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Submission from the Canadian Environmental Law Association

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 l'Association canadienne du droit de l'environnement

À l'égard de

Ontario Power Generation Inc.

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

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Canadian
Environmental Law
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Submission by the Canadian Environmental Law Association Re: Hearing Ref 2015-H-04 - Application by Ontario Power Generation for a Thirteen year License to Operate a Site at the Darlington Nuclear Generating Station in Clarington, Ontario

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September 28, 2015

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**Submission by the Canadian Environmental Law Association Re: Hearing Ref 2015-H-04 -
Application by Ontario Power Generation for a Thirteen year License to Operate a Site at
the Darlington Nuclear Generating Station in Clarington, Ontario**

Offsite Emergency Planning at Darlington

The Canadian Environmental Law Association writes to provide this submission to the Canadian Nuclear Safety Commission in respect of the application by Ontario Power Generation for a license for the life extension of four units at the Darlington Nuclear Power Plant, Units 1 to 4. Our submission will focus on the Commission's decision as to whether or not to grant the license, in respect of the adequacy of offsite nuclear emergency planning and readiness at Darlington. This was a topic we previously reviewed for other applications and hearings, and thus we have updated and reviewed developments since our prior reviews at Darlington in 2011 and 2012 (and the Pickering hearings in 2012 and 2014 which also related to the Durham Nuclear Emergency Plan).

CELA was federally incorporated in 1970 as a not for profit organization dedicated to using and improving laws to protect the environment. CELA is also an Ontario Legal Aid clinic with a mandate for client representation, advice, law reform, public legal education and community

outreach. Our priorities presently focus on environmental equity, environmental health, safe and sustainable energy, safe and sustainable water, community planning and sustainability and local to global issues.

Why the Regulator Needs to Evaluate Sufficiency of Emergency Planning

The CNSC's responsibility in making a decision on the license application is to prevent unreasonable risk to the environment and to the health and safety of persons, associated with the development, production, possession or use of nuclear power.

Nuclear Safety and Control Act Purpose, section 3 and Objects of the Commission, section 9

Among the Commission's powers and responsibilities are those provided in section 24(4) & (5) of the NSCA:

(4) No licence shall be issued, renewed, amended or replaced — and no authorization to transfer one given — unless, in the opinion of the Commission, the applicant or, in the case of an application for an authorization to transfer the licence, the transferee

- (a) is qualified to carry on the activity that the licence will authorize the licensee to carry on; and
- (b) **will, in carrying on that activity, make adequate provision for the protection of the environment, the health and safety of persons** and the maintenance of national security and measures required to implement international obligations to which Canada has agreed (*emphasis added*).

(5) A licence may contain any term or condition that the Commission considers necessary for the purposes of this Act, including a condition that the applicant provide a financial guarantee in a form that is acceptable to the Commission.

Lessons from Fukushima

A number of credible reviews of the Fukushima Daiichi nuclear accident of 2011 noted that the consequences of not taking catastrophic accidents seriously, explicitly including lack of emergency preparedness for a large scale accident, was a key factor in exacerbating the tragedy. An example is the Japanese Diet's independent commission (at 18) which stated:

“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.”

You have heard me cite this quote before, and I do so again because unfortunately in my opinion we have not yet redressed this issue in respect of the nuclear power plants in Ontario, as I will discuss further below.

Why does emergency planning matter

The International Commission on Radiological Protection in Publication 109 gives the essential rationale for emergency planning: to prevent doses of radioactive nuclides to people (and the environment). That publication states that (if not prevented), initially the radioactive doses from an offsite nuclear accident are likely relatively high from inhalation of short-lived beta/gamma emitters during dispersion of the plume; followed by days or weeks when Iodine 131 dominates

