



Oral presentation

**Written submission from
Durham Nuclear Awareness,
Slovenian Home Association and
the Canadian Environmental
Law Association**

In the Matter of the

Ontario Power Generation Inc.

Applicability of the Darlington New Nuclear
Project environmental assessment and plant
parameter envelope to selected reactor
technology

Commission Public Hearing

January 2024

Exposé oral

**Mémoire de
Durham Nuclear Awareness,
Slovenian Home Association et
l'Association canadienne du droit
de l'environnement**

À l'égard d'

Ontario Power Generation Inc.

Applicabilité de l'évaluation
environnementale et de l'enveloppe des
paramètres de la centrale à la technologie de
réacteur sélectionnée pour le projet de
nouvelle centrale nucléaire de Darlington

Audience publique de la Commission

Janvier 2024

**DURHAM NUCLEAR AWARENESS,
SLOVENIAN HOME ASSOCIATION &
THE CANADIAN ENVIRONMENTAL LAW ASSOCIATION**

Comments on the applicability of the Darlington New Nuclear Project's environmental assessment and plant parameter envelope to Ontario Power Generation's selected BWRX-300 reactor technology

Prepared by
Sara Libman, Legal Counsel

Expert Review by:
M.V. Ramana, Professor and Simons Chair in Disarmament, Global and Human Security

November 17, 2023

November 17, 2023

Senior Tribunal Officer, Secretariat
Canadian Nuclear Safety Commission
280 Slater Street, P.O. Box 1046, Station B
Ottawa, Ontario K1P 5S9

Dear Sir or Madam:

Sent by email interventions@cnsccsn.gc.ca

Re: Joint Submission of Durham Nuclear Awareness, Slovenian Home Association, and the Canadian Environmental Law Association, Regarding the applicability of the Darlington New Nuclear Project's environmental assessment and plant parameter envelope to selected reactor technology (Ref. 2024-H-02)


The Canadian Environmental Law Association ("CELA") has enclosed its comments, on behalf of Durham Nuclear Awareness, and Slovenian Home Association, on the applicability of the Darlington New Nuclear Project's environmental assessment and plant parameter envelope to Ontario Power Generation's selected reactor technology (BWRX-300).

Please find below our submission for your review.

By this letter, and pursuant to the CNSC's *Rules of Procedure*, CELA request status to participate as an intervenor in the public hearing and an opportunity to make a 30-minute oral presentation at the January 2024 hearing.

Sincerely,

CANADIAN ENVIRONMENTAL LAW ASSOCIATION


Sara Libman
Legal Counsel, CELA

I. INTRODUCTION

Durham Nuclear Awareness (“DNA”) and Slovenian Home Association (“SHA”) together with the Canadian Environmental Law Association (“CELA”) and the expert review by Dr. M.V. Ramana,¹ submit this written report in response to the Canadian Nuclear Safety Commission’s (“CNSC”) Notice of Public Hearing and Participant Funding dated April 3, 2023 to review CNSC staff’s and Ontario Power Generation’s (“OPG”) submissions to the Commission, as well as participating in the hearing process to consider and decide on the applicability of the Darlington New Nuclear Project (“DNNP”) Environmental Assessment with respect to OPG’s selected BWRX-300 small modular reactor technology, as per the Government of Canada response to recommendation #1 of the joint review panel’s 2012 report.²

DNA, SHA, and CELA’s (herein, “the intervenors”) report is the result of reviewing the submissions filed by OPG and CNSC staff for the January 2024 Public Hearing,³ and applying the findings from these two submissions to the report submitted by the Intervenors in March 2023 reviewing OPG’s Updated Plant Parameter Envelope and Environmental Impact Statement Review Reports for the DNNP.⁴

In addition to reviewing the documents submitted by CNSC staff and OPG, this report considers the CNSC’s jurisdiction pursuant to the *Nuclear Safety and Control Act* (“NSCA”), which requires that in making a licensing decision, the CNSC ensure the adequate protection of the environment and human health. In meeting this objective, per section 24(4) of the *NSCA*, the intervenors’ findings and concerns are itemized below. Our recommendations, including suggested licence and licence condition revisions are summarized in **Appendix A**.

¹ M.V. Ramana is the Simons Chair in Disarmament, Global and Human Security and Professor at the School of Public Policy and Global Affairs, University of British Columbia, Vancouver, Canada.

² Canadian Nuclear Safety Commission, “Notice of Public Hearing and Participant Funding” April 3, 2023, online: <https://www.nuclearsafety.gc.ca/eng/the-commission/pdf/NoticeHearingPFP-OPG-DNNP-EA-Jan2024-e.pdf>

³ CNSC, “Determination for Ontario Power Generation (OPG), Inc. Darlington New Nuclear Project (DNNP)” (CMD: 24-H2), 18 September 2023, online: <https://www.nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/pdf/CMD24/CMD24-H2.pdf> [CMD 24-H2]; OPG, “OPG Written Submission in Support of the Darlington New Nuclear Project Commission Hearing on the Applicability of the Darlington New Nuclear Project Environmental Assessment and Plant Parameter Envelope to the Selected Reactor Technology” (CMD: 24-H2.1), 18 September 2023, online: <https://www.nuclearsafety.gc.ca/eng/the-commission/hearings/cmd/pdf/CMD24/CMD24-H2-1.pdf> [CMD 24-H2.1]

⁴ Sara Libman and M.V. Ramana, “Comments on Ontario Power Generations’ Review of the Environmental Impact Statement and Plant Parameter Envelope for the Darlington New Nuclear Project in the Context of the Proposed BWRX-300 Reactor”, 20 March 2023, Canadian Environmental Law Association, CELA Publication No. 1526, online: <https://cela.ca/review-of-opgs-updated-plant-parameter-envelope-and-environmental-impact-statement-review-reports-for-the-darlington-new-nuclear-project/> [March 2023 submission].

II. INTEREST AND EXPERTISE OF THE INTERVENORS

i. Durham Nuclear Awareness

Durham Nuclear Awareness (“DNA”) is a citizens’ group with a longstanding interest in the Darlington Nuclear Generating Station. DNA was first organized in 1986 in the wake of the Chernobyl disaster and born out of a need for people in Durham Region to come together, learn & empower themselves.

