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Submission from Durham Nuclear Awareness

In the Matter of

Ontario Power Generation Inc.

Application to renew the Power Reactor Operating licence for the Darlington Nuclear Generating Station

Commission Public Hearing
Part 2

November 2-5, 2015

Exposé oral

Mémoire de Durham Nuclear Awareness

À l'égard de

Ontario Power Generation Inc.

Demande concernant le renouvellement du permis d'exploitation pour la centrale nucléaire de Darlington

Audience publique de la Commission
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Canada

Durham Nuclear Awareness – Darlington Refurbishment Hearing
November 2-5, 2015 (PFP 2014 DRL01-DNA)

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1. Introduction

Durham Nuclear Awareness (DNA) has been calling for better nuclear emergency planning in Durham Region since the late 1980s, after the Chernobyl accident that took place on April 26, 1986.

In 1997 (i.e., post-Three Mile Island accident, post-Chernobyl accident, pre-Fukushima disaster) the group called 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.

This is simply to make quite clear that the group's concerns about potential nuclear accidents in Durham Region – as well as concerns about the efficacy of potential response to such accidents – are not new or being expressed in Durham Region only recently.

For the record, and to be clear, DNA has other concerns about the operations of the Darlington NGS. We have concerns about human health impacts and cancer rates; worker health exposures; environmental impacts, especially with respect to tritium emissions and tritium leaks into Lake Ontario; waste storage; waste transportation; and decommissioning plans and related issues.

However, this submission focuses on our current concerns regarding nuclear emergency planning.

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2. Draft EA Screening Report (July 2012)

In 2012 the group commissioned CELA (the Canadian Environmental Law Association) to prepare comments on the Draft Environmental Assessment Screening Report – Refurbishment and Continued Operations of the Darlington Nuclear Generating Station.

The extraordinarily detailed resulting report [1] laid out in minute detail the deficiencies in the draft screening report consideration of emergency planning for the Darlington Refurbishment and continued operation project. The CELA report detailed various aspects of nuclear emergency planning in the Draft EA screening report as follows:

A. Emergency planning, emergency response and evacuation in the sub-categories

- Community notification
- Shelter in place directions
- Potassium iodide distribution
- Evacuation
- Transportation following an accident
- Pathways and exposure mitigation in emergencies

B. Land use considerations
C. Size and Type of Accident Considered for Emergency Planning
D. Emergency Response Capacity
E. Occupational Health
F. Communications, Oversight Decision Making and Direction of Operations

The comments summarized and described in the July 2012 CELA report are almost encyclopedic in reach and depth. They provided DNA with an extraordinarily well-drawn picture of the inadequacy of nuclear emergency preparations in Durham Region in the event of a potential serious nuclear accident in the Region.

We learned of the existence of myriad holes and gaps in emergency planning around such topics as

- Protection of vulnerable communities (communications, evacuation, the care of)
- Considerations/plans for those living beyond 3 & 10 K zones
- Sheltering in place protocols & the very serious limitations to this practice that exist and are well recognized
- Evacuation realities, logistics, challenges, inadequacies; evacuation routes, evacuation time estimates, evacuation centres, food for evacuees; voluntary evacuation issues
- Specifics regarding reunification of families
- Transportation logistics and challenges
- Drinking water issues and alternate supplies, monitoring of food safety
- Population growth around Darlington NGS and the impacts thereof in terms of public safety
- Failure of the EA screening report to consider a major accident with large radiation release, or early release

We learned that current nuclear emergency planning is utterly inadequate, and that huge efforts are needed at both the provincial and federal levels to protect the citizens of Durham Region and Toronto in the event of a potential nuclear accident, always present as a possibility at any nuclear facility. We then took our concerns to the Darlington refurbishment hearing in 2012.

3. Darlington Hearing (December 2012)

The DNA presenter at the 2012 hearing stated "DNA's concerns and recommendations began with the screening report, which was very disappointing for us as it ignored the lessons from Fukushima, in our view. While major accidents are happening once a decade, the possibility of this is ignored in the screening report."[2]

To continue: "But to us the most important thing that you missed or ignored was Recommendation 63.[3] "The panel recommends that prior to construction, the Nuclear Safety Commission -- Canadian Nuclear Safety Commission require OPG to evaluate the cumulative effect of common cause severe accident involving all of the nuclear reactors in the site study area to determine if further emergency planning measures are required."[4]

The EA Screening report on the Darlington Refurbishment project ignored the recommendations of the 2011 Joint Review Panel about multi-unit accidents (which, as the DNA spokesperson pointed out, the Durham Nuclear Awareness group had been being recommending for years).

DNA's recommendation to the CNSC: "The CNSC has ignored lessons from Fukushima. While major accidents are happening once a decade, they're ignored in the screening report. This misrepresents the risk of Darlington's continued operation. Second, the CNSC has been unaccountable and ignored requests by Government of Ontario, the JRP and GOs to consider multi-unit accidents and large radiation releases. And it is the CNSC intransigence that is putting our communities at risk. The CNSC has only provided unsubstantiated assurances that emergency plans will acceptably protect Ontarians in the event of large radiation released during the continued operation of Darlington.

Our recommendation is that a public review of the ability of emergency plans to respond to multi-unit accidents and large releases must take place prior to this environmental assessment or before this environmental assessment can be approved."[5]

CNSC President/CEO Dr. Binder's final comment in response to the DNA submission was:

"Well, I'm surprised it's the first time you heard me ask this. I've been asking this since last year, since the big event, and I can tell you what my assessment -- where we are is we had some plans for emergency management. We're just trying to ascertain how good they are, and I think you heard from EMO and from our staff, there's always room for improvement, and we're going to insist that there will be improvement before the refurbishment. But when we hear -- if we decide to go with the refurbishment in 2014, I would hope that there will be a robust plan dealing with severe accidents." [6]

DNA agrees with President Binder: there *should* be credible plans in place to protect the citizens of Durham Region in the event of a Fukushima-scale accident. As will be discussed, three years later, no such plans have been provided to these hearings.

DNA thus recommends the Commission reject OPG's request to refurbish Darlington until such plans are in place.

Darlington Hearing – Outcome

From the Record of Proceedings, Including Reasons for Decision - Environmental Assessment Screening Regarding the Proposal to Refurbish and Continue to Operate the Darlington Nuclear Generating Station in the Municipality of Clarington, Ontario (undated)

153. The Commission asked for more information on the environmental effects of a more severe accident, notwithstanding it is considered outside the scope of the EA. CNSC staff responded that, under licensing, it is currently identifying safety improvements. CNSC staff further explained that it would be feasible to take these improvements into consideration and assess the health and environmental consequences of a more severe accident. CNSC staff added that the World Health Organization published a report in 2012 on the Fukushima accident, and that the United Nations Scientific Committee on the Effects of Atomic Radiation is due to submit an independent report to the General Assembly in April 2013. CNSC staff, because of public concern, agreed to provide an information document or equivalent assessing health and environmental consequences of more severe accident scenarios discussed by intervenors and intends on updating the Commission on this topic in fall 2013.[7]

4. The Severe Accident Study – June 2014

As referenced above, Dr. Binder, head of the CNSC, stated at the 2012 hearing, in response to the DNA presentation that, like members of the DNA group, he also wished to see a severe accident study before the refurbishment was to proceed. He called for "a robust plan dealing with severe accidents." (See above.)

As noted above in the excerpt from the EA Record of Proceedings, CNSC staff "because of public concern, agreed to provide an information document or equivalent assessing health and environmental consequences of more severe accident scenarios discussed by intervenors and intends on updating the Commission on this topic in fall 2013." [8]

Staff conducted a "Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures" and released a Draft Report in June 2014.

From the June 4, 2014 CNSC message announcing the release of the draft study to the "CNSC Info" email list: "The Canadian Nuclear Safety Commission (CNSC) has released for public review its draft study entitled "Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures."
The study focuses on the assessment of health impacts of a hypothetical, unlikely scenario of a severe nuclear accident. Various scenarios were assessed, where radioactive releases happen without full consideration of multiple safety systems at Canadian nuclear power plants. Had all of the Fukushima Task Force enhancements been fully considered in the study, the likelihood of a severe accident would have been practically eliminated.
The study is available for public comment until August 29, 2014. Copies may be requested and comments can be submitted through info@cnsc-ccsn.gc.ca."[9]

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DNA Feedback on the Study – August 2014

Along with many groups and individuals, DNA sent in comments on the study.
Our comments included mention of:

· The lack of reference to child thyroid cancers in Japan, post-Fukushima accident
· Assumptions used about emergency planning preparation and assumptions about clear responsibility lines being faulty (much existing confusion does exist around who is responsible for what; clearly articulated at the August 20/21st 2014 CNSC meeting when Dr. Binder himself used the phrase "paralysis by analysis"[10] and this was also outlined in a media article at that time[11])
· The methodology used in the study being highly questionable (circular logic assuming emergency response had already been implemented)
· The accident studied clearly not being a severe accident (not a Level 7 on the INES scale)
· Issues around evacuation not being addressed
· Actual impacts of the Chernobyl and Fukushima accidents being denied or minimized
· Impacts to Lake Ontario of an actual serious accident being omitted altogether
· Issues of contamination of wildlife and human impacts not being properly addressed
· The JRP recommendation (#63) regarding evaluating "The cumulative effect of a common-cause severe accident involving all of the nuclear reactors in the site study area to determine if further emergency planning measures are required" being (once again) ignored.

