



Oral Presentation

Exposé oral

**Submission from
Durham Nuclear Awareness**

**Mémoire de
Durham Nuclear Awareness**

In the Matter of

À l'égard de

**Ontario Power Generation Inc.,
Pickering Nuclear Generating Station**

**Ontario Power Generation Inc.,
centrale nucléaire de Pickering**

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station

Demande de renouvellement, pour une période de dix ans, de son permis d'exploitation d'un réacteur nucléaire de puissance à la centrale nucléaire de Pickering

Commission Public Hearing – Part 2

**Audience publique de la Commission –
Partie 2**

June 2018

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Durham Nuclear Awareness – Pickering Relicensing Hearing June 2018 (PFP 2017 PNGS01 DNA)

Sections:

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1. DNA Background & Summary of Concerns

Durham Nuclear Awareness (DNA) came together after the Chernobyl accident that took place on April 26, 1986.

The group began calling for better nuclear emergency planning in Durham Region 30 years ago now.

Post-Three Mile Island accident, post-Chernobyl accident, pre-Fukushima disaster, DNA began calling for emergency evacuation zones around nuclear plants to be expanded from a 10 km to 30 km radius, and also for “stable iodine” (KI) to be pre-distributed to everyone in the 30-kilometre zone.

DNA submitted comments on nuclear emergency planning to the Ontario Ministry of Environment and Energy in 1997¹ and within that submission, refers back to previous comments submitted to the provincial government, vis-à-vis nuclear emergency planning, in 1987. Citing WHO materials, DNA referenced the need for pre-distribution of KI pills ahead of time, also mentioning concerns regarding increasing population density in Durham Region.

This short history reminds us that DNA’s concerns about potential nuclear accidents in Durham Region – as well as concerns about the efficacy of potential response to such accidents – are neither new nor recent.

¹ A copy of this document accompanies our submission.



Perhaps it should be pointed out explicitly that the acronym DNA contains an obvious double meaning, referencing the fact that radiation affects human DNA. The truth of this can be clearly seen in the now-multi-generational genetic impacts on children born in areas hardest hit by the fallout of radioactivity from the Chernobyl disaster, who continue to be born, decades later, with birth defects, including serious heart defects ... along with many other serious, ongoing and indeed lifelong health challenges.

For the record, and to be absolutely clear, DNA has a considerable, wide-ranging number of serious concerns about the operations of the Pickering NGS.

We are concerned about:

- cancer rates (and other human health impacts) in Durham Region
- climate change-related impacts on the operation of nuclear generating stations
- decommissioning plans and related issues of all kinds: economic, environmental, social
- economics of nuclear power
- environmental impacts of nuclear energy
- ever-increasing volumes of dangerous, long-lived nuclear waste(s) at both nuclear stations in Durham Region, located right on the shores of Lake Ontario
- genetic damage to human beings and biota
- impacts on fish in Lake Ontario
- increased electricity rates for ratepayers
- increasing population density around Durham Region's nuclear plants
- lack of consideration for the full fuel-cycle impacts of nuclear energy
- lack of social licence for the continued operations of nuclear facilities
- lack of transparency in both industry and government circles regarding all matters nuclear
- pollution of Lake Ontario, both immediate and long-term
- safety risks that increase with plant aging
- terrorism
- tritium leaks and emissions and presence in air, groundwater and Lake Ontario
- trust issues
- unacceptable population expansion plans in Pickering
- waste storage and the safety and security of waste handling methods and containers/containment
- waste transportation issues: dangers, risks, lack of transparency
- worker health exposures and health risks.

However, this submission focuses primarily on our current concerns regarding the inadequacy of provincial nuclear emergency planning.



2. DNA and Emergency Planning: Hearings & Recent History

DNA has been learning about the vast inadequacies of nuclear emergency planning in Canada in great detail since the Fukushima nuclear disaster began. Many things have been thrown into high relief since March 11, 2011.

“Evacuation zones/planning are inadequate all over the world.” – 2013 comment by Dr. Maureen McCue (M.D., Ph.D.), *Physicians for Social Responsibility* ²

We have been collaborating with CELA (*the Canadian Environmental Law Association*) since 2012. CELA has amassed an encyclopedic knowledge base of all issues related to nuclear emergency planning in Canada, identifying the vast number of gaps, inadequacies and deficiencies. CELA’s expertise is widely acknowledged among all the agencies involved in nuclear emergency planning issues in Canada.

We in Durham Nuclear Awareness have been voicing our concerns about inadequate emergency plans – repeatedly – since 2012 to:

- Local (*i.e., Durham Region*) politicians: municipal, regional, provincial and federal
- Successive Ministers of Community Safety & Correctional Services (*4 or 5 by now*)
- CNSC at the Darlington refurbishment hearing (*December 2012*)
- CNSC in response to the “Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures” (*released June 2014*)
- CNSC at the Pickering licensing hearing (*May 2013 & May 2014*)
- CNSC at the Darlington relicensing hearing (*November 2015*)
- The Province of Ontario, in its review of the PNERP (*Provincial Nuclear Emergency Response Plan*)

We, and the world, learned in the aftermath of the Fukushima disaster that:

*“The government, the regulators, TEPCO management, and the Kantei lacked the preparation and the mindset to efficiently operate an emergency response to an accident of this scope. None, therefore, were effective in preventing or limiting the consequential damage.” – from **The official report of the Fukushima Nuclear Accident Independent Investigation Commission** ³*

It would appear the situation is no better here in Canada. Still. Seven years into the Fukushima experience.

² At the Symposium held in New York City in March 2013 to commemorate the 2nd year anniversary of the beginning of the Fukushima nuclear disaster

³ https://www.nirs.org/wp-content/uploads/fukushima/naiic_report.pdf



3. TMI / Chernobyl / Fukushima: What Lessons Have Been Learned?

Three Mile Island accident, March 28, 1979: The history of this accident has been subject to considerable cover-up. In sum, it was worse than was believed or reported at the time, its impacts (including health impacts)⁴ have been more severe and widespread than most are aware (still), and lack of transparency and truth-telling about the true nuclear risks have been used by the nuclear industry to promulgate, world-wide, the myth “It can’t happen here.”⁵

“But some critical factors that contributed to the Three Mile Island accident were swept under the rug by regulators both in the United States and abroad. These unlearned lessons remained unheeded three decades later when the waves bore down on Fukushima. Both accidents followed from one common and dangerous belief: that an accident like Three Mile Island, or Fukushima Daiichi, just could not happen.”⁶

Kemeny Commission on causes of Three Mile Island accident, in Oct. 1979: “[T]he fundamental problems are people-related and not equipment problems,” the commission wrote. “[W]herever we looked, we found problems with the human beings who operate the plant, with the management that runs the key organization, and with the agency that is charged with assuring the safety of nuclear power plants.” The commission also pointed a finger at “the failure of organizations to learn the proper lessons from previous incidents.” As a result, “we are convinced,” the commission wrote, “that an accident like Three Mile Island was eventually inevitable.”⁷

Chernobyl disaster, April 26, 1986: The existence still, today, 32 years later, of a 30 km exclusion zone around the site speaks to the long-term persistence and dangers of radiation fallout. Health and environmental damage is widespread. Serious (and aggressive) thyroid cancers among children have been widespread in Ukraine, Russia and Belarus.⁸

“When I arrived in Ukraine in 2009, I did not find any serious objective source of information about the state of health of the children and people in the Ivankiv and Poleskiy regions (two areas that neighbor Chernobyl). There was no interest. We have now examined about 4,000 second-generation children and most of them have serious problems with their cardiovascular systems. I was starting to see the same thing in Belarus before I left. I am especially disturbed by irregularities I see in teenagers, in particular boys ages 12-17.

⁴ See <https://www.unc.edu/news/archives/feb97/wing.html> &

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1469835/> & <http://www.beyondnuclear.org/tmi-truth/>

⁵ *Fukushima – The Story of a Nuclear Disaster*, David Lochbaum, Susan B. Stranahan and the Union of Concerned Scientists (2014), Chapter 7, ‘Another March, Another Nation, Another Meltdown’

⁶ *Ibid*, p. 142

⁷ *Ibid*, p. 150

⁸ American Thyroid Association brochure ‘Nuclear Radiation and the Thyroid’

https://www.thyroid.org/wp-content/uploads/patients/brochures/NuclearRadiation_brochure.pdf



For me, the problem of Chernobyl is not finished, it has only just begun.”⁹

“Chernobyl is a word we would all like to erase from our memory. But more than seven million of our fellow human beings do not have the luxury of forgetting. They are still suffering, every day, as a result of what happened...The exact number of victims can never be known.” – former UN Secretary-General Kofi Annan

Fukushima disaster, March 11, 2011: The jury is *not* still out. It is well established that the failure to pre-distribute KI pills has led to the early onset of thyroid cancers among children (*including among children living beyond the evacuated area*). Evacuations were botched, resulting in deaths due to lack of appropriate preparations ahead of time, and the technical SPEEDI computer tracking system used for predictions of fallout was ignored, resulting in the failure to evacuate citizens in the town of Iitate, in spite of their being right in the path of radiation plumes or hotspots.¹⁰ There is clean-up waste all over the country, radioactivity is being spread via incineration of waste, citizens are being obliged to return to contaminated communities, etc. etc. etc. Japan’s troubles are very serious indeed. Lawsuits are in process, and the liability of the industry is under challenge. While seven years have gone by, the country is *merely in the early days* of what Chernobyl’s impacts have taught to 32 years of *that* accident’s victims (see above).

*“The earthquake and tsunami of March 11, 2011 were natural disasters of a magnitude that shocked the entire world. Although triggered by these cataclysmic events, the subsequent accident at the Fukushima Daiichi Nuclear Power Plant cannot be regarded as a natural disaster. It was a profoundly manmade disaster – that could and should have been foreseen and prevented. And its effects could have been mitigated by a more effective human response.” – Kiyoshi Kurokawa, Chairman of **The official report of the Fukushima Nuclear Accident Independent Investigation Commission** (pg. 9)¹¹*

As for the causes?

