

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

***Comments on the Ontario Power Generation's Application to Refurbish Pickering Nuclear  
Generating Station Units 5–8 and to Renew the Pickering Nuclear Generating Station and  
Pickering Waste Management Facility Operating Licences***

(Ref. 2026-H-7)

August 12, 2026

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August 12, 2026

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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:

**Re: Submission of Canadian Environmental Law Association, on behalf of Durham Nuclear Awareness and Slovenian Home Association regarding an application from Ontario Power Generation (OPG) to refurbish Pickering Nuclear Generating Station and to renew licences for the Pickering Nuclear Generating Station and Waste Management Facility (Ref. 2026-H-7)**

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The Canadian Environmental Law Association (CELA) has enclosed its comments, on behalf of Durham Nuclear Awareness and the Slovenian Home Association, regarding OPG's application to request authorization to refurbish the Pickering Nuclear Generating Station (PNGS), as well to renew the power reactor operating licence for the PNGS and the waste facility operating licence for the Pickering Waste Management Facility (PWMF) for a 10-year period.

Please find below our submission for your review. Documentary evidence for the record to support this submission has been prepared separately as Appendix B.

By this letter, and pursuant to the CNSC's *Rules of Procedure*, CELA requests status to participate as an intervenor in the public hearing and an opportunity to provide oral submissions at the October 2026 public hearing. CELA further requests the opportunity to not only present an oral submission, but also to probe the evidence provided by the applicant and the CNSC staff through cross-examination at the hearing.

Sincerely,

**CANADIAN ENVIRONMENTAL LAW ASSOCIATION**



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Jacqueline Wilson, Counsel

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## 1. INTRODUCTION

The Commission has before it a very significant decision on whether the Pickering Nuclear Generating Station (PNGS) will be refurbished and operate for decades into the future. Community members have borne the risk of living near the PNGS for decades, and have been repeatedly assured that the life of the plant would not be extended, including at prior licensing hearings.<sup>1</sup> However, Ontario Power Generation (OPG) is now asking the Commission to allow that risk to be imposed on the same community for decades into the future. There is a serious environmental justice and fairness issue about again seeking to site a nuclear power plant at this unsuitable location and imposing the risk on the same community.

As detailed below, too many people live in the near vicinity of the PNGS. Emergency planning is insufficient. A long list of critical analysis relating to safety and emergency planning is not complete and not before the Commission in this hearing.

The Commission must meet the legislated requirements of the *Nuclear Safety and Control Act*, SC 1997, c 9 (NSCA) and ensure that it fulfills its mandate to form an opinion on the application to renew the PNGS licence, pursuant to s.24(4). In recent Commission hearings, too many critical details have been finalized after the public hearing process, and outside of the knowledge of the Commissioners tasked with making a decision and the scrutiny of the public. OPG is advancing the same approach in this matter and it should be firmly rejected. Key decisions and analysis must be complete in advance of an application to renew a licence, not after. Hold points should not be used to allow applicants to clarify key details about their applications after the Commissioners have made a decision.

If the Commissioners cannot form an opinion on all key issues with the information before them, the licence renewal application should be denied. OPG applied for early licence renewal.<sup>2</sup> OPG should not have done so if it could not provide a complete application that provides enough information to the Commissioners to make an informed decision. It is insufficient for the Commission to rely on OPG's promise to complete future analysis. If any refurbishment of units 5-8 at the PNGS are to proceed, it must be clear that the design, study and evaluation of the proposed nuclear power plant have been finalized and the Commissioner's concerns addressed, prior to a licensing decision.

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<sup>1</sup> See for instance, Canadian Nuclear Safety Commission, Public Hearing, April 4, 2018, at pages 60, 99.