DNA concluded: "We request that this study be completely re-done before the 2015 Darlington hearing in order to actually assess a Fukushima-scale event, i.e., a Level 7 accident on the International Nuclear Event Scale. This will then also compensate for the lack of any consideration in this study having been given to impacts on Lake Ontario, the drinking water source for millions of citizens on both sides of the Canada-U.S. border."[12]

CNSC Staff Response to DNA Comments – March 2015

In its disposition table on the DNA feedback presented by CNSC staff at the March 26, 2015 CNSC meeting, staff commented

"Roles and responsibilities are very clearly documented in emergency plans. These plans are practiced and tested in exercises such as the recent national nuclear exercise held in May 2014."[13]

This staff comment presents a contradiction to the "analysis by paralysis" issue that had been articulated by CNSC President Michael Binder at the August 21, 2014 public meeting.

In response to our request that a proper study of a Level 7 accident be assessed, staff replied "The primary purpose of INES is to facilitate communication and understanding between the technical community, the media and the public on the safety significance of events. The aim is to keep the public as well as nuclear authorities accurately informed on the occurrence and consequences of reported events. It is not appropriate to use INES to assess or to compare safety performance between facilities, organizations or countries.
Given all reactor safety enhancements installed at Canadian nuclear power plants in response to lessons learned from the Fukushima accident, the release of radioactivity of this magnitude (e.g.,

INES 7) is extremely unlikely (e.g., an unimaginable natural disaster would have to occur). As the purpose of the study was to examine human health consequences, a highly unlikely and yet remotely realistic scenario was assumed in this study.
Doses predicted in this study are comparable to those measured to date in Fukushima"[14]

In essence, our chief concerns were minimized or dismissed. DNA is disappointed by staff's dismissal of our feedback. The issues raised by DNA at the 2012 environmental assessment hearings have yet to be addressed.

Severe Accident Study – Ruling August 2015

We were convinced the "Hypothetical Severe Nuclear Accident" was not in fact a severe accident study, and had commented to this effect. When Greenpeace learned through an Access to Information request that the results that had been found were feared to be used "malevolently" at a hearing[15], and staff required to re-do the study, we were proven right.

On August 19th DNA along with seven other groups issued a ruling requesting
"We request under section 20(1) of the CNSC rules of procedure that:

The Commission direct CNSC staff to release the results of the uncensored Darlington accident study by September 15th so that the public intervenors who requested this study in 2012 can consider and incorporate the study's findings in their written submissions due on September 28th, 2015." [16]

On September 21st, 2015 CNSC Commission Secretary Marc Leblanc communicated
"I can confirm that my letter to you of August 26 reflected the Commission's decision in this regard. There is no "uncensored version" of the study, as this final version of the study is not "censored". As per our normal practice, earlier documents were for internal discussion, analysis and debate among our experts resulting in the release of the final report titled: Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures. This is the study to which the Commission's decision on the request for ruling relates."[17]

Déjà vu?

DNA has learned recently that in the early 1980s, after the Three Mile Island accident, a study commissioned by the U.S. Nuclear Regulatory Commission (NRC) and known as the Crac2 study, uncovered facts very inconvenient to the nuclear industry about potential costs of a serious nuclear accident, and that this report was essentially buried until a politician uncovered the story.[18] Even when the study was released, "The Commission was quick to defend its decision not to include the worst-case results, offering a rationale that would become familiar over the years: "the chances of an accident severe enough to produce such death and destruction were so slight as to be hardly worth mentioning."[19]

There is a very worrying parallel here, with the situation here surrounding the Severe Accident Study and the lack of transparency surrounding its release. There is no information to substantiate claims that emergency planning will protect the citizens of Durham Region in the event of a Level-7 accident.

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Severe Accident Study – Regarding Communications

Careful reading of the "Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures" (August 2015 version) yields up a surprising number of references to the critical need for clear communications regarding nuclear emergency planning and preparations.

"Psychosocial effects would be anticipated for all scenarios and could include fear of radiation exposure, anxiety, and stress. Clear, credible and regular communication from responsible parties before, during and after the emergency would help to minimize these effects. In addition, these effects would be expected to decline rapidly once the affected population returns to their normal life patterns. For non-human biota, like birds and mammals, no acute effects would be expected." *[iii of "Extended executive summary]*

"The CNSC Integrated Action Plan applies to all operating nuclear facilities and the CNSC. The areas for continuous improvement that emerged from the Plan are:

- strengthening defence in depth
- enhancing emergency response
- improving regulatory framework and processes
- enhancing international collaboration
- enhancing communications and public education" *[pg.9]*

"Dissemination of information and raising awareness regarding emergency planning through various means by those organizations with emergency planning responsibilities is done on an ongoing basis. In the event of an actual incident, effective, coordinated communication amongst responsible organizations is essential before, during and after the actual incident." *[pg. 32]*

"Ineffective communication and/or coordination of measures to protect the populations at risk will have a similar consequence. These effects are likely to extend to residents in the Secondary Zone, who are likely to be less familiar with the plant and associated emergency plans, if they feel they are not receiving the information or assistance they need in a timely way." *[pg. 67, in section 6.4 on Psychosocial effects]*

"Clear, credible and regular communication from responsible parties before, during and after the emergency would help to minimize these effects as would transparent decisions (e.g., based on health-based limits and other factors) for the return of residents to their homes and daily lives." *[pg. 67]*

We are aware that the IAEA also counsels in their publication "Lessons Learned from the Response to Radiation Emergencies (1945 – 2010), in the chapter "providing information and issuing instructions and warnings to the public," about the importance of providing information to the public on protective actions to be taken in event of an emergency in advance of any emergency for threats such as Nuclear Power Plants. They state "This will engender confidence – the knowledge that the officials have their interest at heart – and, by doing so, improve compliance with protective action recommendations in the event of a real emergency. In addition, there will be a better understanding of the systems used to warn them of an emergency."[20]

The IAEA recommendation is reinforced by the comment in ICRP Publication 109 that recommends engagement with stakeholders and discussions of the plans, including with members of the public. The rationale is that "Otherwise, it will be difficult to implement the plan effectively during the response. The overall protection strategy and its constituent individual protective measures should have been worked through with all those potentially exposed or affected, so that time and resources do not need to be expended during the emergency exposure situation itself in persuading people that this is the optimum response." (at 42)

5. Fukushima: What has the world learned?

When DNA commissioned CELA in 2012 to do an in-depth review of nuclear emergency planning in the lead-up the Darlington Refurbishment hearing, we learned that "In the wake of the accident at Japan, it has been found that the continued belief in the fallacy of nuclear safety and the continued denial of the potential for large scale catastrophic accidents, together with the lack of preparedness for such accidents, were contributing factors to the tragedy. This for example specifically precluded serious disaster preparedness. It was found that this attitude and lack of preparedness was encapsulated in the use of the term "unanticipated" in relation to such severe disasters. The use of this terminology in itself was found to be untenable and unsubstantiated. (Funabashi and Kitazawa at 14). Similarly use of terminology such as "credible" and "not credible", and "beyond design basis"; and other similar terminology is employed in the Darlington refurbishment draft screening report and in the EIS such that the terminology obscures the fact that catastrophic accidents with offsite releases to the environment and general public are not examined in the EA."[21]

Actual Evacuation Experiences in Fukushima

For the residents of Japan, in the case of the Fukushima disaster, evacuation began on March 11th with the 2 mile/3 km radius (people in 2-6 mile zone being instructed to "stay indoors,") but this quickly proceeded (by order of the Prime Minister) to 6 miles/10 km (on March 12th). By the evening of March 12th, this was doubled to 12.4 miles/20 km.[22]

Some villages right in the path of the plume – at a distance from the plant of twenty-five miles/forty kilometres – were left there in spite of predictions by the SPEEDI computer tracking system that prevailing winds were carrying radiation (to Namie and Iitate) from the Unit 3 March 15th explosion – because the data was considered "unreliable." [23]

The village of Iitate was finally ordered evacuated on April 22nd, more than 5 weeks later. Many families (especially those with young children) had already fled. Nearly three thousand cattle had to be slaughtered by Iitate's farmers before they departed.

The government had failed to protect these citizens – for weeks – in spite of their awareness of the existence of the "hot spots" in Namie and Iitate. As one resident of the latter town later asked, "Do they really value our lives?"[24]

Citizens of Durham Region and Toronto might well ask whether we would be similarly inadequately protected in the event of a multi-unit accident and large radiation release here, and whether the clearly inadequate emergency plans to cope with an INES Level 7 accident would leave citizens here asking the same question: Does anyone really care?

6. Nuclear Emergency Planning in Durham Region

DNA has learned much about nuclear emergency planning since the group re-formed in 2012. CELA's extremely thorough 2012 report, already referenced, has been enormously informative in laying out a broad swath of areas in which emergency planning is severely lacking.

The gaps and deficiencies are numerous and glaring, nor are citizens in Durham Region (or Toronto) in any way properly prepared for a serious nuclear emergency.

Most citizens in the Greater Toronto Area are not aware that they live in the secondary zone of not one but two very large nuclear generating stations, and that if an accident similar to the Fukushima disaster were to occur here – a serious multi-unit accident involving a large radiation release – evacuation might become necessary.

People – "regular" citizens as well as politicians – have almost no information about how to proceed should an actual nuclear accident occur. This incontrovertible fact has been gleaned from

- Media articles
- Informal conversations with citizens
- Meetings with regional and municipal politicians in Durham Region.

