



## **MOST PEOPLE IN SOUTHERN ONTARIO LIVE NEAR AN AGING NUCLEAR REACTOR OPERATING ON EITHER THE CANADIAN OR AMERICAN SHORES OF THE GREAT LAKES.**

Historically, Ontario has put in place detailed nuclear emergency response plans to address only a relatively small accidental radiation release.

This must change in light of Fukushima.

We call on the provincial government to ensure nuclear emergency response plans are in place to:

- Protect people from Fukushima-scale accidents;
- Protect vulnerable communities;
- Protect drinking water;
- Ensure transparency and public participation;
- Meet or exceed international best practices.

The Ontario government recently committed to run eighteen aging reactors at the Darlington, Bruce and Pickering stations well beyond their original operational lives. Ten of these aging reactors are in the Greater Toronto Area (GTA) – creating risks for millions of nearby residents.

Aging reactors in the United States at the Fermi, Davis-Besse, Perry, Ginna, Fitzpatrick and Nine Mile Point nuclear stations also put Ontarians and our drinking water at risk.

In light of these risks, the Ontario government should protect public safety and prevent needless risks to health and society by making Ontario's nuclear emergency plans the most robust in the world.

# PROTECT PEOPLE FROM FUKUSHIMA-SCALE ACCIDENTS



## TO PROTECT PEOPLE THE ONTARIO GOVERNMENT SHOULD:

- Use a Fukushima-scale radioactive release as the baseline “reference accident” for determining offsite protective measures, such as alerts, evacuation, and potassium iodide (KI) pre-distribution.<sup>1</sup>
- Regularly publish modelling on Fukushima-scale accidents at the Bruce, Pickering, Darlington nuclear stations to confirm the adequacy of offsite emergency response.
- Expand emergency planning areas to align with the impacts of Fukushima, including at least a 20 km evacuation zone.
- Ensure all municipalities within 100 km of a nuclear station, including American reactors, develop and maintain nuclear emergency response plans.

## BACKGROUND

- To create a nuclear emergency plan, the first public safety decision is selecting the **scale** of reactor accident. The scale of accident chosen is referred to as the “planning basis” or a “reference accident.”
- Ontario’s current “planning basis” was effectively established before the 1986 Chernobyl accident. It assumes delayed radioactive releases that are significantly smaller than Fukushima or Chernobyl.<sup>2</sup>
- Following selection of a reference accident, the second public safety decision involves determining what **protective measures** should be in place. Protective measures protect people from radiation exposure. Examples include evacuation or ingesting potassium iodide (KI), which reduces your thyroid’s exposure to radioactive iodine.
- Ontario’s current emergency measures are geographically limited to areas close to nuclear stations due to the current small-scale “reference accident”. This includes a 10 km evacuation zone also known as the “Primary Zone” and a “Secondary Zone” that varies in size between 50 – 80 km.
- According to a joint committee of European nuclear regulators and radiation protection authorities struck following Fukushima: “...an accident comparable to Fukushima would require protective actions such as evacuation to around 20 km and sheltering to around 100 km. These actions would be combined with the intake of stable iodine.”<sup>3</sup>

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<sup>1</sup> The Fukushima accident released approximately 520 Peta Becquerels of radioactivity. A Becquerel is equivalent to one nuclear decay per second. The radioactive releases from Fukushima were approximately ten times larger than the highest level (level seven) accident on the International Atomic Energy Agency’s (IAEA) International Nuclear Event Scale (INES).

<sup>2</sup> Following the Three Mile Island accident the province began considering how to prepare for a nuclear emergency. In 1985, the Working Group # 3 report recommended the technical basis and reference accident that still effectively serves as the basis for offsite emergency plans.

<sup>3</sup> Heads of the European Radiological protection Competent Authorities (HERCA) and Western European Nuclear Regulators’ Association (WENRA), Ad hoc High-Level Task Force on Emergencies (AtHLET), Position paper, 22 October 2014

- Belgium's Superior Health Council recommended in 2016 that the government adopt a "precautionary approach" to emergency planning and consider large, previously ignored radiation release scenarios.<sup>4</sup> It also recommended that "based on the experience of past accidents, the areas covered by the plan for sheltering, the distribution of stable iodine and evacuation [should] be extended to cover realistic distances."<sup>5</sup>
- Modelling of a Fukushima-scale radioactive release by the German Commission on Radiological Protection (SSK) recommended expanding evacuation zones around German reactors from 10 to 20 km; preparing radiation monitoring programs out to 100 km to determine in the event of an accident whether additional evacuations, sheltering or KI consumption is required; and, preparations for KI consumption for children and pregnant women living beyond 100 km.<sup>6</sup>
- Following the Fukushima disaster, Japan's nuclear regulator observed: "A general lesson learned from the Fukushima accident, as well as the accidents at Three Mile Island and Chernobyl, is that there was an implicit assumption that such severe accidents could not happen, and thus sufficient attention had not been paid to preparedness for the accidents by the operators and the regulatory authorities."<sup>7</sup>

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<sup>4</sup> Conseil Supérieur de la Santé, Conseil Supérieur de la Santé, Accidents nucléaires, environnement et santé après Fukushima. Planification d'urgence, AVIS DU CONSEIL SUPERIEUR DE LA SANTE N° 9235, février 2016, pgs 88.