*“A “manmade” disaster: The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed the nation’s right to be safe from nuclear accidents. Therefore, we conclude that the accident was clearly “manmade.” We believe that the root causes were the organizational and regulatory systems that supported faulty rationales for decisions and actions, rather than issues relating to the competency of any specific individual. (see Recommendation 1)” — from **The official report of the Fukushima Nuclear Accident Independent Investigation Commission** (pg. 16)*

⁹ These words are from scientist Yury Bandazhevsky, from a 2016 series of articles on the 30th anniversary of the Chernobyl nuclear disaster. <https://www.usatoday.com/story/news/world/2016/04/17/nuclear-exile-chernobyl-30th-anniversary/82896510/>

¹⁰ ***Fukushima – The Story of a Nuclear Disaster***, David Lochbaum, Susan B. Stranahan and the Union of Concerned Scientists (2014), Chapter 5

¹¹ https://www.nirs.org/wp-content/uploads/fukushima/naaic_report.pdf



4. Ontario: What Have We Learned?

With no intent to be flippant, it seems very much as though not very much at all has been learned from the world's nuclear disasters. Or rather, if some learning *has* been acquired, it is being acted upon not with great haste, but rather with the very opposite: an outstanding *lack* of haste.

Ontario's provincial nuclear emergency plan – the PNERP – was due to be revised in 2013.

It was finally released four years late, in December of 2017.

Public response and input to the PNERP review process were impressive. More than 1500 submissions from groups and individuals were received. More than 40 groups endorsed 'A Call for Public Safety.'¹² Also during 2017, resolutions for enhanced nuclear emergency measures were passed by a variety of communities in the province, the Region of Durham and the City of Toronto among them.

However, the revised PNERP still seems to be operating under the old Three Mile Island "It can't happen here" myth.

There is a new "Contingency Planning Zone," but with few additional requirements for emergency measures to be instituted.

For example, no broader pre-distribution of KI pills has been proposed – this in spite of CNSC's own revelation in an October 14, 2014 email message to CNSC info list subscribers (*four days after their previous message, announcing the new KI pre-distribution policy*) that

*QUOTE Four independent third party studies explore and describe the benefits of distributing KI pills in advance to citizens within a 30-mile (48 kilometres) radius of a nuclear power plant, and the need for timely and correct consumption of these pills in the case of a nuclear accident. END QUOTE*¹³

While the Province/OFMEM has called for a "technical study" to investigate a variety of emergency management-related measures (*at least one of which – a study on drinking water impacts – was promised by the provincial government more than four years ago now*), these results will not be available until many months after the licensing hearing.

One can scarcely avoid asking why, when the Fukushima nuclear disaster began seven years ago, and this revised iteration of the PNERP was released four years late, this "technical study" has only recently been put out to a "vendor" at this late date. Why the unprecedented delay?

DNA's 1997 comments on nuclear emergency planning to the Ontario Ministry of Environment and Energy (*referenced earlier in this submission*) question the contention by the Royal Society of Canada and Canadian Academy of Engineering that "*modifications to operating conditions and design of safety features have been made that reduce the expected radioactive emissions in*

¹² <http://www.cela.ca/sites/cela.ca/files/Call-for-Public-Safety.pdf>

¹³ October 14, 2014 message from CNSC. A copy is attached with this submission.



an accident,” thus making assumptions about the lack of necessity for emergency measures such as pre-distribution of KI pills.

These words might just as easily have been written last week as 20 years ago! As the old saying goes, plus ça change, plus c’est la même chose.

What has really been learned?

Not very much has been learned, it appears, notwithstanding all the language about “Fukushima enhancements.” Or to put it more accurately, while much has been *learned*, these learnings have yet to be put to good use.

5. PNERP: What Has Changed. What Needs to Change?

What has changed in the PNERP (Provincial Nuclear Emergency Response Plan) since the Fukushima disaster?

Not much. Secrecy in the process of nuclear emergency planning in Ontario has every appearance of having mushroomed dangerously.

One must ask what was taking place at OFMEM pre-Fukushima disaster, given that it took the agency eight years to revise the PNERP (*recall that by the old rules, the PNERP was to be revised every four years. It was four years overdue when it was released last year*).

To all outward appearance, industry dominates the process, behind closed doors. Reports from OFMEM must be obtained painfully through FOI requests.

The 2017 provincial Auditor General’s report makes some things about provincial nuclear emergency management quite clear. Section 4.4.5. ‘Preparedness for Nuclear Emergencies Needs Improvement’ spells out a distinct lack of independence from industry (*which pays part of the funding for EMO or Emergency Management Ontario, in very un-transparent fashion*) and explains:

“The nuclear emergency management program requires EMO to have its own staff with specific technical knowledge in order to assess risks and provide the Province with independent and objective advice. However, EMO has not kept this position filled at all times: the senior scientist position was vacant from July 2016 until April 2017. To compensate for this vacancy, EMO relied in part on a technical network of retired nuclear power company staff and a nuclear consulting group. In 2015, a staff member from a nuclear power company worked at EMO while being paid directly by the nuclear power company. This type of arrangement could pose a risk to EMO’s objectivity.”¹⁴

¹⁴ Office of the Auditor General of Ontario, (2017). “Emergency Management in Ontario,” online: http://www.auditor.on.ca/en/content/annualreports/arreports/en17/v1_304en17.pdf, p. 253.



Changes Recommended:

- Remove industry influence from the nuclear emergency planning process.
- Put people and safety (not industry) first.
- Tell the truth.
- Create truly robust emergency plans for the citizens of Ontario.
- Review the 2017 Auditor General report to find out what needs to be done.¹⁵
- Update the plan continuously, as recommended by the Auditor General.

While doing so, lessons from the Fukushima disaster must be top of mind.

One real life learning from the Fukushima nuclear disaster:

“However the dose rate data did support an evacuation zone of about thirty to forty miles (fifty to sixty-seven kilometers) from Fukushima Daiichi, still a much larger distance than the twelve-mile (twenty-kilometer) zone initially established by the Japanese government or the ten-mile emergency planning zone in existence in the United States for reactor accidents.”¹⁶

6. Review of Licensee and CNSC CMDs

As a recipient of funding from CNSC’s Participant Funding Program, DNA was tasked with reviewing relevant CMDs.

CMD 18-H6.1 lays out OPG’s plans, including its plans regarding plant safety and emergency management.

OPG: “Pickering NGS has always been safe. With the currently implemented nuclear safety improvements (EME, etc.), Pickering NGS is better prepared to deal with emergency events thereby further reducing the risk to the public. With the planned PSR modifications, the Pickering NGS will be even safer.”¹⁷ (pg. 12)

The CMD refers to “a number of significant safety improvements,” “emergency mitigating equipment (EME) Phase 1 and 2” and “Exercise Unified Control (December 2017), which demonstrated the robustness of both on-site and off-site emergency preparedness measures.”

¹⁵ Ibid, p. 224

¹⁶ *Fukushima – The Story of a Nuclear Disaster*, David Lochbaum, Susan B. Stranahan and the Union of Concerned Scientists (2014), p. 140.

¹⁷ On-line <http://www.nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/pdf/CMD18/CMD18-H6-1-Submission-from-Ontario-Power-Generation-Application-for-Pickering-NGS-Licence-Renewal.pdf>



As well, “OPG distributed potassium iodide pills to the entire population in the primary zone (10 km radius) around Pickering NGS” and “is partnering in the Durham Regional NextGen public safety radio system and has installed new radio system infrastructure at the site.”

The CMD details a number of other safety enhancements implemented as a result of studies and lessons learned from the Japanese nuclear disaster experience.

Regarding Beyond Design Basis Accident mitigation, OPG explains:

“From an integrated public risk perspective, OPG concludes that the most effective means of protecting containment and minimizing large releases resulting from a BDBA is to prevent an accident from progressing to the point of challenging containment” (pg. 28)

and goes on to lay out additional measures to be taken to “minimize the likelihood of a large release by providing additional barriers to prevent accident progression, thereby protecting containment.” (pg. 28)

Fire protection means are described, and a new personnel accounting system is referenced.

OPG is confident that “OPG, the Province, and local municipalities have clearly defined roles for responding to emergency events and protecting the public. The OPG planned exercises test and strengthen these partnerships” (pg. 30) and reports on some of the achievements of the recent (December 2017) “Exercise Unified Control.”

With respect to emergency management beyond the fence line, the CMD discusses sirens and media notifications, wireless public alerting and an Evacuation Time Estimate study.

OPG works very closely with the Province of Ontario and various local governments (e.g. City of Pickering, the Region of Durham) and was closely involved in the recent PNERP revisions.

OPG’s outreach efforts to the public are referenced, along with assurances of the avoidance of radiation exposures and of the safety of waste handling and package/transport.

The CMD speaks of future investments that will be made “to further mitigate the already low plant risk and to add reliability enhancements. For example, investments of \$307 M are planned from 2017 to 2020 for additional equipment inspections, the implementation of the PSR2 modifications (eg., Pickering 1,4 fire water supply to the steam generators, heat transport system, and the interconnection of Pickering 1,4 and 5-8 fire water systems) and equipment reliability upgrades.” (pg. 56)

Regarding CNSC staff CMD:18-H6¹⁸:

From the Executive Summary (pg. 1):

¹⁸ On-line: <http://www.nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/pdf/CMD18/CMD18-H6-Submission-from-CNSC-Staff-Pickering-NGS-Licence-Renewal-2018.pdf>



“In 2010, OPG announced that Pickering NGS would continue operation until 2020, at which time the station would shut down. In January 2016, OPG was requested by the Province of Ontario to plan for safe and reliable continued operation beyond 2020. In response, on June 28, 2017, OPG informed the CNSC that all Pickering units would cease commercial operation on December 31, 2024. Following the permanent shutdown of the units, the station will be transitioned to a safe storage state.”

On page 45, CNSC asserts:

“CNSC staff concur with OPG that the already implemented PARS, Phase 1 EME, and SAMGs; as well as the IIP scheduled actions and the provision of fire water to Pickering Units 1, 4 will further enhance safety by ensuring the existence of barriers to prevent a BDBA progression to a severe accident and to ensure the availability of options for controlled filtered post-accident venting.