Most people in Durham Region do not know:

1. Who is responsible for nuclear emergency plans in Ontario/Durham Region, or the dizzying number of government departments and agencies involved.
2. What information sources they should rely on should an emergency occur. (If the power goes out, how can they be confident they will be informed of necessary information promptly?)
3. What sheltering in place means. (Most have never heard of this.)
4. Home construction types considered suitable for sheltering in, & those that are not. (Most have never heard of the IAEA (International Atomic Energy Agency) or ICRP (International Commission for Radiological Protection) groups, let alone their guidelines on these matters indicating that many North American homes are not suitable for "sheltering."
5. How to re-unite with their families.
6. That they are responsible for making their own plans for evacuation.
7. Where evacuation centres are located.
8. What to do if they do not own a vehicle.
9. Whether schools, day care centres, senior homes and hospitals have emergency plans/evacuation plans in place.
10. That they should not go to pick up their children if an evacuation order is issued.
11. Most, it must be said, have no concept of how large their knowledge gap is.
12. Finally, most have no idea that nuclear agencies from the IAEA to ICRP and CNSC make laudable public pronouncements about the need for clear communications to the public about all such matters ahead of time … yet most are utterly, almost 100% unprepared.

This huge gap in information dissemination/communications has been made abundantly clear, especially at the time of the big nuclear emergency exercise held at Darlington in late May 2014.

Media reports revealed that people in the areas around both Pickering and Darlington NGS have "very low levels of awareness' about what to do if there's an emergency." [25]

DNA has been interacting with local politicians in recent months, and has learned that political representatives are no better informed on emergency procedures than the "regular" citizens encountered a year ago (end of May 2014) at the time of the emergency exercise.

This lack of knowledge and awareness led the group to apply to CNSC for funding to conduct polling in the area around the Darlington NGS to learn just how well prepared and well-educated on emergency measures and expectations citizens in the area of the Darlington Nuclear Generating Station in fact are.

Going into the polling project, it seemed that what exists in Durham Region/the Greater Toronto Area is a "perfect storm" of lack of awareness or preparedness on the part of both industry and the citizenry, who have almost zero awareness of existing emergency plans (which do not in any way approach the designation "robust") and consequently and not surprisingly, an extremely low level of personal preparedness.

This is the backdrop to the Oracle poll on levels of awareness of emergency planning and preparation around the Darlington Nuclear Generating Station that DNA received CNSC funding to commission in the lead-up to this hearing.

7. Review of CNSC and Licensee CMDs

The Emergency Planning and Management expectations of the Canadian Nuclear Safety Commission are regulated by REGDOC 2.10.1 Nuclear Emergency Preparedness and Response. The Licensee's compliance is assessed by CNSC staff, and their conclusions and recommendations are compiled in CMD 15-H8 and CMD 15-H8.B.

Requirements for a public information program are included in the emergency preparedness program, and this is regulated by RD/GD-99.3 Public Information and Disclosure. Ontario Power Generation (OPG), the licensee, has a Consolidated Nuclear Emergency Plan (CNEP). This deals predominantly with releases of radioactive materials from nuclear facilities and outlines the interface with the Provincial Nuclear Emergency Response Plan (PNERP). (LCH-DNGS-R000 pgs. 84 & 85).

For purposes of this review, the licensee's compliance with CNSC REGDOC 2.10.1 and RD/GD-99.3 are summarized in hearing CMD 15-H8.1 and CMD 15-H8.1B.

A general review highlights some of the steps that OPG has taken to improve mitigation, emergency response and preparedness both in response to the 2012 hearing and as part of the Fukushima enhancements.

- additional emergency mitigating equipment (EME) in the event of fire
- additional EME to improve management of large releases caused by core damage in a Beyond Design Basis Event

- execution of a large-scale exercise called "Exercise Unified Response" in May 2014 with many organizations in order to assess the integration of the licensee and government agencies' response to a simulated nuclear event with off-site releases.
- issuing of a new emergency preparedness public information document in May 2014
- pre-distribution of Potassium Iodide (KI) pill in primary zone: just now underway

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As seen below, the CNSC REGDOC 2.3.2 Accident Management (pg.4) defines the regulator's guiding principles for emergency management wherein the licensee develops their own emergency management and fire protection program.

Emergency management includes the prevention and mitigation, preparedness, response and recovery of nuclear emergencies.

PREVENTION …..is the responsibility of the licensees…
MITIGATION ….aims at ensuring that mitigating equipment and operating procedures are in place
PREPAREDNESS relates to actions taken before a nuclear emergency
RESPONSE refers to those actions taken during a nuclear emergency, both onsite and offsite,
RECOVERY includes the short-term and long-term actions taken both onsite and offsite in order to restore to an acceptable level both the organizations involved in and the communities affected.

A large portion of the Licensee's improvements and Fukushima enhancements deal with on-site matters, but are not limited to prevention and mitigation. Operational upgrades and procedures to respond to Beyond Design Basis Event (BDBE) are dealt with in the Safety Analysis. Measures for the prevention and mitigation of severe accidents are addressed with the Severe Accident Management Guidelines (SAMG). None of these measures are addressed in this submission.

DNA's concerns, it must be emphasized, are not with on-site mitigation measures, but with *off-site response*.

Public Education on Emergency Preparedness

The CNSC's Licence Conditions Handbook (LCH-DNGS-R000) states "the licensee should provide emergency communications outlining what surrounding community residents need to know and do before, during and after a nuclear emergency. Information should be in plain language, readily accessible and include the following;

- how the public is notified of an emergency;
- what protective actions may be required during an emergency;
- what the public is expected to do, and why, when directed to take protective actions;
- what the public can do now to be better prepared for an emergency; and
- where can the public get more information on emergency plans."

While this is included in the emergency management and fire protection licence conditions, the 'should' is used to express guidance or that which is advised, and stops short of making this a requirement.

This ultimately leaves the public without a plan in place should they wish to raise their level of awareness.

DNA would like to see ongoing public education for emergency preparedness and protective actions. Fire prevention provides an example of how developing a ritual of replacing the batteries in smoke alarms in May can both engage and educate people.

8. Oracle Research Poll Findings

Judging by the results of the Oracle poll completed recently, citizens who live within the 10 km zone of the Darlington Nuclear Generating Station would like to see emergency planning and response to be based on a Fukushima-scale accident. The poll assessed the awareness of actions to be taken before a Nuclear Emergency, and the awareness of actions to be taken during a Nuclear Emergency, off-site.

As OPG's public survey results show, 89% of respondents indicated a solid level of confidence in the safety of the Darlington Nuclear Station (CMD 15-H8.1B pg.5). So this is not a discussion about plant safety or public confidence in nuclear power.

What the DNA-commissioned poll results indicate is that 86% of respondents feel it is important to have a detailed plan in place to protect Durham residents from a Fukushima-scale accident at the Darlington nuclear station. Overall findings summarized in the table on pg. 8 of the poll suggest that general population preparedness levels are low, and that awareness of protective measures and emergency plans is also low. Neither CNSC nor OPG have provided evidence to these hearings showing the public will be protected in the event of a Fukushima-scale accident.

Awareness

Awareness levels of emergency plans and procedures were low.

59% knew to listen to the media for instructions
54% knew when to use KI pills
49% knew meaning of sirens
43% knew to remain in place - meaning to stay indoors and seal your windows and doors
41% knew of the public information document 'Never Be in the Dark About Your Safety'
39% knew of evacuation routes
37% knew of evacuation plans
30% knew the location of reception centres
29% knew of plans in place for schools, daycares and senior centres
29% knew the location of emergency shelters
24% knew the location of monitoring and decontamination centres
21% knew about self-decontamination

When it came to personal family emergency plans, 80% have no plan in place and 83% have no plan for a place to reunite. Of the 500 people polled, 92% have a vehicle or plans for a ride in case of evacuation.

The poll did not address people's awareness of what agencies are responsible for which aspects of nuclear emergency planning.

Communication

The recent Oracle poll reveals that communication efforts and awareness of community outreach by mail is at 39%, which is somewhat surprising considering that the flashlight campaign was quite recent. Overall, 57% of respondents feel unprepared for a nuclear event, but are interested in receiving information, with the strongest demand being for information on reception centres, who to contact, and sheltering.

People want to know.

DNA recommends that CNSC require OPG and the Province of Ontario to report regularly on nuclear emergency planning awareness and the effectiveness of communications programs.

10. Summary and Conclusions

1. Durham Nuclear Awareness has been advocating for better nuclear emergency planning in Durham Region for decades. The group began calling for expanded emergency planning zones and wider KI pre-distribution after the Chernobyl accident that took place 29 years ago now. Durham Region's citizens must be adequately protected in the event that a Fukushima-scale accident occurs.

2. It has taken decades to see CNSC and provincial authorities finally commit to implementing a KI pre-distribution scheme that by the admission even of CNSC tribunal members Dr. McEwan and Rumina Velshi[1] is likely not anywhere near sufficiently protective of health. While we applaud the move to pre-distribute KI in the 10 K zone of the plants, it's critically important to remember that KI is merely an adjunct to nuclear emergency planning; it does not in and of itself constitute an emergency plan. Much more needs to be done on this front, as on various others relating to emergency preparedness.

3. DNA commissioned CELA to assess the adequacy of off-site nuclear emergency plans during the environmental review of the proposed Darlington life-extension in 2012. CELA identified gaps and deficiencies that have yet to be fully addressed. The planning basis for nuclear emergency planning is at the top of this list of issues that must be addressed.

4. During the 2012 environmental assessment hearings, DNA called for impacts of a Fukushima-scale accident to be studied so that weaknesses in emergency planning could be identified. While CNSC President Dr. Binder expressed a sharing of our concerns, what emerged was a not-severe-accident study that leaves us unable to endorse OPG's plans to continue operations largely beneath scrutiny for a 13-year period.

