

Ontario Power Generation Fukushima Emergency Response Drill Highlights

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**INTERNATIONAL WORKSHOP ON OCCUPATIONAL
RADIATION PROTECTION ON SEVERE ACCIDENT
MANAGEMENT: "*SHARING PRACTICES AND EXPERIENCES*"**

17-18 June 2014, Washington DC, USA

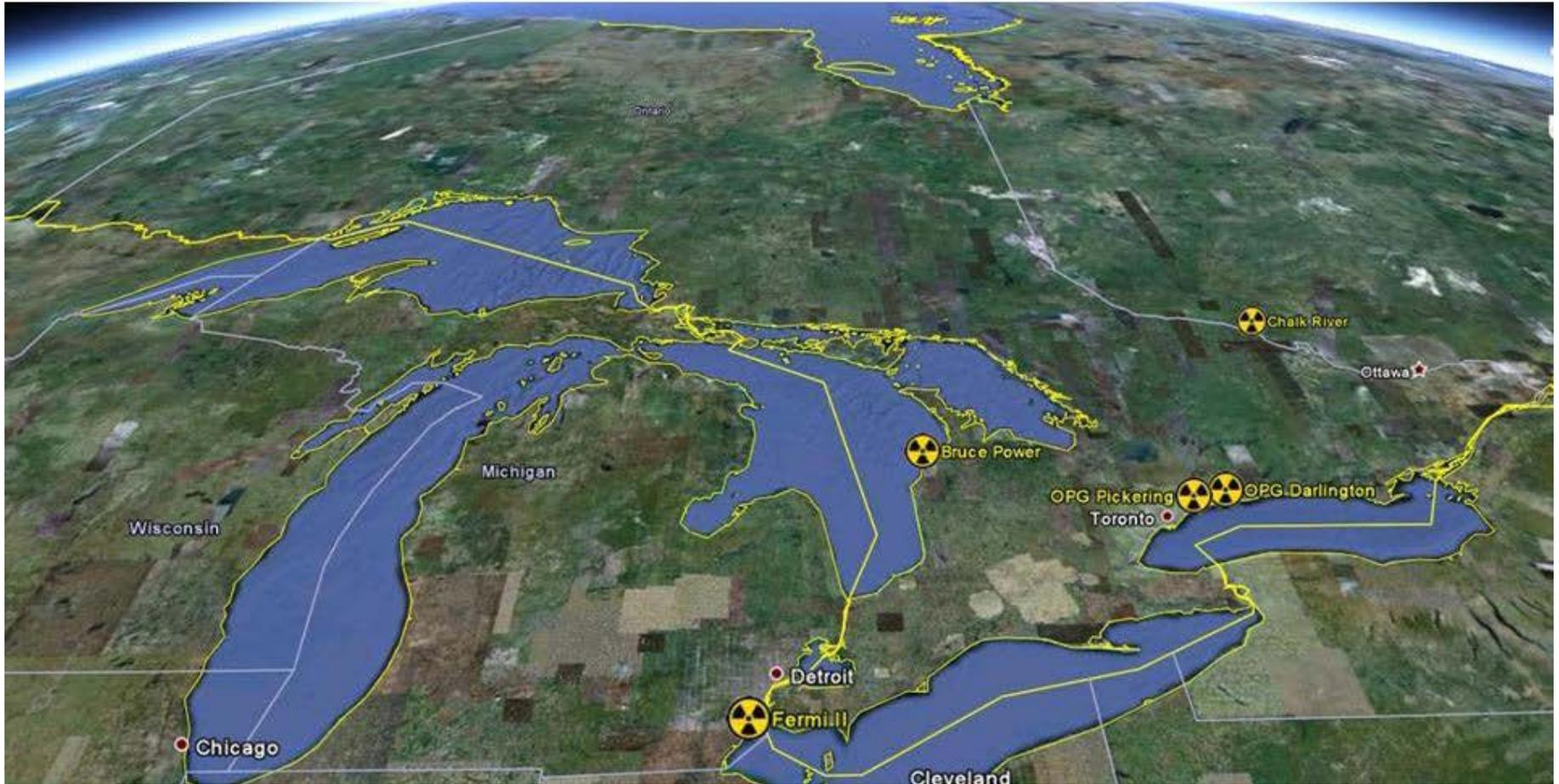
Darlington Exercise Unified Response Conducted

- April 11, 2011 Fukushima Daiichi Severe Accident Event in Japan resulted in a reassessment of nuclear emergency response and preparedness in Canada
- Ontario Power Generation planned and executed a full scale nuclear emergency response exercise on May 26, 27, & 28
- The Utility exercise included regional, provincial and federal bodies in the drill scenario

Exercise Objectives

- All participating organizations agreed to the following common exercise objectives:
- Focus on the response to a nuclear emergency at the Darlington site
- Demonstrate emergency response of the participating organizations to ensure public safety and environmental protection
- Test the interoperability and coordinator of the participating organization
- Prepare a joint evaluation of the interoperability, coordinator and integration of the organizations

Nuclear Facilities in Ontario



Canadian Legislation

I. Emergency Management and Civil Protection Act

- **Provides emergency powers to the Lieutenant Governor in Council (LGIC) and to the Premier to deal with emergencies.**
- **Includes guidelines for determining whether or not a provincial emergency should be declared and gives Cabinet powers to order the evacuation of an area, control travel into an area, and requisition property, among others.**