Accident Management and Recovery

Licensees must have procedures capable of dealing with abnormal incidents as well as design basis accidents. CNSC staff is satisfied that OPG has a series of abnormal incident manual (AIMs) and emergency operating procedures (EOPs) at the Pickering NGS to detect abnormal conditions, mitigate causes of the incidents and accidents, return the plant to a safe and controlled state, and to prevent further escalation into a more serious accident. CNSC staff routinely perform verifications to ensure that up-to-date AIMs and EOPs are available to the operators, should they be required and that operators are trained in their use. CNSC staff are satisfied with the licensee’s performance in this specific area.” (pg. 45)

In a section just above this, it is explained that some of the emergency mitigating measures will not be complete until December 2018 and “during a planned 2020 outage, and the restoration of emergency power to one main volume vacuum pump will be completed by June 2019.” (also pg. 45)

On page 66 CNSC identifies some areas of (seemingly) unsatisfactory performance, but seems confident that OPG staff assertions that the duration of the maintenance activities for emergency power generators “will be reduced significantly and bring the PFU of the emergency power system below the unavailability target.” (pg. 66)

Whole section: “CNSC staff reviewed the reliability performance of SIS [Systems Important to Safety] each year and concluded that all special safety systems for Pickering Units 1, 4 and 5-8 met their unavailability targets during the licence period. The reliability performance of the SIS, other than special safety systems, was also found satisfactory except for the emergency power system for Unit 5-8. The Unit 5-8 Emergency Power System PFU has been above the unavailability target since 2012, due to longer than expected durations of the maintenance activities for Emergency Power Generator (EPG) 1 and EPG 2. OPG has indicated that the major maintenance activities, including overhauls for the emergency power generators, have been completed and in the next licence period the duration of the maintenance activities for emergency power generators will be reduced significantly and bring the PFU of the emergency power system below the unavailability target.”



On page 67, regarding maintenance:

“The corrective critical maintenance backlog is continuously being reduced and is currently close to the industry’s average range. The number of deferrals of critical preventive maintenance was higher than the industry average but has also been reduced. The deficient critical maintenance backlog increased to above the industry’s average range. A CNSC staff focused desktop review [50] was undertaken in 2017 to determine if there is any the relation between the safety performance indicators and the performance of components important to safety for several selected systems (low pressure service water system, vault vapour recovery system and emergency service water system). The review revealed that “lack of adequate resources” was one of the major contributing factors to preventive maintenance deferrals being above industry average. The review also confirmed that OPG is implementing corrective actions to address the repeated failures of a number of components for the three selected systems, and the effectiveness of existing corrective actions has been gradually demonstrated. Although some failed or deficient components led to reduced system redundancy, the safety significance of the findings was determined to be low since the system safety functions have been continuously maintained.”

CNSC expresses confidence in OPG’s handling of emergency management both at the station itself, and in its handling of communications with the public.

7. Oracle Research Poll: Findings and Implications. Two Other Polls

With CNSC Participant Funding Program support, DNA commissioned a poll that was carried out by Oraclepoll Research. The poll results report accompanies our submission. Results bear out expectations that members of the public have a keen interest in the existence of emergency plans for a serious, Fukushima-scale accident.

Key Results

- 93% want detailed plans in place for a Fukushima-scale accident
- 87% support expanding the distance for KI delivery beyond 10K
- 81% have KI pills already
- 83% do not know that citizens can order pills free of charge through a Web site
- 59% of respondents are totally unprepared for a possible accident
- Very high levels of interest exist among respondents for other detailed information regarding a nuclear emergency (*see pg. 19 of Oraclepoll’s report for various aspects of desired information*)

Implications of Poll Findings

These findings suggest strongly that:

- a) Current nuclear emergency planning is inadequate.
- b) OPG needs to do a great deal more work to notify people living within 50K of the Pickering nuclear station that they can order KI pills free of charge.
- c) The KI pre-distribution radius must be expanded.



- d) All agencies involved in nuclear emergency planning in Ontario need to do a great deal more work to prepare citizens for a possible nuclear emergency in the Greater Toronto Area.
- e) Citizens are quite clear on the fact that the pre-distribution of KI pills to residents with a 10K radius *does not constitute a robust nuclear emergency plan.*

OPG Poll Referenced at Day 1 Hearing

According to OPG staff member Steve Grigoris at the April 4th hearing,

“Together with various external agencies, OPG worked hard to reach out and communicate with the public about emergency preparedness. Based on polling results, we are confident that the general public knows what to do in the extremely unlikely event of a nuclear emergency.”¹⁹

DNA requested that OPG produce the source for this alleged polling result. OPG has not obliged.

There is a definite disconnect between what OPG claims, and both the survey DNA has just had done, and a survey done for the Ontario Clean Air Alliance in the Fall of 2017.

DNA and OCAA have been transparent in producing our polling results in our submissions to the CNSC.

Our findings suggest 2 key things:

- a) The “social licence” that OPG claims exists, i.e., broad public support for continued operations at the PNGS, does not appear to exist, in fact, at all.
- b) OPG’s claimed hard work on outreach about emergency preparedness has not succeeded, but rather has failed abysmally. Poll results indicate that people are not at all well prepared, definitely desire more information, and are aware that receiving KI pills does not constitute planning for a serious nuclear accident.

8. Emergency Planning Resolutions: Durham Region, Toronto etc.

Durham Regional Council has passed several resolutions since 2014 to express support for:

- Provincial consultation with government and citizens in the formation of emergency plans
- Best practices in emergency planning
- Greater transparency in the creation of emergency plans
- Consideration of expanding the primary zone beyond 10 K
- Expanding the pre-distribution of KI pill beyond the 10K zone

¹⁹ Transcript from CNSC; on-line: <http://www.nuclearsafety.gc.ca/eng/the-commission/pdf/TranscriptofPickeringHearing-April4,2018.pdf>. 27 in the transcript (p. 29 of the pdf)



- Providing funding to municipalities for additional costs incurred in implementing new requirements in the PNERP.

Other communities that passed motions in 2017 calling for enhanced emergency plans are:

- Ajax
- Amherstberg
- Brockton
- Essex County
- Windsor
- Toronto

Support for better nuclear emergency measures has thus been demonstrated across the province – not just in Durham Region, and not just by citizens – but also by local and regional governments.

9. A Word About Safety

The section of OPG’s CMD on Environmental Safeguards is eye-opening.

It includes information about:

- Chemical contaminants in groundwater and “certain industrial substances” (pg. 47)
- Used fuel canisters designed for 50 years (p. 50) *For waste that will be unbelievably toxic and dangerous for hundreds of thousands of years!*
- SEFDRs – Site Event Free Day Resets (pg. 59) – *a significant enough number of these in 2017 (i.e., last year) that a “station wide stand down” took place “to highlight the significance of these events to staff”*
- Mispositions (pg. 60)
- Unplanned tritium uptakes & precursor events (pg. 67)
- Tritium spills & the existence of a “tritium airborne reduction team” (pg. 71)
- Tracking tritium in groundwater (p. 71)
- “Infracctions” (pg. 73)

The CNSC CMD points to lack of maintenance being an issue, and that “lack of adequate resources” was implicated.

Sobering language!

OPG admits, in its own documents,



“The overall conclusion, based on the information provided in this submission, is that the Pickering whole-site risk is low.”²⁰

Low. Not *very* low. Not *extremely* low. Just ... low.

This is a long way from a rousing endorsement of the safety of a gigantic nuclear station for the millions of citizens who live right in its backyard!

More detailed and technical critiques about plant safety by more technically knowledgeable intervenors have been submitted to the CNSC, and thus will be available to the Commission/tribunal members for their perusal.

What strikes DNA is how easy it is for a decidedly *un*-technical person to do a little reading between the lines and observe that there exist very serious safety and environmental issues at the Pickering nuclear generating station.

10. Conclusions

As has been referenced, Durham Nuclear Awareness has been voicing concerns about inadequate nuclear emergency planning in the Greater Toronto Area since the late 1980s. Following the Chernobyl nuclear disaster.

During all these years, when nothing was changing in terms of creating truly robust emergency planning, the population around the nuclear stations was increasing substantially. The intensification was continuing to intensify, and now appears on a trajectory to intensify yet considerably more.

The plants meanwhile were getting older, systems and components were weakening and breaking down – with maintenance not always being quite what it ought to be – yet somehow with plans for an emergency never seeming to become any more “robust” as the years and decades passed.

Then, in 2011, another huge nuclear disaster occurred. In 2018, 7 years into this disaster, OPG makes the claim “Pickering NGS has always been safe.” In the next breath, “Fukushima enhancements” are mentioned, some of which will not be completed until 2 years into the *next* licence period.

Surely there is a logical fallacy in asserting that the plant is safe, then asserting in the next breath that it has become *safer*, and in the next, that it is going to become *even safer* in the next licence period.

Is the station safe, or isn't it? If it's going to become *safer* next year, does that mean it was NOT safe last year? And in fact, is not safe now?

²⁰ OPG CMD 18-H6.1, page 124.



All this certainly stretches credulity for the discerning reader.

The language of industry documents makes it quite clear that a serious accident *could* occur, and that everyone is perfectly aware of this immutable fact.

OPG can claim until the proverbial cows come home that it has safety well in hand on the site of the station – but this offers little comfort to those of us who live in the big world out *beyond OPG's fence line*.

In the *real world* – where there are far too many people to be protected or evacuated – we live and work and conduct our lives. In and around Canada's largest city and major economic engine.

It must be stressed that emergency exercises staged by the industry provide zero reassurance to members of the public that a nuclear emergency will be handled well. It is all too painfully obvious to anyone who is paying close attention that there are so many agencies with “fingers in the pie” (i.e., responsibilities vis-à-vis emergency planning) and so many ways for important things to fall between the cracks, that a serious nuclear emergency in the Greater Toronto Area would be a disaster of truly monumental proportions.

From the 2017 Auditor General report:

“The focus on practice tests for nuclear emergencies is driven by the licensing requirements of the nuclear power companies. The tests are paid for and organized by these companies and generally focus on their concerns. We noted that the tests mainly concentrate on events occurring inside the nuclear power facility—the responsibility of these companies; they usually do not extensively test areas outside the nuclear power facility—the Province's responsibility.”²¹

Reasons for Plant Closure

There are many reasons why the Pickering nuclear generating station should be shut down. This list is likely not an exhaustive one.