<sup>5</sup> Conseil Supérieur de la Santé, 2016, pg 83.

<sup>6</sup> German Commission on Radiological Protection (SSK), Planning areas for emergency response near nuclear power plants, 2014.

<sup>7</sup> T. Homma et al., "Radiation protection issues on preparedness and response for a severe nuclear accident: experiences of the Fukushima accident," ICRP 2013 Proceedings, pgs 347- 356.



# PROTECT VULNERABLE COMMUNITIES



## TO PROTECT VULNERABLE COMMUNITIES, ONTARIO'S NUCLEAR EMERGENCY PLANS SHOULD:

- Identify vulnerable groups, such as people with disabilities, babies, children, pregnant women, people residing in retirement homes, and hospital patients who may need to be evacuated in the event of a Fukushima-scale accident.
- Require clear plans to assist vulnerable groups before and after evacuation, including support from health care practitioners.
- Acknowledge that operating reactors in densely populated areas like the Greater Toronto Area (GTA) will complicate emergency response in the event of a major reactor accident and require detailed plans for large-scale evacuation in the short-term and the accommodation of large populations in the long-term.
- At a minimum, pre-stock potassium iodide (KI) pills in all schools within 100 km of all nuclear stations in or near Ontario.

## BACKGROUND

- Deaths in vulnerable communities, particularly the elderly, during evacuations following the Fukushima disaster have largely been attributed to the lack of pre-planned health care provision including evacuation logistics.<sup>8</sup>
- Belgium's Superior Health Council concluded that siting reactors near densely populated areas would significantly complicate emergency response, compared to the sparsely populated area around Fukushima. To address this vulnerability, the Council recommended that plans be in place for the evacuation and long-term displacement of large populations.<sup>9</sup>
- A committee charged with investigating the Fukushima disaster by the Japanese government concluded: "An accident at a nuclear power station has risks to bring about damage in vast areas. Nuclear operators on one hand, nuclear regulators on the other, should establish a systematic activity to identify all risk potentials from the "disaster victims' standpoint" when designing, constructing and operating such nuclear systems, for ensuring credible nuclear safety including evacuation."<sup>10</sup>
- The German Commission on Radiological Protection recommended in 2014 that authorities have in place "concrete plans" to provide KI pills to "children and young people up to the age of 18 and to pregnant women" over the entire territory of Germany.<sup>11</sup>
- Belgium's Superior Health Council also recommended having plans in place to distribute KI pills to vulnerable communities, including children as well as pregnant and breastfeeding women up to 100 km from any nuclear station. It also recommended that the effectiveness of large-scale distribution strategies should be regularly and carefully evaluated.<sup>12</sup>

<sup>8</sup> A. Hasegawa et al., "Emergency Responses and Health Consequences after the Fukushima Accident; Evacuation and Relocation," *Clinical Oncology*, 28 (2016) 237

<sup>9</sup> Conseil Supérieur de la Santé, 2016, pg 85.

<sup>10</sup> International Investigation Committee on the Accident at Fukushima Nuclear, July 23, 2012, pg 490. Power Stations of Tokyo Electric Power Company, July 23, 2012

<sup>11</sup> German Commission on Radiological Protection (SSK), 2014, pg 21.

<sup>12</sup> Conseil Supérieur de la Santé, 2016, pg 69.

# PROTECT DRINKING WATER



## TO PROTECT DRINKING WATER, ONTARIO'S NUCLEAR EMERGENCY PLANS SHOULD:

- Provide alternative sources of drinking water for residents whose drinking water is sourced from any of the Great Lakes on which a nuclear power plant is located.
- Ensure alternative drinking water sources are identified, and that logistical plans to supply the impacted population with these alternative sources are in place to last indefinitely.
- Model and publish Fukushima-scale accidents at nuclear stations on the Canadian and American sides of the Great Lakes to assess impacts on drinking water supplies and aquatic ecosystems.

## BACKGROUND

- The Fukushima accident caused significant – and ongoing – radioactive emissions to the Pacific Ocean, contaminating aquatic ecosystems and food supplies.
- The Great Lakes provide drinking water for approximately 40 million Canadians and Americans.
- There are ten reactors at the Pickering and Darlington nuclear stations operating on the Canadian side of Lake Ontario.
- There are eight reactors operating on the Canadian side of Lake Huron at the Bruce nuclear station.
- There are three reactors operating at the Fermi, Davis-Besse and Perry nuclear stations on the US side of Lake Erie.
- There are four reactors operating on the US side of Lake Ontario at the Fitzpatrick, Nine Mile Point and Ginna nuclear stations.
- Belgium's Superior Health Council recommended the government pay special attention to the circulation of radioactivity in water following a major accident, noting the short term risk to drinking water and the long-term risk of contamination of agriculture and the environment.<sup>13</sup>

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<sup>13</sup> Conseil Supérieur de la Santé, 2016, pg 86.