II. Ontario Regulation 380/04

- **Standards for ministry and municipal preparedness**

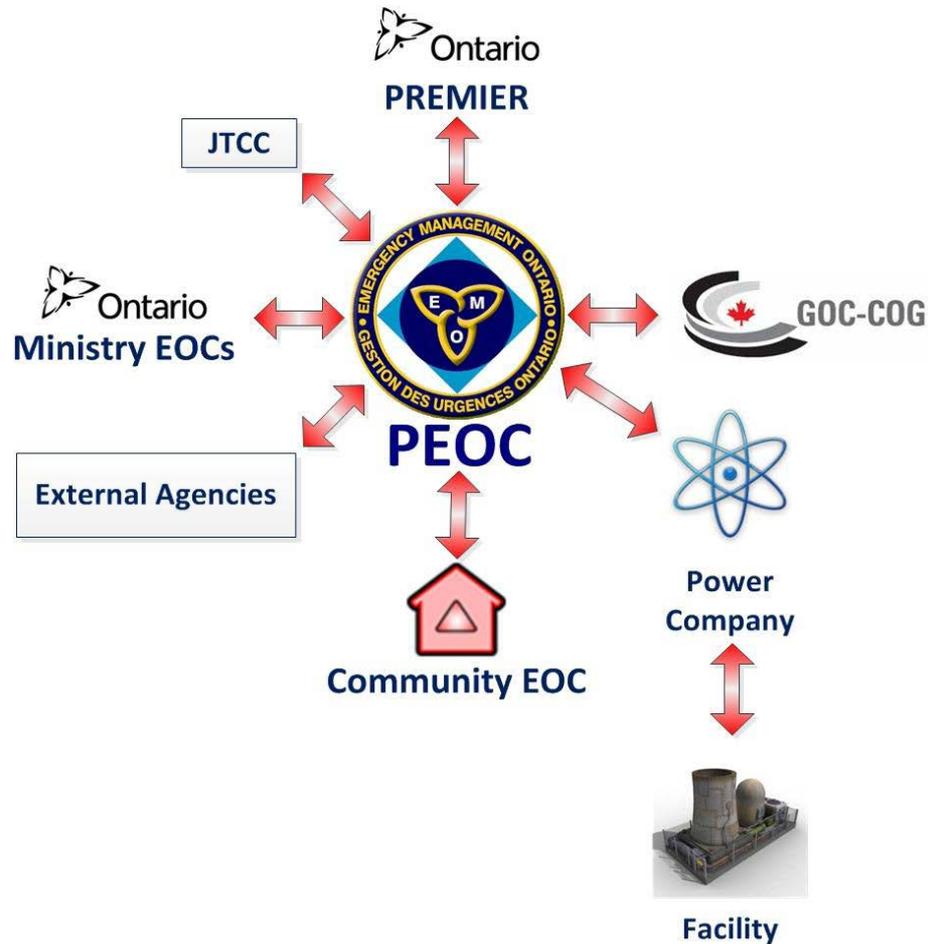
III. Order in Council 1157-2009

- **Special responsibilities assigned to 13 ministries**
- **•MCSCS: severe weather, civil disorder, space object crash**
- **•MNR: floods, forest fires, dam failures**

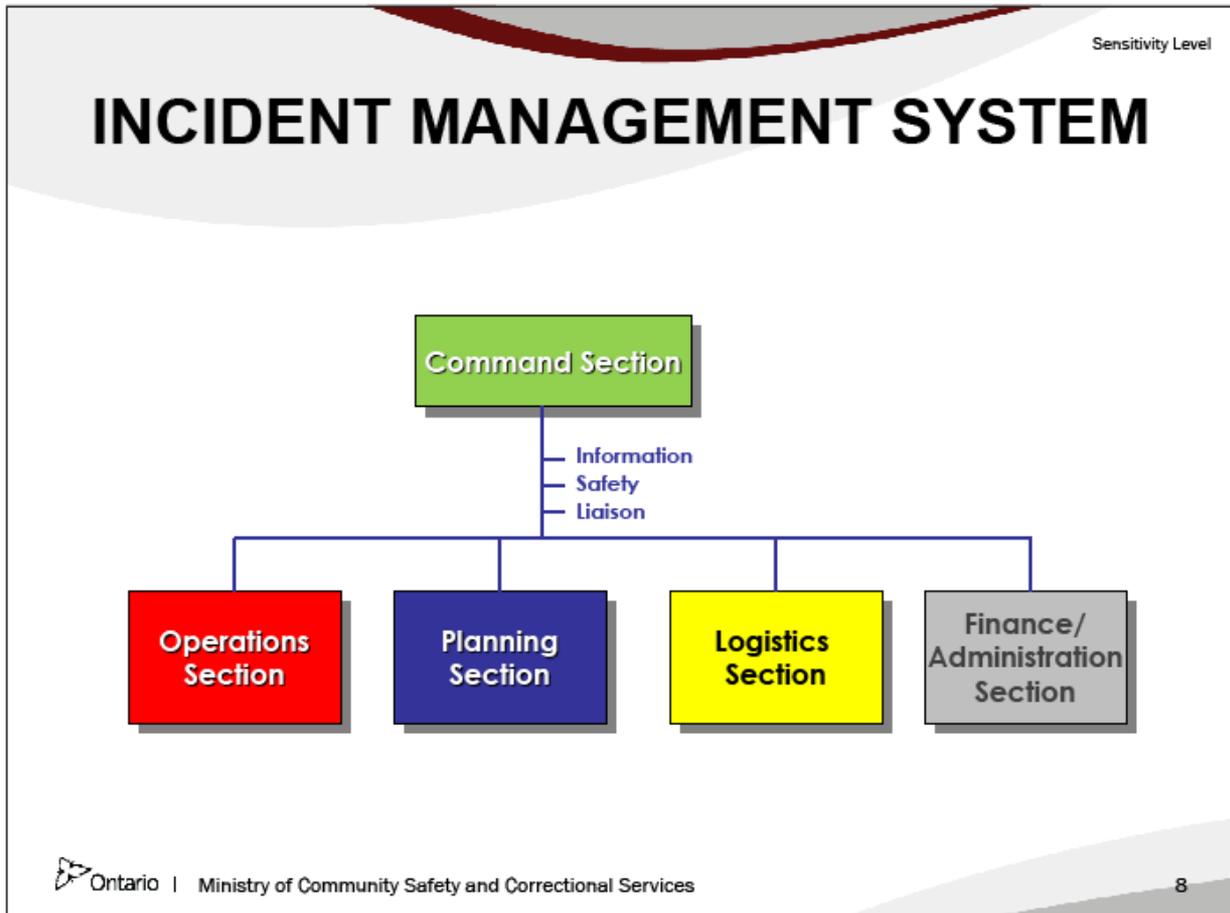
ONTARIO PROVINCE, CANADA

- •1 MILLION SQ KM
- •13 MILLION PEOPLE
- •7 MILLION in the GREATER TORONTO AREA (GTA)
- •< .5 MILLION PEOPLE < 10 KM FROM NUCLEAR PLANT
- •~ 100K < 10 KM FROM DARLINGTON

