shortly before the vacuum building reaches atmospheric pressure. For planning purposes, the hold-up times for containment at the nuclear stations are as follows:

- Darlington NGS: 7 days
- Pickering NGS: 2 days

2.9 Evacuation Time Estimates

Ontario Power Generation (OPG) has commissioned an American company to conduct traffic engineering evacuation time estimates for the Planning Zones around the Darlington and Pickering stations. Evacuation time estimate studies are prepared and updated to facilitate planning and the management of transportation during a response.

The 2018 study for Darlington used 2016 census data and took into account the roadway infrastructure network, mobilization time required by evacuees to make preparations, voluntary evacuation of people when not ordered to do so, school population, special events, ridesharing, weather, time-of-day, time-of-week, time-of-year, and traffic management strategies by Durham Police, as well as shadow evacuations of people who live beyond the 10 km zones. For the study, 700 unique cases were modelled, based on 50 different evacuation regions and 14 separate scenarios resulting in the following worst case evacuation time estimates for Darlington:

- Automatic Action Zone – 5 hours and 15 minutes
- Detailed Planning Zone – 5 hours and 25 minutes
- All Planning Zones (to 20 km) – 11 hours and 55 minutes

The 2018 study for Pickering, using the same methodology described above, 742 unique cases were modelled, based on 53 different evacuation regions and 14 separate scenarios resulted in the following worst-case evacuation time estimates for Pickering:

- Automatic Action Zone – 5 hours and 50 minutes
- Detailed Planning Zone – 7 hours
- All Planning Zones (to 20 km) – 14 hours and 40 minutes

2.10 Concept of Operations

Operations to deal with a nuclear emergency will be conducted in three phases: The Early Phase, the Intermediate Phase and the Recovery Phase.

The Early Phase

The Early Phase begins with an initial notification and actions will be based on preliminary status and prognosis of the nuclear or radiological emergency. This phase may last from hours to days. During this phase, the following may be required:

- Exposure control protective measures
- Ingestion control protective measures
- Emergency worker protective measures

The Intermediate Phase

The Intermediate Phase begins once the radioactive release or source is brought under control 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.

The protective action strategies listed above will also be used in this phase but decisions made will be based on the Operational Intervention Levels as well as the operational situation.

The Recovery Phase

The Recovery Phase involves longer term action to restore conditions to normal, pre-emergency conditions. This phase will continue to involve ingestion control measures and on-going monitoring of the environment.

Recovery phase actions may include:

- Care for persons exposed and/or contaminated
- Psychosocial support
- Long-term relocation issues
- The resettlement of and return of individuals affected
- Long-term support to the public living in contaminated areas
- Decontamination or reconstruction of property damaged as a result of the emergency and associated response activities
- Economic impact studies and studies on how to revive local business activity

3.0 Nuclear Emergency Response Organization

3.1 Province of Ontario

Overall Direction

Response organizations for a nuclear emergency are the same as for any emergency. However, in a nuclear emergency, the Province of Ontario will provide overall direction to the management of the response through the Provincial Emergency Operations Centre (PEOC).

The PEOC shall normally coordinate the emergency management response in Durham Region through the Regional Control Group (RCG) in the Regional Emergency Operations Centre (REOC). However, if there are communication problems, the PEOC may issue directions directly to any element of the emergency response organization.

Provincial Emergency Operations Centre

The PEOC is organized using the Incident Management System (IMS) and includes the following sections: Command, Operations, Planning, Logistics, Finance and Administration, and Science. The Scientific Section is responsible for providing advice on projected offsite effects, coordinating radiation monitoring efforts and performing technical assessments of the developing situation.

Provincial Emergency Information

The Provincial Emergency Information Section will be activated for a nuclear emergency. The Province will issue news releases and other information products, coordinate news conferences, monitor media and the public's perception of and reaction to the situation, and provide key messages and information to activated call centres. The Province will coordinate the development and release of information with the Region's Emergency Information Centre (EIC) at the REOC to ensure consistent messaging at all levels.

Unified Transportation Coordination Centre

A Unified Transportation Coordination Centre (UTCC) will be established by the Ontario Provincial Police (OPP) to implement the Unified Transportation Management Plans (UTMPs). The UTCC is responsible for the management of evacuations as well as the traffic impact beyond it. The UTCC includes representatives from the OPP, Durham Region Police, York Region Police, Toronto Police, road and transit authorities, Ministry of Transportation and others as required.

Liaison

The PEOC will normally provide a liaison officer to the Regional Emergency Operations Centre during a nuclear emergency.

3.2 Ontario Power Generation

Corporate Emergency Operations Facility

OPG will establish their Corporate Emergency Operations Facility (CEOF) in the event of a nuclear emergency. The CEOF is an off-site facility common to the nuclear sites that coordinates and manages the overall OPG nuclear response to a nuclear emergency. The CEOF supports the nuclear station with technical and financial resources and operates under the auspices of the Chief Nuclear Officer (CNO). The CEOF will liaise directly with the PEOC and not Durham Region.

Site Management Centre

The affected nuclear generating station will establish a Site Management Centre (SMC) for an emergency. The SMC is the on-site facility where station management augmentation and technical staff assemble. Overall site emergency response is managed from the SMC, including the support to and oversight of the Main Control Room and EOC.

Liaison

The affected nuclear generating station will provide a liaison officer to the REOC. The liaison officer will coordinate OPG support to the Region and provide situational updates related to the emergency.

3.3 Regional Municipality of Durham

General

The Regional Chair will manage nuclear emergency response activities in Durham Region through the RCG working out of the REOC. The Regional emergency response organization which consists of all the entities that report directly to the REOC (see Figure 5) will be responsible for the implementation of the DNERP.