# ENSURE TRANSPARENCY AND PUBLIC PARTICIPATION



## TO PREVENT COMPLACENCY AND ENABLE PUBLIC PARTICIPATION, THE ONTARIO GOVERNMENT SHOULD:

- Apply the government's Open Government policy to nuclear emergency planning and require detailed government information on nuclear emergency planning be available by default, including accident modelling.
- Require regular five-year reviews and detailed consultations with the public and affected communities as to continuous improvement of both the planning basis and emergency response measures.

## BACKGROUND

- Premier Kathleen Wynne has stated her government's goal is to become "the most open and transparent government in Canada."
- There are currently no legal requirements for the Ontario government to regularly review and consult communities on the adequacy and acceptability of offsite nuclear emergency planning.
- International Commission on Radiological Protection (ICRP) recommends: "During planning, it is essential that the plan is discussed, to the extent practicable, with relevant stakeholders, including other authorities, responders, the public, etc. Otherwise, it will be difficult to implement the plan effectively during the response."<sup>14</sup>
- In its recommendation that "vulnerability analysis" be the basis of nuclear emergency planning, Belgium's Superior Health Council noted that such an analysis requires the participation of all affected stakeholders, including citizens.<sup>15</sup>
- The Japanese government's investigation into the Fukushima disaster found that people responsible for and involved in responding to the accident were unfamiliar with protective measures and that emergency plans had not been recently updated and were incomplete.<sup>16</sup>
- In November 2015 Durham Region, the host community for the Pickering and Darlington nuclear stations, passed a motion asking the government of Ontario to "provide all non-confidential data and studies used in considering changes to Ontario's off-site nuclear emergency plans."<sup>17</sup>

<sup>14</sup> Commission on Radiological Protection, Publication 109: Application of the Commission's Recommendations for the Protection of People in Emergency Exposure Situations, Approved by the Commission in October 2008.

<sup>15</sup> Conseil Supérieur de la Santé, 2016, pg. 17.

<sup>16</sup> The National Diet of Japan, The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission, Executive Summary, 2012.

<sup>17</sup> Durham Regional Council – Minutes, November 4, 2015, pg. 29.

# MEET OR EXCEED INTERNATIONAL BEST PRACTICES

**TO ENSURE ONTARIANS A LEVEL OF PUBLIC SAFETY ON PAR WITH OTHER JURISDICTIONS AND REFLECTING THE EXTREMELY HIGH POPULATION DENSITY IN THE VICINITY OF 10 OF THE OPERATING REACTORS IN THE GREATER TORONTO AREA, THE GOVERNMENT SHOULD:**

- Require nuclear emergency response measures meet or exceed international best practices.
- Regularly review and publicly report on international developments and best practices in offsite nuclear emergency planning as well as on plans to adjust and improve Ontario's plan to meet or exceed the best practices in other OECD jurisdictions.

## **BACKGROUND**

- Using international best practices as a decision-making principle will drive Ontario policy toward excellence and prioritizes public safety.
- Reporting on international best practices will enable public scrutiny and debate by providing Ontarians with tangible examples of how Ontario's emergency protective measures compare to other jurisdictions.
- Establishing emergency protective measures using a best-practice approach is a means of addressing the inherent uncertainties in nuclear risks and building trust with the public.
- Regularly reporting on international best practices will discourage complacency among government agencies responsible for nuclear emergency response.
- International Atomic Energy Agency safety guidance is in many respects a "lowest common denominator"<sup>18</sup> standard. Such standards should only be considered as a safety baseline.

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<sup>18</sup> J. D. Harvie, Review of Licensing Approach Proposed for the Advanced CANDU Reactor, Commissioned by the Canadian Nuclear Safety Commission (RSP-0184C), September 2004, pg 4.



# ENDORISING ORGANIZATIONS



PROVINCIAL COUNCIL OF WOMEN OF ONTARIO



Health for All Now!  
People's Health Movement



CAPE  
Canadian Association  
of Physicians  
for the Environment  
Association Canadienne  
des Médecins  
pour l'Environnement  
ACME



Nipissing Environmental Watch



National Farmers Union  
Union Nationale des Fermiers  
Local 353 - Essex County, ON  
Local 334 - Hastings, Northumberland, Prince Edward



Registered Nurses'  
Association of Ontario  
L'Association des  
infirmières et infirmiers  
autorisés de l'Ontario



Citizens Environment Alliance



David  
Suzuki  
Foundation

SOLUTIONS ARE IN OUR NATURE



National Network on  
Environments and Women's Health  
Réseau pancanadien sur la santé  
des femmes et le milieu

Science for Peace



Canadian  
Environmental Law  
Association  
EQUITY JUSTICE HEALTH



environmental  
defence



Concerned Citizens of  
Renfrew County



Toronto Chapter  
Windsor Essex Chapter  
Peterborough & Kawartha Chapter



FRESHWATER  
FUTURE

Ensuring the Healthy Future of Our Waters



The Inverhuron Committee



Windsor



On Watch