the exposure {I-131 is also important in the early part of a release}; followed by external irradiation from contamination deposited in the environment and ingestion from direct contamination on crops and milk. Nuclear emergency planning, as you know, aims to avoid or reduce these exposures. As the Commission has accepted with the publication of the recent Reg. Doc 2.10.1, the Panel has a responsibility to review the sufficiency of nuclear emergency planning before granting a license. CELA submits that there is additional context that the Panel must consider, namely the expectations of the Panel members and the public arising from the 2012 environmental assessment Darlington refurbishment screening hearings when many matters were identified as issues that would return for the present licensing application. Since the 2012 hearing, the CNSC passed a new Regulatory Document 2.10.1 with new offsite emergency planning requirements and this is the first license application for Darlington NPP since those new requirements arose. CELA notes that the proposed Licence condition handbook requires OPG to be in compliance with RegDoc 2.10.1 by December 3, 2018. This is much too long a time frame and reinforces the inappropriateness of granting a lengthy license of 10 or 13 years to OPG for the Darlington Nuclear Plant. If the licensee is not already in compliance with the RegDoc for this application, then its 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

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.

Offsite Emergency Plan Context

The CNSC Commissioners must consider that if the offsite emergency plan is triggered, by definition it is the last barrier that might prevent or reduce harm to the health and safety of persons – because in such an event, radioactive emissions from an accident are either occurring or imminently threatening to occur. This is why it is so critical for the Panel to assess the sufficiency of the offsite emergency plans in its licensing decision.

Adequacy of Nuclear Emergency Plan for Darlington Nuclear to Reduce or Avoid Radioactive Exposures

As stated, the essential function of the nuclear emergency response plans is to avoid or reduce radioactive emissions doses to persons. Once an accident is occurring or a sequence of events makes emissions imminent or possible, this requires response measures like:

- moving people away from the area (short or long term evacuation),
- getting people into concrete structures (limited protection in some cases),
- advising people to consume KI (potassium iodide) to reduce the chances of thyroid exposure to radioactive iodine,
- ensuring no consumption of contaminated drinking water, milk or food, among other measures.

How Quickly Can People be Protected

A significant issue for the CNSC Panel at this licensing hearing therefore is how quickly people can be protected from these exposures in such scenarios. “Early” radioactive releases are conceivable –where an accident occurs suddenly, and there are releases the environment early in

the accident sequence (containment breached and little time to “hold” radioactive materials in containment before venting). The risks to persons may be higher from such events as there is less time for some radioactive isotopes to decay. Accordingly an important test for the regulator is to ask how fast measures can be implemented to protect people. In the case of the Durham Nuclear Emergency Response Plan, the most recent version of which is dated 2008, the modelled highest times to evacuate people varies in various sectors ranging from 4.77 hours up to 36.58 hours in one scenario; several scenarios exceed 20 hours. (The Durham Region Nuclear Emergency Evacuation Information, Annex B to the DRNERP; Annex B is dated 2008 and as discussed elsewhere herein, an update is not expected until December, 2015, following these hearings). It should be noted, however, that these are modelled times, from a seven year old document, and their reliability has not been tested as evacuation was not part of the Darlington y 2014 Exercise Unified Response.

The recently published 2014 Clarington Municipal Emergency Plan states that special institutions and those without transportation will be assisted pursuant to the Durham Region Evacuation and Sheltering Plan but CELA was advised by the Durham Region Emergency Management Office prior to the deadline for this submission that all of the Durham Region nuclear plans are in the process of being updated post-Fukushima and after the most recent nuclear emergency response exercise. Accordingly CELA was unable to review these latest plans for this submission, but we have been advised by the Durham Region Emergency Management Office that they are to be finalized within the next two weeks, and that copies will be provided to CELA as they are finalized. We will follow up with the DEMO office to ensure that we receive them, and will address any changes or additions to the Durham plan and its annexes during our presentation to the Commission at the part 2 hearings.

Early Release

That 2014 Clarington Municipal Emergency Plan states that the containment holdup time estimate for Darlington NGS is seven days (at section 5.5) – See (Clarington Plan: <http://clarington.uberflip.com/i/277630-clarington-emergency-plan-2014/14>). While this may be the design intent, emergency planning must also contemplate an early release, and the Commission members must satisfy themselves that the planning actually in place would respond to such a case.

It is thus difficult for the Panel to conclude that international guidance is met, namely IAEA Safety Requirements GSR-R-2, “Preparedness and Response for a Nuclear or Radiological Emergency” which states that “For facilities in threat category I or II {which includes nuclear power plants} the threat assessment shall demonstrate for the range of postulated emergencies that identification, notification, activation and other initial response actions **can be performed in time** to achieve the practical goals (see para.2.3) of emergency response.” (At Paragraph 4.26.) (Emphasis added).