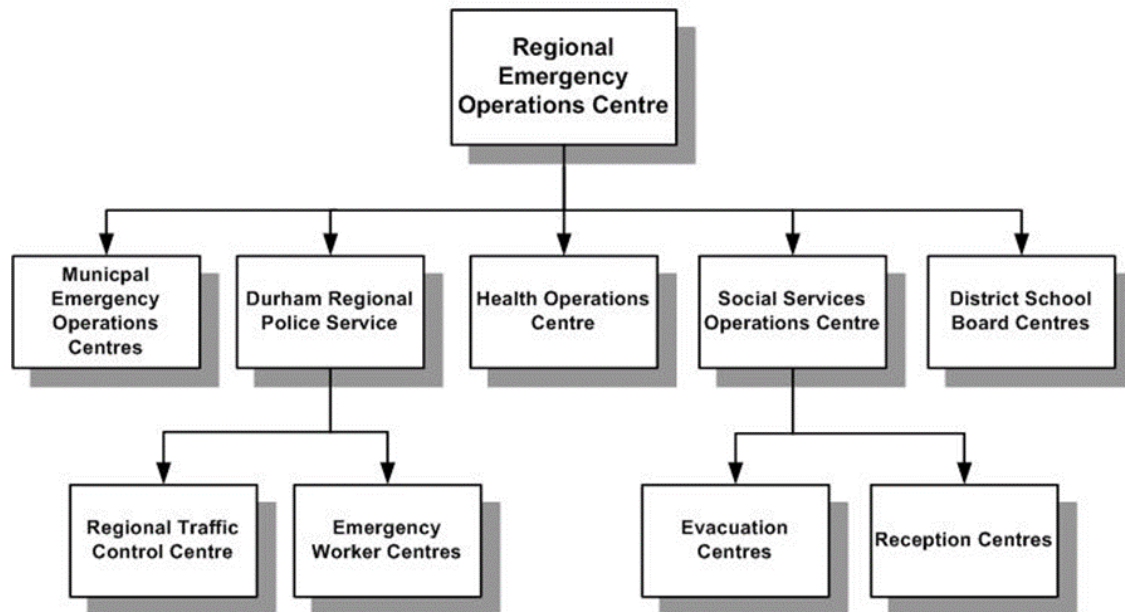
Regional Emergency Operations Centre

The REOC coordinates emergency operations within Durham Region, monitors operations conducted by other agencies and coordinates Regional resources in support of other agencies. It is responsible for implementing Provincial directives during a nuclear emergency.

The REOC is organized utilizing the Incident Management System (IMS). The Management Section is supported by the RCG, established under By-law 36-2015, which is composed of Department Heads, the Chief of Police and other senior Regional staff under the management of the CAO.

Figure 5 - Regional Nuclear Emergency Response Organization

REGIONAL EMERGENCY RESPONSE ORGANIZATION



Departmental Operations Centres

For a nuclear emergency, Regional Departments such as Health and Social Services will establish the Health Operations Centre (HOC) and the Social Services Operations Centre (SSOC), respectively. These centres will coordinate Departmental response activities, coordinated through the REOC.

Regional Traffic Control Centre

The Regional Traffic Management Centre (TMC) will be set up as a Regional Traffic Control Centre to be staffed by DRPS and supported by the Works Department to implement traffic control measures required by the Unified Transportation Coordination Centre (UTCC) in Toronto. The TMC maintains direct contact with the UTCC but is under command of the Chief of Police at the REOC.

Reception Centres

If required and so ordered by the PEOC, reception centres will be set up during nuclear emergencies to monitor and decontaminate people and to provide emergency reception services. OPG staff will operate the monitoring and decontamination units while Social Services will coordinate the reception of evacuees including registration and inquiry,

allocation to evacuation centres, first aid and other personal support services. In Durham Region, reception centres are planned to be established at the following locations:

- Durham College, Oshawa
- Delpark Homes Centre (formerly Legends Centre), Oshawa

Additional fixed reception centres will be established by host municipalities designated in the provincial plan (see Section 3.5 below).

Evacuation Centres

Evacuation centres may be set up by Social Services to provide emergency temporary shelter for people who evacuate but have no other place to stay. According to the PNERP, for a nuclear emergency, the majority of temporary shelter requirements for evacuees will be provided by host municipalities. For more detailed information, please refer to the Evacuation and Reception Centre NESF.

Emergency Worker Centres

Emergency Worker Centres (EWCs) will be set up in the event of a nuclear emergency to protect emergency workers by providing monitoring and decontamination services. When ordered by the PEOC, all workers (including police, fire, paramedic services, transit, utilities, provincial and federal survey teams, etc.) will be required to report to an EWC before entry into the Detailed Planning Zone. Durham Regional Police has operational control of the two EWCs in Durham Region and OPG staff will provide monitoring and decontamination services for workers entering and exiting the zone. The City of Toronto is responsible for one EWC.

Table 5 - Emergency Worker Centre Location and Responsibility

Emergency at	Emergency Worker Centre	Responsibility
Pickering NGS	Centennial College, Scarborough	City of Toronto
	Iroquois Park, Whitby	Durham Region
Darlington NGS	Orono Arena, Clarington	Durham Region
	Iroquois Park, Whitby	Durham Region

If the identified emergency facilities are at risk of exposure to a radioactive plume, the Region of Durham will collaborate with the PEOC to determine which alternate facilities would be used to support the emergency response. In the event of an emergency where all previously identified alternative facilities are unavailable, the PEOC will identify and

source appropriate alternate facilities and communicate the location of these facilities to the REOC.

3.4 Local Municipalities

The municipalities of Ajax, Clarington, Oshawa, Pickering and Whitby will open their Municipal Emergency Operations Centres (MEOCs) to coordinate the implementation of protective measures in their respective communities and to support the overall Regional response to the emergency. The municipalities of Uxbridge, Brock and Scugog may also be required to assist especially if there is an order to evacuate.

3.5 Designated / Host Municipalities

The provincial plan designates municipalities to act as a host municipality in the event of a nuclear emergency. Host municipalities will have plans for the reception and accommodation of evacuees and for the coordination of monitoring and decontamination arrangements. Host municipalities and planned reception centre locations are shown below:

Table 6 – Designated / Host Municipality and Reception Centres

Emergency at	Host Municipality	Reception Centre
Pickering NGS	Region of Durham	Delpark Homes Centre
	Region of Durham	Durham College
	City of Peterborough	Sir Sanford Fleming
	City of Toronto	York University
Darlington NGS	Region of Durham	Delpark Homes Centre
	Region of Durham	Durham College
	City of Peterborough	Sir Sanford Fleming
	City of Toronto	York University

4.0 Operational Concepts

4.1 Control of Operations

In a nuclear emergency where the provincial plan has been activated, the Province will lead the offsite response through the PEOC. The Province may issue operational directives and emergency orders under the EMCPA.

Whenever the Province contemplates issuing operational directives or an emergency order for a protective action within Durham Region, the Province will consult with the Region through the REOC.

The Province will communicate response directives from the PEOC to the REOC. However, if communication problems exist, the PEOC may communicate directly to other entities of the Durham Region emergency management structure such as local municipalities.

4.2 Declaration of Emergency

Pursuant to Section 4 (1) of the EMCPA, the Regional Chair can declare that an emergency exists in the Region. The Regional Control Group will advise the Chair to make such a declaration when the DNERP is activated. The Solicitor General of Ontario will be notified immediately following the declaration of an emergency.

4.3 Public Alerting

The PNERP details the public alerting requirements that Durham Region must implement for the Detailed Planning Zones around the Darlington and Pickering Nuclear Generating Stations. OPG is required to provide the resources for the establishment and maintenance of the alerting system.

The public alerting requirement for the Automatic Action Zone (3 km) is as follows:

Provide within 15 minutes of initiation of the alerting system:

- warning to practically 100% of the people in that zone,
- whether they be indoors or outdoors, and
- irrespective of the time of day or year.

The term “practically 100%” means that the signal can be heard by nearly everyone in the 3 km zone unless exceptional circumstances (e.g. hearing impairment, loud machinery operations) provide an impediment.