5. Learning what we have learned – what has been learned by the world at large – about what led to the Fukushima disaster in terms of inadequate defences for earthquakes and tsunamis (in spite of having been warned of inadequate preparations), how inadequately prepared Japan's citizens

and governments were for the nuclear disaster, and how inadequate the response to it was (KI not distributed, evacuations done haphazardly, there was a breakdown in chain of command, citizens were left for 5 weeks in "hotspot" areas, etc.), we have no reason to believe that an accident here would play out any better.

"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." [2]

Ontario is similarly ill-prepared. Perhaps even more so.

6. Nuclear emergency plans in Durham Region/Ontario are not adequate to handle a serious disaster, and as our polling has highlighted, public awareness of what to do in the case of a serious nuclear emergency is very low. Public awareness is low; awareness among community leaders is equally low. This is a recipe for chaos should a serious accident occur. A large majority (86%) of Durham residents polled believe that off-site emergency plans need to be in place for a level 7 INES accident. They are very aware that they have no (80%) personal plans in place, are relying largely on Radio, TV, Internet and police instruction (76% together) for real time instructions and are currently eager to receive added information on emergency reception centres, who to call and what 'sheltering' means and involves (90% average). There is at the same time very little concern (23%) about a possible accident.

7. We would like to be able to trust OPG and the CNSC to protect the public, but after seeing it take decades just to get sirens installed around the plants, and witnessing all the authorities involved take decades to implement an already-clearly-inadequate KI pre-distribution plan, trust is absent.

8. It would seem, judging from the many important facts gleaned from the extremely thorough accounting (by nuclear experts) of the Fukushima crisis in *Fukushima – The Story of a Nuclear Disaster*, the mantra of the nuclear industry has been, for three decades now, "It can't happen here." The fact is, it *could* happen here. And we are not prepared.

9. Finally, it's important to highlight the (stated) awareness of those in the nuclear industry of the great and overwhelming importance of good communications about the existence of nuclear emergency plans. It would seem that this often-cited awareness must now be put into action.

10. Recommendations to CNSC

Durham Nuclear Awareness endorses the recommendations of the Canadian Environmental Law Association from their submission. CELA's recommendations are repeated below.

Recommendation 1: OPG's operating license should be strictly time-limited to a one year period, until it can return in another public hearing to demonstrate that it is in compliance with RegDoc 2.10.1, and this should be required before the Commission considers the application for a life extension.

Recommendation 2: **The Commissioners should require OPG to return to the commission in 1 year with updated evacuation modelling, prior to considering the**

application for life extension.

Recommendation 3: The Commission should require this additional detailed information to be provided to it within eight months and publicly released, and at a return hearing before the Commission next year, the Commission should evaluate the ability of the public to be protected by evacuation before granting this license to the applicant.

Recommendation 4: The Commissioners should assess and ensure that there are provisions for effective, fast evacuation of all of the potentially affected residents, occupants, and workers in the primary and secondary zones and beyond.

Recommendation 5: The geographic scope of potential evacuation measures and assessment of their adequacy should be based on a large INES 7 scale accident as well as on potential early releases.

Recommendation 6: The CNSC should direct OPG to ensure that KI is pre-distributed to all residents within the secondary zone as a condition of licensing.

Recommendation 7: CELA recommends ingestion control be extended to 100 km around the plant.

Recommendation 8: The Commission must transparently and explicitly review the present and predicted populations surrounding the Darlington NGS in light of IAEA Site Evaluation Safety Standard No. NS-R-3 "Criteria Derived from Considerations of Population and Emergency Planning."

Recommendation 9: CELA submits that prior to considering the application for life extension, the Commissioners must require consideration of a nuclear accident emergency planning basis for Darlington that contemplates the potential for some or all of the following scenarios:

- **Early release of radioactive emissions**
- **Large source term released to the public**
- **Widely dispersed radioactive emissions**
- **Weather patterns moving emissions over highly populated areas around the plant.**

Recommendation 10: A study of the potential consequences of an accident on the scale of Fukushin should be required before the Commission should make a decision on the 30 year life extension requested by OPG, in conjunction with the requirements of the IAEA guidance on siting and in vie of the current population and of the population growth expected to 2045.

Recommendation 11: The Commissioners should require a site-wide evaluation of risks prior to consideration of the application for life extension.

Recommendation 12: CELA submits that the panel should not consider this application for life extension until the planning basis has been reviewed, and increased to reflect the actual global nuclear power plant accident experience, namely INES level 7 events, as well as early releases, and multi-unit accident releases, and the items listed in this section have been provided in the nuclear emergency plans relating to Darlington (provincial, regional and local municipal) with sufficient detail and demonstration of practical implementation.

Recommendation 13: The Commissioners should consider the input from any revisions to the provincial nuclear emergency response plan as a critical input to this licensing decision.

Recommendation 14: The Commission should set out timelines relative to the Darlington NGS for the installation of a direct data feed to the CNSC Emergency Operations Centre as recommended by the Independent Evaluator of Exercise Unified Response.

Recommendation 15: CELA submits that the Commission should take up recommendation 13 of the Independent Evaluator, forthwith and then use the insights from that involvement in scrutinizing the adequacy of nuclear emergency response planning and preparedness in all licensing decisions concerning the Darlington NPP (and other class 1A facilities) beginning with the current application for life extension.

Recommendation 16: The Commission should require that its staff, and the licensee, in cooperation with provincial and municipal authorities, should conduct detailed and transparent open public engagement and consultation with residents of Durham Region, the Region of York, the City of Toronto, the County of Peterborough, as to the above noted planning basis implications.

[1] Canadian Environmental Law Association (CELA) report Emergency Planning at the Darlington Refurbishment Comments of the Canadian Environmental Law Association to the Canadian Nuclear Safety Commission with respect to the Draft Screening Report: Consideration of Emergency Planning in the Darlington Refurbishment and Continued Operation Project, July 18, 2012.
[2] Darlington Refurbishment Public Hearing transcript, December 3, 2102. Pages 335-357.
[3] Joint Review Panel Environmental Assessment Report Summary, Section 8.1, August 2011. http://www.ceaa-acee.gc.ca/050/documents/55382/55382E.pdf
[4] Page 339 of the Darlington hearing transcript.
[5] Pages 340-41
[6] Page 357.
[7] Record of Proceedings, Including Reasons for Decision - Environmental Assessment Screening Regarding the Proposal to Refurbish and Continue to Operate the Darlington Nuclear Generating Station in the Municipality of Clarington, Ontario (undated), Page 33.
[8] Record of Proceedings, Including Reasons for Decision - Environmental Assessment Screening Regarding the Proposal to Refurbish and Continue to Operate the Darlington Nuclear Generating Station in the Municipality of Clarington, Ontario (undated), Page 33.
[9] Info@cnsc message dated June 4, 2014.
[10] Canadian Nuclear Safety Commission Public Meeting August 21, 2014 transcript; Pg. 114. Actual phrase used by Dr. Binder is misquoted in the written transcript as "powerless by analysis" when what he actually said was "But we will not accept forever, paralysis by analysis."
[11] "The real question about nuclear disaster: Federal or provincial issue? Ontario health bureaucrats question whether federal officials should meddle with distributing protective pills in a nuclear disaster" http://www.thestar.com/business/2014/08/23/the_real_question_about_nuclear_disaster_federal_or_provincial_issue.html (August 23, 2014)
[12] DNA August 29, 2914 feedback letter in response to "Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures" Draft Report.
[13] CNSC Staff CMD 15-M10 9 March 2015 An Update on the Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures, pg 132
[14] Staff CMD 15-M10 9 March 2015 An Update on the Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures, pg. 133
[15] Request for Ruling, August 19, 2015.
[16] Request for Ruling, August 19, 2015.

[17] September 21, 2015 letter to Ms. Theresa McClenaghan, Canadian Environmental Law Association from CNSC Commission Secretary Marc Leblanc.
[18] See *Fukushima – The Story of a Nuclear Disaster*, David Lochbaum, Edwin Lyman, Susan G. Stranahan and the Union of Concerned Scientists, 2014). Chapter 10 lays this out.
[19] Book referenced above, page 208.
[20] Emergency Planning at the Darlington Refurbishment Comments of the Canadian Environmental Law Association to the Canadian Nuclear Safety Commission with respect to the Draft Screening Report: Consideration of Emergency Planning in the Darlington Refurbishment and Continued Operation Project, July 18, 2012. Page 35-36.
[21] *Fukushima – The Story of a Nuclear Disaster*, David Lochbaum, Edwin Lyman, Susan G. Stranahan and the Union of Concerned Scientists, 2014).
[22] Page 118.
[23] Page 119.
[24] http://www.durhamregion.com/news-story/4542807-pickering-clarington-residents-not-sure-what-to-do-in-nuclear-emergency/
[25] August 21st CNSC meeting transcript, pages 79-96
http://www.nuclearsafety.gc.ca/eng/the-commission/pdf/2014-08-21-Meeting-Final-e.pdf
[26] The official report of The Fukushima Nuclear Accident Independent Investigation Commission, page 18.

Darlington Emergency Preparedness Report

By:

September 2015

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EXECUTIVE SUMMARY

Oracle Poll Research was hired by Durham Nuclear Awareness to organize and conduct a random representative survey of the local population in Durham Region in order to gauge the level of awareness of emergency planning and procedures in relation to the Darlington NGS.

The new survey of residents living within a 10 km radius of the Darlington Nuclear Generating Station finds that an overwhelming 89% of people stated it is important or very important to have detailed nuclear emergency plans in place to protect Durham residents from a Fukushima scale accident. At the same time 57% said they were not concerned or not at all concerned about a possible accident at the station, while 23% stated that they were concerned.

The highest level of awareness was in the need to listen to accurate media sources for direction (59%), followed by knowing when to use KI or potassium pills (54%). The lowest level of awareness was in understanding decontamination and the location of emergency shelters and reception centers.