The practical goals in Para. 2.3 include among others, regaining control of the situation, preventing and mitigating consequences; and preventing health effects, both as to early injuries and as to long term effects such as cancers.

Similarly, ICRP Publication 109 indicates that the purpose of evacuation is to provide “rapid, temporary removal of people from an area to avoid or reduce short-term radiation exposure in an emergency exposure situation.” It also states that it is “most effective if it can be taken as a

precautionary measure before there is any significant release of radioactive material.” (at page 66) Likewise, Health Canada’s Guidelines for Intervention indicate that “the goal of evacuation is to avert elevated short-term doses arising mainly from the radioactive plume (external irradiation and inhalation) and from radionuclides deposited on the ground (external irradiation). Evacuation has the potential to avert most or all doses if carried out in the pre-release phase of an accident. Evacuation is effective for reducing exposures in cases where the release is of uncertain size or duration.” (at 18)

However, as noted, the Durham Nuclear Emergency Response Plan proposes that people could be evacuated over sectors some of which exceed 20 hours and even 37 hours. In some scenarios that could mean radioactive exposures to people, depending on time until release, wind speed and direction, traffic volumes and other factors. Since removing people from the area where exposures may be occurring is the only effective way to avoid some doses (since effectiveness of sheltering is limited and KI deals only with radioactive iodine), this method must be strengthened – especially with effective, and tested, planning for faster evacuation. With population and traffic growth in the area of Darlington, this is a major concern. At a recent stakeholder meeting regarding this license application, OPG staff also expressed concern with keeping people from travelling into a plume – this is a fair concern but does not in any way justify failing to have a robust and very fast plan for evacuating people in the primary and secondary zones around the Darlington nuclear plants. Yet a further concern with respect to this application is that the applicant has not provided updated evacuation time estimates, despite asking for a 13 year license. This is an unacceptable deficiency given that evacuation is one of the most critical emergency preparedness issues. According to its submissions for this hearing,

OPG that update evacuation time estimates are planned, but not until December, 2015, one month after this hearing. The Commission should not accept this deficiency and this is an additional reason to decline the request for a thirteen year license, or for the life extension, but rather to require OPG to return to the commission in 1 year with this updated evacuation modelling. (I will make further submissions later about the necessity of expanding the size of the secondary zone).

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.

Evacuation Logistics

It is incumbent on this Panel to examine the logistics and preparedness for nuclear accident evacuation relating to the Darlington nuclear plant. For example, by comparison to a peer nuclear plant regulator, the U.S. Nuclear Regulatory Commission requires explicit calculation of numbers of households with no vehicles; with unsupervised latchkey children; with one vehicle at work that would not return; with residents who have limitations on driving such as elderly who do not drive at night; with specialized transportation needs such as wheelchair vans or ambulances. It also specifies that a summary of the total number of vehicles available to support evacuation of transit dependent residents, and people with accessibility needs must be done.

While institutions are listed in the Durham plan, these specific logistical and needs calculations have not been conducted in Appendix B to the existing Durham Plan. It is thus very difficult for this Panel to assess the reliability of evacuation planning logistics for the Darlington plant. With

Durham and east Toronto population growing so rapidly this is an ever growing major issue of public safety.

The Durham Region Nuclear Evacuation Plan, Annex B, dated Jan. 2008, lists for each sector, the special care facilities (child cares, retirement homes), schools, (all with numbers of residents, students, staff,) as well as recreation centres, parks, and locations of emergency services, works, services, and vital services such as health centres. It also notes motels and hotels when present in the sector. This information obviously needs to be updated and is not yet available to the Commission for this hearing. The additional detailed logistical information such as that required by the U.S. NRC and detailed above is essential. 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. Given that this information is not now available, the Commission should not grant the requested length of license, and should instead require the licensee to return with all of these details at the one year expiry of a shorter license as we have recommended in these submissions.

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.