Within the 3 km radius of the Pickering and Darlington Nuclear Generating Stations, the outdoor alerting system, consisting of 34 sirens, will sound steadily for 3 minutes to alert people to return indoors to turn on the radio or television for emergency information and follow instructions provided by the Province.

The public alerting requirement for the Detailed Planning Zone (3 - 10 km) is as follows:

Provide, within 15 minutes of initiation of the alerting system:

- warning to the population in all of the response sectors within the 3 to 10 km zone.

Emergency notification throughout the 10 km zone is achieved using an automated dialling system. Once activated, hundreds of phone calls are made simultaneously, delivering the same message to households and businesses. The outdoor and indoor alerting systems will be activated simultaneously.

In the case of a nuclear emergency with an on-going or imminent emission of radioactivity, the Region is authorized to immediately initiate the public alerting system. The PEOC will issue the appropriate emergency bulletins in order to ensure there is relevant information for the public to receive, once directed inside by the sirens. The provincial Alert Ready program may also be used to alert all populations within and beyond the Detailed Planning Zone.

4.4 Public Direction – Emergency Bulletins

The aim of public direction is to provide to the affected population, direction and guidance regarding protective measures they should undertake.

Public direction will be implemented through the release of emergency bulletins through broadcast and social media. It is the responsibility of the PEOC to issue emergency bulletins. The Region will be consulted on and notified of the release of any bulletins.

4.5 Emergency Information

The aim of emergency information is to provide to the public and to the media, timely and accurate information on the emergency, the measures being taken to deal with it and action to be taken by the public.

Each jurisdiction (Province, OPG, Region, local municipalities) is responsible for providing emergency information related to their respective operations. Every effort will be made to ensure that the information being developed and issued is coordinated and consistent with the overall messaging from the Provincial Emergency Information Section, particularly with respect to protective actions and status information.

In Durham Region, the Director, Corporate Communications, will act as the Emergency Information Officer (EIO) in the event of a nuclear emergency. The EIO will receive direction from the RCG and oversee the emergency communications structure, including the Emergency Information Centre, Public Inquiry Centre and Media Centre, located at Regional Headquarters. The EIO will support the operation of a Joint Information Centre (JIC), established by the Provincial Chief EIO, to the extent possible, including the provision of an emergency information liaison. Details of emergency information can be found in the Emergency Information, Emergency Support Function.

4.6 Protective Action Decision Making

During the response to a nuclear emergency, the PEOC will implement a protective action response strategy to protect the public and responding emergency workers from the effects of a radioactive emission. The response strategy will be based on technical assessments which includes details of the accident and its prognosis, re-pressurization

time for the vacuum building, venting data and projections, evacuation requirements and public safety considerations.

Protective measures will 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. Decision making, based on generic criteria should commence before exposure is expected to occur with an assessment of projected doses to determine the need for any protective and precautionary measures. Generic criteria are used in the early stages of an emergency, prior to the availability of actual radiation monitoring data.

Where a protective measure is warranted, the PEOC will consult with the Region if time permits, and then issue an operational directive or, once an emergency is declared, an order for that protective measure to be carried out. The PEOC will also issue the emergency bulletins to the public. Protective actions include:

- Exposure Control Measures
Designed to avoid or limit exposure to the source of radiation and surface deposits from it. These measures include entry control, thyroid blocking (use of KI pills), sheltering indoors, evacuation and decontamination.
- Ingestion Control Measures
To avoid or reduce the risk from ingestion of contaminated foodstuff and water. Measures include milk, water, pasture, produce, crop and livestock control.
- Precautionary Measures
These facilitate the application and effectiveness of protective measures and include closing of beaches, recreation areas, schools and workplaces, entry control to affected areas and suspension of non-critical patient admissions in hospitals.
- Additional Measures
The PEOC Commander may recommend other practical dose reduction measures to the public such as respiratory protection, self-decontamination and staying indoors as much as possible.

Protective actions are complementary to each other and may be applied in combination as appropriate to the situation, taking into account their respective efficacies and limitations. Precautionary measures should be directed in advance of, or in combination with protective measures, as appropriate. Unlike protective measures, precautionary measures are not associated with a numerical intervention level.

Operational Intervention Levels

Operational Intervention Levels (OILs) are used once radiation monitoring data is available to determine the need to continue or implement further protective measures such as ingestion control or temporary relocation. There are 4 classifications for OILs:

1. Ground Monitoring OILs – used to identify areas 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.
2. Skin Monitoring OILs – used to identify individuals with enough radioactive material on the skin to warrant response actions such as decontamination.
3. Food, Milk and Drinking Water OILs – used to confirm and adjust initial restrictions on food, milk and drinking water restrictions.
4. Thyroid Monitoring OILs – used to identify individuals warranting registration and medical follow-up due to the intake of radioiodine.

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

4.7 Sheltering

Sheltering is a protective measure that uses the shielding properties of buildings to reduce the radiation dose to people inside and is generally undertaken during the early or intermediate response phases. This is considered a very temporary measure, normally limited to a maximum of 2 days.

Sheltering may be utilized as a protective measure if there is insufficient time to safely evacuate an area or where circumstances prevent a safe evacuation such as severe weather, environmental hazards, transportation impediments or vulnerable populations for whom evacuation poses greater risks than that of the hazard itself.

In general, all sectors adjacent to those being evacuated will be ordered to shelter. If possible, the operational directive to shelter will be issued by the PEOC at least 4 hours prior to the expected commencement of an emission.

For sheltering, an emergency bulletin from the PEOC will direct that people go or remain inside. All doors and windows and fireplace dampers should be closed, and air conditioners and furnaces turned off. If possible, go to a basement or a ground floor room with no windows.

4.8 Evacuation

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 exposure to the plume or deposited radiation. Emergency bulletins to evacuate will be issued by the PEOC to the affected population.

“Shadow” evacuations may occur spontaneously in areas close to the Detailed Planning Zone and therefore will contribute to road congestion. Shadow evacuation is when people living outside the area at risk choose to leave which may impede evacuees from an area that is at risk.

Families will want to reunite and evacuate together, if possible. The ability for families to unite will depend on the entry control measures put in place due to the severity of the accident and the timing of an emission. All routes will be utilized to evacuate the Detailed Planning Zone. There are no designated routes out. Durham Region Transit will support the evacuation operations out of the zone, in concert with DRPS, for those people without vehicles.

It is assessed that the majority of evacuees will make their own arrangements for alternate accommodation. Host municipalities will be designated to assist Durham Region with the reception and care of evacuees.

Emergency plans of those school boards with schools in the Detailed Planning Zone should detail the arrangements for the transportation of students and staff to pre-arranged temporary "holding" schools. If directed, evacuated students and staff may be required to go first to a monitoring and decontamination unit. Evacuated students are the responsibility of their respective school boards until collected from the holding school by their parents/guardians.

Emergency plans for Regional long-term care facilities and other institutions will include provisions for the transfer of patients/residents to appropriate facilities outside the Detailed Planning Zone.