<sup>2</sup> CNSC, Transcript of Public Hearing Day 1, June 23, 2026: Ontario Power Generation Inc.'s application to renew its Power Reactor Operating Licence (PROL 48.03/2028) for 10 years to December 31, 2036, in connection with the refurbishment of the Pickering Nuclear Generating Station Units 5–8 and decommissioning of Units 1–4 (23 June 2026), at page 38. [CNSC, Hearing Part 1 Transcript]

## ***i. The Role of the Canadian Nuclear Safety Commission in Licensing Decisions***

### Legislative Framework

The objects of the Canadian Nuclear Safety Commission are established pursuant to s.9 of the *NSCA*. A central concern of the Commission is to regulate the nuclear industry and prevent unreasonable risk to the environment and the health and safety of persons:

#### **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.<sup>3</sup>

It is the Commission, pursuant to s. 24(4) of the *NSCA*, which must form the opinion that the applicant is both “qualified to carry on the activity that the licence will authorize the licensee to carry on”, and “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”.<sup>4</sup>

Section 3 of the *NSCA* also requires a value judgment about the limitation, to a reasonable level, of the risks to national security, the health and safety of persons, and the environment.<sup>5</sup>

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<sup>3</sup> Nuclear Safety and Control Act, SC 1997, c 9, s. 9(a), *emphasis added* [*NSCA*]

<sup>4</sup> *NSCA*, s. 24(4)

<sup>5</sup> *NSCA*, s. 3.

The CNSC is a court of record.<sup>6</sup> It has broad powers to summon and examine witnesses, compel the production and inspection of records, and compel the enforcement of its orders and others matters necessary or proper for the “due exercise” of its jurisdiction.<sup>7</sup>

The *NSCA* entrenches the important role of the public in Commission decision-making. It provides the Commission with the power to establish and maintain a participant funding program to “facilitate the participation of the public”.<sup>8</sup> The *NSCA* also provides for a public hearing where the Commission shall issue or renew a licence.<sup>9</sup>

### The Decision to Licence a Nuclear Power Plant is a Value Judgment of Reasonable Risk

Glenn Archinoff, Candesco Division of Kinectrics Inc., argues that a decision of the Commission on the reasonableness of the risk posed by a nuclear power plant is a value judgment:

The reasonableness of the risk is a **value judgment** based on extensive qualitative and quantitative information, including confirmation that regulatory limits and goals are met.<sup>10</sup>  
[emphasis added]

Archinoff states that the decision-making process should provide Commission decision-makers with quantitative and qualitative information to support a judgment on whether the whole-site risk is limited to a reasonable level.<sup>11</sup> The factors to be considered in making this value judgement should include the Probabilistic Risk Assessments or Probabilistic Safety Assessments, the safety and control areas, but also input from “interested parties including those who may be exposed to the risk”.<sup>12</sup>

The Federal Court of Appeal highlighted in a decision on maritime safety that an assessment of risk and safety are value judgments in *Canada v Berhad*, 2005 FCA 267 (“*Berhad*”). In understanding decisions about safety and risk, the Court highlighted expert evidence, which stated:

... safety is not measured. It is judged and it is judged according to an assessment of an acceptable risk... An acceptable risk is essentially a **value-based proposition** determined

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<sup>6</sup> *NSCA*, s. 20(1).

<sup>7</sup> *NSCA*, s. 20(2).

<sup>8</sup> *NSCA*, s. 21(1)(b.1)

<sup>9</sup> *NSCA*, s. 40(5).

<sup>10</sup> Glenn Archinoff, “Whole-Site Risk Considerations for Nuclear Power Plants”, September 2017 (“Whole-Site Risk”), at pages v, 2, 11.

<sup>11</sup> “Whole-Site Risk”, at page 3.

<sup>12</sup> “Whole-Site Risk”, at pages 2-3.

by policy and/or by those authorized by governments to judge safety and/or by those exposed to the risk.<sup>13</sup> [emphasis added]

The Court highlighted in *Berhad* that governments must regulate safety and decide on an acceptable level of risk. The regulated industry, which decides to take on the hazardous activity, are not the only ones who bear the risks.<sup>14</sup> Accordingly, the views and concerns of the public, who bear the risks as well, must be of paramount concern. This is particularly pertinent where the community was repeatedly assured that the PNGS would not be refurbished and ongoing risk of living near a nuclear power plant would not be imposed on the same community.