- The station is old and increasingly dangerous.
- The risks of running an old plant like this are simply far too great.
- Leaks and spills and emissions continue to occur (*along with lack of transparency about same*).
- The station is located much too close to a huge population base.
- Durham Region's chief economic engine is agriculture, and nuclear operations endanger that.
- We don't need the power!
- The power is too costly.

²¹ Office of the Auditor General of Ontario, (2017). “Emergency Management in Ontario,” online: http://www.auditor.on.ca/en/content/annualreports/arreports/en17/v1_304en17.pdf; p. 251.



- Creating more nuclear waste is unnecessary and indeed, it is immoral to exacerbate the size of this problem that has already been placed – irresponsibly – on future generations.
- There are issues around security of waste storage at PNGS.
- Emergency plans for a serious nuclear emergency are woefully inadequate.
- There are serious trust issues regarding Ontario Power Generation.
- There are serious barriers to the ability to place trust in the regulator.
- Discerning members of the public do not trust computer modelling, nor “desktop reviews,” nor the use of averaging with spills & emissions data, nor in the usefulness of staged emergency exercises.
- We do not and cannot trust in weak emergency plans that fly in the face of reality and common sense.

One need be neither a rocket scientist nor a technical expert to be able to read between the lines in OPG and CNSC’s documents.

It does not matter how many times you repeat the words “safe,” and “safety,” and “robust.”

Calling something safe does not magically make it so! Repeating the words endlessly will not make the station safer, nor does overblown language constitute safety. Nor does it generate credibility, or trust.

As we all know, it *can* happen here.

And if it does, it will be disastrous – even catastrophic.

Recall the finding of the Kemeny Commission, after the Three Mile Island accident in 1979:

Kemeny Commission on causes of Three Mile Island accident, in Oct. 1979: “[T]he fundamental problems are people-related and not equipment problems,” the commission wrote. “[W]herever we looked, we found problems with the human beings who operate the plant, with the management that runs the key organization, and with the agency that is charged with assuring the safety of nuclear power plants.” The commission also pointed a finger at “the failure of organizations to learn the proper lessons from previous incidents.” As a result, “we are convinced,” the commission wrote, “that an accident like Three Mile Island was eventually inevitable.”²²

“A “manmade” disaster: The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties. They effectively betrayed the nation’s right to be safe from nuclear accidents. Therefore, we conclude that the accident was clearly “manmade.” We believe that the root causes were the organizational and regulatory systems that supported faulty rationales for decisions and actions, rather than issues relating to the competency

²² *Fukushima – The Story of a Nuclear Disaster*, David Lochbaum, Susan B. Stranahan and the Union of Concerned Scientists (2014), Chapter 7, ‘Another March, Another Nation, Another Meltdown,’ pg. 150



of any specific individual. (see Recommendation 1)” — *from The official report of the Fukushima Nuclear Accident Independent Investigation Commission* (pg. 16)

“The Commission has verified that there was a lag in upgrading nuclear emergency preparedness and complex disaster countermeasures, and attributes this to regulators’ negative attitudes toward revising and improving existing emergency plans.” — *from The official report of The Fukushima Nuclear Accident Independent Investigation Commission* (pg. 19)²³

We are failing to learn from history, and thus, may very well be doomed to repeat it.

For the 9 or 10 million of us who rely on Lake Ontario for our drinking water, continuing to run nuclear plants right on the shoreline of the lake is a mistake of colossal proportions. Even worse – *it is a deliberate and entirely avoidable mistake.*

11. Recommendation to CNSC Tribunal

DNA endorses the work and recommendations of the Canadian Environmental Law Association (CELA).

We are aware that the CNSC has jurisdiction not just over the emergency plans of the proponent, but also has the broad duty and obligation to ensure that public safety and environmental protection are maintained.

We need the CNSC to exercise its obligations and jurisdictional responsibilities.

CNSC must ensure that IAEA standards with respect to emergency planning are met, which is not currently the case with the proponent’s licensing basis.

CELA has pointed out that Licence Condition Handbooks must be current with international guidance and standards.

And that this must be the case at the time of licensing.

CELA points out that Ontario’s emergency planning zones are not aligned with international best practice or IAEA guidance, and references IAEA Safety Guide GS-G-2.1. Further, that detailed planning must be carried out for distances beyond the current Automatic Action Zone and Detailed Planning Zone.

As CELA has pointed out, the Pickering Nuclear Generating Station has been in operation for 47 years. It ought to be a world leader in carrying out public awareness and education efforts, yet as

²³ https://www.nirs.org/wp-content/uploads/fukushima/naic_report.pdf



our public opinion poll results have demonstrated, the public is both in need of considerable additional information, and highly desirous of being protected in the event that a serious, Fukushima-scale accident should occur.

DNA requests that, based on the need for public safety in Canada's most populous metropolitan area, CNSC deny this licence extension request from Ontario Power Generation for the Pickering Nuclear Generating Station.

Pickering Nuclear Station Emergency Preparedness Report



March 2018

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EXECUTIVE SUMMARY

Overall, there is a low level of perceived concern among residents when it comes to a potential accident at the Pickering Generating Station – 26% concerned or very concerned. However, those living closer or within three kilometers, younger or under the age of 35 and females tend to have a higher level of apprehension. Despite this, there is overwhelming support by more than nine in ten for having a detailed nuclear emergency plan in place to protect residents from a Fukushima-scale accident.

Given the nominal concern over a possible accident, it is not surprising that only about three in ten rated their overall awareness and understanding of emergency procedures and preparedness as good or very good. When it came to specific emergency plans or procedures, the areas that fared the best in terms of awareness were knowledge of sirens and KI pill usage, while emergency shelters and emergency plans for children, seniors or others at public facilities rated poorest. Residents living within a three-kilometer radius of the Station had higher overall levels of awareness.

Only slightly more than a quarter of residents said that they are prepared for a possible accident – a similar number of those that are concerned or very concerned. Higher income earners and those living closest were most prepared. However, few or only 16% have a specific household emergency plan in place.

Less than two in ten claimed to have recently seen or heard something about planning in the event of an accident or were aware of community outreach or communications efforts to educate residents about emergency preparedness. While roughly half said that they have received information at their residence related to emergency preparedness, most of them could not recall the content.

KI pill penetration in the areas surveyed is high at 81% of households and strongest in the three-kilometer radius of the Station (93%). The percentage of those that have heard a siren in the past year is half that number or 41% and very low for the previous month time frame (5% of total sample).



A high level of interest was expressed for all emergency information types or sources – including sheltering or staying in place, emergency contact numbers or information, emergency reception centres, alert systems and how to self-decontaminate. There is strong support by 87% of residents to include areas beyond the current 10-kilometer limit for KI pill distribution.

Social media and internet websites are preferred sources to get emergency information and to be informed or engaged, although there are demographic variances. While digital methods appeal to younger and the mid-aged cohorts, traditional media sources and household mailings are preferred by the older.




Low preparedness as well as a minimal understanding of emergency procedures appear correlated to the overall low concern over a potential accident. This lack of perceived urgency is also revealed in that given the relatively high acknowledged receipt of information at their home, it appears to be having little impact or resonance. Residents do want information, but they also want delivery approaches that would include a stronger social media or web component to augment more traditional approaches. The content also needs to be more impactful, as a low perceived concern over an accident is resulting in low awareness and preparedness for an emergency.

METHODOLOGY & LOGISTICS


Study Sample

-  This report represents the findings from an Oraclepoll Research telephone survey of N=1000 residents, 18 years of age and older, that reside within a 20-kilometre radius of the Pickering Nuclear Generating Station.
-  The purpose of the survey was to assess concerns over a possible accident at the Pickering Nuclear Generating Station, awareness of emergency plans or procedures, plans in place and interest in receiving information on the topic.



Survey Method

-  Surveys were conducted by telephone at the Oraclepoll call centre using person to person live operators from the days of March 14th and March 26th, 2018.
-  All surveys were conducted by telephone using live operators at the Oraclepoll call centre facility. The survey was conducted using person to person interviewing with computer-assisted techniques of telephone (CATI) and random number selection (RDD). The dual sample frame database was inclusive of cell phone numbers as well as land-lines.
-  A total of 20% of all interviews were monitored and the management of Oraclepoll Research Limited supervised 100%.



Logistics

-  Initial calls were made between the hours of 6:00 p.m. and 9:00 p.m. Subsequent call-backs of no-answers and busy numbers were made up to 5 times (from 10:00 a.m. to 9:00 p.m.) until contact was made. In addition, telephone interview appointments were attempted with those respondents unable to complete the survey at the time of contact. If no contact was made at a number after the fifth attempt, the number was discarded and a new one was used. At least one attempt was made to contact respondents during a weekend.

Study Sample & Confidence

-  The margin of error for this N=1000-person survey is $\pm 3.1\%$, 19/20 times.
-  Throughout this report, only statistically significant effects as a function of area and demographics are presented. All effects are significant at the $p < .05$ level. This means that there are less than 5 chances in 100 that a reported effect does not reflect a true effect.