As a volunteer group of concerned citizens, DNA dedicates themselves to raising public awareness about nuclear issues facing Durham Region, and fostering greater public involvement in the nuclear decision-making process. DNA has appeared on numerous occasions before the CNSC and has a lengthy history arguing for critical public health and safety measures, including improved emergency planning and baseline health studies, and setting standards for tritium in drinking water. DNA continues to advocate for upgrades to nuclear emergency plans to ensure the protection of communities in the event of a nuclear accident.

ii. Slovenian Home Association

Slovenian Home Association (“SHA”) is a non-profit cultural organization dedicated to the preservation of Slovenian culture language, heritage and identity in Canada. Many Slovenians reside in the vicinity of the Pickering and Darlington nuclear plants and are concerned about the proposed plans to expand nuclear power generation within the region, particularly with OPG proposing novel reactor technology at the Darlington site. Much of these concerns stem from emergency planning for nuclear accidents.

SHA members are not aware of what to do in case of a nuclear alert from the Province of Ontario. Some questions posed to SHA by its members include: *Should they be prepared to evacuate or stay at home? Where is their closest evacuation center? How to protect themselves by staying at home?* Despite emergency planning being a heavy concern for its members, SHA not been made aware of any public information meetings where the details of the actions taken by the citizens, in case of a nuclear alert, were discussed. SHA would welcome an opportunity to distribute emergency preparedness instructions to its members and to organize and host a preparedness workshop on the topic of emergency preparedness.

iii. Canadian Environmental Law Association

CELA is a non-profit, public interest law organization. CELA is funded by Legal Aid Ontario as a speciality legal clinic to provide equitable access to justice to those otherwise unable to afford representation for environmental injustices. For nearly 50 years, CELA has used legal tools to

advance the public interest, through advocacy and law reform, in order to increase environmental protection and safeguard communities across Canada.

CELA has been involved in number of nuclear facility licensing and regulatory matters before the CNSC including federal environmental assessments. CELA also maintains an extensive library of public legal education materials related to Canada's nuclear sector on its website.⁵

iv. Dr. M.V. Ramana

Expert review of this submission was provided by M. V. Ramana, Professor and Simons Chair in Disarmament, Global and Human Security at the School of Public Policy and Global Affairs (SPPGA), University of British Columbia. M. V. Ramana has extensive knowledge of small modular nuclear reactor designs and expertise in analyzing the multiple risks associated with these and accompanying adverse environmental effects. His research interests are in the broad areas of international security and energy supply, with a particular focus on topics related to nuclear energy and fissile materials that can be used to make nuclear weapons. He combines technical skills and interdisciplinary methods to address policy relevant questions related to security and energy issues.

III. BACKGROUND

In December 2021, OPG announced that GE Hitachi Nuclear Energy was selected as the Small Modular Reactor technology development partner.⁶ The previous round of CNSC participant funding concerning the DNNP enabled the intervenors to review and comment on two documents prepared by OPG: *Use of Plant Parameters Envelope to Encompass the Reactor Designs being Considered for the Darlington Site* and *Darlington New Nuclear Project Environmental Impact Statement Review Report for Small Modular Reactor BWRX-300*.

In March 2023, the intervenors prepared a report ("March 2023 submission") which involved reviewing the aforementioned OPG documents, along with additional documents released by OPG and the CNSC related to the DNNP, spanning back as far as 2007. The March 2023 submission assessed the proposed BWRX-300 technology and whether or not the technology fit within the parameters of the Environmental Impact Statement ("EIS") or the Plant Parameter Envelope ("PPE"). The intervenors determined that that selected technology does not within the parameters of the EIS or the PPE for two reasons:

1. The BWRX-300 reactor is 'fundamentally different' from the variety of technologies captured within the EIS and PPE approved under for the federal environmental assessment (EA) of this project; and

⁵ Canadian Environmental Law Association, online: www.cela.ca

⁶ OPG, "OPG advances clean energy generation project" Media Release, 2 December 2021, online: <https://www.opg.com/releases/opg-advances-clean-energy-generation-project/>

2. OPG's two documents, *Use of Plant Parameters Envelope to Encompass the Reactor Designs being Considered for the Darlington Site* and *Darlington New Nuclear Project Environmental Impact Statement Review Report for Small Modular Reactor BWRX-300*, failed to adequately address the significant changes in our understanding of the likelihood, types, and consequences of nuclear accidents which have occurred since their 2009 licence application, EIS and EA and thus, these documents are no longer current nor validly reflect present circumstances or current knowledge.

The March 2023 submission requested that a new environmental assessment be conducted for the BWRX-300 reactors, and provided 23 recommendations for the CNSC and OPG to resolve before any additional steps occur in the development of the DNNP.

The scope of this submission's review builds on the March 2023 submission, assessing whether the September 2023 submissions by OPG and the CNSC adequately address the recommendations previously made by the intervenors. In addition to these two documents, the intervenors considered federal and provincial legislation, various CNSC REGDOCs and CMDs, international nuclear standards documents, and academic studies regarding nuclear power and small modular reactors.

In reviewing these documents, the intervenors prepare this submission to better assist the CNSC Commission Members in their assessment of the applicability of the DNNP EA to the BWRX-300 reactor technology at the January 2024 hearing.

IV. PRELIMINARY MATTERS & PROCEDURAL CONCERNS

Preserving Public Trust in Nuclear Safety Proceedings

According to the Notice of Public Hearing and Participant Funding dated April 3, 2023:

The Canadian Nuclear Safety Commission (CNSC) will hold 2 separate public hearings to consider the application from Ontario Power Generation (OPG) for a licence to construct a reactor facility for its Darlington New Nuclear Project (DNNP). The first hearing will be held during the week of January 22, 2024 and will focus on the applicability of the DNNP environmental assessment (EA) to Ontario Power Generation's selected reactor technology.⁷

The Notice goes on to explain that the second hearing to determine whether to issue a construction licence for the DNNP will be held no earlier than October 2024, and "pending the Commission's decision from the first hearing."⁸ This means that should the Commission find that the DNNP EA

⁷ CNSC, *supra* note 2.

⁸ *Ibid.*

is not applicable to the proposed BWRX-300 reactor technology, a hearing would not occur in October 2024, as a new EA would likely be required for the selected technology.