Sheltering in place

There is a serious lack of clear information on sheltering in the emergency plans applicable to Durham. In particular it is very problematic that the communications and outreach material thus far, including recent materials prepared and circulated by OPG, and Durham Region, imply that sheltering may be suggested by the provincial and health authorities and that this would be protective. For example, the “Never Be in the Dark” brochure published by Durham Region, City of Toronto, EMO, and OPG last year lists sheltering as one of the protective measures (as do the emergency plans themselves). However it is critical to make clear to people that certain types of shelter provide more protection, whereas others would provide little, IAEA Guide GS-G-2.1 points out that “typical European and North American homes and their basements may not provide adequate protection”. Likewise, ICRP Publication 109 states that buildings constructed of wood or metal (as opposed to solidly constructed buildings) are “not generally suitable for use as protective shelters against external radiation, and buildings that cannot be made substantially airtight are not effective in protecting against any exposures.” Health Canada too notes that sheltering may be effective only for some radionuclides, and up to a few days at most, and even then, in concrete buildings where people can be kept away from windows. As a result, this Panel should place very low reliance on the potential protection to people that “sheltering” would provide to avoid radioactive doses to people if there are radioactive emissions in the area from a nuclear accident. This observation reinforces and reiterates that the primary remedy must be to ensure provisions for effective, fast evacuation of all of the potentially affected residents, occupants, and workers in the primary and secondary zones and beyond, and that 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. For a description of the INES scale, see <http://www-ns.iaea.org/tech-areas/emergency/ines.asp>.

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.

Potassium Iodide (KI)

Since the 2012 environmental assessment screening hearing, the CNSC last year has passed RegDoc 2.10.1 which requires the pre-distribution of KI to all residences and institutions within 10 km of the plant boundary. Previous to this new RegDoc there was a hope that people would pick up KI at area pharmacies, but very few had in fact done so, and thus the new requirements are intended to ensure that KI is already on hand in the case of a nuclear accident. This is because the timeliness of ingestion of KI in the event of radioactive emissions is critical. Health Canada advises that KI is most effective to reduce the amount of radioactive iodine that would be picked up by thyroid glands if it is ingested just prior to or at the time of the first emission of radioactive iodine from a nuclear accident, with effectiveness very rapidly diminishing after that. In particular, protecting against radioactive iodine exposure is very important in cases of early releases. Health Canada's Guidelines for Intervention during a Nuclear Emergency, 2003, state

that “once in the bloodstream, about 20% of the iodine is absorbed by the thyroid...it is particularly susceptible to beta and gamma irradiation from radioisotopes of iodine, especially I-131.” (at 21)

International guidance such as that of the ICRP states that ingestion of KI is a short-term measure, and IAEA Guide GS-G-2.1 states that it must be taken before or soon after the intake of radioiodine; that its effectiveness diminishes rapidly after the exposure; the ICRP confirms this in its publications. (Again, these cautions reinforce the need for the logistical ability to rapidly evacuate the secondary zone.)

While CELA applauded this measure taken by the CNSC, we remain concerned about whether people in the secondary zone (50 km here) would be able to obtain and ingest KI fast enough. In many scenarios, the only realistic way people could ingest KI quickly enough to be effective, is if it was already obtained in advance. CELA therefore continues to advocate pre-distribution in the whole secondary zone and we submit that this should be added to the LCH requirements for the Darlington nuclear plant. The present proposed license condition in the draft License Condition Handbook provides as follows:

ensure that a sufficient quantity of ITB agent is pre-stocked and available within the secondary zone to the extent practicable. This pre-stocked inventory of ITB agents shall be located so that it can be promptly and efficiently obtained by, or provided to, members of the public with particular consideration to sensitive populations such as children and pregnant women; (section 10.1 page 85)

CELA submits that this is insufficient. We submit that the CNSC should direct OPG to ensure that KI is pre-distributed to all residents within the secondary zone as a condition of licensing. By way of comparison, Panel members will recall that at the recent Bruce power relicensing hearing, Bruce Power advised that they are distributing coupons to all residents within 50 km to pick up KI tablets; and pre-distributing to institutions within that zone. For Darlington it has remained unclear to CELA despite paying close attention, exactly what the plans are for KI distribution for the secondary zone; at the Day 1 hearing OPG said KI pills would be “made available” within the secondary zone. Given the necessity of consuming KI just in advance of, or at the very onset of, a nuclear accident, and given the experience of other nuclear accidents world-wide where radioactive exposures have exceeded 10 km, the Commission should mandate that OPG support the actual pre-distribution of KI within the secondary zone.