Sample Selection

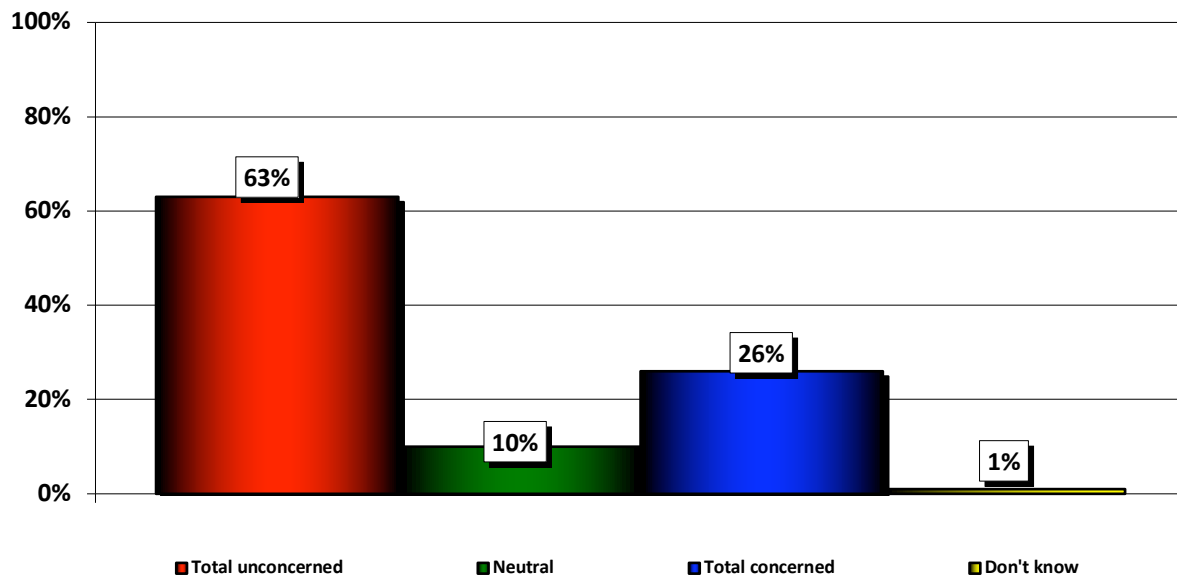
-  An initial screening question was asked to **ensure that all of those interviewed live within a 20-kilometre radius of the Pickering Nuclear Generating Station (Q1).**
-  In total, 24% of the final sample (N=237) reside within a three-kilometre radius of the Generating Station and 76% (N=763) three kilometers or more away.

RESULTS OVERVIEW

Accident Concern

Respondents were asked about their level of **concern over a potential accident** at the Generating Station. The graph below combines the total unconcerned (1-not at all & 2-not concerned) and total concerned (4-concerned & 5-very concerned) responses from the five-point scale used.

**Q2. "How concerned are you about a possible accident at the Pickering Nuclear Generating Station?
Please use a scale from one not at all concerned to five very concerned."**



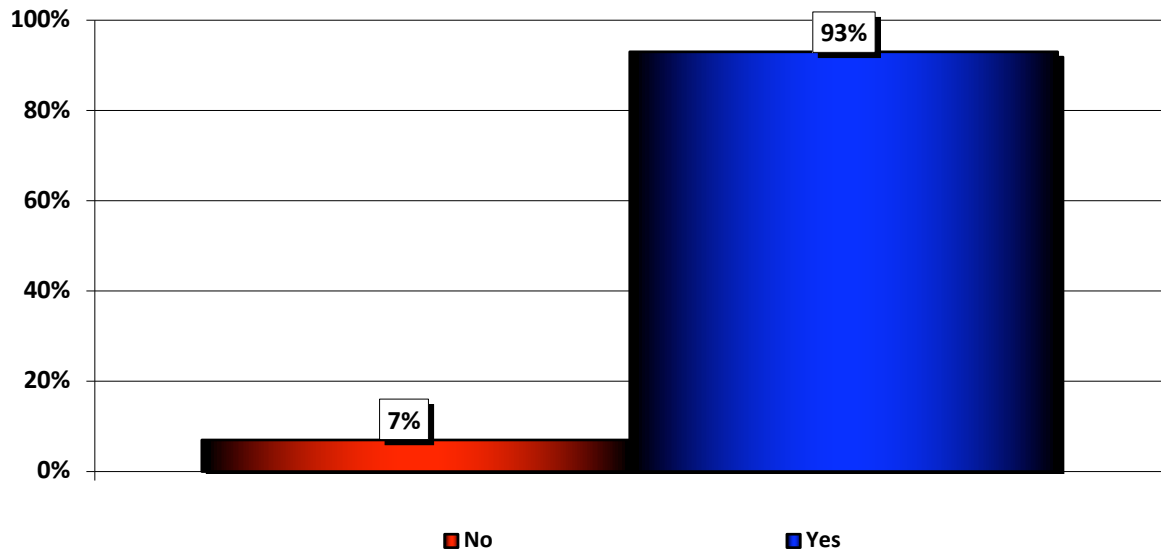
There is a low level of concern as slightly more than one-quarter or 26% of all residents interviewed said they are concerned (14%) or very concerned (12%) about a possible accident. This compares to 63% that are not concerned (26%) or not at all concerned (37%), while 10% were neutral (neither concerned nor unconcerned) and 1% were unsure.

Concern was highest among 18-34-year olds (33%), females (30%) in relation to males (21%) and those living within three kilometres of the Station (45%) compared to those residing three or more kilometres from it (21%),

Emergency Plan – Support

Next respondents were asked if they felt there **should be a detailed nuclear emergency plan in place** to protect residents from a large-scale accident at Pickering and Darlington.

Q3. “Do you think there should be detailed nuclear emergency plans in place to protect Durham residents from a Fukushima-scale accident at the Pickering and Darlington Nuclear Generating Stations?”

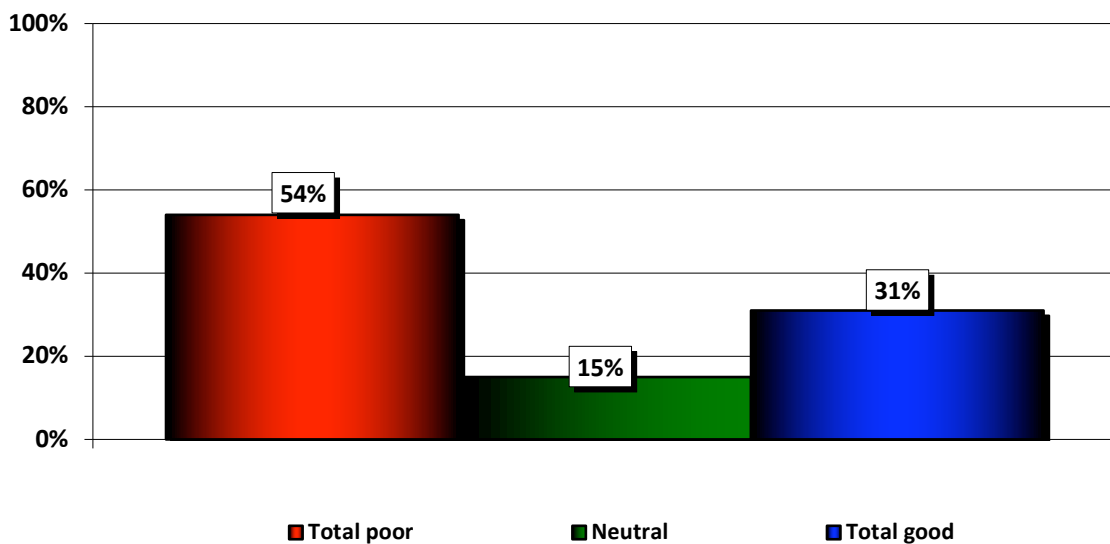


A very strong level of support was expressed by 93% of residents for having a detailed nuclear emergency plan in place to protect residents from a Fukushima-scale accident. Results were strong and consistent across all demographic cohorts, while they were slightly higher among those living closest to Pickering or within three kilometres (96%), than three or more kilometers away.

Emergency Procedures & Preparedness -Overall Awareness

An indicator about **overall awareness and understanding of emergency procedures and preparedness** was asked. Respondents answered using a five-point likert scale with results below merging the total poor (1-very poor & 2-poor) and total good (4-good & 5-very good) answers.

Q4. "Overall, how would you rate your level of awareness and understanding of emergency procedures & preparedness in the event of a nuclear incident? Please use a scale of from 1 (very poor) to 5 (very good)."



Most residents claim not to have a good level of awareness and understanding of emergency procedures and preparedness in the event of a nuclear incident. Only 31% rated their awareness and understanding as good (18%) or very good (13%), compared to more than half or 54% as poor (42%) or very poor (12%), while 15% had a neutral opinion of neither poor nor good.

Awareness and understanding was stronger (good & very good) among females (34%) compared to males (27%) and residents living closest to the generating station (under 3 kilometers – 36%) than those farther away (3 kilometers or more – 29%).

Specific Plans & Preparedness –Awareness

Respondents were asked to rate their **level of awareness with eleven emergency plans or procedures** using a five-point scale. The results in the table below combine the total unaware (1-not at all & 2-not aware) and total aware (4-aware & 5-very aware) findings.

“Next, I would like you to rate your level of awareness of each of the following emergency plans or procedures for a possible accident at the Pickering Nuclear Generating Station. Please respond to each using a scale from one at all aware to five very aware.”

AWARENESS & UNDERSTANDING AREAS	Total unaware	Neutral	Total Aware	Don't know
Q5. How and when to use KI (potassium iodide) pills	30%	19%	51%	-
Q6. Evacuation plans in the community in the event of an accident at the nuclear station	58%	8%	32%	3%
Q7. Emergency plans in place for children, seniors or others at public institutions in the community (e.g. schools and day care centres)	62%	13%	23%	2%
Q8. Evacuation routes in the community	57%	5%	35%	3%
Q9. What emergency sirens mean or represent	28%	17%	55%	-
Q10. The location of public reception centres in the event of a serious emergency	59%	9%	30%	2%
Q11. The location of monitoring and decontamination centres	61%	7%	31%	1%
Q12. The location of emergency shelters	65%	8%	26%	1%
Q13. Of being told to remain “in place” for emergency instructions including “sheltering-in-place” or staying indoors, sealing your windows and doors	48%	6%	46%	-
Q14. On how to self decontaminate yourself and your family	57%	10%	33%	-
Q15. Of Public Action Directives that will explain the measures to be taken to avoid or minimize radiation exposure in the event of an accident	52%	12%	32%	4%