There is nothing in the *NSCA*, the regulations, or CNSC guidance that requires the Commission to consider the economic wellbeing of the nuclear industry, OPG, or this project in fulfilling its statutory mandate. Instead, the focus of the Commission as a regulator is on the limitation, to a “reasonable level”, of the risk to human health and the environment, which is a value judgment. We urge the CNSC not to interpret a judgment on the reasonableness of the risk as the same or even overlapping with the concept of the cost effectiveness of enhanced safety measures.

#### The Commission is Mandated to Make the Decision

It is the Commissioners, and not CNSC staff, that are mandated to make a decision about renewal of the licence under s.24(4) of the *NSCA*. The Commissioners have an exceptionally important role in regulating an inherently risky industry. The matters governed by the *NSCA* are particularly hazardous and the risks to the public and the environment, especially in the event of an accident, are very serious. The purpose of the *NSCA* is focused on protection of the public and the environment from unreasonable risk, along with meeting Canada’s international commitments.<sup>15</sup>

The Commission has sought to implement changes to safety requirements to learn from the accident in Fukushima, occurring in Ōkuma, Japan in 2011. The Japan 2012 report found that the root cause of the accident was two-fold. Firstly, the organizational and regulatory systems supported flawed rationales for its decisions and actions, and secondly, both the utility and the regulator were aware of the inadequacy of the plant’s design yet did not act on it.<sup>16</sup> The report also emphasized the fact that the regulator lacked independence from the utility as a contributing factor.<sup>17</sup> Due to all of this, the Japan2012a report called for a reorganization of the regulatory body

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<sup>13</sup> *Canada v Berhad*, 2005 FCA 267 (“*Berhad*”) at para 122.

<sup>14</sup> *Berhad* at para 123.

<sup>15</sup> *NSCA*, s. 3(a).

<sup>16</sup> Dr. Victor G. Snell & Dr. Nikola K. Popov, [Regulatory Requirements and Licensing](#) (University Network of Excellence in Nuclear Engineering, 2024), ch 6 at page 14.

<sup>17</sup> *Ibid*, [Regulatory Requirements and Licensing](#), page 14

and highlighted the issue of Japan's Nuclear and Industrial Safety Agency being too focused on the short-term rather than the long-term.<sup>18</sup>

The Commission has relied too heavily on hold points in past decision-making. It has allowed applicants to complete key reports and make important decisions after the public hearing and licencing decision. The intervenors urge the Commission to ensure that hold points are not used where they fall within the core legislated mandate of the Commission under the *NSCA*. The authority of the Commission to come to an opinion on whether a licence should be renewed cannot be delegated, especially taking into consideration the long-term effects of these decisions. The intervenors urge the Commission to set a new bar at this important hearing and to ensure they have all of the information they need prior to making a licensing decision.

**RECOMMENDATION NO. 1:** The intervenors urge the CNSC to focus on the reasonableness of the risk of its licensing decision and not to interpret reasonableness as the same or overlapping with the concept of the cost effectiveness of safety measures.

**RECOMMENDATION NO. 2:** The Commission must ensure that hold points are not used where they fall within the core legislated authority of the Commission under the *NSCA*.

## *ii. Do Public Interventions Matter at the Commission?*

CELA commissioned a report to examine the effectiveness and influence of public interventions on Commission decisions in past licensing hearings.<sup>19</sup> Saher Khan finds that public concerns rarely shape the final licensing outcome.<sup>20</sup> Intervenor issues are often dealt with outside of the formal hearing process and away from public scrutiny. As Khan observed:

The Pickering case shows the same pattern in an even sharper way. Intervenors raised concerns about operating beyond design life, probabilistic safety assessment, large release risk, cumulative site risk, emergency preparedness, and the adequacy of the evidence before the Commission. Despite these concerns, the Commission allowed continued operation. Outstanding issues were allowed to be dealt with through future reporting and CNSC staff oversight, not through a refusal to proceed or a requirement that the concerns be resolved first.<sup>21</sup>

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<sup>18</sup> *Ibid*, [Regulatory Requirements and Licensing](#), at page 15.