Despite the second hearing date being contingent on the outcome from Hearing #1, there is already a participant funding application available to assist Indigenous Nations and communities, members of the public, and interested parties in reviewing the application from Ontario Power Generation (OPG) for a licence to construct for the Darlington New Nuclear Project (DNNP).⁹ Furthermore, during a public information session held by the CNSC on October 31, 2023 to discuss Regulatory Review and a Public Hearing Update for the DNNP, a “schedule of events” was shared with attendees, which seemed to solidify the second hearing would be occurring in October 2024. According to the schedule, members of the public should be prepared for the following deadlines:

- November 20, 2023: Interventions for Hearing #1 due
- December 8, 2023: Applications for Participant Funding for DNNP Stage 3 due
- Week of January 22, 2024: Hearing #1
- May/June, 2024: Public webinar or workshop discussing update and Hearing #2
- June 18, 2024: CMD #2 released by CNSC staff
- August 20, 2024: Interventions for Hearing #2 due
- September 2024: public webinar
- October 2024: Hearing #2

While the intervenors note that the CNSC should be transparent with the public in regards to nuclear project developments and the timelines linked to public participation opportunities, the fact that this much of a timeline for OPG’s licence to construct application has been set out before the deadline (November 20, 2023) for intervenors and members of the public to submit their comments for Hearing #1 raises concerns about the CNSC’s position on the BWRX-300 technology before Hearing #1 has even commenced.

Even though it has yet to be determined by the Commission as to whether the DNNP EA is even applicable to the selected technology, this timeline combined with CNSC staff’s conclusion that “the BWRX-300 reactor technology is bounded by the EA, and that the EA remains applicable for this reactor technology”,¹⁰ members of the public are given the impression that the outcome for the January 2024 Hearing has already been made.

The intervenors submit that the CNSC’s approach to the DNNP licensing process is detrimental to the Commission’s credibility with the public, in particular, its receptivity to input from intervenors. The announced timeline implies that the upcoming public hearing has been pre-determined, and

⁹ CNSC, “Participant funding for review of Ontario Power Generation’s application for a licence to construct (Darlington New Nuclear Project)”, Participant Funding Opportunities (online): <https://nuclearsafety.gc.ca/eng/the-commission/participant-funding-program/opportunities/2023-dnnp-opp-2.cfm>

¹⁰ CNSC, CMD 24-H2, *supra* note 3 at page 82.

whatever public comments and concerns are raised in this round of interventions will not be taken into consideration into the CNSC's decision.

Section 9 of the *NSCA* sets out the objects of the CNSC:

9 The objects of the Commission are

(a) to regulate the development, production and use of nuclear energy and the production, possession and use of nuclear substances, prescribed equipment and prescribed information in order to

(i) prevent unreasonable risk, to the environment and to the health and safety of persons, associated with that development, production, possession or use,

(ii) prevent unreasonable risk to national security associated with that development, production, possession or use, and

(iii) achieve conformity with measures of control and international obligations to which Canada has agreed; and

(b) to disseminate objective scientific, technical and regulatory information to the public concerning the activities of the Commission and the effects, on the environment and on the health and safety of persons, of the development, production, possession and use referred to in paragraph (a).¹¹

The objects of the CNSC are therefore to regulate nuclear energy and nuclear substances activities and disseminate objective scientific, technical and regulatory information to the public on these activities. As an impartial regulator for the nuclear industry, the CNSC does not exist to promote nuclear energy projects and streamline regulatory approval processes to align with the timelines of provincial governments and energy production entities, like OPG.

Having such a rigid timeline in place for OPG's licence to construct application process (which aligns with OPG's timeline for having the first reactor built and operational) suggests to the public that the CNSC is prepared to give OPG's technology selection the greenlight to be constructed before the public has the opportunity to sift through complex information and provide commentary on said information.

The intervenors **submit** that the CNSC should approach the hearing with an open mind, allowing for the possibility that the interventions during the hearing might force it to conclude that a new

¹¹ *NSCA* at s. 8.

EA is needed. It is only if that were not to be the decision of the CNSC that next steps should be announced.

Recommendation 1: The CNSC should re-evaluate its decision making process and focus on one stage at a time, without presuming that construction will have to start within some pre-set time period.

V. ACTION REQUESTED OF THE COMMISSION

After reviewing both submissions by CNSC staff and OPG (“the CMDs”), the intervenors submit that the DNNP Environmental Assessment is not applicable to OPG’s selection of the General Electric Hitachi BWRX-300 reactor technology for the DNNP. The CMDs fail to adequately address the concerns previously highlighted by the intervenors in our March 2023 submission. As we will discuss in greater detail throughout this report, the CMDs provided by OPG and CNSC do not adequately address concerns surrounding the prevention of unreasonable risk to the environment and to the health and safety of persons. With the recommendations and requests from our March 2023 submission remaining unresolved by the release of these two CMDs, the intervenors submit that the risks and uncertainty surrounding the BWRX-300 reactor technology are too great for the Commission to allow this project to operate under the existing EA from 2011.

We maintain the position that the BWRX-300 reactor is ‘fundamentally different’ from the variety of technologies captured within the EIS and PPE approved under the federal EA of this project.

Because the DNNP EA is therefore not applicable to the selected BWRX-300 reactor technology, we request that a new environmental assessment be conducted for the BWRX-300 reactor(s).

In the alternative that the CNSC deems the BWRX-300 reactor design to be consistent with the parameters of the PPE and EIS (which the intervenors submit it is fundamentally different), we submit that before a licence to construct (LTC) process commences, the aforementioned issues must be resolved in order to bring the selected reactor technology within the approved parameters of the EIS and PPE.

A. Reactor Design

When discussing the “fundamental difference” of the BWRX-300 from the other technologies captured in the EIS and PPE, the intervenors had concerns with the reactor design itself, as expressed in our March 2023 submission. The intervenors note that the two recommendations linked to reactor design from the March 2023 submission have not been addressed or resolved by either CMD, and therefore submit that these recommendations need to be addressed before the CNSC can determine that the BWRX-300 design falls within the bounds of the EA:

- OPG should carry out a full-fledged severe accident analysis taking into account the challenges of estimating the reliability of the Passive Isolation Condenser System in order to show how the BWRX-300 design will adhere to CNSC requirements.
- OPG must address how it intends to ensure the proposed reactors will meet the requirement for 2 separate, independent and diverse means of reactor shutdown.

Reading through the recently released CMDs has raised another concern of how the selected technology falls outside the bounds of the EA and its EIS and PPE. In the CNSC staff's discussion of the Plant Parameter Envelope ("PPE"), it is pointed out that eight parameters differed from the bounding scenario described in the EA. One particular parameter is the "importance factor for wind loads", which is defined within the PPE as a "multiplication factor (as defined in American National Standards Institute (ANSI) A58 1-1982) applied to the basic wind speed to develop the plant design."¹² CNSC staff go on to explain that "the selection of wind load importance factors is a design requirement for safety-related and non-safety-related structures and is dependent on the maps of wind speed hazards at a particular location."¹³

While CNSC staff support OPG's conclusion that the selection of an importance factor of 1.0, based on the Darlington specific wind speed maps and building classification is consistent with the target strength as the methodology described in the original PPE, CNSC staff also note: "...further verification is required to confirm that the DNNP design includes wind loads that envelope NBCC factored wind loads. This verification will be required to support CNSC staff's review of the LTC application."¹⁴ The intervenors **submit** that this verification sought by the CNSC for compliance with *National Building Code of Canada* wind loads should have been provided in advance of the January 2024 hearing to determine the EA's applicability to the selected reactor technology. But perhaps more importantly, the intervenors **submit** that compliance with wind loads pursuant to the *National Building Code of Canada* indicates that a new EA is required to establish up-to-date Canadian wind load standards. Since the original DNNP EA occurred, the *National Building Code of Canada* has undergone two major revisions (in 2015 and 2020), and therefore, updated standards should be shaping the assessment of major projects like the DNNP.