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.

Avoiding consumption of radioactively contaminated drinking water, milk and food

In some past nuclear accidents such as at Chernobyl, a significant amount of radioactive exposure was due to drinking contaminated milk or eating contaminated food (see below). As a result prompt action is needed to monitor those possible sources, and to keep those food sources away from markets. The area impacted by releases from a nuclear accident can be very large, and for example the provincial plan presently proposes to control ingestion within the 50-80 km called the “ingestion zone” (equivalent to the secondary zone in the PNERP).

Internationally, IAEA Safety Guide GS-G-2.1 outlines expectations for prior arrangements to ensure that the public will be instructed not to eat or drink potentially contaminated food, milk and water in the event of a major release. It noted that radiation induced thyroid cancers following the Chernobyl accident occurred mainly at distances more than 50 km from the plant, and that “the most effective protective action to prevent or reduce these thyroid cancers would have been to restrict the consumption of potentially contaminated food and milk.” (At V.24) Similarly based on the Fukushima experience, ingestion control at distances exceeding 50 km are required. CELA recommends ingestion control be extended to 100 km around the plant. The Durham plan, DNERP, 2011 has a brief reference to banning consumption of local water, milk, meat and produce in the section dealing with Partial Activation of the Plan, as a Precautionary Measure. It indicates that the PEOC would discuss with the Regional Emergency Operations Centre the implementation of precautionary measures and communicate them to the public by emergency bulletins issued by the PEOC. There is no mention of food and water bans in the Full Activation section of the DNERP, 2011.

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

Planning Basis

A critical issue in this Panel’s evaluation of the adequacy of nuclear emergency planning and readiness to protect persons and the environment is the question of the “planning basis” for the offsite nuclear emergency response plants. Planning to implement protective measures fundamentally relies on a definition of the size of accident (amount of exposure) that might

occur. This dictates evaluations of how many people might have to evacuate; how far they might have to go; how many people should have KI in advance and in what area around the plant. In Switzerland this is exactly what was done in the wake of the Fukushima accident, and as a result, the regulator is requiring detailed emergency planning and readiness within 50 to 80 km of their nuclear power plants, including pre-distribution of KI and detailed evacuation (See the Examen des mesures de protection applicables en Suisse en cas d'urgence - Rapport du groupe de travail interdépartemental IDA NOMEX June 2012) . Of particular note is that these zones are based on dispersion modelling which is publicly available on their website at <http://www.ensi.ch/en/emergency-protection/dispersion-modelling>.

CELA submits that the Commissioners must require consideration of a 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.

CELA submits that the SARP study released by the Commission does not provide this needed information to the Commission members. While only accidents with a predicted frequency modelled at greater than 1 in a million reactor years by the operator were included in the 2012 EA screening hearing (for example see evidence of Dr. Thompson at page 179 of the Day 3 Transcript, December 5, 2012), there was an expectation by the commission and the public that Fukushima level accidents would be considered for the instant licensing application. For example, in the 2012 hearing, only an accident that required sheltering within 3 km was considered (see p. 30 of the 2012 Record of Decision); not one that required evacuation like

Fukushima. As to the expectations of the Commission and members of the public, see page 32 of the Record of decision as to multi-unit accidents, and page 33 (para. 153) of the Record of decision as to the severe accident study. In the latter case, the commitment was to do an ``information document`` or equivalent, assessing the health and environmental consequences of more severe accident scenarios discussed by the Intervenors. What the hundreds of Intervenors discussed during that hearing was the necessity to examine and plan for the possibility of an accident on the scale of the Fukushima accident – which the commissioners will recall required evacuations to 20 km around the plant, and even beyond that in certain sectors, due to release of radioactive emissions and deposition to these distances from that accident. The type of study envisaged by the Intervenors has not been provided and CELA submits that as a result the Commission does not have necessary information on which to base a licensing decision. For example in the 2012 Darlington EA hearing it was confirmed that there was no multi-unit failure assessed for that EA (See evidence of Mr. McAllister at page 301, day 4 December 6, 2012).