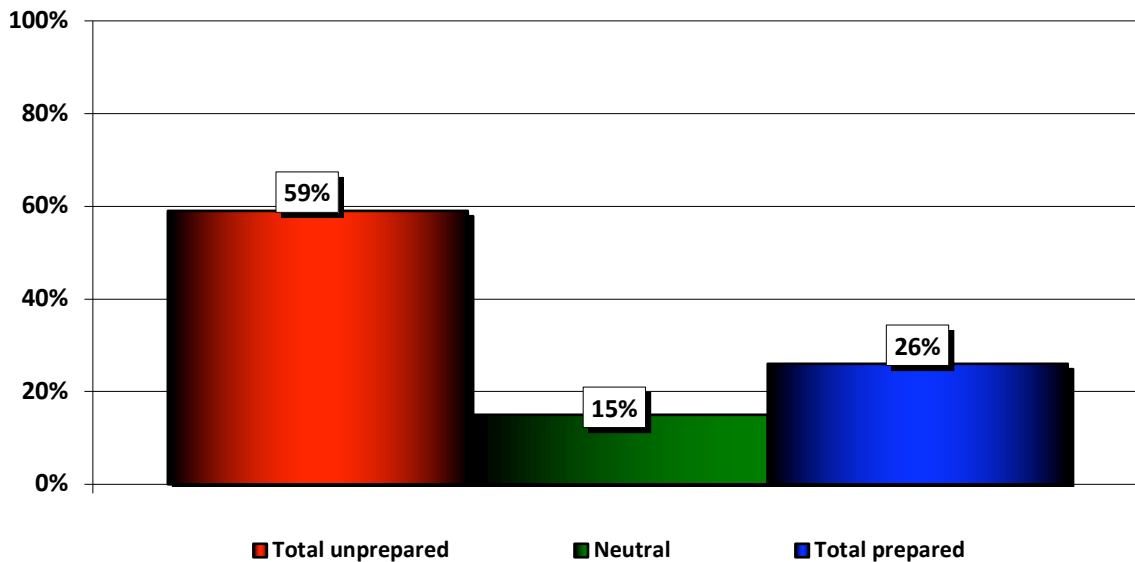
Residents expressed their highest awareness for knowledge of what emergency sirens mean at 55%, followed by how and when to use KI pills at 51% and being told to remain in place for emergency instructions at 46%. Awareness for these three indicators was highest among residents living closest to the Station or within three kilometers (65%, 57% and 55% respectively).

Findings for the remaining indicators reveal lower awareness and high lack of awareness especially for the location of emergency shelters (26% aware & 65% unaware) and emergency plans in place for children, seniors or others at public facilities (23% aware & 62% unaware). While results were higher among those living within three kilometers, they were also compressed (32% & 38% respectively).

Level of Readiness or Preparedness

Residents were then questioned about their **level of readiness or preparedness for a possible nuclear accident** at the Pickering Generating Station. A five-point scale was used, with the following table combining the total unprepared (1-not at all prepared & 2-not prepared) and total prepared (4-prepared & 5-very prepared) results.

Q16. *“Overall, how would you rate your level of readiness or preparedness for a possible accident at the Generating Station? Please use a scale from one not at all prepared to five very prepared.”*



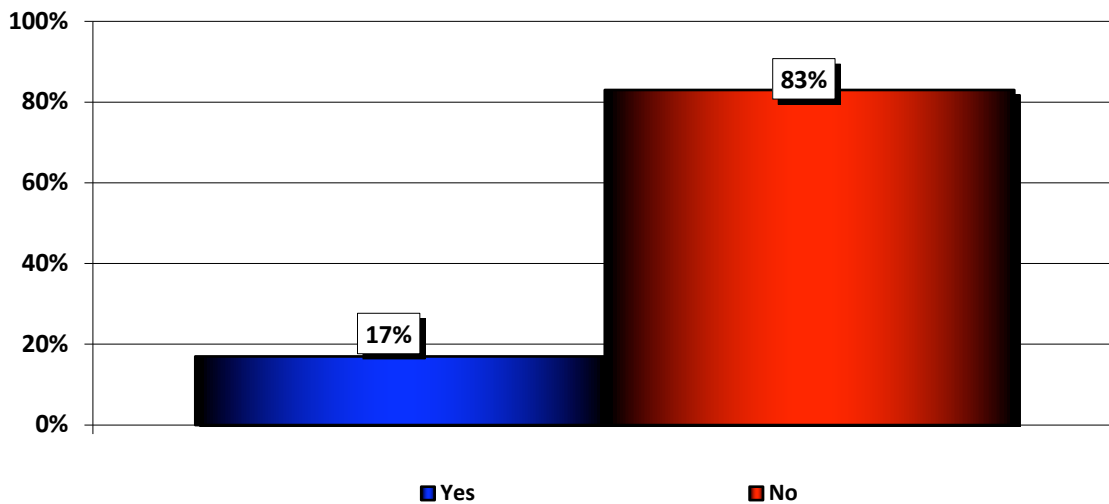
Only slightly more than a quarter of residents or 26% said that they are prepared for a possible accident, compared to a 59% majority that are unprepared, while 15% were in the middle being neither prepared nor unprepared (neutral). The highest earners in the \$100,000+ income cohort were most prepared (39%) as were more of those residing within three kilometers of the Station (30%).

Awareness of Information & Communications

A series of questions were posed about awareness of communications related to planning and education.

The first question asked residents if they have recently become **aware of information related to planning in the event of an accident**.

Q17. "Have you seen or heard anything recently about planning in the event of a nuclear accident at the Generating Station?"

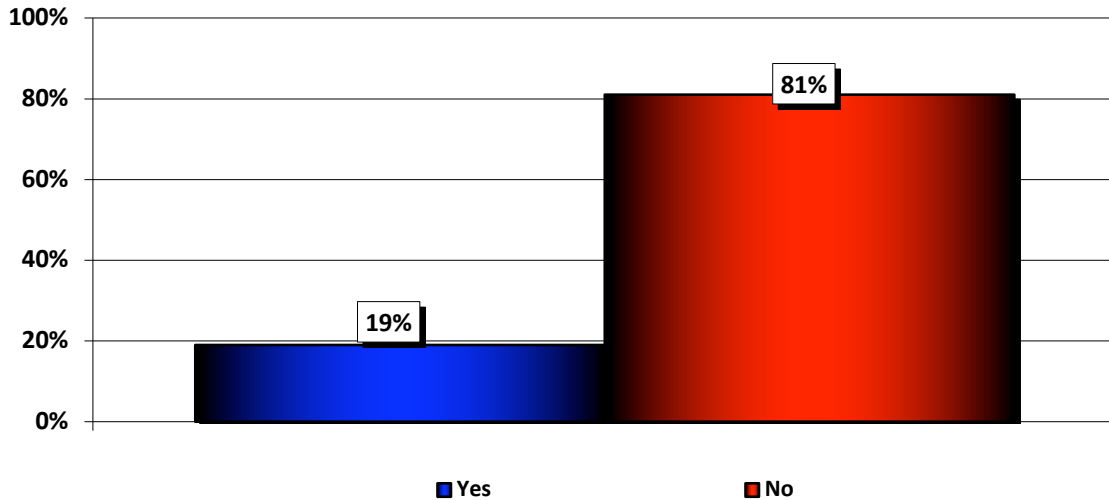


Only 17% (N=166) of residents claimed to have recently seen or heard something about planning in the event of an accident. While there was no significant variance as a function of age or gender, results were higher for residents making \$100,000 or more per annum (21%) and living within three kilometers of the Station (25%).

The (N=166) residents that claimed to have recently seen or heard something about planning in the event of an accident were asked an open-ended follow-up question about **what they saw or heard (Q18)**. Twenty-percent (N=33) cited information in the media or news, 18% (N=29) word of mouth discussions or talking to others, 13% (N=22) mentioned KI pills including their distribution or where to get them, 10% (N=17) emergency planning or drills, 10% (N=16) where to go in the event of an accident and 9% (N=15) information or a kit in the mail. Other mentions included emergency plans by agencies or government (5%, N=9), what to have on hand – emergency, survival kit etc. (4%, N=6), information at a meeting (4%, N=6), what to do in an emergency (3%, N=5), something from an online search (2%, N=4) and the Station’s emergency plans (1%, N=1). There were 2% (N=4) that could not remember.

The next question dealt with **awareness of community outreach or communications efforts**.

Q19. *“Are you aware of any community outreach or communications efforts to educate residents about emergency preparedness in the event of a nuclear accident?”*

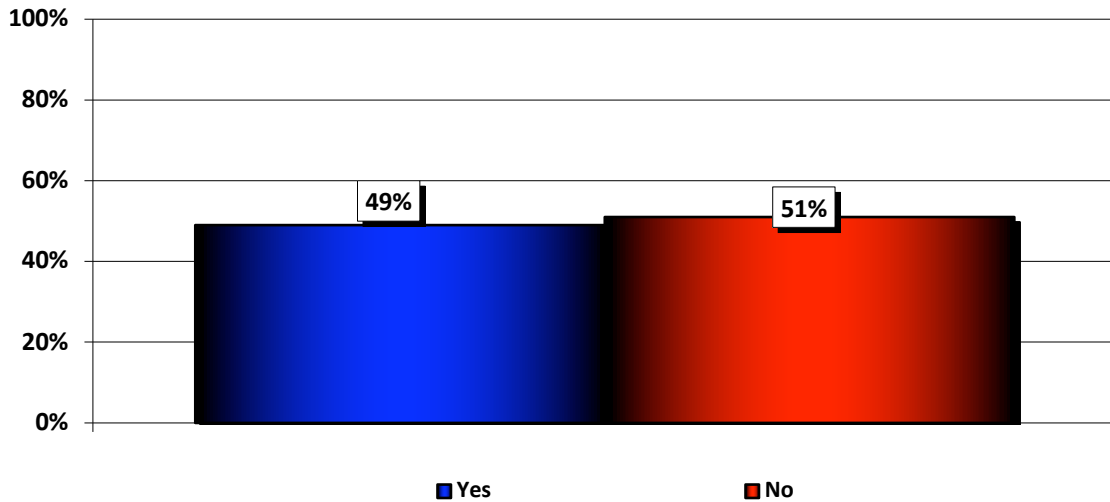


Nineteen percent (N=193) said that they were aware of community outreach or communications efforts to educate residents about emergency preparedness. Awareness was higher among those 65 or older (24%), residents within three kilometers of the Station (23%) and females (21%) compared to males (17%).