4.9 Thyroid Blocking

In the event of a serious accident at a nuclear station, radioactive material may escape, including radioactive iodine. 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.

OPG is required to procure adequate quantities of KI pills for the 10 km zone populations around the Darlington and Pickering NGS, pre-distribute KI to all homes and businesses within 10 km, and make available to anyone within 50 km who may wish to possess it.

Detailed Planning Zone institutions such as schools, childcare centres, health care facilities and emergency facilities are the responsibility of the Durham Region Health Department. Procedures for the administration of KI and the approved dose are contained in Potassium Iodide (KI) Distribution Nuclear Emergency Support Function.

The order to take KI will be made by the Chief Medical Officer of Health for the Province in coordination with the PEOC and the local Medical Officer of Health and is normally undertaken during the early and intermediate phases. As KI pills only provide protection against one radioisotope, this measure is optimally used in combination with other protective measures.

4.10 Monitoring and Decontamination

In the event of a delayed emission, evacuees will likely not require monitoring or decontamination. In the event of an on-going emission, evacuees may be exposed to varying levels of contamination. Contamination would be in the form of loose particulate on people. Internal contamination may be present in some individuals.

Monitoring and decontamination of the public, if required, will be accomplished by the establishment of Monitoring and Decontamination Units (MDU) by OPG. Currently, there are plans to establish MDUs at the fixed reception centres listed in Section 3. OPG also has 2 mobile MDUs which can be deployed to additional pre-designated locations as required.

If it is estimated that evacuees will clear the affected area before an emission occurs, they will not be directed to MDUs for monitoring and decontamination. Evacuees from sectors not affected by the emission will be directed to go to a destination of their choosing.

If evacuees cannot clear the affected area before an emission, they may be directed to proceed for monitoring and decontamination. The first priority is for the public to leave the affected area as quickly as possible. If MDUs are not yet set up, evacuees will be advised to go to a destination of their choice, shower and bag their clothes. MDUs will be set up and direction from the PEOC on decontamination or reassurance monitoring will be provided once the initial evacuations have been completed.

Details of personal decontamination procedures will be provided through emergency bulletins from the PEOC as will the locations of MDUs when they are operational.

4.11 Radiation Health Response

If there is a reasonable possibility of significant radiation exposure, the Ministry of Health will implement the Provincial Radiation Health Response Plan. This includes monitoring for internal contamination, maintaining a database of potentially affected people, counselling and conducting a public health information program.

4.12 Environmental Radiation Monitoring

The PEOC has overall responsibility for the organization and coordination of radiation monitoring resources. Environmental radiation monitoring teams will be directed to gather information about contamination, including plume and depositions, air and ground concentrations and exposure rates. Data that is gathered will be collated and coordinated through the PEOC.

The Environmental Radiation and Assurance Monitoring Group (ERAMG) is a multi-jurisdictional group comprised of representatives from designated provincial ministries, the federal government and reactor facilities staff primarily focused on post-release activities such as conducting surveillance and monitoring of the environment and sampling air, water, milk and foodstuffs. The results of their surveys will be assessed by

the province against pre-determined Operational Intervention Levels, to identify any areas where additional protective actions and other response actions are warranted or where measures can be rescinded where they are no longer required.

4.13 Emergency Worker Safety

The Ministry of Labour will oversee the system of emergency worker safety during a nuclear emergency. Emergency workers will only be allowed to enter affected response sectors in order to provide or maintain essential services. All emergency workers will report to an EWC prior to entry into a potentially contaminated zone. An exception to this is DRPS officers who are trained and are equipped with personal monitoring equipment who may be required to enter a sector before an EWC is functioning.

Two EWCs will be established for the affected nuclear station under management of the DRPS. At these centres, emergency workers will be provided with personal monitoring devices and be briefed by OPG staff on the precautions they should observe and the maximum limit on their stay in the sector. After completing their assigned tasks, the emergency workers will again report to the EWC for monitoring and debriefing, and decontamination if required.

In the event of an emergency, the PEOC will assign a safety status and colour code to all response sectors in the 10 km zone around the affected NGS based on the projected dose rate. The colour codes used are as follows:

Table 7 – Emergency Worker Safety – Sector Status Colour & Dose Rate

Sector Status Colour	Dose Rate
Green	Up to 1 $\mu\text{Sv/h}$ or Up to 0.1 mrem/h
Yellow	1 $\mu\text{Sv/h}$ - 25 $\mu\text{Sv/h}$ or 0.1 mrem/h – 2.5 mrem/h
Orange	25 $\mu\text{Sv/h}$ - 1000 $\mu\text{Sv/h}$ or 2.5 mrem/h – 100 mrem/h
Red	>1000 $\mu\text{Sv/h}$ or > 100 mrem/h

Precautionary measures will be implemented as ordered by the PEOC and based on the colour code. The following table is a summary of precautionary measures:

Table 8 – Precautionary Measures for Emergency Workers

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 <i>foodstuffs</i> and beverages.
ORANGE	<ul style="list-style-type: none"> a) Pregnant workers <i>shall</i> not enter the sector. b) Report to the <i>Emergency Worker Centre (EWC)</i> before entering the sector. c) Carry <i>personal monitoring</i> devices and observe all precautions prescribed by the EWC. d) <i>Dosimeters should</i> 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 <i>shall</i> be limited to 4 hours, or the time prescribed by the EWC. g) Report again to the EWC on leaving the sector.
RED	<ul style="list-style-type: none"> a) Pregnant <i>emergency workers and helpers shall</i> not enter the sector. b) Report to the <i>Emergency Worker Centre (EWC)</i> before entering the sector. c) Enter the sector accompanied by a qualified escort provided by the <i>reactor facility</i> and <i>shall carry personal monitoring</i> devices. They <i>shall</i> observe any precautions prescribed by the EWC. d) <i>Dosimeters should</i> 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 <i>shall</i> be limited to one hour, or the time prescribed by the EWC. g) Report again to the EWC on leaving the sector.

See the Emergency Worker Centre, Nuclear Emergency Support Function, for more detailed procedures on the setup and operation of these centres.

4.14 Traffic Control

The Ministry of Transportation (MTO) will oversee the development and maintenance of Unified Transportation Management Plans. During an emergency, the Unified Transportation Coordination Centre shall be responsible for implementing the plan. The UTCC is located in the City of Toronto and includes staff from MTO and police services from Durham Region, Toronto, York Region and the OPP.

Traffic monitoring and control measures will be implemented in the Region through the Regional Traffic Management Centre (also see Section 3.3).