Recommendation 2: OPG should carry out a full-fledged severe accident analysis taking into account the challenges of estimating the reliability of the Passive Isolation Condenser System in order to show how the BWRX-300 design will adhere to CNSC requirements.

Recommendation 3: OPG must address how it intends to ensure the proposed reactors will meet the requirement for 2 separate, independent and diverse means of reactor shutdown.

¹² CNSC, CMD 24-H2, *supra* note 3 at page 16.

¹³ *Ibid.*

¹⁴ *Ibid* at page 17. Note: NBCC stands for National Building Code of Canada.

Recommendation 4: The verification sought by the CNSC for compliance with *National Building Code of Canada* wind loads should have been provided in advance of the January 2024 hearing to determine the EA’s applicability to the selected reactor technology.

Recommendation 5: Compliance with wind loads pursuant to the *National Building Code of Canada* indicates that a new EA is required to establish up-to-date Canadian wind load standards. Since the original DNNP EA occurred, the *National Building Code of Canada* has undergone two major revisions (in 2015 and 2020), and therefore, updated standards should be shaping the assessment of major projects like the DNNP.

B. Waste Management

In our March 2023 submission, we made the **recommendation** that OPG should conduct a thorough assessment of the hazards associated with spent fuel fires at the Darlington nuclear power plant. This recommendation arose from lessons learned since the 2011 Fukushima disaster, as it is now well-understood that there are increased risks tied to accumulating spent fuel from the nuclear power plant’s operations on site. This risk is further compounded by the fact that there is still no geological repository in Canada, which requires on-site storage of spent fuel and radioactive waste from nuclear power plants.

Upon reviewing both CMDs, this recommendation remains unaddressed and unresolved. In particular, the submission by OPG spends very little time discussing spent fuel storage. The only mention of spent fuel within the CMD is with regard to the PPE parameter of “spent fuel cask weight”:

The PPE listed a parameter for spent fuel cask weight, but this value is not directly used in the Environmental Impact Statement. The PPE reactors had a limiting weight of 100 tonnes. The BWRX-300 design will require a cask that slightly exceeds the PPE value. While the BWRX-300 value exceeds the PPE value, this will be mitigated by designing the hauling roads for the cask weight and has no impact to the conclusions of the EIS.¹⁵

Meanwhile, the submission by CNSC staff spends a bit more time discussing spent fuel accidents, including what it terms “pool fires”. Its submission notes:

CNSC staff reviewed OPG’s assessment for an accident involving used fuel, in which a fuel dry storage canister is dropped causing damage to a portion of the stored fuel assemblies. Although a BWRX-300 fuel assembly contains approximately 40% less krypton-85 radioactivity as compared to the source terms for the reactors assessed in the EA, it consists of a larger number of assemblies (89) per storage container than those assessed in the EA (40). The krypton-85 activity released in this accident scenario is

¹⁵ OPG, CMD 24-H2.1, *supra* note 3 at page 17.

therefore expected to be slightly higher, and the resulting dose to workers is approximately 28% higher than the dose for the same scenario assessed in the EA. Similarly, the dose to the public is 54% higher than predicted in the EA for this same scenario.¹⁶

The higher dose releases to workers and the public is a result of the krypton-85 inventory in the spent fuel arising from a BWRX-300 reactor being much higher. Likewise, the CNSC staff submission documents that “the BWRX-300 source term for alpha emitting radionuclides” is increased and this results in the “estimated dose to workers and members of the public” for a “pool fire” involving “intermediate-level waste is approximately 10 times greater than the dose for the equivalent scenario estimated in the EA”.¹⁷ Yet again, this is a result of different inventories of alpha emitting radionuclides in spent fuel arisings from a BWRX-300.

These differences in radioactive inventories implies an even greater need for a thorough assessment of the hazards associated with spent fuel fires. By spent fuel fires, we are not referring to the scenario involving “a spill of gasoline or diesel fuel from a material handling vehicle” that has caught “fire adjacent to a stack of waste containers” but one involving the zircalloy cladding used in BWRX-300 spent fuel.¹⁸ This was what nearly happened at Fukushima-Daichi, which also featured boiling water reactors.¹⁹

The “Joint Report on GEH BWRX-300 Safety Strategy White Paper” prepared by the U.S. Nuclear Regulatory Commission (“USNRC”) and the CNSC further highlights the shortfalls in mitigation strategies. In particular, the NRC observed:

The safety strategy did not seem to include provisions for or references to meeting the mitigating strategies rule under 10 CFR 50.155, “Mitigation of beyond-design-basis events.” This includes the provisions related to the Spent Fuel Pool level monitoring and cooling makeup capabilities.²⁰

The intervenors **submit** that a shortfall in mitigation strategies surrounding spent fuel pool level monitoring, combined with the increased dose levels from an accident involving the spent fuel canisters, indicates that there is still uncertainty surrounding the waste management safety

¹⁶ CNSC, CMD 24-H2, *supra* note 3 at page 62, *emphasis added*.

¹⁷ *Ibid* at page 61.

¹⁸ IAEA, “Status Report—BWRX-300 (GE Hitachi and Hitachi GE Nuclear Energy)” USA, 30 September 2019, online: https://aris.iaea.org/PDF/BWRX-300_2020.pdf

¹⁹ National Academies of Sciences, Engineering, and Medicine, “Chapter 6: Loss-of-Coolant Events in Spent Fuel Pools” in *Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2* (The National Academies Press, 2016), online: <https://nap.nationalacademies.org/read/21874/chapter/9#133> at page 133.