Though there is some awareness of community outreach, when asked whether they have seen or heard anything recently about emergency planning, 387 of the 500 polled stated no. This is surprising considering the recent distribution of the “Never Be in the Dark About Your Safety” paper flashlight, of which 205 were aware.

The overall findings suggest that preparedness levels are low with only 31% stating that they are prepared or very prepared, while almost six in ten or 58% are unprepared and 11% are neutral. Those most unprepared are 18-34 year olds (65%), lower income earners in the under $75,000 income range (68%) and residents living within three kilometres of the Station (68%).

A take home for all is that 80% do not have an emergency plan in place for their family, and even more have no plan in place to reunite should they be separated

When read a list of emergency information sources they may be provided with, the top three requests were for the location of emergency reception centres, contact information of sources , and information about ‘sheltering’. Mail outs and public meetings were the two top answers in an open ended question on how to best engage residents.

In summary it is evident that though most people are unconcerned about a nuclear accident at Darlington but that people still want to know and be educated on emergency plans and emergency procedures, to the extent that a Fukushima scale accident would require.

The poll is part of a submission of DNA to the Darlington Nuclear Generating Station Refurbishment Hearing and conducted with Participant Funding in agreement with the Canadian Nuclear Safety Commission.

METHODOLOGY & LOGISTICS

STUDY SAMPLE

- This report represents the findings from an Oraclepoll Research telephone survey of 500 residents 18 years of age and older that reside within a 10 kilometre radius of the Darlington Generating Station.

SURVEY METHOD

- Surveys were conducted by telephone at the Oraclepoll call centre using person to person live operators from the days of August 13th and August 21st 2015.

- 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 sample frame was inclusive of private numbers as well as cell phone only households. 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. from August 13th and August 21st 2015. 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 500-person survey is +/- 4.4%, 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 lived within a 10 kilometre radius of the Nuclear Station.

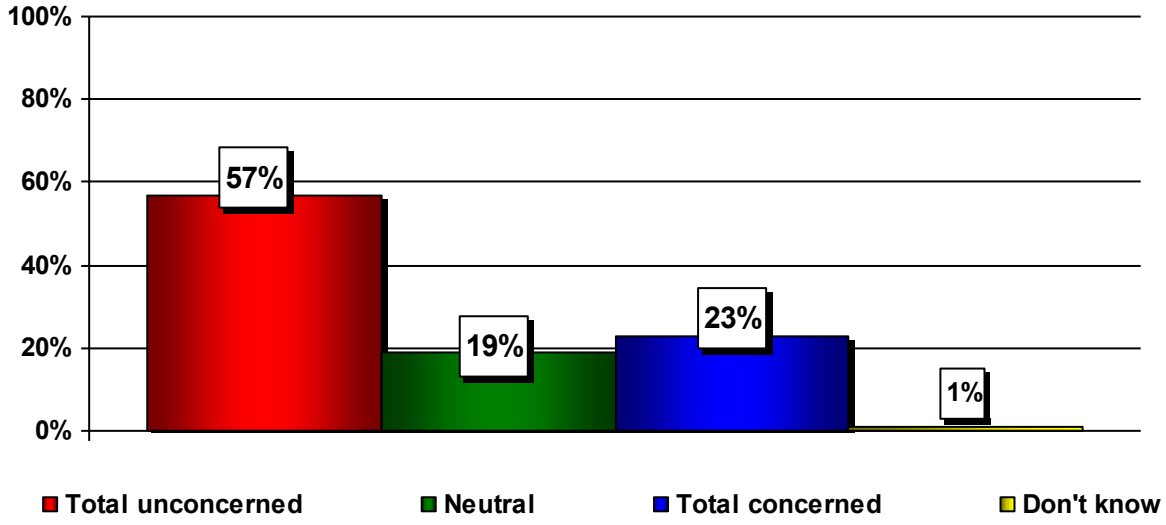
- In total 28% of the final sample (n=141) lived with in a three kilometre radius of the Generating Station and 72% (n=359) outside of the three kilometres up to 10 kilometres.

RESULTS OVERVIEW

CONCERN

Respondents were first asked about their level of concern over a potential accident at the Generating Station.

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

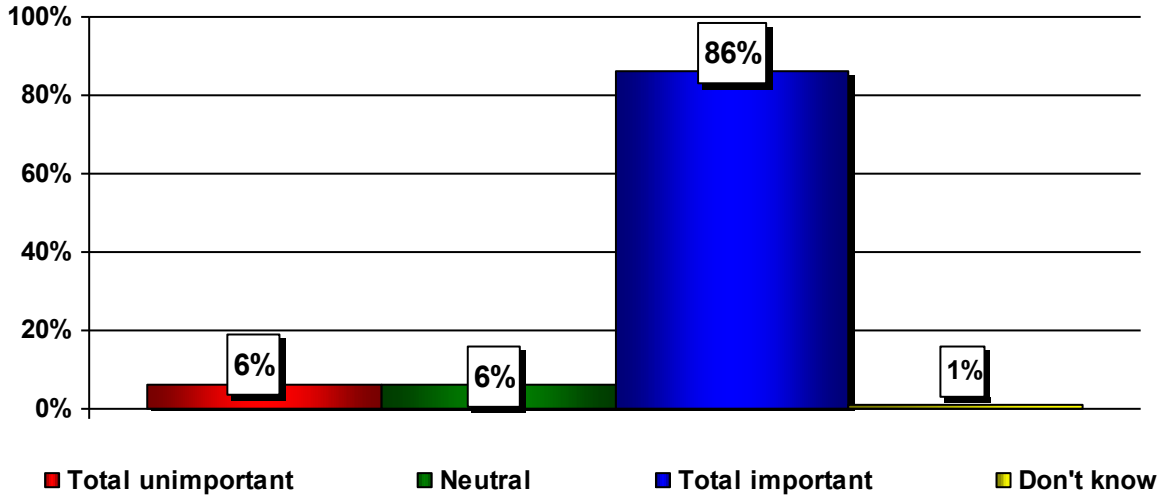


Only 23% of all residents interviewed stated that they were concerned about a possible accident compared to 57% that were not concerned, while 19% held a neutral view (neither concerned nor unconcerned) and 1% were unsure. Concern was higher among those living within three kilometres of the Station (30%) in relation to those residing more than three kilometres from it (20%).

EMERGENCY PLANS

Next respondents were asked about how important it was to them in having a detailed nuclear emergency plan in place to protect residents from a large scale accident.

"How important is it to have detailed nuclear emergency plans in place to protect Durham residents from a Fukushima scale accident at the Darlington nuclear station? Please use a scale from one not at all important to five very important."



An 86% majority feel that it is important to have a detailed plan in place to protect residents in the event of a large scale accident, while only 6% do not think it is important, 6% had a neutral opinion (neither important nor unimportant) and 1% did not know. Regardless of geography or demographic makeup, all residents placed a high level of importance in having a detailed plan in place.

AWARENESS EMERGENCY PLANS

Residents were then asked to rate their awareness of a series of emergency plans or procedures

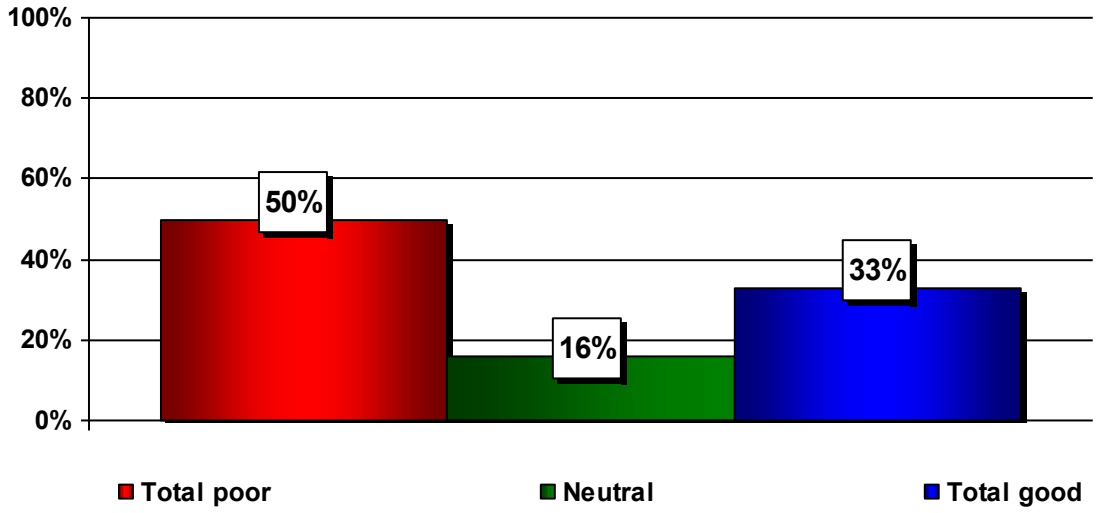
"Please rate your level of awareness of each of the following emergency plans or procedures using a scale from one being not at all aware to five very aware."