A follow up question was asked to the N=193 aware about **which efforts they were aware of (Q20)**. Most recollected by 46% (N=88) was information in the mail, next followed by 15% (N=29) that named something in the media or news, 11% (N=22) recalled information about where and how to get to emergency shelters, 7% (N=14) emergency services material, 6% (N=11) KI pills and 5% (N=9) communication from the municipality. There were 10% (N=20) that did not know or could not remember.

Residents were then specifically asked if they had **received material about emergency preparedness at their residence**.

Q21. "Have you received any material about emergency preparedness at your residence?"



Almost half or 49% (N=486) of those surveyed claimed they received information at their residence related to emergency preparedness. Receipt was higher among those 65+ (57%), residents living within three kilometers of the facility (54%) and the highest earners of \$100,000+ (53%).

The N=486 that said they received information were then asked to state **what they recalled about the communication and its messages (Q22)**. There were 52% of respondents to the question that did not know, could not recall specifics or did not read the literature, while another 18% were only able to mention useful material or general information. Among those that did name specifics, most named were evacuation routes, what to do in an emergency including where to go and how to use KI pills.

Don't know	N=159	33%
Did receive but don't recall specifics	N=73	15%
Evacuation routes	N=55	11%
Good information / useful	N=46	9%
General information	N=42	9%
What to do in case of an emergency	N=40	8%
When and how to use KI pills	N=28	6%
Where to go in case of an emergency	N=25	5%
Did not read / pay attention	N=18	4%

Sirens

Residents were asked if they had **heard emergency test sirens in their area in the past year**.

Q23a. "Have you heard emergency (test) sirens in your area in the past year?"

Sirens Heard – Past 12 Months		N=1000
	Yes	41%
	No	59%

In total, 41% (N=410) of residents claimed that they have heard an emergency test siren in their vicinity with the past 12 months. Females (46%) were more likely to have heard test sirens than males (36%), as were those living within three kilometers of the Facility (46%) than those three kilometers or farther (31%). Older resident 65+ (44%) and 35-64 (42%) also had a higher likelihood of hearing a siren than those under 35 years of age (37%).

The N=410 or 41% of residents that said they have heard a test siren within the last year were then asked if they **have heard it in past month**.

Q23b. "Have you heard emergency (test) sirens in your area in the past month?"

Sirens Heard – Past Month		N=410
	Yes	13%
	No	87%

Of those asked, 13% (N=53) stated that they have heard an emergency test siren within the last month – representing 5% of the total sample of N=1000.

KI Pills

All respondents were asked **if they have KI or potassium iodide pills at their residence**. A majority of 81% stated that they have KI pills at their home, with residents living closest to the Station or within three kilometers (93%) being most likely to have them compared to those living farther away (three or more kilometers – 77%)

Q24. “Do you have KI (potassium iodide) pills at your residence?”

KI Pills at Residence		N=1000
	Yes	81%
	No	19%

Next, residents were read a short statement after which they were asked about their **awareness of being able to order KI pills online**.

“Canada’s nuclear regulator has decreed that KI pills (Potassium Iodide; thyroid-blocking pills) are to be delivered to all households within 10-kilometer radius of a nuclear plant.”

Q25. “Are you aware that you can order the pills free of charge through the website preparetobesafe.ca?”

KI Pill Online Ordering Awareness		N=1000
	Yes	17%
	No	83%

Seventeen percent of residents have knowledge of the ability to order KI pills on the preparetobesafe.ca website. Younger respondents 18-34 (23%) were most aware, followed by 35-64-year old’s (16%), while those 65+ had the lowest awareness (8%).

A descriptive statement was first read to survey participants about current KI pill delivery and how other jurisdictions deal with their geographic distribution. They were then asked if they support the expansion of the current system beyond the current 10-kilometer radius.

“KI (Potassium Iodide; thyroid-blocking pills) are currently delivered to every household within 10 km of the Pickering nuclear station. However, in the event of an emergency people may need KI beyond the 10 km. In New Brunswick, KI pills are delivered to everyone within 20 km of the Point Lepreau Nuclear Station, and in Switzerland, KI pills are delivered within 50 km. The City of Toronto and Durham Region have also called for the delivery of KI to be expanded.”

Q26. “Would you support expanding the distance for KI delivery beyond the current 10 kilometers?”











Support for KI Delivery Expansion		N=1000
	Yes	87%
	No	10%
	Don't know	3%

There is strong support by 87% of residents to include areas beyond the current 10-kilometer limit for KI pill delivery – this across all demographic cohorts.

Sources of Information

In an open ended or unaided question, residents were asked about what **information sources they would refer to in the event of a nuclear accident**. Multiple responses were accepted and below are the findings from the N=1410 responses provided.












Q27. “In the event of a nuclear accident, what sources would you use to go to information about what to do and where to go?”

 Website / Internet	N=324	23%
 Radio	N=249	18%
 Don't know	N=217	15%
 Social media	N=197	14%
 TV	N=141	10%
 Emergency services (fire, police)	N=138	10%
 Newspapers (online)	N=59	4%
 The hospital	N=45	3%
 From the Region	N=35	3%
 Information booklet we received	N=5	<1%

Most named by 23% of all combined responses were internet websites, followed by radio at 18% and social media by 14%. There were 10% that cited each of television and emergency services in the Region, while 15% were unsure. Millennials 18-34 years of age most cited internet websites (49%) and social media, 35-64-year old's online sites (27%) and radio, while those 65+ tended to name television (34%) and radio (39%).

In another open-ended question, respondents were asked about the **most effective way to engage and advise residents about emergency planning**. One top of mind answer was accepted.

Q28. “In your opinion, what would be the most effective way to engage residents and the community to advise them about emergency planning, including evacuations and routes to follow?”

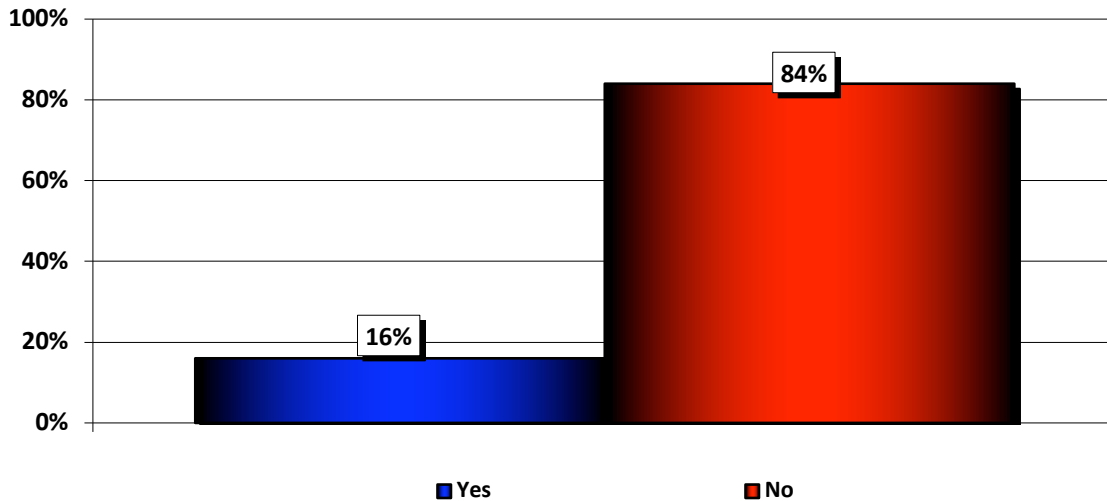
 Social media	N=277	28%
 Media (Not specified)	N=178	18%
 Internet / (their) website(s)	N=124	12%
 Tours of the Generating Station	N=102	10%
 Information in the mail	N=87	9%
 Don't know	N=77	8%
 Public meetings	N=75	8%
 Schools	N=25	3%
 Television	N=23	2%
 Newspapers (print & online)	N=17	2%
 Radio	N=15	2%

Social media had the highest recall from 28% of respondents for being most effective, while 18% named the media in general (unspecified). Other notable mentions included 12% that said internet websites, 10% tours of the Station, 9% mailings and 8% public forums. Younger respondents 18-34 prefer social media (45%) and websites (18%), the oldest 65+ tended to name media in general (26%), mail (17%) and public meetings (11%), while 16% of them were unsure. The middle cohort of 35-64 had a range of preferences including social media (26%), media in general (19%), tours of the Station (12%) and websites (12%).

Household Emergency Plan









The next set of indicators related to household emergency planning, starting with a question asking if respondents have a **family emergency plan in place**.

Q29. “Does your family have an emergency plan in place in case of a nuclear emergency?”



Sixteen percent (N=160) of respondents claimed that their household has an emergency plan in place. Those most likely to have a plan are residents living within three kilometers of the Station (21%), 18-34-year old’s (20%) and \$100,000+ earners (22%).

The N=160 (16%) were asked in an open-ended follow up question to **describe the emergency plan that they have in place (Q30)**. While results varied, the most common responses were to stay in place while waiting for instructions, take KI pills if needed and having food or water on hand.

 Stay put & listen to the media and do as told	N=42	26%
 Take pills if needed	N=28	18%
 Have emergency food & water	N=24	15%
 Evacuation route / plan	N=19	12%
 Meet (family members) at emergency location	N=16	10%
 Have safe section in home	N=14	9%
 Have an alternative residence to go to	N=12	7%
 Don't know	N=5	3%

All respondents were then asked if they have a **vehicle at their residence or a ride in place** from someone they know in the event of a possible evacuation scenario.

Q31. "Do you have a vehicle at your residence or plans for a ride from a relative, neighbour or friend in case of a possible evacuation?"

Vehicle at Residence or Ride in Place		N=1000
	Yes	92%
	No	8%

A 92% majority stated they have a vehicle or claim to have a ride in place from someone else if there were to be an evacuation. While only 8% do not, those more likely to have said no were older residents 65+ (15%) and the lowest earners of under \$75,000 per annum (14%).

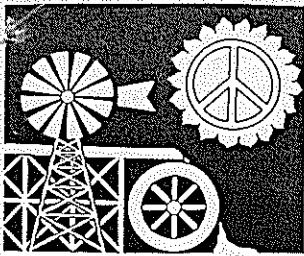
Interest in Information

In a final set of questions, residents were read a list of possible types of **emergency information that may be provided**, and they were then asked if each would be of interest.