²⁰ USNRC & CNSC, “Joint Report on GEH BWRX-300 Safety Strategy White Paper: A Collaborative Review by the U.S. Nuclear Regulatory Commission and the Canadian Nuclear Safety Commission” July 2023, online: <https://www.nrc.gov/docs/ML2313/ML23135A151.pdf> at page 9.

procedures for the BWRX-300 reactor(s). Furthermore, the intervenors do not agree with the following determination by CNSC staff about the increased dose releases:

While these doses are higher than the original EA estimates, CNSC staff conclude that these increased dose estimates remain consistent with the evaluation criteria from the EA, for both workers and members of the public, as the estimated doses are lower than the regulatory dose limits from the *Radiation Protection Regulations*.²¹

With the selected technology's doses exceeding the estimates of the original EA, the EA should not be applicable to the selected technology. While the estimated doses are lower than the regulatory dose limits from the *Radiation Protection Regulations*, the dose to workers is 28% higher, and the dose to the public is 54% higher than originally predicted. Furthermore, this accident estimate appears to be based on one dry spent fuel storage container being dropped; it does not consider accidents involving multiple containers, or a large scale spent fuel fire, the kind we mentioned earlier. For these scenarios, the dose limits could exceed the regulatory dose limits. Therefore, the intervenors continue to **recommend** that OPG should conduct a thorough assessment of the hazards associated with spent fuel fires at the Darlington nuclear power plant. The CNSC staff CMD also states that accidents and malfunction scenarios for refurbishment wastes assessed in the EA were determined to not be relevant to the BWRX-300 deployment, and that no other scenarios specific to the BWRX-300 were identified.²² With every accident and malfunction scenario that does not apply to the BWRX-300, it becomes clear this selected technology is fundamentally different from the bounding parameters of the EA. The intervenors **submit** that because these BWRX-300 reactor(s) would be the first of their kind being deployed, there needs to be a new EA conducted to properly assess the accident and malfunction scenarios specific to this selected technology, considering that bounding scenarios within the 2011 EA were deemed not relevant.

Recommendation 6: OPG should conduct a thorough assessment of the hazards associated with spent fuel fires involving BWRX-300 reactors.

Recommendation 7: Because the BWRX-300 reactor(s) would be the first of their kind being deployed, there needs to be a new EA conducted to properly assess the accident and malfunction scenarios specific to this selected technology, considering that bounding scenarios within the 2011 EA were deemed not relevant.

²¹ CNSC, CMD 24-H2, *supra* note 3 at page 62.

²² *Ibid.*

C. Malfunctions, Accidents, and Malevolent Acts

Multi-Unit Reactor Accidents and Aging Facilities at the Darlington Site

The intervenors have previously expressed concerns surrounding malfunctions, accidents, and malevolent acts at the DNNP site. For instance, during the EA process, CELA expressed concerns about siting additional reactors at the Darlington site, emphasizing that the addition of new reactors to a location already holding multiple reactors makes the site completely unsuitable. Any consequences and risks from accidents would be magnified by their proximity to multiple sources of material which can achieve critical chain reactions, both in reactor cores and in used fuel storage. Serious damage to one building or facility is not only a massive risk for that reactor, but it also becomes a massive risk to a neighbouring reactor facility simply due to proximity.²³ With the selection of the BWRX-300 technology, the intervenors submit that the concerns for adding new nuclear power reactors at a site with multiple reactors already in service remains relevant to the EA discussion.

The intervenors submit that since the EA was completed, the existing reactors at the Darlington site have continued to age and degrade, increasing the risks arising from an accident at this site. As noted within our March 2023 submission, the *Preliminary Safety Analysis Report* discussing the defence-in-depth approach for the BWRX-300 reactors does not clarify how the existing CANDU reactors at the Darlington site fit into the accident analysis.

The issue of multi-unit accidents (including the Darlington Nuclear Generating Station) is yet another issue untouched in the two CMDs. When reviewing nuclear accidents leading to a potential radiological release to the environment, CNSC staff focused the hazard screening analysis on "...internal hazards (such as pipe whips, turbine-generated missiles, etc.), as well as external hazards (such as earthquakes, flooding), and non-malevolent human-induced events (such as aircraft crashes or other transportation hazards)".²⁴ For a more fulsome safety analysis, the risk of accidents involving the existing nuclear reactors at the Darlington site should be considered as an external hazard. Without a careful assessment of how the BWRX-300 reactor might interact with the existing reactors at the Darlington site in an emergency situation, the DNNP EA cannot be presumed to apply to the BWRX-300 reactor design.

²³ Theresa McClenaghan, Richard Lindgren, Ramani Nadarajah and Joe Castrilli, "Darlington New Nuclear Plant Project: Final Comments of the Canadian Environmental Law Association", *CELA's Comments to the Joint Panel*, Canadian Environmental Law Association, 17 May 2011, online: <https://cela.ca/darlington-new-nuclear-power-plant-project-final-written-submission/> at page 16 [CELA's JRP Submission].

²⁴ CNSC, CMD 24-H2, *supra* note 3 at page 59.

Severe Accidents

Recommendation #63 from the Joint Review Panel for the DNNP EA stated: “The Panel recommends that prior to construction, the Canadian Nuclear Safety Commission require OPG to evaluate 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.”²⁵ This recommendation highlights not only the risk associated with having new nuclear reactors being built on a site with pre-existing reactors, but also emphasizes the importance of assessing severe accidents. It has been the concern of the intervenors throughout the entirety of the DNNP review process that OPG is not seriously considering the potential accidents in this project, and that the risks associated with a severe accident are not being adequately assessed.

In CELA’s submission to the JRP, concerns stemming from documented severe accidents (i.e., Three Mile Island in 1979; Chernobyl in 1986; and Fukushima Daiichi in 2011) were raised due to the fact that probabilistic safety analysis does not guarantee that severe nuclear reactor accidents will never happen.²⁶ CELA also emphasized that there was no evidence before the Panel to substantiate that an evacuation for a worst case scenario accident could be managed, mitigated and the population adequately protected, since this type of scenario was not evaluated in these proceedings.²⁷

Twelve years after CELA raised these concerns surrounding the lack of a severe accident assessment for the DNNP EA, the intervenors still find that there is an absence of a robust accident assessment now that OPG has selected a reactor technology. In our March 2023 submissions, we noted that a number of accidents and malevolent events were screened out of assessments due to a low likelihood of occurring.²⁸ After reviewing OPG’s documents assessing the applicability of the EIS and PPE parameters to the selected technology, the intervenors made a number of recommendations to provide a more accurate accident assessment.²⁹ Upon reviewing the CMDs submitted by OPG and CNSC staff, concerns surrounding severe accidents remain unresolved.