AWARENESS AREAS	Total unaware	Neutral	Total Aware
The need to **listen to accurate media sources** for Public Action Directives that explain the measures to be taken to avoid or minimize radiation exposure in the event of an accident	28%	13%	59%
Of when to use **KI or potassium pills**	38%	8%	54%
Of what **emergency sirens** mean or represent	43%	7%	49%
To **remain in place** for emergency instructions including sheltering- meaning to stay indoors and specifically to seal your windows and doors	52%	5%	43%
Of the **'Never Be in the Dark About Your Safety'** paper flashlight that explains what to expect in a nuclear emergency and how to prepare.	48%	11%	41%
Of **evacuation routes** out of the community	51%	10%	39%
Of **evacuation plans** for the community in the event of an accident at the nuclear station	56%	7%	37%
The location of **public reception centres** in the event of the emergency	61%	9%	30%
Of **emergency plans in place** for children, seniors or others at public institutions in the community	59%	12%	29%
The location of **emergency shelters**	63%	8%	29%
The location of **monitoring and decontamination centres**	72%	4%	24%
On how to **self de-contaminate** yourself and your family	71%	8%	21%

The highest level of awareness related to the need to listen to accurate media sources for Public Action Directives (59%), next followed by when to use KI potassium pills (54%). Awareness was lowest and unawareness highest for self de-contamination (71%) and the location of monitoring centres (72%). Unawareness was also high as it related to the location of emergency shelters (63%), of emergency plans in place for children, seniors or others (59%) and the location of public reception centres (61%). Most also expressed unawareness for evacuation plans (56%), for evacuation routes (51%) and remaining in place (52%), followed by 'Never Be in the Dark About Your Safety'. There was a split of opinion on the issue of the meaning of emergency sirens with 49% aware and 43% unaware.

Next a global indicator was asked about respondents overall awareness and understanding of emergency procedures and preparedness in the event of an accident.

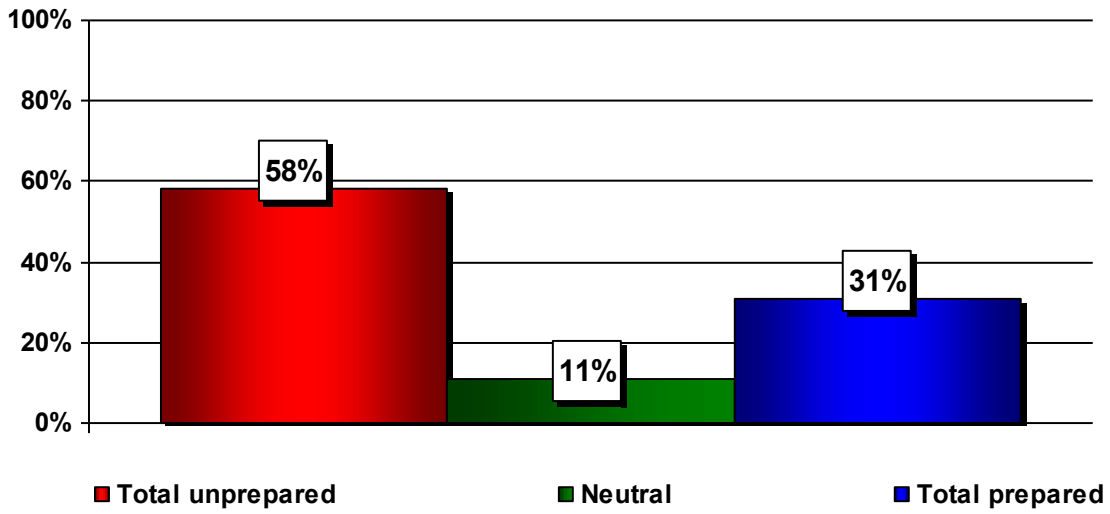
"Overall how would you rate your level of awareness and understanding of emergency procedures and preparedness in the event of a nuclear incident? Please use a scale of from 1 very poor to 5 very good."



Only one-third (33%) rated their awareness and understanding as good, compared to half (50%) as poor, while 16% had a neutral opinion of neither poor nor good.

Residents were then questioned about their level of readiness or preparedness for a possible nuclear accident at the Station.

"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."

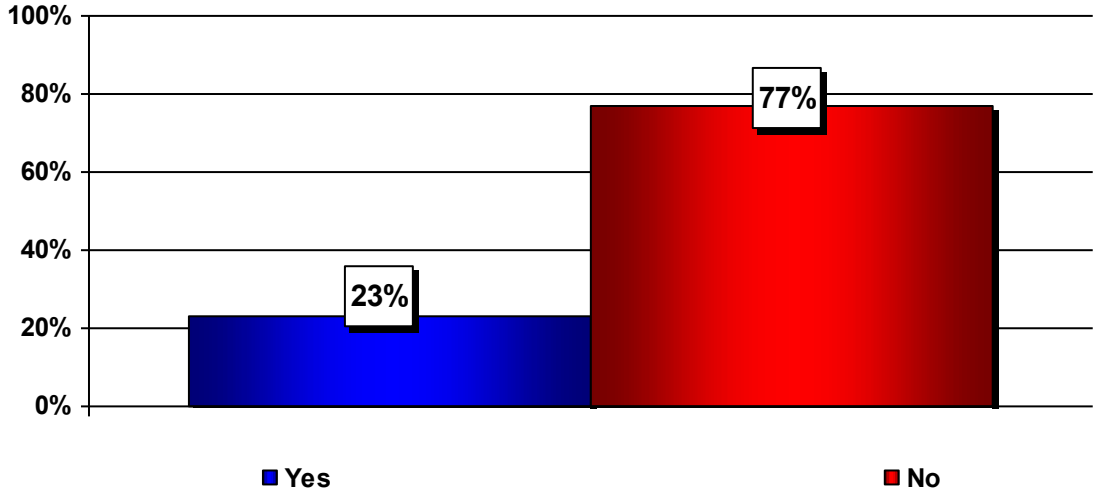


Preparedness levels are low with only 31% stating that they are prepared or very prepared, while almost six in ten or 58% are unprepared and 11% are neutral or neither prepared or unprepared. Those most unprepared are 18-34 year olds (65%), lower income earners in the under $75,000 income range (68%) and residents living within three kilometres of the Station (68%).

AWARENESS – COMMUNICATIONS

A series of questions were asked about awareness of communications related to planning and education. The first question dealt with awareness of planning in the event of an accident.

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

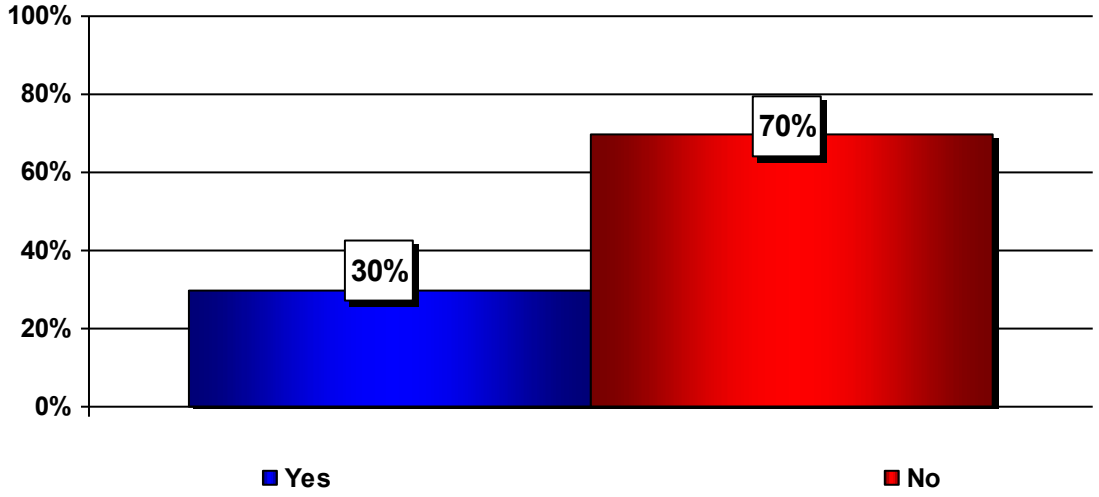


Only 23% of residents claimed to have recently seen or heard something about planning in the event of an accident.

When those aware were asked what they have seen or heard, 25% said the distribution of KI pills, 20% general safety information, 14% training, 12% newspaper articles (in general), 11% upgrades to the Station and 4% just general word of mouth information (4%). A total of 16% could not recall any specifics.

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

"Are you aware of any community outreach or communications efforts to educate residents about emergency preparedness in the event of a nuclear accident?"

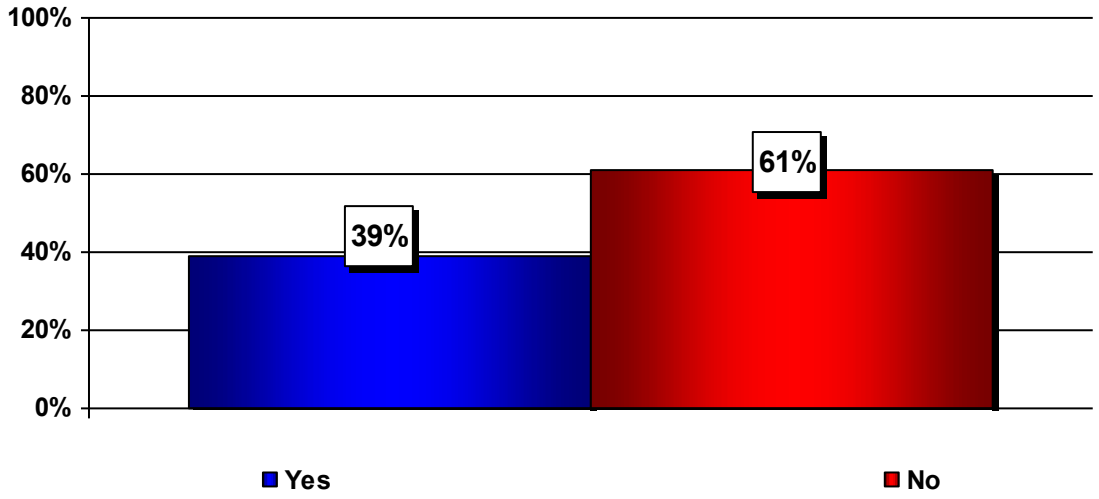


Awareness was higher (+7%) for community outreach or communications efforts to educate residents about emergency preparedness but it was still low at 30%.