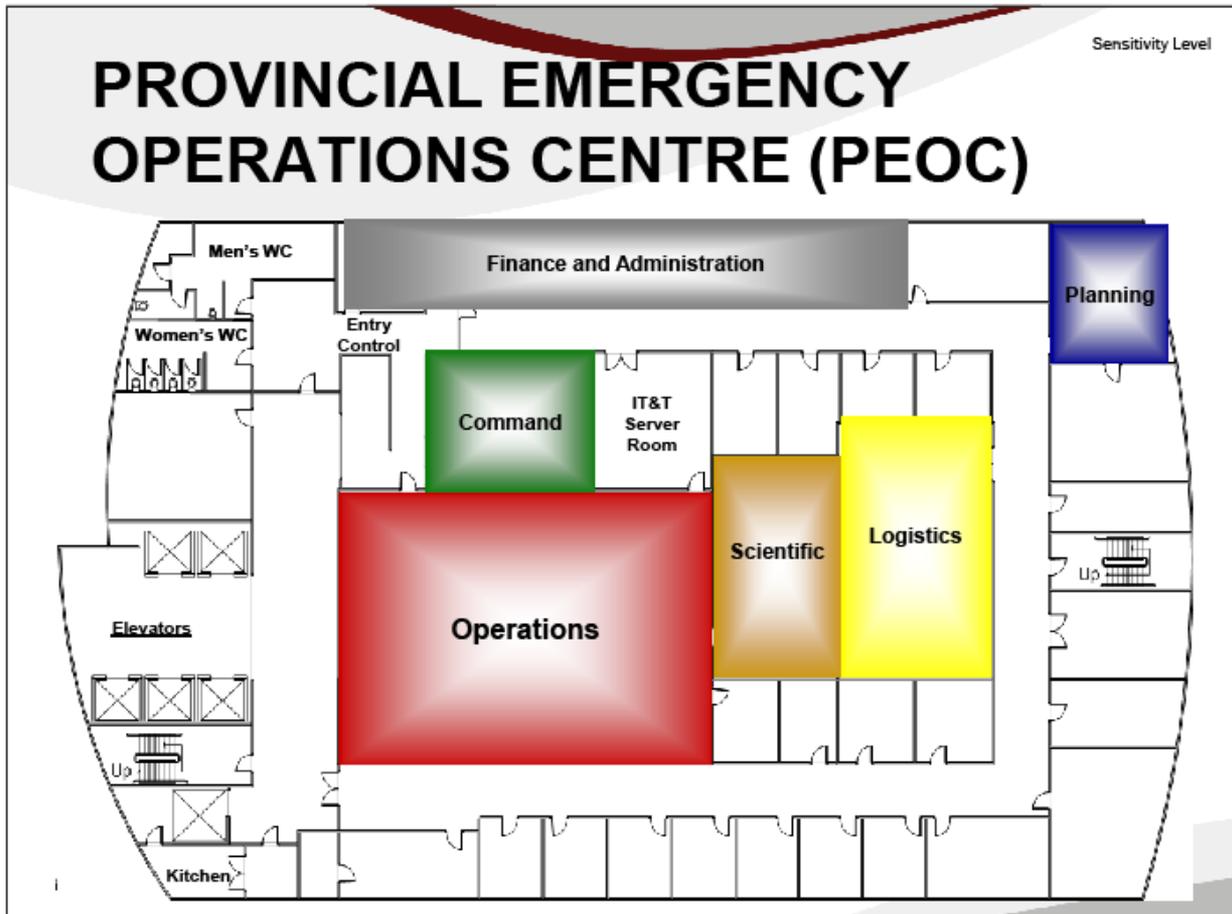
Organizational Reporting Relationships



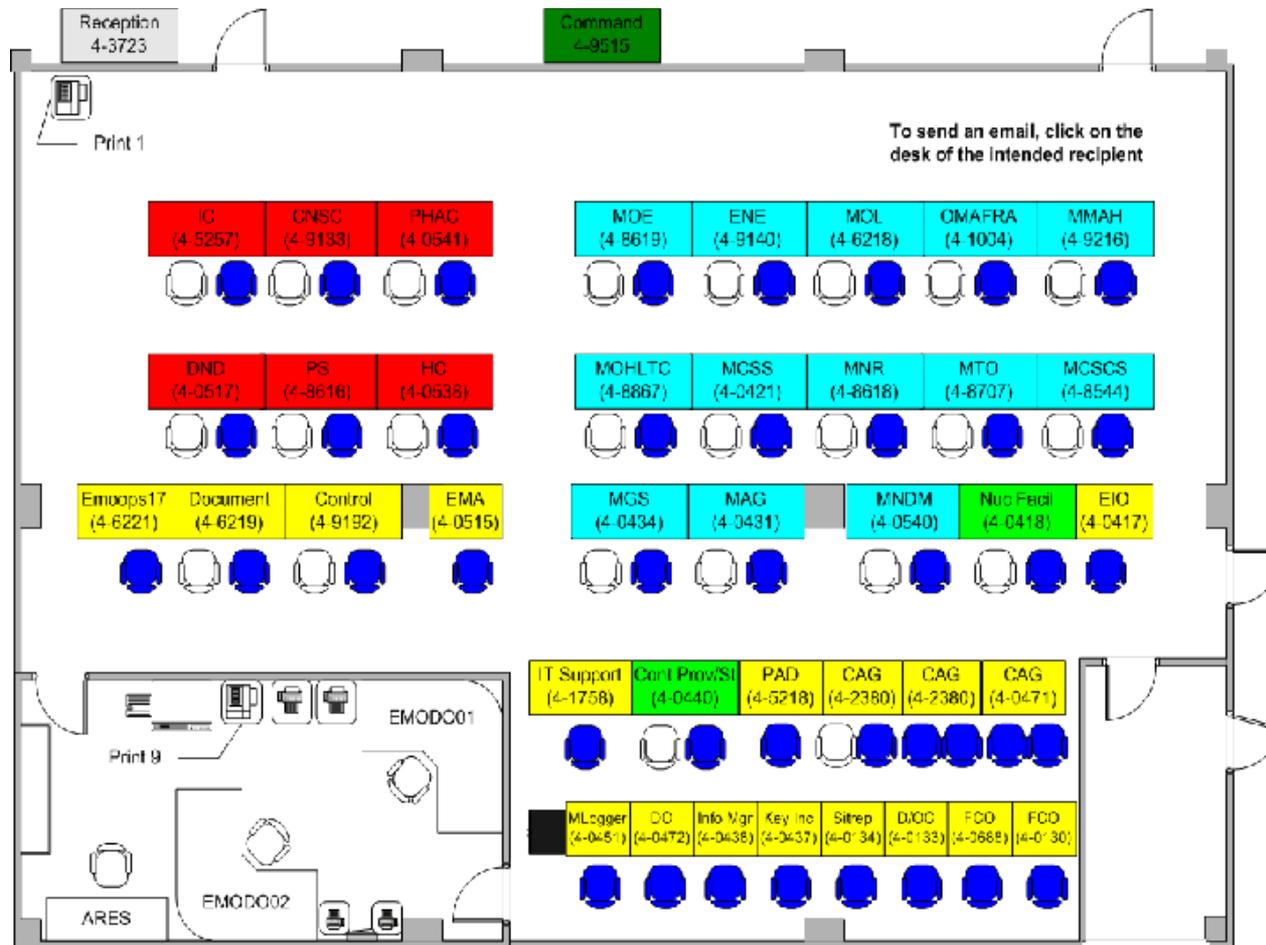
Incident Management System at PEOC



Provincial Emergency Operations Centre in Toronto



PEOC in Downtown Toronto

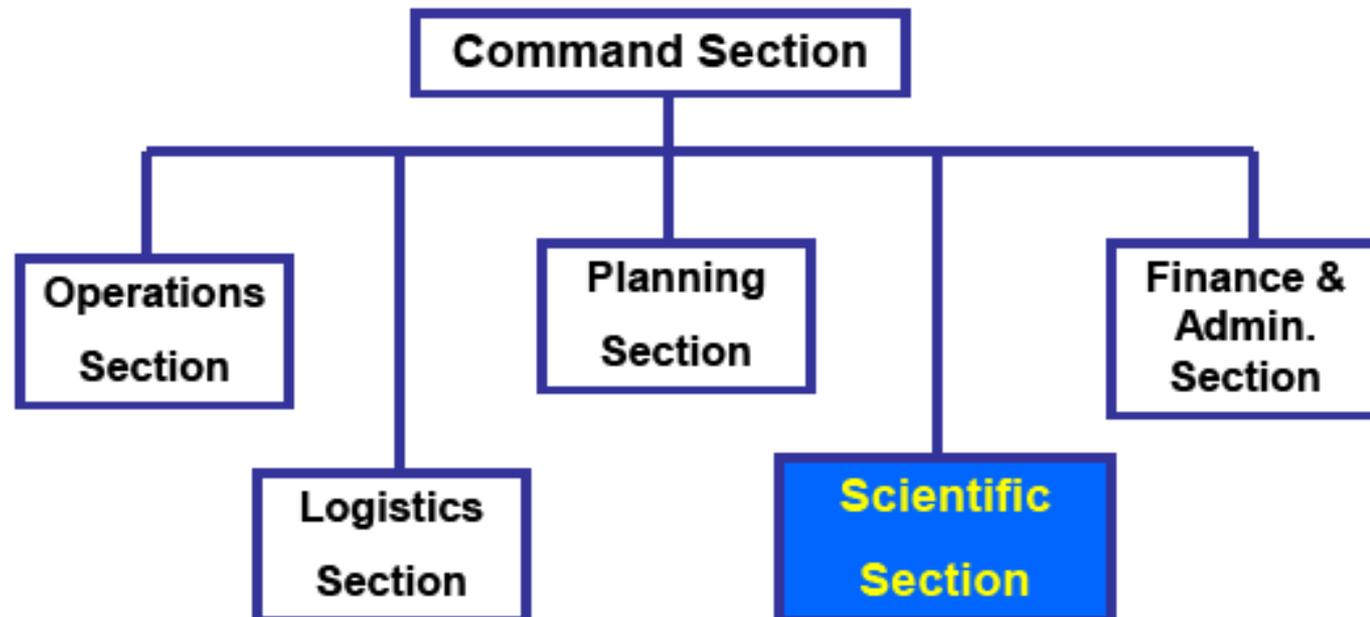