However, the results of the Darlington NGS Probabilistic Safety Assessment Study (DARA), as summarized in the Summary Report describe a Release Category 1 potential accident as a very large release with the release of approximately 3% of the core inventory of I-131, with the potential for acute offsite radiation effects, and/or widespread contamination. (See 2015 DARA: http://www.opg.com/generating-power/nuclear/stations/darlington-nuclear/Documents/DarlingtonNGSProbabilisticSafetyAssessment_SummaryReport.pdf) This is not the type of release that was assessed in the Severe Accident Study recently released by the Commission. Nor did that study consider emissions equivalent to the Fukushima accident, nor did it consider early release (i.e. a situation where containment was not able to hold for 24 hours following an accident). Accordingly that study is inconsistent with the expectations of the public

in 2012, and CELA submits, means that the Commission now lacks essential information for this licensing hearing in order to assess the adequacy of nuclear emergency planning. In particular, it does not allow the Commission to ensure that the site remains suitable for a further 30 years of operation of the Darlington NPP. This is a critical question given the expanding population in Durham region which has been designated one of the “Places to Grow” by the province of Ontario. A study of the potential consequences of an accident on the scale of Fukushima is imperative 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 (IAEA Safety Standard Series: Site Evaluation for Nuclear Installations No. NS-R-3) and in view of the current population (much greater than when Darlington was originally sited) and of the population growth expected to 2045. The Commission must transparently and explicitly review the present and predicted populations and CELA submits that the only reasonable conclusion is that the Darlington site is unsuitable for a Class 1A Nuclear Generating Station given the potential radiological consequences and the feasibility of implementing emergency plans (See IAEA Site Evaluation Safety Standard No. NS-R-3 at page 9 “Criteria Derived from Considerations of Population and Emergency Planning.”)

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.”

The necessity to conduct these evaluations of potential consequences and the efficacy of protective response measures under the nuclear emergency plan is compounded even further by

the need to undertake a site-wide evaluation of risks, which has not been done yet - but which was requested by the commission in the 2012 EA screening hearing.

There are significant and consequential implications to the Commission's decision in this licensing application that would arise from requiring an increased planning basis. Given the known experiences and scenarios at nuclear accidents world-wide, such as Chernobyl and Fukushima, this is a reasonable approach to protecting safety of persons and the environment (and disregarding these potential scenarios in the planning basis conversely would not be a reasonable decision in the face of those accidents). If the Commission requires an increased planning basis as a precondition to considering the instant licensing application (as CELA submits it ought to do), the result would be the following changes to the provincial and regional nuclear emergency plans:

- Detailed planning and preparation for larger numbers of potential evacuees in traffic planning and in resourcing to assist people with transportation
- Detailed planning and preparation for a larger geographic area to be evacuated
- Detailed planning and preparation for further distances to reach evacuation shelters and reconsideration of the suitability of the currently proposed evacuation shelters for Darlington
- Consideration of the numbers of people who might require sheltering in a very large accident (under the current plans there is no provision for sheltering of 250,000 people; it is only anticipated that people be moved out of the area – see the evidence of Mr. Kontra at page 313 of the transcript, Day 4, December 6, 2015).

- Larger numbers of people requiring advance distribution of KI in larger radius around the Darlington plant
- Resourcing and training increased numbers of emergency response workers
- Planning and preparing for increased requirements for decontamination facilities, emergency transport, and medical treatment facilities and treatment personnel
- Advance preparation and planning for the potential for longer (or long) stays away from residences by residents in the secondary zone
- Advance preparation and planning for the potential for permanent abandonment of land
- Advance consideration, preparation, planning and demonstration of ability to provide requirements for drinking water for up to millions of people
- Advance consideration, preparation, planning and demonstration of ability to provide requirements for food substitution (in lieu of agricultural products within the secondary zone) for much larger numbers of people

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, and the above noted items have been provided in the nuclear emergency plans relating to Darlington (provincial, regional and local municipal) with sufficient detail and demonstration of practical implementation.