A follow up question was asked to those aware where they were asked to name what efforts they had seen or heard. Once again, specifics were difficult for respondents to recall as 30% did not remember, 26% named print or newspapers they read, 22% said general information, 10% did cite where to go / shelters, 7% evacuation routes, 3% stated "Never be in the Dark" and 2% the Hospital unit for nuclear emergencies.

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

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



A total of 39% claimed that they did received information at their residence. Despite this, there was very low recall about what information was contained in this material. When asked to explain what they read, a high 43% said that they could not remember anything about the message and a further 7% said that they did not read the material. A total of 15% mentioned evacuation routes and shelters, 14% "Never be in the dark", 11% just general information, 8% that a more detailed plan would be coming into place and 3% that it contained emergency contact numbers.

SIRENS & KI PILLS

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

"Have you heard emergency (test) sirens in your area in the past year?"		
		Percent
	Yes	35%
	No	65%

A total of 35% of those surveyed said that they have heard a siren in the past year but only 18% have in the last month.

"Have you heard emergency (test) sirens in your area in the past month?"		
		Percent
	Yes	18%
	No	82%

When then asked if they have KI pills at their residence only 12% said that they currently have them.

"Do you have KI pills at your residence?"		
		Percent
	Yes	12%
	No	88%

SOURCES OF INFORMATION

In an open ended or unaided question, residents were asked about what information sources that they would go to in the event of an accident.

"In the event of a nuclear accident, what sources would you go to in order to get information about what to do and where to go?"

SOURCES IN EVENT OF ACCIDENT	%
Don't know	21%
Radio	19%
TV	17%
Website / Internet	13%
Police	12%
Newspaper	6%
Hospital	5%
Municipality	3%
Social media	3%
Fire Services	1%

Radio (19%) and television (17%) were the most named sources, next followed by the internet or websites (13%) and from the Police (12%). Other mentions included newspapers (6%), from the Hospital (5%), the Municipality (3%), social media (3%) and from the Fire Services.

In another open ended or unaided question, residents were asked about their preferred source to get information in the event of an accident.

"What is your preferred source to get information in the event of a nuclear accident?"

PREFERRED SOURCES OF INFORMATION	%
Radio	25%
TV	21%
Websites / internet	19%
Police	11%
Don't know	6%
Social media	6%
Media (not specified)	5%
Email	4%
Door to door	2%
A phone call	1%
From the Station	<1%

Radio (25%), television (21%) and the internet / websites (19%) are the favoured means by which to get information. A total of 11% want information directly from the Police, 6% prefer social media sources, 5% named the media in general, 4% would like email notification, 2% a door to door approach and 1% a telephone notice. Only 6% were unsure or did not know.

In a final open ended question related to outreach and communications, residents were asked about the most effective way by which to engage the community with respect to emergency planning.

"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?"

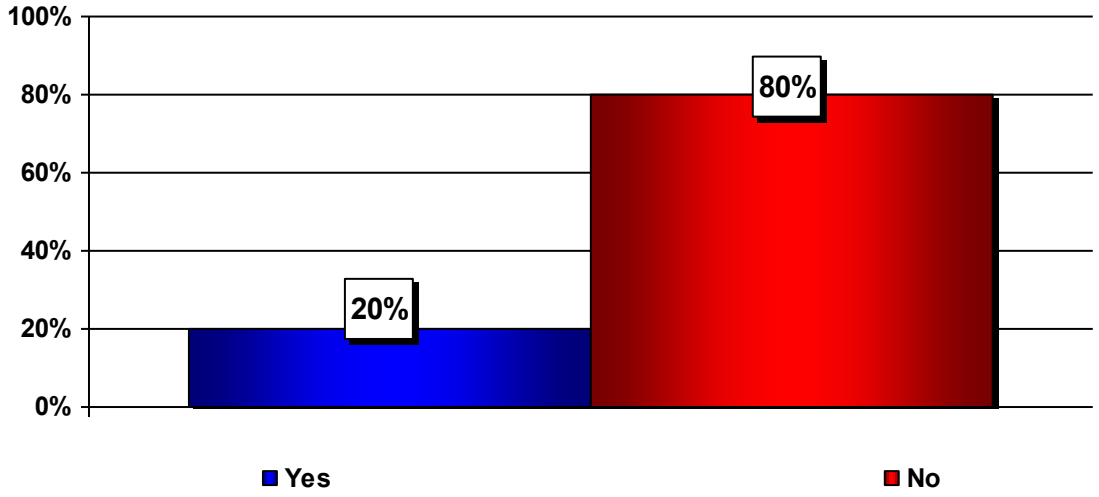
HOW TO ENGAGE RESIDENTS	%
Information in the mail	22%
Public meetings	21%
Media (Not specified)	12%
Social media	10%
Television	10%
Newspapers	8%
Websites	5%
School / workplace visits	4%
Tours of the Station / open houses	4%
Don't know	4%

The most cited approaches included information in the mail distributed to households (22%) and through public meetings in the community (21%). Other responses were varied and included the media in general (12%), social media (10%), television (10%), newspapers (8%) and internet websites (8%), while 4% named each of school or workplace visits and open houses at the Station. A total of 4% did not know or were unsure.

FAMILY EMERGENCY PLAN

A series of indicators were asked about household emergency planning, starting with a question as to whether they had a family emergency plan in place.

"Does your family have an emergency plan in place in case of a nuclear emergency?"



Only two in ten or 20% claimed to have an emergency plan in place for their household in the event of a nuclear emergency. Those least likely to have one in place were the lowest income earners (under $75,000 – 2%) and the oldest residents (64 or older – 12%).

The 20% of those that stated they have an emergency plan in place were then asked to describe what they have prepared. A total of 20% said that they plan to listen to media reports and do as told, 13% will stay where they are until notified and 12% have KI pills. There are 11% that have an evacuation plan in place, 10% have an alternative residence to go to, 9% have stocked emergency food and water, 8% plan to meet (family members) at an emergency shelter location and 2% said they know where to go in their house to a safe area.

Next respondents were asked if they have a plan in place to reunite with family members that they may be separated from in the event of a nuclear emergency. Only 17% said that they have this type of plan in place.

"If you were separated from your immediate family or those close to you during an emergency, do you have a plan in place to reunite with them?"		
		Percent
	Yes	17%
	No	83%

When then questioned if they have a vehicle at their residence or if they have plans for a ride if there were an evacuation, most or 92% said they do have this in place. Results were lower when it came to older residents 64+ as a lesser 84% have a vehicle or ride in place.

"Do you have a vehicle at your residence or plans for a ride from a relative, neighbor or friend in case of a possible evacuation?		
		Percent
	Yes	92%
	No	8%

INFORMATION TO BE PROVIDED

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

"I am now going to read a list of emergency information sources that may be provided to residents and after each one please tell me if you would be interested in receiving information on each topic"

INFORMATION – TO BE PROVIDED	Yes-Interested	No-Not interested
The location of emergency reception centres	93%	7%
Contact information of sources in the event of an emergency	89%	10%
Information about sheltering or staying in place	88%	12%
Information about public alerting systems	85%	15%
Maps with evacuation routes	84%	16%
Information about Potassium iodide pills	83%	17%

A high level of interest was expressed for all of the information types or sources mentioned with the strongest demand being for knowing about emergency receptions centres, next followed by contact information and information about sheltering. Slightly lower interest was with respect to information about public altering systems, evacuation map routes and information about KI pills.

RESULTS BY QUESTION

Q1. How near the Darlington Nuclear Generating Station is your home located? READ

	Frequency	Valid Percent
Within 3 kilometers	141	28.2
10 Kilometers	359	71.8
Total	500	100.0

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

	Frequency	Percent
1-Not at all concerned	156	31.2
2-Not concerned	129	25.8
3-Neither concerned nor unconcerned	95	19.0
4-Concerned	73	14.6
5-Very concerned	40	8.0
Don't know	7	1.4
Total	500	100.0

Q3. What do you feel can be done to improve public safety at the nuclear station?

	Frequency	Percent
Don't know	316	63.2
More awareness / information	58	11.6
Nothing	53	10.6
They are already doing the best the can	26	5.2
Keep us informed of any accidents or problems	22	4.4
Constant training and upgrades	15	3.0
Use alternative energy sources	5	1.0
More security	5	1.0
Total	500	100.0

Q4. How important is it to have detailed nuclear emergency plans in place to protect Durham residents from a Fukushima scale accident at the Darlington nuclear station? Please use a scale from one not at all important to five very important.

	Frequency	Percent
1-Not at all important	20	4.0
2-Not important	11	2.2
3-Neither important nor unimportant	32	6.4
4-Important	70	14.0
5-Very important	361	72.2
Don't know	6	1.2
Total	500	100.0

Please rate your level of awareness of each of the following emergency plans or procedures using a scale from one being not at all aware to five very aware.