Scientific Section Responsibilities

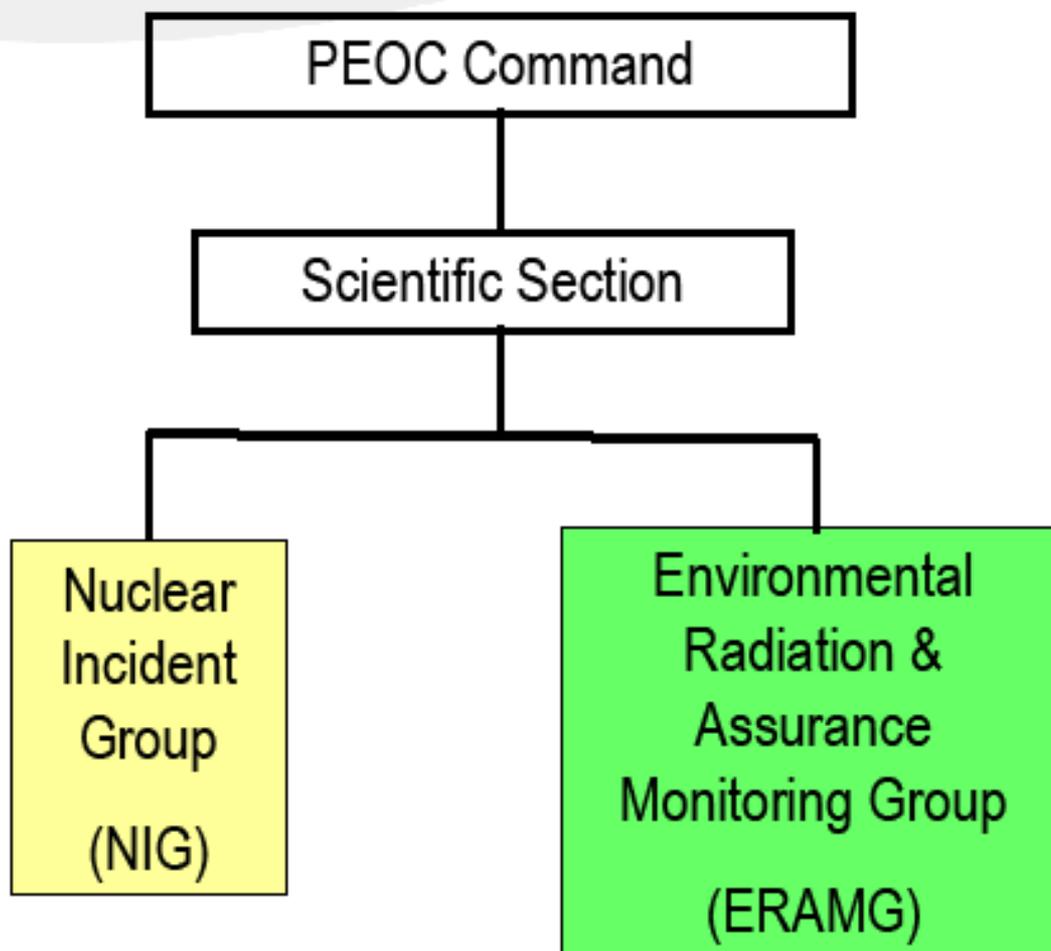
- Give scientific direction
- Monitor/assess developing situation
- Project offsite effects (public doses)
- Coordinate environmental radiation monitoring activities
- Analyze results
- Recommend protective actions
- Solve problems