Traffic control plans are designed to be implemented in three incremental stages:

- Stage 1
Implemented automatically when the DNERP is activated. At this stage traffic will be monitored on all major routes out of the Detailed Planning Zone. The aim at this stage is to ensure that traffic keeps flowing as smoothly as possible.
- Stage 2
Shall be ordered by the PEOC when it appears likely that evacuations may become necessary, or if spontaneous evacuations begin. Highway 401 will be closed to through traffic and a diversion route around the affected Detailed Planning Zone will be put into place. Entry into the Detailed Planning Zone will be controlled.
- Stage 3
Shall be ordered by the PEOC when particular response sectors are to be evacuated. Additional traffic control resources may be deployed to ensure that the evacuee traffic moves as safely and quickly as possible out of the Detailed Planning Zone and beyond.
- Lake Sectors
Whenever it is likely that a radioactive emission will take place, the PEOC will issue operational directives to clear boat traffic from Lake Sectors of the affected nuclear station and entry control will be imposed by the Canadian Coast Guard and assisted by the DRPS and Toronto Police marine units.

4.15 Radioactive Liquid Emission

A radioactive liquid emission in Durham Region is an accidental release into Lake Ontario of water containing tritium at levels above normal, with the potential to affect drinking water supplies.

The emergency response to a tritium release is dealt with differently than an atmospheric emission and is not part of the DNERP. The response to a liquid emission in Durham Region is detailed in the Liquid Emission (Tritium), Nuclear Emergency Support Function.

4.16 Public Awareness and Education Program

Durham Region's Public Awareness and Education Program includes general and specific risks, such as nuclear preparedness and education, to meet the requirements of the EMCPA and the PNERP. The nuclear emergency public awareness and education program activities are ongoing throughout the year and utilize a variety of media and social media and other public alerting tools to promote awareness. Materials used for preparedness campaigns, such as public alerting and KI distribution, are developed in collaboration with the province, OPG and other stakeholders as appropriate.

Displays, municipal safety day booths, community group presentations, social media campaigns, website information, public service announcements, "Are You Ready?" brochures, fact sheets and seasonal targeted materials are provided throughout the year to promote awareness. Key messages include how the public should prepare, what to expect and how to respond to a nuclear emergency, with focus on notifications/public alerting and protective actions, such as evacuations, shelter-in-place and KI pills. Public education materials can be accessed at durham.ca/demo.

The Region of Durham also participates as a key member of the nuclear emergency public awareness and education subcommittee that addresses PNERP requirements and objectives for both the Pickering and Darlington Nuclear Generating Stations. This subcommittee reports annually to the Nuclear Emergency Management Coordinating Committee.

5.0 Notification and Initial Response

5.1 Initial Notification

Initial notification is the report made by a nuclear generating station (NGS) to the Province and the Region that an event has occurred which requires immediate disclosure under the PNERP.

The affected NGS shall make a notification to the PEOC, DRPS Communications and DEM within 15 minutes of the requirement for notification being recognized. The NGS cannot terminate or cancel an initial notification once it has been made.

Details of the Durham Region notification are set out in the Nuclear Notification, Nuclear Emergency Support Function. This document outlines how key regional, municipal and other emergency response personnel will be contacted and what level of monitoring or response will be adopted, as directed by the Province. Please refer to Figure 6 for an overview of the notification process.

5.2 Initial Offsite Response

Initial offsite response is the action taken by the Province and Region which is appropriate for the initial notification. Within 15 minutes of the receipt of the initial notification from the NGS, the PEOC will decide on the initial response level to be

adopted by the Region and the Province. This direction will be provided to the DEM Duty Officer through established protocols.

The DEM Duty Officer will immediately call and notify the DRPS Communications Supervisor of the response level and any specific municipal protective action requirements and confirm that they are prepared to begin coordinating Durham Region's emergency response.

5.3 Notification Categories

There are four categories for initial notification which relate to the severity of the event at the NGS. The notification categories are:

- Reportable Event
Any event affecting the NGS which would be of concern to offsite authorities including any event that could reduce the nuclear station capability to deal with an emergency onsite.
- Abnormal Incident
An abnormal occurrence at the NGS which may have a significant cause or may lead to more serious consequences. Examples include a minor break in the physical integrity of the heat transport system and activation of the emergency cooling system or containment system.
- Onsite Emergency
A serious malfunction which results or may result in an atmospheric emission of radioactive material or is likely to result in an emission at a later time of more than 12 hours.
- General Emergency
An on-going atmospheric emission of radioactive material, or one likely within 12 hours, as a result of a more severe accident.

5.4 Activation of Nuclear Emergency Response Plans

The PEOC will determine the initial offsite response to all NGS nuclear emergency notifications. The offsite response level will be communicated by the DEM Duty Officer to all appropriate municipalities, departments and organizations. The PEOC will order one of the following levels of activation as an initial action:

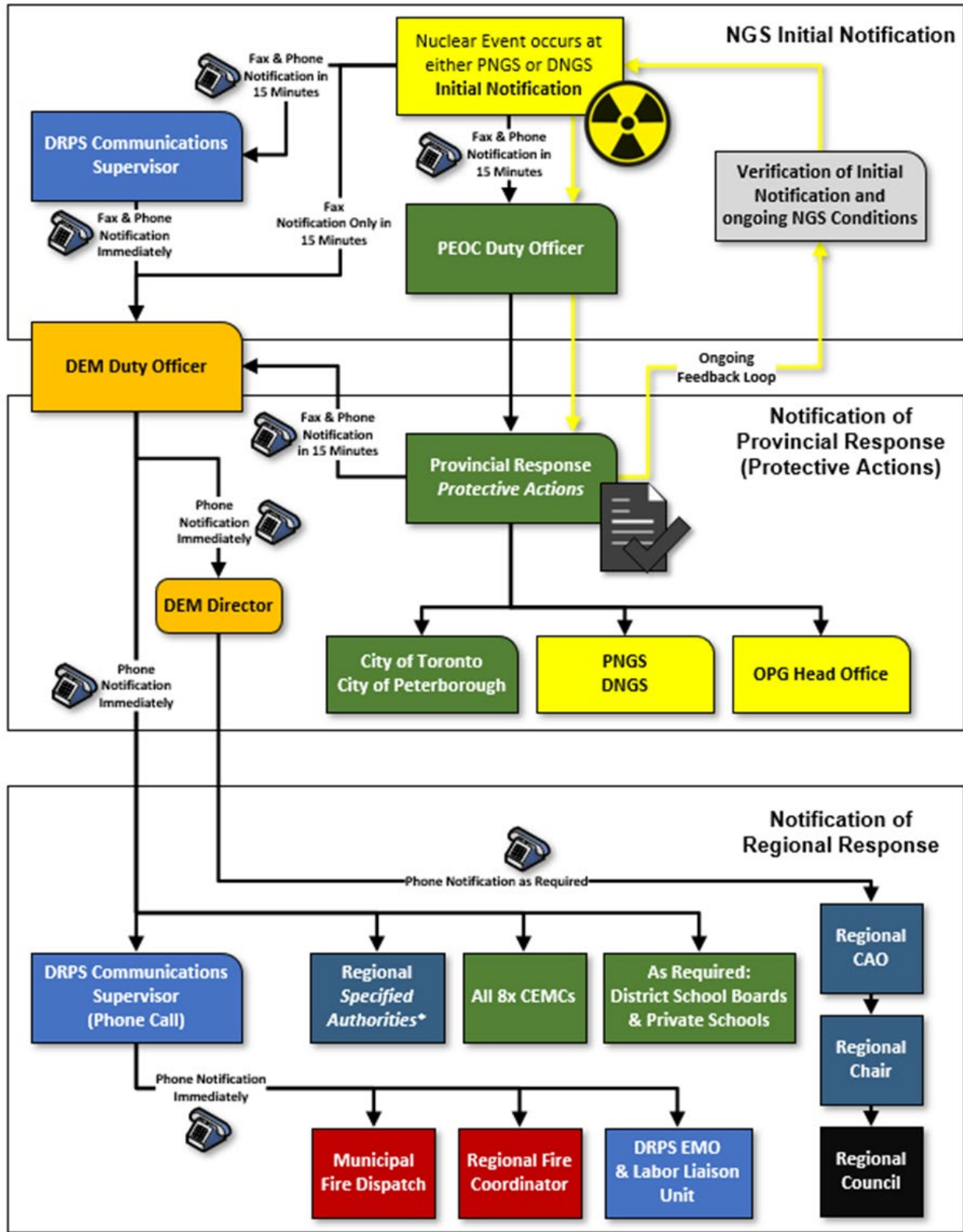
- Routine Monitoring
DEM staff and appropriate municipal and departmental emergency coordinators will monitor the situation and review emergency preparedness arrangements from their normal workplaces.

