



Supplementary Information

Oral presentation

Submission from Greenpeace

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

Renseignements supplémentaires

Exposé oral

Mémoire de Greenpeace

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
Partie 2

2-5 novembre 2015

Supplementary Comments

The Darlington Nuclear Station:

Risking Toronto and the Environment

October 19, 2015

The following provides supplementary information supporting Greenpeace's request for the Commission to reject and put conditions on Ontario Power Generation's (OPG) request to rebuild and extend the life of the four aging Darlington reactors.

Environmental Assessment Results No Longer Valid

Greenpeace requests the Commission update the conclusions of the 2012 environmental assessment to acknowledge the station may cause an "adverse effect" in light of the updated site-wide risk information provided at this hearing.

This would be consistent with both the findings of recent environmental reviews on both new reactors at Darlington and the proposed life-extension of the Pickering B nuclear station. Both of these environmental reviews assessed the consequence of radioactive releases equivalent to a level 5 or 6 accident on the International Nuclear Event Scale (INES).

The Pickering B environmental review found that Ex-Plant Release Category (EPRC) 5 was a "residual" or "minor adverse effect".¹ Notably, EPRC 5 was included in the assessment only after Greenpeace noted during the hearings on environment review guidelines that external events hadn't been included in OPG's risk assessment. Despite this precedent, OPG and CNSC staff ignored the impact of external events in selecting the accident considered in the environmental review of the Darlington life-extension.

The accidental radioactive releases considered by the Joint Panel Review (JRP) on OPG's proposal to build new reactors is equivalent to the scenario considered in the CNSC's *Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures*. As stated in the panel report, "...the source terms considered were developed based on Canadian Nuclear Safety Commission RD-337 safety goal release thresholds. OPG explained that these source terms were used as bounding

1 CMD 08-H27, Information and Recommendation of Canadian Nuclear Safety Commission Staff - Recommendation for the Acceptance of the Proposed Environmental Assessment Screening Report regarding the Refurbishment and Continued Operations Project at the Pickering Nuclear Generating Station B, Pickering, Ontario, December 10, 2008

releases because they would represent the maximum releases for reactors that would be accepted for licensing in Canada.”²

The effects of this level 6 INES accident, moved the Joint Review Panel to make several recommendations related to siting, multi-unit accidents and emergency planning that Greenpeace recommends be implemented before the Darlington life-extension is approved. As noted, evidence since the 2012 environmental review shows that a level 6 accident is realistic or credible at the Darlington site.

Land Use and Siting

In light of Fukushima and the level 6 INES accident it evaluated, the Panel made several recommendations to restrict land use around the Darlington station. Indeed, these recommendations highlight the inadequacy of the CNSC’s current siting requirements.

Specifically, “[t]he Panel believes that appropriate steps must be taken to evaluate and define buffer zones around nuclear facilities in Canada, taking into consideration the lessons learned from the Fukushima Daiichi nuclear accident.”³

The Panel made the following recommendations:

Recommendation #43: The Panel recommends that the Canadian Nuclear Safety Commission engage appropriate stakeholders, including OPG, Emergency Management Ontario, municipal governments and the Government of Ontario to develop a policy for land use around nuclear generating stations.

Recommendation #44: The Panel recommends that the Government of Ontario take appropriate measures to prevent sensitive and residential development within three kilometers of the site boundary.

Recommendation #45: The Panel recommends that the Municipality of Clarington prevent, for the lifetime of the nuclear facility, the establishment of sensitive public facilities, such as school, hospitals and residences for vulnerable clientele within the three kilometer zone around the site boundary.

Recommendation #59: The Panel recommends that the Municipality of Clarington manage development in the vicinity of the Project site to ensure that there is no deterioration in the capacity to evacuate members of the public for the protection of human health and safety.

² Joint Review Panel, Environmental Assessment Report: Darlington New Nuclear Power Plant Project, pg. 126.

³ Ibid, 105.

These recommendations have not been implemented, but in Greenpeace's view should be made a condition of the Darlington life-extension given the evidence provided at this hearing on the risk of a level 6 accident.

Lack of Siting Standards

An internal CNSC comment acquired by Greenpeace through Access to Information cites a staff member stating that it is not the job of the Integrated Safety Review "to rule definitively on the suitability of the site nor to definitely interpret results from DNNP [new reactor environmental assessment] work. ***I think it is the EA's job...***"⁴ This requires further scrutiny by the Commission.

As noted, Greenpeace believes the CNSC cannot approve the life-extension of the Darlington nuclear station before it has published, consulted on, and reviewed the Darlington site against post-Fukushima siting requirements. This concern is validated by the observations and recommendations of the Joint Review Panel on new reactors.

As noted in our submission, the CNSC has no deterministic criteria for determining the site suitability and, despite committing to establish siting criteria in its *Fukushima Action Plan*, the CNSC has yet to publish and consult on new criteria.

Notably, the CNSC's lack of clear and quantitative siting criteria has been repeatedly criticized by consultants commissioned by the CNSC to assess its regulatory framework.