In the CNSC staff’s assessment of OPG’s Probabilistic Safety Analysis (“PSA”),

... OPG is finalizing the methodologies governing severe accidents and the bounding cases corresponding to the releases of iodine-131 in an amount greater than 1 PBq (1E10+15 Bq) and caesium-137 in an amount greater than 100 TBq (1E+14 Bq). In subsequent PSA submissions for future licensing phases, OPG has committed to demonstrate that there are

²⁵ Joint Review Panel Environmental Assessment Report: Darlington New Nuclear Power Plant Project, by Joint Review Panel, Environmental Assessment (2011), at page vi. [EA Report].

²⁶ CELA’s JRP Submission, *supra* note 20 at page 16.

²⁷ *Ibid* at page 17.

²⁸ March 2023 Submission, *supra* note 4 at pages 12-15.

²⁹ *Ibid*. See recommendations 8 through 11 within the March 2023 submission.

no accident sequences that exceed the threshold for small and large release frequencies. CNSC staff will review these submissions to confirm that the remaining credible accident sequences have source terms below the thresholds required by REGDOC-2.5.2 for small and large releases.³⁰

The intervenors **submit** that these methodologies should have been finalized and available for assessment prior to the January 2024 hearing, as both the Commission and the public should be able to determine whether the methodologies governing severe accidents for this novel technology are adequate. Without having a complete understanding of severe accidents involving BWRX-300 reactor(s), it is not possible to bound this selected technology by the determinations of the 2011 EA. Furthermore, the intervenors **submit** OPG's commitment to demonstrate that there are no accident sequences that exceed the threshold for small and large release frequencies is an unrealistic commitment, especially when the cumulative effects of a multi-unit accident including the existing reactors at the Darlington site have not been discussed during the various stages of the DNNP's development.

Recommendation 8: The potential for and effects of a multi-unit accident must be considered, including scenarios involving accidents at the existing reactors of the Darlington Nuclear Generating Station affecting BWRX-300 reactors operating within the same site.

Recommendation 9: OPG should have finalized the methodologies governing severe accidents and bounding cases corresponding to the releases of iodine-131 and caesium-137 and submitted to CNSC well before the January 2024. Without these methodologies available for review, the Commission cannot make the determination that the BWRX-300 technology is bound by the DNNP EA, as the environmental and human health effects caused by a severe accident cannot be assessed.

D. Land Use Planning & Site Suitability

The Intervenors have repeatedly expressed concerns throughout the various DNNP engagement phases about the inappropriate selection of the Darlington site for a new nuclear power project. In our March 2023 submission, we pointed out that the *Nuclear Safety and Control Act* ("NSCA") requires the CNSC to limit risk to Canadian society.³¹ There are two major factors which make the selected site unsuitable for the construction and operation of up to four new nuclear reactors: the existence of the aging Darlington Nuclear Generation Station reactors on the site, and the considerable population growth and urbanization that has and continues to occur within Durham region and the Greater Toronto Area. As the intervenors noted in the March 2023 submission, the

³⁰ CNSC, CMD 24-H2, *supra* note 3 at pages 60-61.

³¹ Nuclear Safety and Control Act, SC 1997, c 9.

EA for the DNNP occurred 12 years ago, and since then the region surrounding the DNNP site has been subjected to rapid growth and urban development, which greatly increases the effects of societal disruption in the event of a severe nuclear accident.

The intervenors have previously requested the CNSC confirm whether CNSC staff have reviewed the land use provisions applicable to the region surrounding the Darlington plant under provincial guidance and municipal official planning, including the implications of provincial growth targets, to ensure land use compatibility in the vicinity of major facilities, which includes energy generation facilities. The intervenors also submitted specific regard should be given to population density and growth around nuclear generating stations and impacts of new and additional nuclear on the implementation of emergency measures and existing plans.

These recommendations align with the guidance provided by the International Atomic Energy Agency (“IAEA”) on site selection processes for nuclear installations.³² In terms of general recommendations for the siting process, the IAEA identifies three distinct steps: (1) regional analysis; (2) screening; and (3) evaluation, comparison and ranking.³³ When screening a site for nuclear installation, the IAEA provides a breakdown of safety related criteria that should be considered, such as other nuclear installations (e.g., the existing Darlington reactors), as well as population density and population distribution and distance to centres of population, including projections for the operating lifetime of the nuclear installation.³⁴ According to the IAEA, “the general approach to site survey and site selection should be directed towards reducing the uncertainties at various steps of the siting process...” and ‘...the most effective way of achieving this is to collect a sufficient amount of reliable and relevant data.’³⁵ The intervenors note that relying on updated, reliable and relevant data is essential to understanding how the selected technology for the DNNP would interact with population growth, land use, and the existing nuclear infrastructure on the selected site.

CNSC staff briefly touched upon the issue of land use, discussing OPG’s EIS Review document:

In its EIS Review, OPG reviewed the Municipality of Clarington current development plans and proposals to confirm that the surrounding region continues to be subject to increased population and economic growth. OPG stated the measures identified in the EA continue to be sufficient to mitigate any adverse effects on land use planning and development in the area surrounding the DNNP site from the construction and operation of the BWRX-300 reactors.³⁶

³² IAEA, “Site survey and site selection for nuclear installations”, Vienna: International Atomic Energy Agency, 2015, online: <https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1690Web-41934783.pdf>.

³³ *Ibid* at pages 10-11.

³⁴ *Ibid* at pages 21-22.

³⁵ *Ibid* at page 25.

³⁶ CNSC, CMD 24-H2, *supra* note 3 at pages 49-50.

CNSC staff concurred with OPG’s conclusions, and did not discuss how issues like planned and additional density growth within Durham Region is being considered for emergency planning for the DNNP site. Furthermore, the CNSC staff did not discuss how population density in the surrounding regions may have an impact on the DNNP. The intervenors **submit** that due to the vastly different state of land use in the region along with the increase in population in Durham Region and beyond, compared to the date of the original EA, the siting of up to four BWRX-300 reactors at the Darlington site would be inappropriate, and a new environmental assessment is required to determine what would be an appropriate site for this selected technology.

Recommendation 10: There must be an assessment of how the selected BWRX-300 technology would interact with the existing (and aging) reactors situated at the Darlington site in the context of population surrounding the site, as well as a new assessment of the site selection and suitability for this project.

Recommendation 11: Due to the vastly different state of land use in the region along with the increase in population in Durham Region and beyond, the siting of up to four BWRX-300 reactors at the Darlington site would be inappropriate, and a new environmental assessment is required to determine what would be an appropriate site for this selected technology.