- Enhanced Monitoring
DEM staff and appropriate municipal and departmental emergency coordinators will increase the level of staffing to monitor the developing situation. Organizations may be required to monitor the situation from their respective operations centres with minimum staffing, 24 hours a day.
- Partial Activation
Protective measures are not immediately required but may become necessary if the situation deteriorates. All emergency response personnel are placed on standby, operations centres at all levels are fully staffed to monitor or assess the situation and other emergency centres (reception centres, EWCs) are readied to become fully operational.
- Full Activation
It is expected that protective measures will be necessary to deal with the emergency. All operations and appropriate emergency centres are fully staffed, 24/7. All emergency response staff with designated roles will report to their place of duty.

5.5 Public Alerting System Activation

The PEOC will order the activation of the public alerting system, depending on the initial notification level and will issue a corresponding emergency bulletin prior to sounding the alerts. This will typically be directed for an on-site or general emergency at the NGS.

Figure 6 - Overview of Notification Process



6.0 Operational Response

6.1 Monitoring

The initial operational response for a Reportable Event or Abnormal Incident is monitoring.

For a Reportable Event, the response is Routine Monitoring. The DEM Duty Officer will monitor the situation from the normal place of work or home. Similarly, local municipal emergency management coordinators will monitor from their normal place of work or home.

For an Abnormal Incident, the response is Enhanced Monitoring and DEM staff may monitor the situation from the REOC if directed to do so by the PEOC. Similarly, local municipality emergency coordinators may monitor from their MEOCs.

6.2 Partial Activation (Delayed Emission)

The most probable scenario for an accident at a NGS is a delayed emission, with the holdup of any radioactive material in the containment system.

The general sequence of actions for a Delayed Emission with Partial Activation is as follows:

- Notification of the Regional emergency management organization and set up and full staffing of the REOC,
- Technical assessments of the accident and its projected effects by the PEOC Scientific Section. The assessment will include an evaluation of the accident and its prognosis, the operation of the NGS vacuum building, venting times, evacuation distances and recommended protective measures,
- Decisions by the PEOC on any precautionary and protective measures and directives to the Region, and
- Issuing of emergency bulletins by the PEOC.

Technical Assessment

The technical assessment will produce a projection of the maximum distance from the NGS at which the Generic Criteria for evacuation, sheltering and KI is likely to be reached during an emission. Once discussion with the REOC and decisions on protective actions are made, emergency directives and emergency bulletins will be issued to provide direction to the public.

The PEOC will upgrade to Full Activation response if it is determined that an emission is expected in 36 hours or less.

Precautionary Measures

The PEOC will consider, and discuss with the REOC, the implementation of precautionary measures. The application of precautionary measures will be conveyed to the public by emergency bulletins. The REOC and MEOCs must be prepared to implement these measures including:

- closing beaches and recreation areas,
- closing workplaces and schools,
- entry control,
- suspension of admissions of non-critical patients to hospitals,
- banning consumption of local water, milk, meat and produce.

Venting for Delayed Emission

Any radioactive material released would be held up in the vacuum building for a minimum of 2 days at Pickering NGS and for 7 days at Darlington NGS. This will create the opportunity to vent the material in a controlled manner. The PEOC will consult with the REOC as well as other organizations before decisions are taken regarding venting and the protective measures that should be implemented before venting is carried out.

6.3 Full Activation (Imminent / Ongoing Emission)

The PEOC will order Full Activation under the following circumstances:

- Upon receipt of a General or Onsite Emergency notification from the NGS,
- After a Partial Activation, at a later stage of an emergency, if the situation deteriorates, and
- If an emission will occur in 36 hours or less.

Imminent/Ongoing Emission Sequence

If the PEOC receives an initial notification from the NGS that an emission is imminent or on-going and there is insufficient time for the Scientific Section to assemble, the PEOC will take the following action:

- Initiate a Full Activation response,
- Issue an emergency bulletin to the broadcast media.
- Direct public alerting to be initiated
- Issue operational directives for sheltering and evacuation

For an Onsite Emergency, the default action is sheltering of the 3 km zone. For a General Emergency, the default action will be to evacuate the 3 km zone and shelter in

the remainder of the 10 km zone. As soon as the Scientific Section is assembled, it will undertake a rapid technical assessment to determine what further protective measures are required and to which sectors they are to be applied.

Evacuation and Personal Decontamination

If evacuations are being undertaken during an emission, the first priority is to leave the affected area as soon as possible. If Mobile Decontamination Units are not available because of time constraints, evacuees will be directed to go to a destination of their choice and decontaminate themselves (shower and put on fresh clothes). Details for decontamination will be provided in emergency bulletins issued by the PEOC.

KI and Sheltering

The decision to issue an operational directive for thyroid blocking by use of KI pills will be made by the Chief Medical Officer of Health for Ontario and MOHLTC in coordination with the PEOC. If sheltering in some sectors is determined to be required, an emergency bulletin will be issued at least 4 hours in advance of the commencement of any emission.