Nuclear Emergency Response Organizational Structure

Provincial Emergency Operations Centre



Scientific Section Organization Chart



Nuclear Emergency Notification Category & Response Level

Notification Category	Response Level
Reportable Event	Routine Monitoring
Abnormal Incident	Enhanced Monitoring
Onsite Emergency	Partial Activation
General Emergency	Full Activation

Environmental Radiation & Assurance Monitoring Group (ERAMG) – Federal Liaison Officers

- Health Canada
- Canadian Nuclear Safety Commission
- Canadian Food Inspection Agency

Nuclear Incident Group (NIG) Positions

- Section Chief
- Meteorologist
- Dispersion Modeller
- 2 Dose Assessors
- 2 Reactor Specialists
- ERP Advisor

Pre-release Activities - Nuclear Incident Group (NIG)

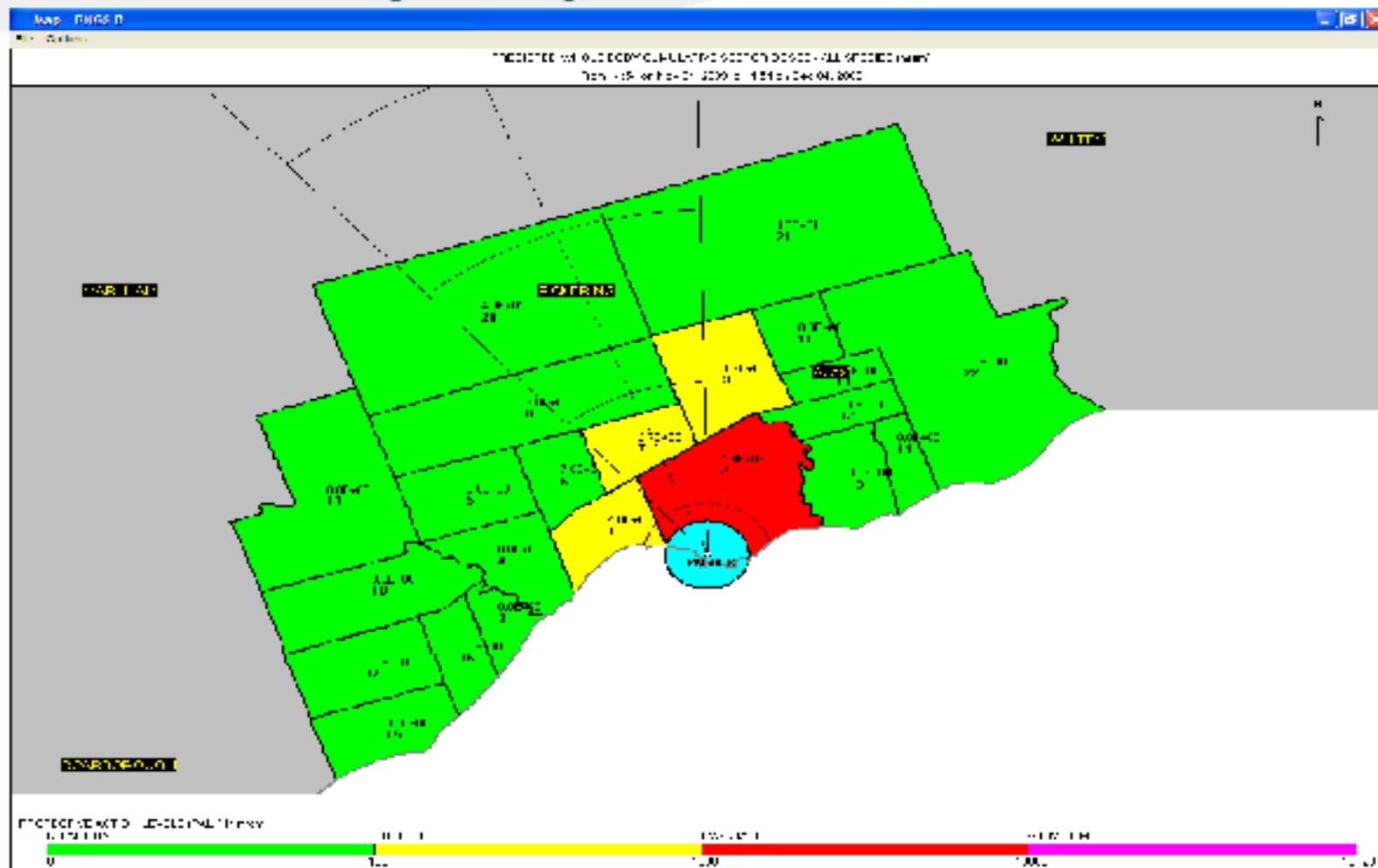
- Receive data/information from nuclear facility
- Assess progress of accident
- Estimate time of release
- Forecast weather conditions
- Carry out dose projections
- Predict max radius out to which evacuation should be directed
- Recommend protective actions
- Default operating cycle – hourly

ERP Input Data – Nuclear Plant Status

- Accident type
- Status of safety systems and containment
- Reactor Building pressures/temperatures
- Vacuum Building pressures/temperatures
- Field monitoring data
- Weather data
- Transmitted hourly to Scientific Section