“I am now going to a list of emergency information sources that may be provided to residents. After each one, please tell me if you would be interested in receiving information on each topic.”

INTEREST – EMERGENCY INFORMATION SOURCES	Yes-Interested
Q32. Maps with evacuation routes	82%
Q33. Information about alert systems	88%
Q34. Numbers and contact information in the event of an emergency	90%
Q35. Information about Potassium iodide pills	84%
Q36. Information about sheltering or staying in place	92%
Q37. The location of emergency reception centres	89%
Q38. How to self-decontaminate	87%

A high level of interest was expressed for all emergency information types or sources. Results were strongest in terms of interest for material about sheltering or staying in place at 92% and emergency contact numbers or information at 90%, followed by locations about emergency reception centres (89%), alert systems (88%) as well as how to self-decontaminate (87%). There was slightly lower interest, but still a strong majority, for information about KI pills (84%) and maps or evacuation routes (82%).



Durham Nuclear Awareness

Box 104, Uxbridge, Ontario L9P 1M6 Tel/Fax 905-852-0571

February 12, 1997

Ms. Debbie Farr
Manager,
Electricity Operations and Planning Section
Electricity Policy Branch, Policy Division
Ontario Ministry of Environment and Energy
135 St. Clair Ave. West, 6th floor
Toronto, ON M4V 1P5

Re: Provincial Nuclear Emergency Plan

Dear Ms. Farr,

I'm writing to provide you with comments on the Royal Society of Canada and Canadian Academy of Engineering (RSC/CAE) report to the Ministry of Environment and Energy (MoEE) dated November 1996 on nuclear emergency planning matters. As you know, Durham Nuclear Awareness (DNA) has been involved in nuclear emergency planning issues since the group was formed in 1986. DNA is a citizens environment group dedicated to raising awareness about nuclear issues in Durham Region. DNA prepared a detailed submission on emergency planning for the Ontario Nuclear Safety Review in 1987, and has been suggesting major improvements to the plans on an ongoing basis.

DNA has reviewed the RSC/CAE report and finds it to be an inadequate analysis of the matters under review. This could be due in part to the very limited scope of the terms of reference for the report. We believe that the topics have not been reviewed with the necessary rigour, and we question the validity of the RSC/CAE report findings and recommendations.

The RSC/CAE report states that "Since the time of the WG-8 Report, modifications to operating conditions and design of safety features have been made that reduce the expected radioactive emissions in an accident." (page 8). This statement is not substantiated or referenced. The RSC/CAE report credits the containment system with being able to hold contamination for 48 hours. "The holdup time used in very conservatively based estimates of emissions to the environment should now be at least 48 hours instead of 24 hours in most accidents." (page 8). Again, this statement is not substantiated or referenced. In addition, the report credits the presumed availability of the Emergency Core Coolant Injection (ECCI) safety system, and goes on to state: "All these are factors that reduce possible releases of radioactivity and must be taken into account." (page 8).

.../2

DNA believes it is inappropriate to assume that the containment system and the other safety systems such as the ECCI will be functioning properly during a severe accident. The unavailability record of special safety systems at CANDU reactors proves that these systems are not 100% reliable.

The report offers no credible argument for not pre-distributing stable iodine. The reviewers say that a delay in taking stable iodine is quite likely, so it will be ineffective anyway; that containment will work, so emission will be controlled and if containment failed: "KI tablets would be even less useful because they would likely be administered late". (page 28) Obviously, if people had stable iodine available in their homes and workplaces, they would be able to take it when needed to prevent exposure. The report fails to address the situation in New Brunswick surrounding the Point LePreau Nuclear Station. Stable iodine is pre-distributed with the emergency measures information kit, which is periodically updated. If New Brunswick can pre-distribute stable iodine, why can't Ontario?

The reviewers recommend against pre-distribution of KI because they claim that radioactive iodine is a small part of the risk from exposure to fallout from an accident. However, according to the World Health Organization:¹

"In any accident to an operating nuclear reactor which involves a release to the environment of fission products, the isotopes of iodine will be a prominent, if transitory, cause of radiation exposure. Initially, exposure will be by inhalation of the radioactive cloud, to be followed, particularly if rainfall occurred at the time of passage of the cloud, by ingestion as the radioactive iodine enters the foodchain. The affinity of iodine for the thyroid gland and the extent to which it is concentrated by the small gland results in very high doses to the thyroid." p. 15, 16.

"The infant thyroid is particularly at risk for two reasons, namely that for any given environmental exposure (radioactive iodine in the air or food chain), the dose to the infant thyroid is likely to be up to one order of magnitude greater than to adults with the same exposure, because of the differences in mass of the infant thyroid (about 1.8g at six months) compared to that of the adult (about 20g). In addition the young thyroid is up to an order of magnitude more sensitive to the cancer inducing effects of radiation than the adult." p. 17.

1. Dr. K.F. Baverstock, "WHO Guidelines on the Use of Stable Iodine After Nuclear Accidents" in *The Implementation of Short-term Countermeasures After a Nuclear Accident*, Proceedings of a Nuclear Energy Agency (NEA) Workshop, Stockholm, Sweden, 1-3 June 1994, Organization for Economic Co-operation and Development (OECD), 1995, p. 15-24.

The findings of the RSC/CAE report regarding stable iodine use are not consistent with other recent reviews of the issue. For example, the Group of Medical Advisors to the Atomic Energy Control Board noted: "Provided that stable iodine is ingested just before exposure to radioiodine, it provides virtually complete protection for the thyroid."²

A recent international conference sponsored by the OECD Nuclear Energy Agency *The Implementation of Short-term Countermeasures After a Nuclear Accident* Stockholm, June 1994, concluded:

"The medical basis for the use of stable iodine is firm... Stable iodine is most effective at reducing thyroid exposure from the inhalation of radioiodine when taken before the arrival of any airborne radioiodine... Questions remain as to the methods for the distribution of stable iodine to the population at risk in a timely manner, and as to the integration of these methods into emergency planning."³

The reviewers have failed to consider the very high population density around the nuclear stations in Durham Region. Given the likely difficulty of evacuating in a timely manner, the only reasonable way to proceed in our view is to provide all residents and workplaces in the primary zone with stable iodine. As an absolute minimum, DNA believes that authorities should provide residents and representatives of workplaces with the opportunity to obtain KI tablets in advance from the existing stockpile for storage in homes and workplaces.

The reviewers do note that the contiguous zone (3 km. radius) should have a relatively low population density, and preferably no permanent residents: "High population density and possible bad weather could make evacuation difficult and this zone should have a small population and preferably be restricted to parkland or industrial park use." (page 31). The reviewers don't address how this might be achieved in Durham Region, where large residential developments exist inside the contiguous zone around Pickering. This recommendation has important implications for property values, and for population density and zoning by-laws within Durham Region.

The RSC/CAE reviewers failed to adequately address the issue of the appropriate primary zone size: "In comparison to the wide range of consequences from a severe accident, 10 and 13 km are essentially the same number" (p. 1); and "the use of

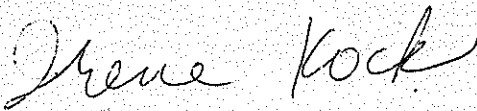
2. AECB Group of Medical Advisors, "Guidelines on the use of stable iodine as a prophylactic measure during nuclear emergencies", GMA-9, AECB INFO-0587, September 1995, p. 13.

3. *The Implementation of Short-term Countermeasures After a Nuclear Accident*, Proceedings of a Nuclear Energy Agency (NEA) Workshop, Stockholm, Sweden, 1-3 June 1994, Organization for Economic Co-operation and Development (OECD), 1995, p. 302-304.

10 km implies a reasoned generality while 13 km implies a precision which does not exist" (p. 32). It appears that no consideration was given to the present population distribution in the southern part of Durham Region, and the fact that the existing 10 km zone around Darlington cuts through urban Oshawa, and that the Town of Whitby, directly down-wind from Pickering, is excluded from the evacuation planning process. DNA believes that the ideal primary zone size is a 30 km. radius zone around each nuclear facility. As a minimum, it is essential that all residents in the urban areas between Pickering and Darlington be provided with detailed information about the nuclear emergency plans.

While I understand that the recommendations in the RSC/CAE report have been adopted by the government and will be incorporated into draft 2 of the new Master Plan, I would nevertheless appreciate hearing from you about the concerns we have raised in relation to this report. Finally, I would appreciate an explanation of why MoEE is the lead agency for this particular review, given that emergency measures are the mandate of the Ministry of the Solicitor General and Correctional Services through Emergency Measures Ontario (EMO). I look forward to your reply.

Sincerely,



Irene Kock

- c.c. Ifti Ahmed, Emergency Measures Ontario
- Hon. Robert Runciman, Solicitor General
- Nizar Jiwan, Ministry of Environment and Energy
- Hon. Norm Sterling, Minister of Environment and Energy
- Dalton McGuinty, Liberal Party Leader
- Howard Hampton, NDP Leader
- Ivan Ciuciura, Director, Durham Emergency Measures Office
- James Witty, Chairman, Regional Municipality of Durham
- Pickering / Ontario Hydro Liaison Committee

From: info@cnsccsn.gc.ca

Subject: Third Party Research : Potassium Iodine (KI) Pill Studies

Date: 14 October, 2014 11:42:47 AM EDT

To: mcneill.janet@gmail.com

Four independent third party studies explore and describe the benefits of distributing KI pills in advance to citizens within a 30-mile (48 kilometres) radius of a nuclear power plant, and the need for timely and correct consumption of these pills in the case of a nuclear accident.

The studies indicate such preventative measures can greatly reduce the accumulation of radioiodines in the thyroid gland, as well as the resulting radiation dose. This is an essential measure, since thyroid cancer - , most specifically in children and infants - is one of the most frequently observed consequences of a nuclear accident.

The studies also highlight the need for appropriate administrative policies and increased research on the topic of children and infant consumption of KI pills, to better understand both the effectiveness and the safety of these measures.

Read the studies:

<http://www.nuclearsafety.gc.ca/eng/resources/health/index.cfm#Hot-Topics>

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