E. Emergency Planning

The issues of land use planning and site suitability mentioned above have a direct correlation with effective emergency preparedness—a central factor in the CNSC fulfilling its obligations to limit harm to Canadian society. The intervenors have repeatedly expressed concerns about the emergency planning measures for this project. For instance, at the Site Preparation Licence Hearing in 2021, the intervenors discussed the important role of public awareness in emergency planning, and how most citizens in the Greater Toronto Area are not aware that they live within the Ingestion Planning Zone—extending 50 km from nuclear facilities—of not one but two very large nuclear generating stations each with multiple existing large units. Even fewer are aware of the SMRs developments proposed in Durham Region.³⁷

Effective emergency planning needs to factor in population growth—including the growth in the Ingestion Planning Zone and not just the 10-km radius of a nuclear power site. In the March 2023 submission, the intervenors noted that the Darlington Evacuation Time Estimate relies on the 2016 National Census Data with per-decade population projections out to 2088. According to OPG, “in the first quarter of 2023, OPG will issue an updated Darlington Site Evacuation Time Estimate based on 2021 national census data and will subsequently be shared with stakeholders.”³⁸ This

³⁷ Kerrie Blaise & M.V. Ramana, “Comments on Ontario Power Generations Nuclear Power Reactor Site Preparation Licence for the Darlington Site” Canadian Environmental Law Association, 3 May 2021, online: <https://cela.ca/cela-and-durham-nuclear-awareness-written-intervention-to-cnsc-for-opgs-site-licence-renewal-at-darlington/> at page 14.

³⁸ Ontario Power Generation Inc. Darlington New Nuclear Project: BWRX-300 Preliminary Safety Analysis Report, by Ontario Power Generation, Revision 0 (2022) at page 2-172.

updated information was not available during the commenting period that ended in March 2023, and this information has not been discussed in either CMD submitted by OPG and CNSC staff in September 2023. The intervenors reiterate that with the proposed BWRX-300 reactors projected to in operations in 2095, having updated population projections are essential in determining whether OPG is preparing adequate emergency plans and accurate Site Evacuation Time Estimates.

Therefore, the intervenors once again **submit** that before a determination can be made as to whether the BWRX-300 reactor fits within the parameters of the EIS and PPE, the updated Darlington Site Evacuation Time Estimate and emergency planning models based on the 2021 Census data must be made available.

Recommendation 12: Before a determination can be made as to whether the BWRX-300 reactor fits within the parameters of the EIS and PPE, the updated Darlington Site Evacuation Time Estimate and emergency planning models based on the 2021 Census data must be made available to the Commissioners and the Intervenors, and explicitly considered during the hearing in January, 2024.

F. Climate Change

As discussed in our March 2023 submission, the consequences of climate change can directly and indirectly affect the functionality of nuclear facilities. For instance, we noted that the frequency of extreme-weather events in the last decade have increased the likelihood of these effects on Ontario's nuclear facilities through shutdowns caused by a lack of cooling capacity. Rising water temperatures resulting in algal blooms have already impacted the Pickering Nuclear Power Plant, for example, as algae loading has previously clogged cooling water intakes causing Pickering's reactors to temporarily go offline.³⁹

Due to the once-through lake cooling required for the BWRX-300 reactor design, the DNNP is not immune to considering how it will monitor and mitigate climate change impacts. Therefore, to ensure that OPG is carefully assessing how the DNNP may be impacted by climate change during construction, operations, and decommissioning, there needs to be adequate monitoring of changes to Lake Ontario's water temperatures and algal blooms, in addition to the increasing frequency of extreme weather events. Because the *Preliminary Safety Analysis Report* relied on the use of statistical summary of ambient water temperatures near Darlington Nuclear from an out-dated range of 1984-1996, 2011, and 2012, the intervenors had recommended that an updated climate analysis is required for the DNNP.⁴⁰

³⁹ March 2023 submission, *supra* note 4 at page 26.

⁴⁰ *Ibid* at pages 26-27.

When reviewing the two recent CMDs, the intervenors are disappointed that OPG did not adequately consider or discuss the potential impacts of climate change on the selected technology (or proposed monitoring and mitigation measures). In fact, the only climate change discussion within OPG's submission focuses on the DNNP's role in OPG's climate change plan, that it will provide "...greenhouse gas free electricity and will be a key component of OPG's contribution to Canada's goal of net-zero by 2050."⁴¹ Despite the effects of climate change being one of the parameters of the EA, OPG has not elaborated on how the BWRX-300 design meets these parameters that were established over a decade prior to technology being selected.

Turning to the CNSC staff submission, section 2.2.2.12.4 discusses the Effects of Climate Change. As summarized by staff, the EA had concluded that "...despite possible changes to the climate in the future, there were no climate parameters that would influence the proposed physical structures or systems of the DNNP, resulting in a risk to either the public or the environment."⁴² After reviewing the EA, the EIS Review and supporting documentation, CNSC staff have concluded that the BWRX-300 deployment would not impact the conclusion of no significant residual adverse effects due to climate change.⁴³ The intervenors disagree with this determination because the impact of climate change and extreme weather events need not be just through any "influence" on "physical structures or systems of the DNNP". Such events could also affect the institutional response to any unusual events at the nuclear plant during such an extreme event for a variety of reasons. For example, it might be difficult for plant personnel to reach the site because roads around the plant are flooded or because trees might have fallen and blocked roads. This might prevent specialists or even replacement workers from reaching the site. Lake levels may vary widely in various climate scenarios, and seiches are a real risk that must be evaluated.

Furthermore, heat events may require widespread shutdown of power to the plant with implications for availability of safety systems both at the proposed new reactor as well as at others on the site and fuel storage systems. As noted earlier, wind events are critical risks, and high and catastrophic wind events are increasing in frequency in the Great Lakes region, as are intensity, duration and severity of ice storms which threaten electrical infrastructure. We **submit** that the CNSC should take into account the greater intensity and frequency with which the effects of climate change are affecting Ontario since the EA for the DNNP was conducted, and risk assessment needs to reflect that increased intensity.⁴⁴

⁴¹ OPG, CMD 24-H2.1, *supra* note 3 at page 2.

⁴² CNSC, CMD 24-H2, *supra* note 3 at page 65.

⁴³ *Ibid*, at page 66.