ERP Output – PNGS

Total Dose by Response Sector

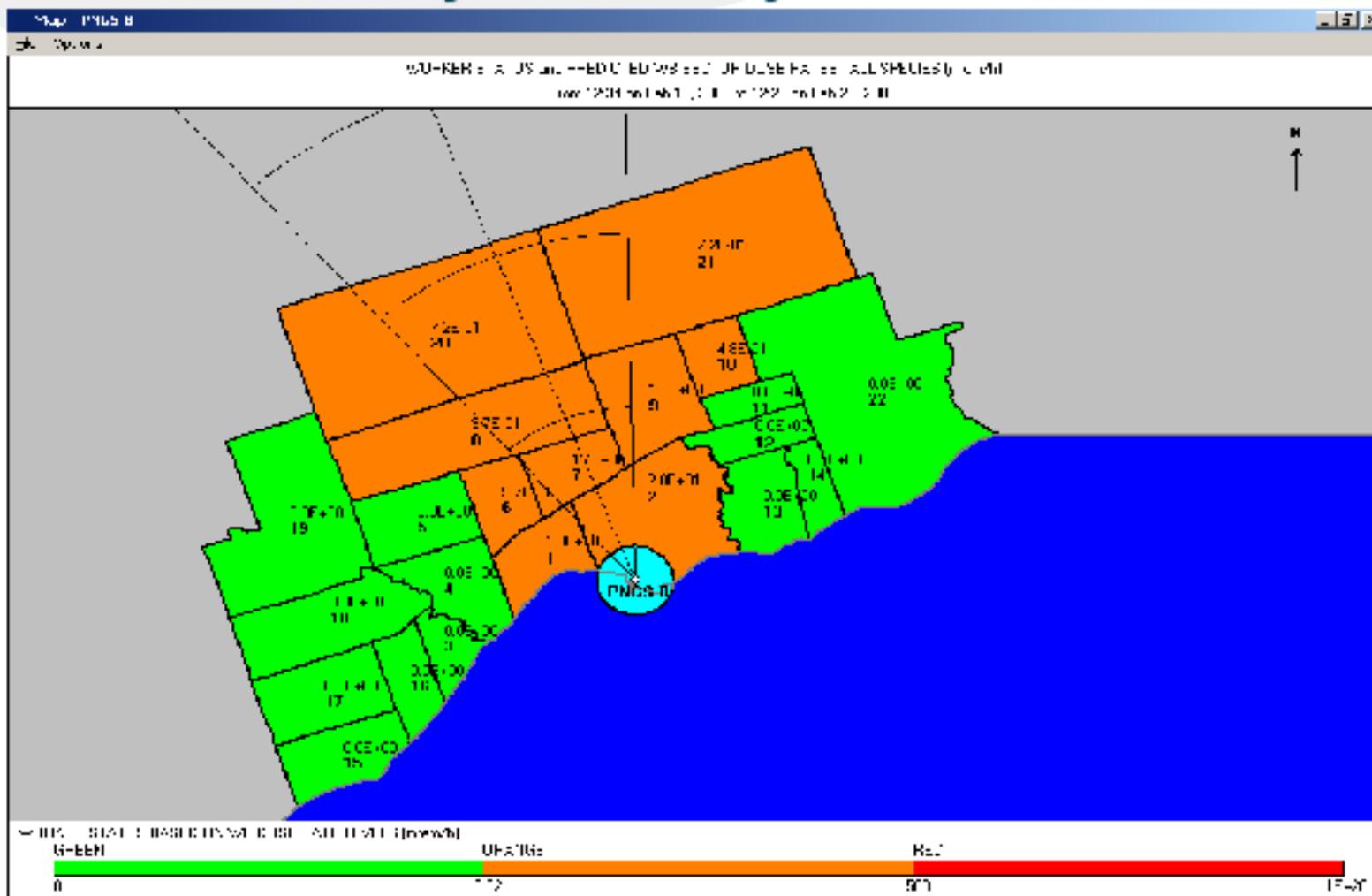


Worker Safety Status by Response Sector

- A colour-coded system to determine emergency worker safety
- 3 levels: - Green, Orange, Red
- Emergency worker centre to monitor / approve actions based on safety status
- MOL is responsible for overseeing the emergency worker safety system

ERP Output – PNGS

Worker Safety Status by Sector



Post-Release Activities: Environmental Radiation & Assurance Monitoring Group

- ERAMG on stand-by when PEOC is at Partial Activation
- ERAMG fully activated when PEOC is at Activation
- MOL and Health Canada co-lead
- Teams will deploy to accomplish specific field tasks

Post-release Activities - Field Tasks

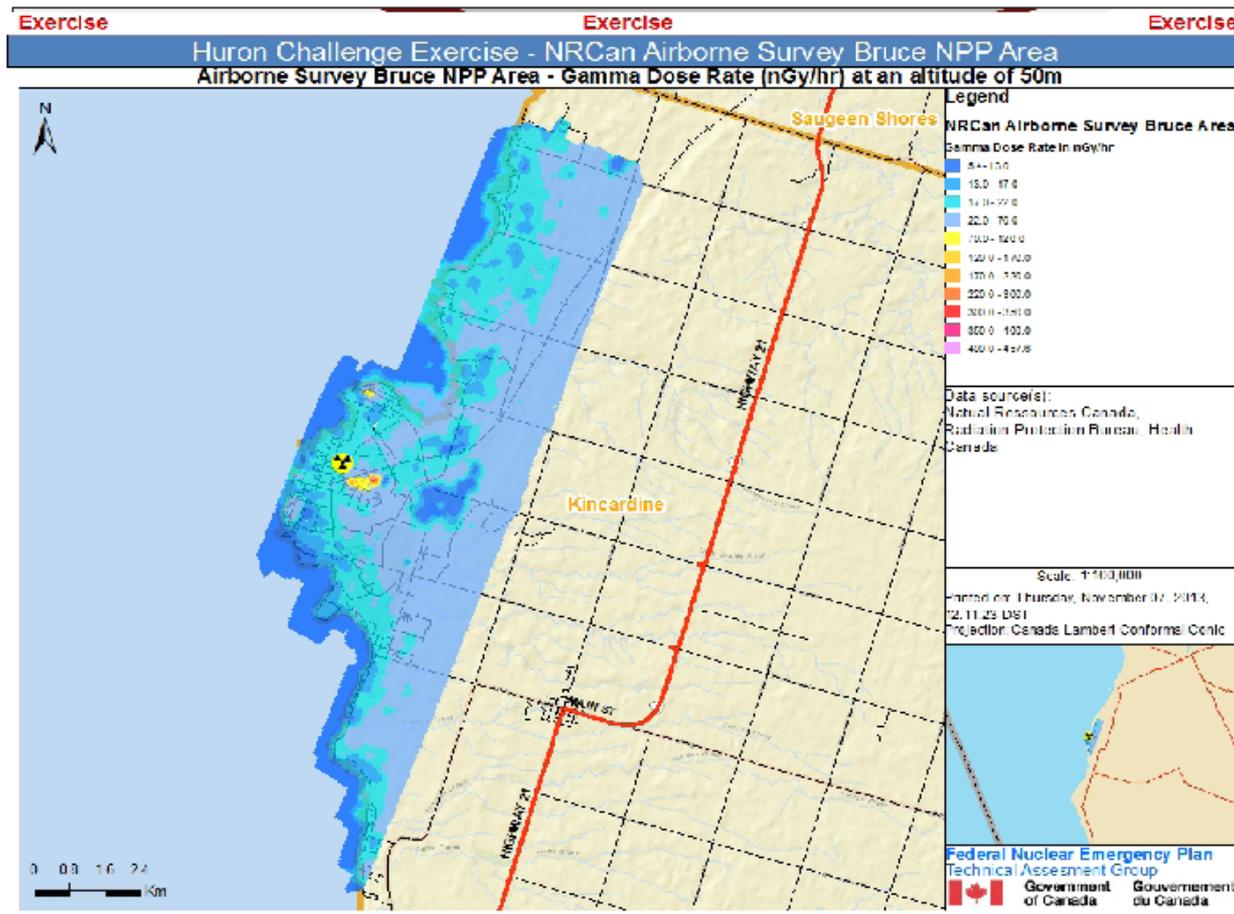
- Collect information about contamination
 - Ground deposition
 - Air and ground concentrations
 - Exposure rates