Emergency Worker Safety

For a nuclear emergency with an on-going emission at the Pickering Nuclear Generating Station, the default sector safety status (including Lake Sectors) will be as follows:

- Onsite Emergency
 - Sectors P1, P2, P23 - Orange
 - All other Sectors – Green
- General Emergency
 - Sectors P1, P2, P23 - Red
 - Sectors P3 through P14 and P24 -Orange
 - All other Sectors- Green

For a nuclear emergency with an on-going emission at the Darlington Nuclear Generating Station, the default sector safety status (including Lake Sectors) will be as follows:

- Onsite Emergency
 - Sectors D1 and D14 – Orange
 - All other sectors – Green
- General Emergency
 - Sectors D1 and D14 – Red
 - Sectors D2 through D5 and D15 – Orange
 - All other sectors - Green

In all other cases, if there is no ongoing emission, then the sector safety status for all sectors should be GREEN and should remain GREEN until an emission commences.

As soon as relevant data is available, the PEOC will reassign safety status to all of the sectors. Emergency workers who need to enter a sector that has been assigned a safety status other than Green will first report to an EWC where they will be provided with personal monitoring devices by OPG staff and be briefed on precautions they should follow. An exception to this is DRPS officers who are trained and are equipped with personal monitoring equipment who may be required to enter a sector before an EWC is functioning.

If an emission is ongoing, emergency services (police, fire and paramedic services) who may be required to enter a sector before an EWC is functioning will be equipped with personal protective equipment (e.g. respiratory protection, gloves, etc.), dosimetry, KI pills (one tablet to be ingested prior to entering a RED sector) and a card listing the default safety status of sectors and the precautions to be taken for each safety status.

Public Direction

Directions to the public on the protective measures they should take to ensure their safety during the emergency will be issued by the PEOC. The PEOC will provide public direction by use of emergency bulletins issued to media. Release of these bulletins will be coordinated with the REOC.

Emergency Information

When the offsite response is Routine or Enhanced Monitoring, the Director of the Communications Branch of the Ministry of Community Safety & Correctional Services, will prepare media releases on the situation. When the offsite response is Partial or Full Activation, the Provincial Emergency Information Section (PEIS) will be established. For Durham Region, the EIO will be responsible for preparing media releases on behalf of the Region and activating the Emergency Information Centre when the REOC is activated.

Table 9 - Overview of Operational Response Actions

Response Level (Associated Notification Category)	Provincial Response	Regional Response	Emergency Information/ Emergency Bulletin/ Public Alerting
<p>Routine Monitoring (Reportable/ Unusual Event)</p>	<ol style="list-style-type: none"> 1. PEOC informs municipality (and others) of level of response to be adopted. 2. PEOC monitors event. 3. PEOC Scientific staff consulted, if appropriate. 	<ol style="list-style-type: none"> 1. Regional notification to DRPS Communications, Regional Chair, CAO, municipalities and other Regional departments as required. 2. DEM to monitor situation from normal workplace and maintain regular contact with PEOC Duty Officer. 	<ol style="list-style-type: none"> 1. If and when appropriate, the Provincial Emergency Information Section (EIS) co-ordinates the issuance of news release(s).
<p>Enhanced Monitoring (Abnormal Incident / Alert)</p>	<ol style="list-style-type: none"> 1. PEOC informs municipality (and others) of level of response to be adopted. 2. PEOC monitors event. 3. External notifications to Michigan, New York, Ohio and Quebec are made. 4. PEOC to set up a duty team consisting of operations, EIS 	<ol style="list-style-type: none"> 1. Regional notification made to DRPS Communications, Regional Chair, CAO, Regional Clerk, REOC Staffing Plan members, RCG, Emergency Information, municipalities and other Regional Departments as required. 2. If ordered by the PEOC, DEM and 	<ol style="list-style-type: none"> 1. If and when appropriate, the Provincial EIS co-ordinates the issuance of news release(s).

Response Level (Associated Notification Category)	Provincial Response	Regional Response	Emergency Information/ Emergency Bulletin/ Public Alerting
	<p>and scientific staff, reactor facility operator representative(s) and others as required.</p> <p>5. Provincial staff (e.g. ERAMG) are notified to remain available to report in for duty.</p>	<p>the affected municipality emergency staff to monitor situation from REOC/MEOC(s)</p> <p>3. DEM to confirm communications arrangements with PEOC and other operations centres and review Regional preparedness arrangements.</p>	
<p>Partial Activation (Onsite / Site Area Emergency with no ongoing or imminent release)</p>	<p>1. PEOC issues the appropriate internal and external notifications informing municipalities and host communities, of level of response.</p> <p>2. PEOC is fully staffed and monitors event.</p> <p>3. Ministry EOCs and Unified Transportation Coordination Centre (UTCC) set up and staffed as appropriate.</p>	<p>1. Regional notification made to DRPS Communications, Regional Chair, CAO, Regional Clerk, REOC Staffing Plan members, RCG, Emergency Information, municipalities and other Regional Departments.</p> <p>2. All Regional Departments, Regional Police and municipal support staff with nuclear emergency</p>	<p>1. Provincial EIS set up and staffed.</p> <p>2. Consideration given to issuing emergency bulletins, news releases, or both, as soon as feasible.</p> <p>3. Follow-up news releases issued as and when appropriate.</p>

Response Level (Associated Notification Category)	Provincial Response	Regional Response	Emergency Information/ Emergency Bulletin/ Public Alerting
		<p>responsibilities placed on standby.</p> <p>3. REOC, EIC, and affected MEOC(s) to be set up with respective control group staff and operational. Key staff report or liaise with Regional emergency centres, as required. The other municipalities will adopt “enhanced monitoring” and Region Traffic Management Plan implemented.</p> <p>4. Other emergency centres will be ready to become operational without undue delay.</p> <p>5. REOC/MEOC(s) to monitor media and respond to public enquiries. News release may be issued.</p>	

Response Level (Associated Notification Category)	Provincial Response	Regional Response	Emergency Information/ Emergency Bulletin/ Public Alerting
<p>Full Activation</p> <p>(Onsite / Site Area Emergency with ongoing or imminent release within 12 hours OR a General Emergency)</p>	<ol style="list-style-type: none"> 1. PEOC issues the appropriate internal and external notifications and activates nuclear emergency response plans and organization. 2. PEOC is fully staffed and monitors event and when appropriate, directs the initiation of public alerting. 3. PEOC shall issue operational directives (e.g. suspension of road, rail and air throughout AAZ, evacuation and precautionary measures). 4. If emission is ongoing or if evacuations are not completed prior to emission, issue operational directives for evacuees to report for radiation 	<ol style="list-style-type: none"> 1. Regional response notification to entire Regional Emergency Response Organization. 2. Recall all designated Regional employees. 3. Activate the public alerting system. 4. Set up and fully staff all required EOCs, reception, evacuee and emergency worker centres, as well as EI centres in the Region. 5. Formally declare a Regional Emergency. 6. Implement traffic control and entry measures directed by UTCC. 7. Implement protective measures and operational 	<ol style="list-style-type: none"> 1. Provincial EIS set up and fully staffed. 2. PEOC to issue the appropriate emergency bulletins and operational directives. 3. Further emergency bulletins and news releases, or both, issued as appropriate.