Especially in light of the commitment by the province of Ontario to a public review of its nuclear emergency response plan in 2016, which will necessitate a review of the planning basis, it is not appropriate for the Commission to grant a life extension of a projected 30 years to the

Darlington NPP, nor the requested 13 year license. The Commission must consider the input from any revisions to the provincial nuclear emergency response plan as a critical input to this licensing decision – yet one more reason to restrict any current license granted to the applicant to one year.

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 Fukushima 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 view 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.

Lessons learned from Exercise Unified Response and Implications for emergency planning planning and preparedness.

There was a recent emergency planning exercise for Darlington called “Exercise Unified Response”. The independent evaluation of Exercise Unified Response by Margaret Purdy reported that there were “serious delays” in CNSC obtaining needed technical data from OPG during the exercise, to support decision making. In relation to emergency planning, it is of note that this was discussed particularly in respect of decisions on venting radio-nuclides from containment, and the timing thereof. Accordingly the independent evaluator recommended as follows (at page 5, section 5.1 of the independent evaluator’s report):

Recommendation 2: The CNSC should explore the feasibility of installing a direct data feed to the CNSC Emergency Operations Centre from all Canadian nuclear power plant control centres to provide the CNSC with immediate on-line access to all critical technical data during emergency situations.

While that recommendation appears to be an important recommendation in its own right, this finding by the independent evaluator demonstrated that the timeliness of exchange of data was

inadequate and had very serious repercussions for one of the most important factors that might affect public exposure during a nuclear accident, namely the timing of venting from containment. A similar and very important lesson from the independent evaluation of Exercise Unified Report was the lack of understanding of the CNSC role as to public health, both within and without the CNSC. The evaluator found that there was confusion and inconsistency as to the CNSC role, and between CNSC and other agencies during the exercise; in particular as to appropriate protective action measures such as evacuation and KI ingestion. While the evaluator made recommendations as to the necessity of federal inter-departmental discussions about those roles, for the purpose of this submission, CELA notes that the finding demonstrates that having ``paper`` plans is not sufficient, reinforcing the experience of the Fukushima Daiichi accident, where governmental and agency communications and determination of protection action measures such as evacuation was fraught with difficulty. The Commission should satisfy itself now that there is very clear resolution to this issue of the roles regarding public health and determination of public health protective action measures. Similar findings were reported in the OPG Exercise Unified Response After Action Report. Without this, one of the most fundamental functions of the nuclear emergency response plan, that of providing direction to the public to ensure avoidance of radioactive doses, is in jeopardy and accordingly does not meet the test in section 24 of the NSCA. In particular, in this respect, I would draw your attention to Recommendation 8 of the Independent evaluator as follows:

13. The CNSC should consider including Commission members in future emergency management exercises in order to familiarize them with the relevant plans, processes and players.

CELA submits that the Commission should take up this recommendation forthwith and 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).

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.

Community Engagement

CELA also submits that this panel has the jurisdiction to 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. IAEA Publication “Lessons Learned from the Response to Radiation Emergencies (1945 – 2010), (IAEA, August 2012) includes a comment 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 stated that “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.” While I have included this quote as well as several others, in this submission in prior submissions to the Commission, I have repeated them because this type of consultation has not occurred and these significant concerns remain outstanding. CELA commends the new Clarington Emergency Plan for stressing the importance of stakeholders “as an integral part of the regional emergency information distribution” and to be “kept informed of changing emergency conditions” (see 8.8.2 of Clarington plan); however what we are stressing here is the need to engage transparently and inclusively in seeking input and consulting on the details and mechanics of nuclear emergency planning implementation from the general public prior to any accident. For example as to how family reunification will work in the event of an accident; or in discussions as to the actual workability of evacuation routes; and in discussions about the geographic scope of pre-distribution of KI pills (for example the area in between Pickering’s and Darlington’s primary zones).

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.

Conclusion and Recommendations

CELA submits that adequacy of emergency planning preparedness and readiness is one of the most fundamental issues to be assessed by the Commission in deciding upon this application. Based on the issues reviewed herein, CELA submits that the application for a life extension should be denied at this hearing; and that the license to operate a site should be restricted to one year.

Summary of Recommendations

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 Fukushima 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 view 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.