In 2005, John W. Beare made the following comments on the CNSC's draft licensing basis for new reactor:

*19. There are two significant gaps in the Licensing Basis Document. ... The safety goals are independent of the site, the size of the exclusion area (if any) and the demographics of the area around the site. **I was advised that site considerations do not affect the design requirements for the nuclear power plant but that explanation is difficult to accept.***

*20. Before issuing this Licensing Basis Document the Canadian Nuclear Safety Commission should document and **publish its siting policy giving quantitative values for the tolerable risk** (not unreasonable to use the wording of the Nuclear Safety and Control Act) to individuals and the population around a nuclear power plant site. One weakness of the current siting policy in AECB-1059 is that only radiological risks are addressed. In AECB- 1059 the frequency and radiological consequences of process failures alone and in combination with safety system failures are addressed for individuals and the population, **but only the risk to***

⁴ See Access to Information request A00036517_93-000904

individuals from more serious accidents. These weaknesses in the current siting policy should be remedied. ⁵

Mr. Beare also made the follow frank observation: “Depending on one’s perspective, from the safety point of view the approval of the Pickering site was an act of faith or hubris.”

A report commissioned specifically on siting requirements found “[i]mportant gaps not addressed in the CNSC documents (or anywhere in its licensing framework” include “Criteria for the rejection of a proposed site if it is deemed unsuitable” and “that there are no insurmountable obstacles to the establishment of suitable emergency measures.”⁶

Notably, this report observed that the Nuclear Regulatory Commission has siting criteria for multi-unit sites. Specifically:

“If the reactors are interconnected to the extent that an accident in one reactor could affect the safety of operation of any other, the size of the exclusion area, low population zone and population center distance shall be based upon the assumption that all interconnected reactors emit their postulated fission product releases simultaneously. This requirement may be reduced in relation to the degree of coupling between reactors, the probability of concomitant accidents and the probability that an individual would not be exposed to the radiation effects from simultaneous releases. The applicant would be expected to justify to the satisfaction of the Commission the basis for such a reduction in source term.”⁷

The above citations underline the relevance of Greenpeace’s concerns: the Commission needs to establish clear siting criteria and update the licensing-basis for the Darlington nuclear station before the proposed life-extension can be approved.

Emergency Planning

In light of Fukushima and its assessment of a level 6 INES accident, the Joint Review Panel also stated concerns and made recommendations related to offsite nuclear emergency plans.

⁵ John W. Beare, P.Eng., Review of ACR-LBD-001, Licensing Basis Document for New Nuclear Power Plants in Canada, Draft dated 2004 December

⁶ Regulatory Site Requirements Needed for New Nuclear Power Plants in Canada, Final Report, June 2007, RSP-0223, pg. 8.

⁷ Ibid, pg 45.

For example, the Panel state its recognition “...that existing regulations require measures to ensure that severe nuclear accidents do not have significant consequences beyond the site boundary. However, the fact that such accidents have occurred in the last 25 years further emphasizes the need for a prudent approach.”⁸

The Panel made the following recommendations:

Recommendation #46: Given that a severe accident may have consequences beyond the three and 10-kilometre zones evaluated by OPG, the Panel recommends that the Government of Ontario, on an ongoing basis, review the emergency planning zones and the emergency preparedness and response measures as defined in the Provincial Nuclear Emergency Response Plan (PNERP), to protect human health and safety. (pg. 106).

Recommendation #63: The Panel recommends that prior to construction, the Canadian Nuclear Safety Commission require OPG to evaluate the cumulative effective of a common-cause severe accident involving all of the nuclear reactors in the site study area to determine if further emergency measures are required.

Again, these recommendations have not been implemented. Given the evidence on accident risks Greenpeace believes these recommendations should be implemented before the Commission can approve the life-extension. Specifically, Greenpeace feels the Commission should not approve the Darlington life-extension before it has received the planning basis for offsite emergency plans and reviewed their adequacy.

The table below compares the radioactive releases of various accident scenarios that have been released by the CNSC and larger releases that should be considered before the life-extension is approved.

It is important to note that Release Category 1 is a multi-unit accident (98% of sequences)⁹ with radioactive releases 20% larger than the baseline scenarios assessed in the CNSC’s *Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures*. In light of Fukushima, Greenpeace believes it is incumbent on the Commission to require the effects of accident scenarios such as RC 1 are reviewed publicly. Indeed, the Commission must do this to address recommendation 63 of the Joint Review Panel.

⁸ Joint Review Panel, *Environmental Assessment Report: Darlington New Nuclear Power Plant Project*, Pg. 106.

⁹ Yolande Akl et al., *Discussion Paper on Safety Goals – Stage 1: Analyze Issue, Probabilistic Safety Assessment and Reliability Division*, March 2013.

Accident Sequence	Origin of radioactive releases	I-131	Cs-137	INES Level
Release Category 2 & Severe Accident Study Release.	- Proposed by OPG - Source term equivalent to lower threshold for large release under RD-337. - OPG used the same source term as reference accident in new build environmental assessment. - Equivalent to 0.0015% of core inventory of I-131	4.4E+15	1E+14	INES 6
SARP Multi-Unit Scenario	- Proposed by CNSC staff. - RC2 source term multiplied by four to imitate multi-unit accident at Darlington. - Equivalent release modeled in past. - Equivalent to 0.01% of core inventory of I-131	1.76E+16	4E+14	INES 6
Suppressed Severe Accident Study Release	- Originally proposed by OPG. - RC2 source term multiplied by 10. - Was removed from public report because staff feared citizens would use results "malevolently". - Equivalent to 0.015% of core inventory of I-131	4.4E+16	1E+15	INES 7
Release Category 1	- Release of more than 3% of core inventory of I-131. - Twenty times larger than RC2 and CNSC's lower threshold for a large release. 98.8% of accident sequences are multi-unit.	8.76E+16	?	INES 7
Fukushima	Release from 3 Reactors	1.6E+17	1.5E+16	INES 7
Chernobyl	Single Unit Release	1.5E+18	6.2E+16	INES 7