- Conduct air, water and food sampling to confirm “safe” agri-food production areas

ERAMG (cont'd)

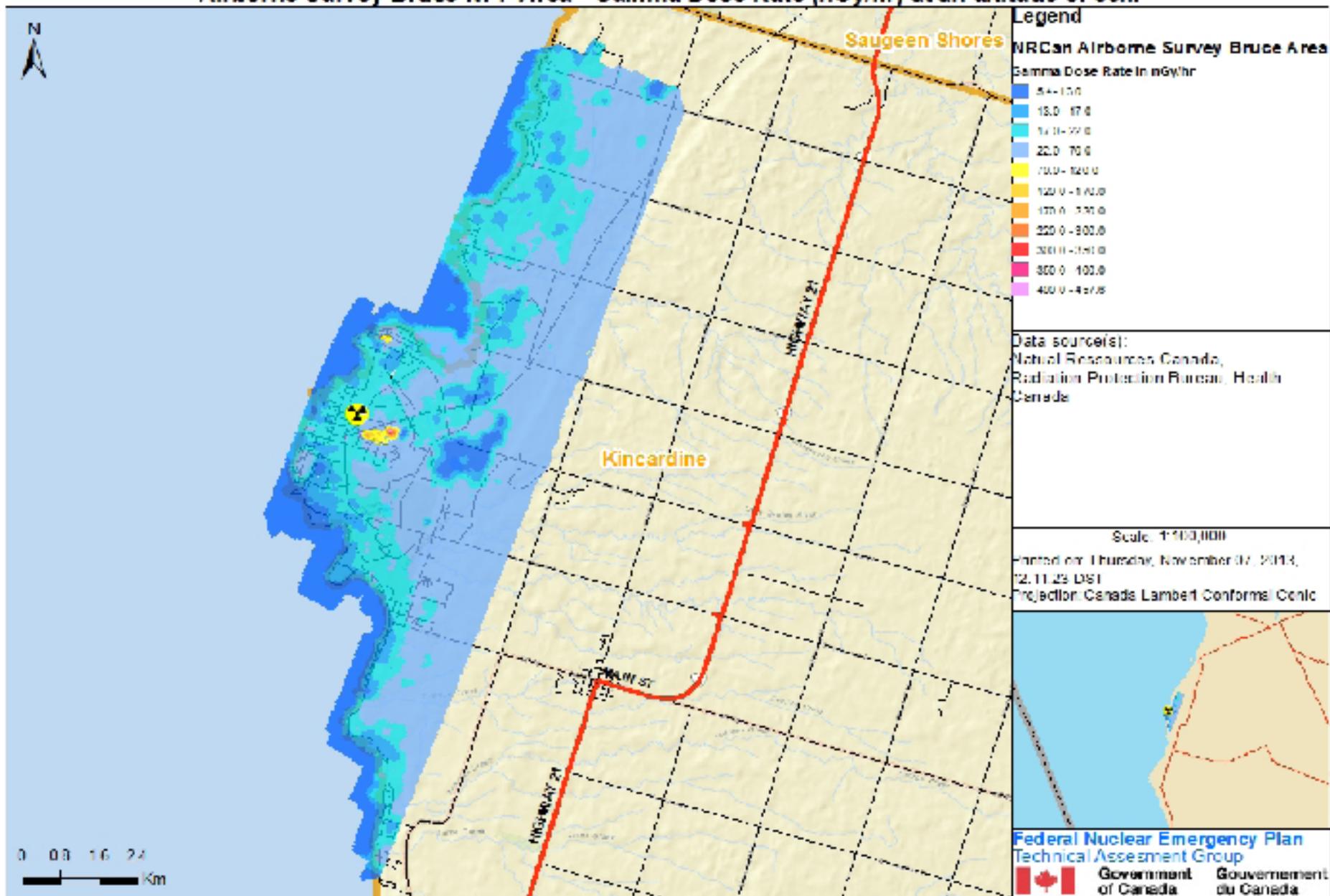
- Plan aerial/ground and field monitoring activities
- Analysis done at HC Mobile Nuclear Lab and MOL Radiation Protection Lab
- Report results/findings to the Section Chief
- Recommend ingestion control measures to Command