Response Level (Associated Notification Category)	Provincial Response	Regional Response	Emergency Information/ Emergency Bulletin/ Public Alerting
	monitoring or to self-decontaminate, ingestion of KI pills and sheltering. 5. PEOC shall assess the situation for further action and issue further emergency bulletins as appropriate. 6. Ministry EOCs, and UTCC set up and fully staffed.	directives ordered by PEOC. 8. Ensure all PEOC directives/orders are communicated to local municipalities.	

6.4 Transition to Recovery

The PEOC will end the response phase of the emergency and move to the recovery phase at any time after both of the following conditions have been met:

- the nuclear reactor that had the accident is in a guaranteed shutdown state, and
- no further emissions at significant levels are anticipated (i.e. they do not adversely affect public safety and do not warrant any exposure control measures.)

The Region of Durham will participate as an impacted community to the extent possible and take direction from provincial and federal partners during the recovery phase.

7.0 Nuclear Emergency Facilities List

Regional Emergency Operations Centre (REOC)

Durham Region Headquarters
605 Rossland Road East, Whitby

Regional Traffic Management Centre

101 Consumers Drive, Whitby

Ajax Municipal Emergency Operations Centre

Ajax Fire Headquarters
900 Salem Road North, Ajax

Clarington Municipal Emergency Operations Centre

Clarington Fire Department
3333 Highway 2, Newcastle

Oshawa Municipal Emergency Operations Centre

Oshawa Fire Station #5
1550 Harmony Road North, Oshawa

Northview Community Centre
150 Beatrice Street East, Oshawa

Pickering Municipal Emergency Operations Centre

Dr. Nelson F. Tomlinson Community Centre (formerly Claremont Community Centre)
4941 Old Brock Road, Claremont

Municipal Office
One the Esplanade, Pickering

Whitby Municipal Emergency Operations Centre

Fire Department Headquarters
111 McKinney Drive, Whitby

Reception Centres in Durham Region

Delpark Homes Centre (formerly Legends Centre)
1661 Harmony Road North, Oshawa

Durham College
2000 Simcoe Street North, Oshawa

Reception Centre in City of Toronto

York University
4700 Keele Street, North York

Reception Centre in City of Peterborough

Sir Sanford Fleming College
599 Brealey Drive, Peterborough

Emergency Worker Centres

Iroquois Park Sports Centre
500 Victoria Street West, Whitby

Orono Arena and Community Centre
2 Princess Street, Orono

Centennial College
941 Progress Avenue, Scarborough

8.0 Glossary

Abnormal Incident

An abnormal occurrence that may have a significant cause and/or may lead to more serious consequences.

Absorbed Dose

The amount of energy absorbed in the body, or in an organ or tissue of the body, due to exposure to ionizing radiation, divided by the respective mass of the body, organ or tissue. Expressed in terms of sieverts (or rem).

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.

Acute Radiation Syndrome

An acute illness caused by irradiation of the entire body (or most of the body) by a high dose of penetrating radiation in a very short period of time.

Activation

Decisions and actions taken to implement a plan, a procedure or to open an emergency operations centre.

Alerting

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

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.

Cloudshine

Radiation from radioactive materials in an airborne plume.

Containment (System)

A series of physical barriers that exist between radioactive material contained in a nuclear installation and the environment. Containment usually refers only to the reactor and vacuum buildings, and integral systems such as dousing.

Contamination

The unwanted presence of radioactive material in water or air, or on the surfaces of structures, areas, objects or people.

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.

Decontamination

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

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 nuclear facility which has been designated under the *Emergency Management and Civil Protection Act*, as one that shall have a nuclear emergency plan.

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.

Deterministic Effects

Radiation-induced health effects including changes to cells and tissues that are certain to occur in an individual exposed to radiation.

Dosimeter

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

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 Workers

A person who assists in connection with an emergency that has been declared by the Lieutenant Governor in Council or the Premier, under 5.7.0.1 of the EMPCA or by the head of council of a municipality under section 4 of the EMCPA. This may include persons who are required to remain in, or to enter, offsite areas affected or likely to be affected by radiation from an accident, and for whom special safety arrangements are required. Examples of emergency workers include police, firefighters, ambulance and personnel from the Canadian Armed Forces, and other essential services. They shall not include radiation workers or ingestion monitoring field staff.

Emergency Worker Centre (EWC)

A facility set up to monitor and control radiation exposure to emergency workers.

Emission

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

Entry Control

The prevention of non-essential persons from entering a potentially dangerous area.

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.

Evacuation Centre

A centre which provides affected people with basic human needs including accommodation, food and water.

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.

Field Monitoring

The assessment of the magnitude, type and extent of radiation in the environment during an emergency by such means as field surveys and field sampling.

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 food storage to permit radionuclide decay, diversion of food to non-human, non-food chain use or disposal of unusable stocks.

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.

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.

Groundshine

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.

Imminent Emission

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 food 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 (d) restrict distribution of non-food commodities until further assessments

Initial Notification

The notification made by a nuclear 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 prescribed 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.

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.

Milk Control

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

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 caused by an actual or potential hazard to public health and property or the environment from ionizing radiation or from a nuclear facility.

Nuclear Establishment

A facility that uses, produces, processes, stores or disposes of a nuclear substance, but does not include a nuclear installation. 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 nuclear installations.

Nuclear Installation

A facility or a vehicle (operating in any media) containing a nuclear fission or fusion reactor (including critical and sub-critical assemblies). It includes, where applicable, any land, buildings, structures or equipment located at or forming part of the facility, and, depending on the context, the management and staff of the facility.

Offsite

Offsite refers to the area outside the boundary (fence) of a nuclear facility.

Onsite

Onsite refers to the area inside the boundary (fence) of a nuclear facility.

Operational Directives

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.

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.).

Pasture Control

Removing milk and meat producing animals from pasture and from access to open water sources and supplying them with uncontaminated feed and water.

Personal Monitoring

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

Personal Protective Equipment

Clothing or other specialized equipment provided to an off-site emergency worker to prevent or reduce their exposure to radioactive material.

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.

Plume

A cloud of airborne radioactive material that is transported in the direction of the prevailing wind from a nuclear facility. A plume results from a continuing release of radioactive gases or particles.

Precautionary Measures

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

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.

Protective Measures

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

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.

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.

Radiation

In the context of this Plan, radiation means ionizing radiation (i.e. radiation with the potential to harm human tissue or cells produced by a nuclear substance or a nuclear facility.)

Radiological Emergency

Emergency caused by an actual or environmental hazard from ionizing radiation emitted by a source other than a nuclear installation.

Radiological Device

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 food and water supplies.

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.

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.

Sheltering

A protective measure which uses the shielding properties of buildings and their potential for ventilation control to reduce the radiation dose to people inside.

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.

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.

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.

Venting

The release to the atmosphere of radioactive material from the containment of a nuclear facility through systems designed for this purpose.

Vulnerable Group

A group which, because it is more vulnerable to radiation, may require protective measures not considered necessary for the general population, such as pregnant women and, in some cases, children.

Water Control

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