Q5. Of when to use KI or potassium iodide pills

	Frequency	Percent
1-Not at all aware	103	20.6
2-Not aware	85	17.0
3-Neither aware nor unaware	41	8.2
4-Aware	132	26.4
5-Very aware	139	27.8
Total	500	100.0

Q6. Of evacuation plans for the community in the event of an accident at the nuclear station

	Frequency	Percent
1-Not at all aware	196	39.2
2-Not aware	85	17.0
3-Neither aware nor unaware	36	7.2
4-Aware	79	15.8
5-Very aware	104	20.8
Total	500	100.0

Q7. Of emergency plans in place for children, seniors or others at public institutions in the community

	Frequency	Percent
1-Not at all aware	164	32.8
2-Not aware	133	26.6
3-Neither aware nor unaware	60	12.0
4-Aware	80	16.0
5-Very aware	63	12.6
Total	500	100.0

Q8. Of evacuation routes out of the community

	Frequency	Percent
1-Not at all aware	162	32.4
2-Not aware	91	18.2
3-Neither aware nor unaware	51	10.2
4-Aware	89	17.8
5-Very aware	107	21.4
Total	500	100.0

Q9 Of what emergency sirens mean or represent

	Frequency	Percent
1-Not at all aware	120	24.0
2-Not aware	96	19.2
3-Neither aware nor unaware	37	7.4
4-Aware	97	19.4
5-Very aware	150	30.0
Total	500	100.0

Q10. The location of public reception centres in the event of the emergency

	Frequency	Percent
1-Not at all aware	164	32.8
2-Not aware	141	28.2
3-Neither aware nor unaware	45	9.0
4-Aware	64	12.8
5-Very aware	86	17.2
Total	500	100.0

Q11. The location of monitoring and decontamination centres

	Frequency	Percent
1-Not at all aware	284	56.8
2-Not aware	76	15.2
3-Neither aware nor unaware	21	4.2
4-Aware	66	13.2
5-Very aware	53	10.6
Total	500	100.0

Q12. The location of emergency shelters

	Frequency	Percent
1-Not at all aware	209	41.8
2-Not aware	106	21.2
3-Neither aware nor unaware	41	8.2
4-Aware	63	12.6
5-Very aware	81	16.2
Total	500	100.0

Q13. To remain in place for emergency instructions including sheltering- meaning to stay indoors and specifically to seal your windows and doors

	Frequency	Percent
1-Not at all aware	146	29.2
2-Not aware	113	22.6
3-Neither aware nor unaware	24	4.8
4-Aware	84	16.8
5-Very aware	133	26.6
Total	500	100.0

Q14. On how to self de contaminate yourself and your family

	Frequency	Percent
1-Not at all aware	220	44.0
2-Not aware	135	27.0
3-Neither aware nor unaware	42	8.4
4-Aware	49	9.8
5-Very aware	54	10.8
Total	500	100.0

Q15. Of the 'Never Be in the Dark About Your Safety' paper flashlight that explains what to expect in a nuclear emergency and how to prepare.

	Frequency	Percent
1-Not at all aware	173	34.6
2-Not aware	68	13.6
3-Neither aware nor unaware	54	10.8
4-Aware	96	19.2
5-Very aware	109	21.8
Total	500	100.0

Q16. the need to listen to accurate media sources for Public Action Directives that explain the measures to be taken to avoid or minimize radiation exposure in the event of an accident

	Frequency	Percent
1-Not at all aware	62	12.4
2-Not aware	78	15.6
3-Neither aware nor unaware	65	13.0
4-Aware	113	22.6
5-Very aware	182	36.4
Total	500	100.0

Q17. Overall how would you rate your level of awareness and understanding of emergency procedures and preparedness in the event of a nuclear incident? Please use a scale of from 1 very poor to 5 very good.

	Frequency	Percent
1-Very poor	132	26.4
2-Poor	120	24.0
3-Neither poor nor good	82	16.4
4-Good	101	20.2
5-Very good	65	13.0
Total	500	100.0

Q18. 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.

	Frequency	Percent
1-Not at all prepared	155	31.0
2-Not prepared	137	27.4
3-Neither prepared nor unprepared	55	11.0
4-Prepared	89	17.8
5-Very prepared	64	12.8
Total	500	100.0

Q19. Have you seen or heard anything recently about planning in the event of a nuclear accident at the Generating Station?

	Frequency	Percent
Yes	113	22.6
No	387	77.4
Total	500	100.0

IF YES ASK Q20 / NO SKIP TO Q21

Q20. What have you seen or heard?

	Frequency	Percent
Iodide pills / distribution of	28	24.8
General information	22	19.5
Don't know / don't recall	18	15.9
Training process	16	14.2
Newspaper articles (general information)	13	11.5
Upgrades to Station	12	10.6
Word of mouth (from employees)	4	3.5
Total	113	100.0

Q21. Are you aware of any community outreach or communications efforts to educate residents about emergency preparedness in the event of a nuclear accident?

	Frequency	Percent
Yes	149	29.8
No	351	70.2
Total	500	100.0

IF YES ASK Q22 / NO SKIP TO Q23

Q22. Which ones are you aware of?

	Frequency	Percent
Don't know / don't recall	45	30.2
Print / newsletter / newspapers	38	25.5
General information	33	22.1
Where to go / shelters	15	10.1
Evacuation routes	11	7.4
"Never be in the Dark"	4	2.7
Hospital unit for nuclear emergencies	3	2.0
Total	149	100.0

Q23. Have you received any material about emergency preparedness at your residence?

	Frequency	Valid Percent
Yes	193	38.6
No	307	61.4
Total	500	100.0

IF YES ASK Q24 / NO SKIP TO Q25

Q24. What do you recall about this communication and its messages?

	Frequency	Percent
Don't know / don't recall	83	43.0
Evacuation routes / shelters	29	15.0
"Never be in the Dark"	26	13.5
General information	22	11.4
A more detailed plan coming into effect	15	7.8
Did not read it	13	6.7
Contact numbers	5	2.6
Total	193	100.0

Q25. Have you heard emergency (test) sirens in your area in the past year?

	Frequency	Percent
Yes	173	34.6
No	327	65.4
Total	500	100.0

Q26. Have you heard emergency (test) sirens in your area in the past month?

	Frequency	Percent
Yes	89	17.8
No	411	82.2
Total	500	100.0

Q27. Do you have KI pills at your residence?

	Frequency	Percent
Yes	62	12.4
No	438	87.6
Total	500	100.0

Q28. In the event of a nuclear accident, what sources would you go to in order to get information about what to do and where to go?

	Frequency	Valid Percent
Don't know	107	21.4
Radio	94	18.8
TV	84	16.8
Website / Internet	65	13.0
Police	60	12.0
Newspaper	28	5.6
Hospital	26	5.2
Municipality	17	3.4
Social media	15	3.0
Fire Department	4	.8
Total	500	100.0

Q29. What is your preferred source to get information in the event of a nuclear accident?

	Frequency	Percent
Radio	126	25.2
TV	107	21.4
Websites / internet	94	18.8
Police	53	10.6
Don't know	30	6.0
Social media	29	5.8
Media (not specified)	27	5.4
Email	21	4.2
Door to door	8	1.6
A phone call	4	.8
From the Station	1	.2
Total	500	100.0

Q30. 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?

	Frequency	Percent
Information in the mail	112	22.4
Public meetings	106	21.2
Media (Not specified)	58	11.6
Social media	50	10.0
Television	49	9.8
Newspapers	40	8.0
Websites	24	4.8
School / workplace visits	22	4.4
Tours of the Station / open houses	21	4.2
Don't know	18	3.6
Total	500	100.0

Q31. Does your family have an emergency plan in place in case of a nuclear emergency?

	Frequency	Valid Percent
Yes	99	19.8
No	401	80.2
Total	500	100.0

IF YES ASK Q32 / IF NO SKIP TO Q33

Q32. What plan do you have in place?

	Frequency	Percent
Listen to the media and do as told	20	20.2
Don't know	14	14.1
Stay where you are until notified	13	13.1
Iodide pills	12	12.1
Evacuation plans	11	11.1
Have an alternative residence to go to	10	10.1
Have emergency food / water	9	9.1
Meet at emergency location (shelter)	8	8.1
Where to go in our house	2	2.0
Total	99	100.0

Q33. If you were separated from your immediate family or those close to you during an emergency, do you have a plan in place to reunite with them?

	Frequency	Percent
Yes	85	17.0
No	415	83.0
Total	500	100.0

Q34. Do you have a vehicle at your residence or plans for a ride from a relative, neighbor or friend in case of a possible evacuation?

	Frequency	Percent
Yes	460	92.0
No	40	8.0
Total	500	100.0

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

Q35. Maps with evacuation routes

	Frequency	Percent
Yes-Interested	421	84.2
No-Not interested	79	15.8
Total	500	100.0

Q36. Information about public alerting systems

	Frequency	Percent
Yes-Interested	427	85.4
No-Not interested	73	14.6
Total	500	100.0

Q37.Contact information of sources in the event of an emergency

	Frequency	Percent
Yes-Interested	449	89.8
No-Not interested	51	10.2
Total	500	100.0

Q38. Information about potassium iodide pills

	Frequency	Percent
Yes-Interested	415	83.0
No-Not interested	85	17.0
Total	500	100.0

Q39. Information about sheltering or staying in place

	Frequency	Percent
Yes-Interested	442	88.4
No-Not interested	58	11.6
Total	500	100.0

Q40. The location of emergency reception centres

	Frequency	Percent
Yes-Interested	463	92.6
No-Not interested	37	7.4
Total	500	100.0

The following questions are of a personal nature and involve the collecting of demographic data. This information is statistically important for this survey and please be assured once again that all individual responses are kept in strict confidence.

D1. Which of the following age groups may I place you in?

	Frequency	Valid Percent
18-34	153	30.6
35-64	236	47.2
64 and over	111	22.2
Total	500	100.0

D2. What is your combined family income?

	Frequency	Valid Percent
Under $75,000	85	17.0
Under $100,000	152	30.4
$100,000 & over	157	31.4
Refused	106	21.2
Total	500	100.0

D3.Gender

	Frequency	Valid Percent
Male	244	48.8
Female	256	51.2
Total	500	100.0