Airborne Survey Team Maps

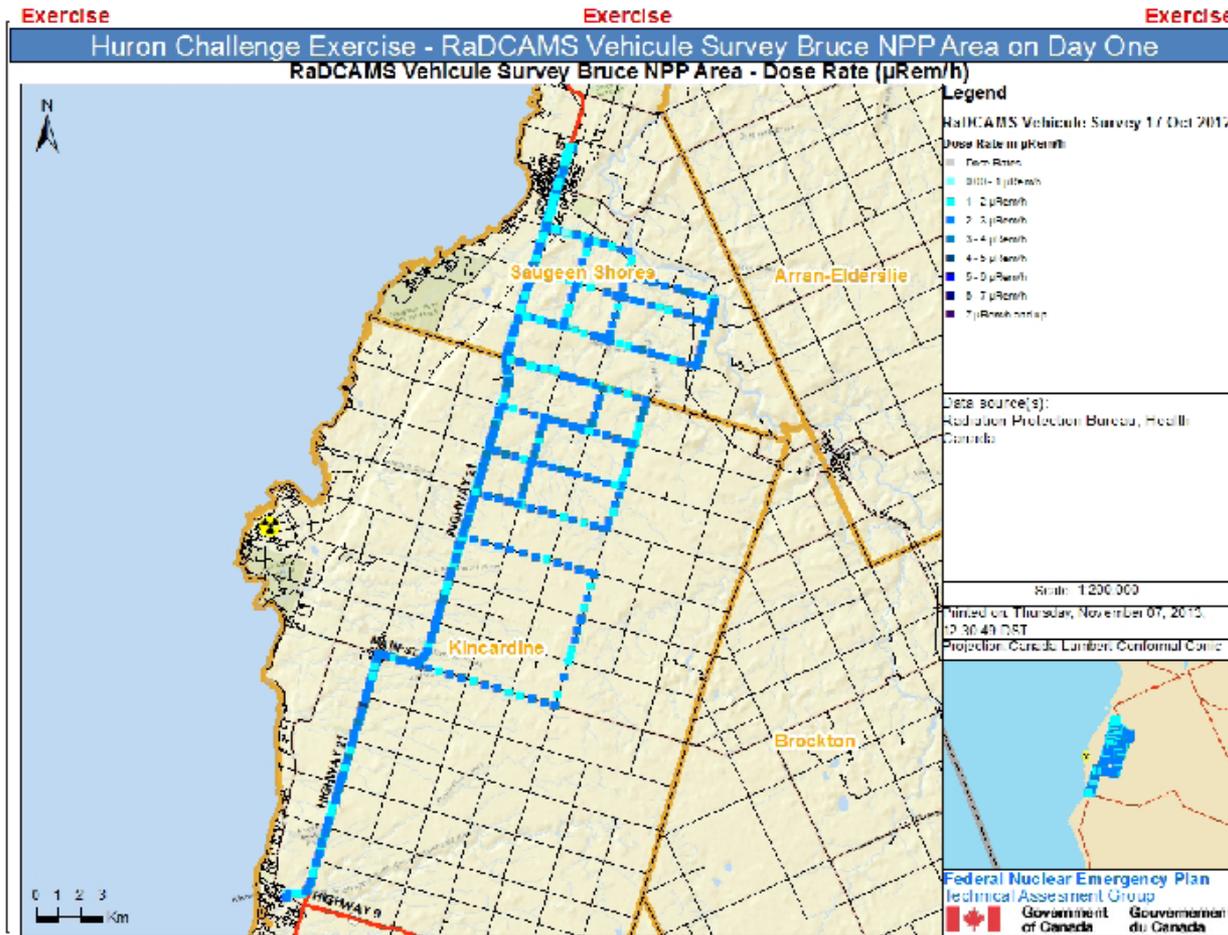


Huron Challenge Exercise - NRCan Airborne Survey Bruce NPP Area

Airborne Survey Bruce NPP Area - Gamma Dose Rate (nGy/hr) at an altitude of 50m



Vehicle Radiation Survey Team Data Tracking System



Other Considerations

- Duration of release
- Sheltering vs. evacuation
- Return of evacuees

Protective Measures

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EXPOSURE CONTROL MEASURES	INGESTION CONTROL MEASURES
<ul style="list-style-type: none">• Entry Control• Sheltering• Evacuation• Thyroid Blocking• Use of Protective Equipment• Decontamination	<ul style="list-style-type: none">• Milk Control• Water Control• Pasture Control• Produce and Crop Control• Livestock Control• Food Control• Land Control*• Environmental Decontamination*

Table 2.1: PROTECTIVE MEASURES

Note - These measures are defined in the **Glossary, Annex K.**

* Normally applicable only to Recovery Phase

Conclusions

- VIP Observers impressed with the engagement of over 1000 participants in the national nuclear exercise
- Over 200 OPG utility employees involved in offsite response duties with local, provincial and federal organizations
- Very positive attitudes in responders of the importance of the nuclear exercise to maintain highest level of emergency response for all types of emergencies including flooding, fires, and hazardous materials releases

Executive Summary

- The May 26, 27 & 28, 2014 Exercise Unified Response achieved major objectives
- First Fukushima-related, large scale, inter-agency Nuclear Emergency Exercise in North America
- Observed great pride in locally elected officials, government agencies, emergency responders, and utility employees in the detailed planning and execution of a comprehensive exercise
- Excellent communications practiced over the three day scenario

Abstract

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- Ontario Power Generation Fukushima Emergency Response Drill Highlights
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- By David W. Miller, PhD, NATC ISOE Cook Nuclear Plant/VIP Observer & OPG Self Assessment Participant
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- Japan's Fukushima Daiichi severe nuclear accident on April 11, 2011 has resulted in a reassessment of nuclear emergency response and preparedness in Canada. On May 26, 27 & 28, 2014 Ontario Power Generation (OPG) conducted the first North American full scale nuclear emergency response exercise designed to include regional, provincial and federal bodies as well as the utility. This paper describes the radiological aspects of the OPG Exercise Unified Response (ExUR) with emphasis on deployment of new Fukushima equipment on the Darlington site, management of emergency workers deployed in the vicinity of Darlington to collect environmental samples and radiation measurements, performance of dose calculations, communication of dose projections and protective actions to local, provincial and federal agencies and conduct of vehicle, truck and personnel monitoring and decon facilities.
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- The ExUR involved more than 1000 personnel from local, provincial and federal bodies. Also, 200 OPG employees participated in the off-site emergency response duties. The objective of the ExUR was to test and enhance the preparedness of the utility (OPG), government and non-government agencies and communities to respond to a nuclear emergency. The types of radiological instrumentation and mobile facilities employed are highlighted in the presentation. The establishment of temporary emergency rooms with 8 beds and treatment facilities to manage potentially contaminated injuries from the nuclear emergency is also described.