⁴⁴ *For instance*, the impacts of climate change are not only an issue for Canadian nuclear facilities, but for nuclear facilities in other parts of the world. For example, France is facing challenges with addressing how climate change is impacting its water use for cooling its nuclear fleet. See: Grace Symes, "France: Addressing Climate Change Impacts on EDF's French Fleet" Energy Intelligence, 3 November 2023, online: <https://www.energyintel.com/0000018b-911c-dc0c-a3cf-9ddc23e50000#:~:text=EDF%20plans%20to%20optimize%20nuclear,on%20its%20domestic%20nuclear%20fleet>

The intervenors continue to **recommend** that OPG should provide updated information on ambient water temperature trends for Lake Ontario and compare that with the allowed range of inlet temperatures for the BWRX-300 reactor design. We also **recommend** once again that additional studies should be conducted on the impacts of an increase in algal blooms due to climate change impacts on Lake Ontario. The modelling for managing aquatic species' interactions with water intake equipment needs to be adapted for the worst case- scenario due to climate change.

Finally, the intervenors **submit** that without an adequate analysis of climate effects on the selected technology, as well as a provision of adequate climate change monitoring and mitigation strategies, the BWRX-300 reactor technology cannot be assessed within the parameters of the previous EA. Too much time has elapsed since the assessment, and therefore a new environmental assessment catered to the selected technology is required to adequately consider the effects of climate change on this project.

Recommendation 13: OPG should provide updated information on ambient water temperature trends for Lake Ontario and compare that with the allowed range of inlet temperatures for the BWRX-300 reactor design.

Recommendation 14: Additional studies should be conducted on the impacts of an increase in algal blooms due to climate change impacts on Lake Ontario. The modelling for managing aquatic species' interactions with water intake equipment needs to be adapted for the worst case- scenario due to climate change.

Recommendation 15: It is necessary to carefully study how severe weather events and other climate change related physical impacts will affect the capacity of OPG and plant operators to respond to unusual events or accident precursors and to evaluate climate risks on the proposed plant in this specific location and with the current context of other facilities on the site, before concluding that the proposed project fits within the PPE of the prior EA.

Too much time has elapsed since the original environmental assessment, with many changes to risk factors, and therefore a new environmental assessment catered to the selected technology is required to adequately consider the effects of climate change on this project.

VI. CONCLUSION

For the foregoing reasons provided in this intervention, which also includes our written submission dated March 20, 2023, DNA, SHA, and CELA submit OPG's selected BWRX-300 reactor technology is not bounded by the 2011 DNNP environmental assessment, and recommend the CNSC issue an order:

- (1) Granting Durham Nuclear Awareness, Slovenian Home Association, and the Canadian Environmental Law Association the status of intervenor;
- (2) Granting Durham Nuclear Awareness, Slovenian Home Association, and the Canadian Environmental Law Association the opportunity to make an oral presentation at the January 2024 public hearing;
- (3) Making a determination that because the BWRX-300 reactor technology is fundamentally different from the bounding parameters within the Environmental Impact Statement and the Plant Parameters Envelope for the Darlington New Nuclear Project, a new environmental assessment specific to the BWRX-300 technology is required.
- (4) In the alternative, before moving on from this pre-licencing stage to commence the licence to construct process, OPG must produce a substantial amount of additional information and updated data which is missing or inadequate in order to complete an assessment of the bounding parameters for the selected technology. Any new resources produced by OPG should be subjected to a public review and commenting process.

Sincerely,

On behalf of

CANADIAN ENVIRONMENTAL LAW ASSOCIATION
DURHAM NUCLEAR AWARENESS
SLOVENIAN HOME ASSOCIATION



Sara Libman, Legal Counsel

APPENDIX 1 - SUMMARY OF RECOMMENDATIONS

- 1 The CNSC should re-evaluate its decision making process and focus on one stage at a time, without presuming that construction will have to start within some pre-set time period.
- 2 OPG should carry out a full-fledged severe accident analysis taking into account the challenges of estimating the reliability of the Passive Isolation Condenser System in order to show how the BWRX-300 design will adhere to CNSC requirements.
- 3 OPG must address how it intends to ensure the proposed reactors will meet the requirement for 2 separate, independent and diverse means of reactor shutdown.
- 4 The verification sought by the CNSC for compliance with *National Building Code of Canada* wind loads should have been provided in advance of the January 2024 hearing to determine the EA's applicability to the selected reactor technology.
- 5 Compliance with wind loads pursuant to the *National Building Code of Canada* indicates that a new EA is required to establish up-to-date Canadian wind load standards. Since the original DNNP EA occurred, the *National Building Code of Canada* has undergone two major revisions (in 2015 and 2020), and therefore, updated standards should be shaping the assessment of major projects like the DNNP.
- 6 OPG should conduct a thorough assessment of the hazards associated with spent fuel fires at the Darlington nuclear power plant involving BWRX-300 reactors.
- 7 Because the BWRX-300 reactor(s) would be the first of their kind being deployed, there needs to be a new EA conducted to properly assess the accident and malfunction scenarios specific to this selected technology, considering that bounding scenarios within the 2011 EA were deemed not relevant.
- 8 The potential for and effects of a multi-unit accident must be considered, including scenarios involving accidents at the existing reactors of the Darlington Nuclear Generating Station affecting BWRX-300 reactors operating within the same site.
- 9 OPG should have finalized the methodologies governing severe accidents and bounding cases corresponding to the releases of iodine-131 and caesium-137 and submitted to CNSC well before the January 2024. Without these methodologies available for review, the Commission cannot make the determination that the BWRX-300 technology is bound by the DNNP EA, as the environmental and human health effects caused by a severe accident cannot be assessed.
- 10 There must be an assessment of how the selected BWRX-300 technology would interact with the existing (and aging) reactors situated at the Darlington site in the context of population

surrounding the site, as well as a new assessment of the site selection and suitability for this project.

- 11 Due to the vastly different state of land use in the region along with the increase in population in Durham Region and beyond, the siting of up to four BWRX-300 reactors at the Darlington site would be inappropriate, and a new environmental assessment is required to determine what would be an appropriate site for this selected technology.
- 12 Before a determination can be made as to whether the BWRX-300 reactor fits within the parameters of the EIS and PPE, the updated Darlington Site Evacuation Time Estimate and emergency planning models based on the 2021 Census data must be made available.
- 13 OPG should provide updated information on ambient water temperature trends for Lake Ontario and compare that with the allowed range of inlet temperatures for the BWRX-300 reactor design.
- 14 Additional studies should be conducted on the impacts of an increase in algal blooms due to climate change impacts on Lake Ontario. The modelling for managing aquatic species' interactions with water intake equipment needs to be adapted for the worst case- scenario due to climate change.
- 15 It is necessary to carefully study how severe weather events and other climate change related physical impacts will affect the capacity of OPG and plant operators to respond to unusual events or accident precursors and to evaluate climate risks on the proposed plant in this specific location and with the current context of other facilities on the site, before concluding that the proposed project fits within the PPE of the prior EA.