<sup>19</sup> Saher Khan, "Acknowledged and Deferred: Intervenor Influence in CNSC Licensing Decisions", Publication Forthcoming.

<sup>20</sup> Saher Khan, *ibid*, at page 1.

<sup>21</sup> Saher Khan, *ibid*, at page 1

The core finding of the report is that the CNSC rarely treats the concerns raised by public intervenors as decisive. Technical and safety considerations are often deferred through scope limitation, hold points, or staff level review, raising serious transparency concerns.<sup>22</sup>

Khan observed that the Commission ultimately appeared willing to accept only partial satisfaction to its inquiries in the 2014 Pickering Nuclear Generating Station licensing decision.<sup>23</sup> The Commissioners had explicitly refused to delegate hold-point removal to CNSC staff in 2013, but the Commissioners proceeded in 2014 to release the hold point without resolution of key safety issues.<sup>24</sup>

Khan ultimately concluded that intervenor concerns are consistently recorded and acknowledged, but their influence on final licensing outcomes is uneven and highly constrained.<sup>25</sup> Intervenor influence is predominantly procedural and not substantive. Intervenors are far less successful at altering core licensing outcomes, technical determinations, or binding safety requirements.<sup>26</sup>

### ***iii. Request for Cross-Examination and Probing of Evidence by the Public in this Proceeding***

The Commission has discretion to vary or supplement its rules of procedure.<sup>27</sup> The intervenors have particular concerns about the adequacy of the information provided to the Commission in this hearing and the long list of critical reports that OPG proposes to complete after the hearing. The proposed intervenors request the opportunity to not only present an oral intervention, but also to probe the evidence provided by the applicant and CNSC staff through cross-examination at the hearing.

Saher Khan has identified that in past licensing decisions, the Commission has relied on CNSC staff for technical decisions. Intervenor critiques of safety analysis and risk assessment did not cause any reassessment of underlying technical conclusions.<sup>28</sup> As a result of its inquisitorial approach, the CNSC has not in the past allowed for hearing participants to fairly and effectively test the factual, technical and scientific evidence presented at licensing hearings.<sup>29</sup> The current approach of the Commission, which has no requirements for duly qualifying experts who wish to

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<sup>22</sup> Saher Khan, *ibid*, at pages 1-2

<sup>23</sup> Saher Khan, *ibid*, at page 21.

<sup>24</sup> Saher Khan, *ibid*, at page 21.

<sup>25</sup> Saher Khan, *ibid*, at page 25.

<sup>26</sup> Saher Khan, *ibid*, at page 25.

<sup>27</sup> CNSC Rules of Procedure, r. 3.

<sup>28</sup> Saher Khan, *ibid*, at page 26.

<sup>29</sup> Kerrie Blaise et. al, "Chapter 12: Nuclear Law, Oversight and Regulation: Seeking Public Dialogue and Democratic Transparency in Canada", in J.L Black-Branch and D. Fleck (eds.), *Nuclear Non-Proliferation in International law – Volume IV*, 2019, p. 239

present opinion evidence, and no provisions that enable participants to cross-examine experts under oath, should not be followed in this proceeding.<sup>30</sup>

**RECOMMENDATION NO. 3:** The proposed intervenors request the opportunity to not only present an oral intervention, but also to probe the evidence provided by the applicant and CNSC staff through cross-examination at the hearing.

## 1.1 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 and the Pickering 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 and 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 lobbying 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 power plants and are concerned about the proposed plans to expand nuclear power generation within the region. Many of these concerns relate to emergency planning for nuclear accidents.

### *iii. Canadian Environmental Law Association*

CELA is a non-profit, public interest law organization. CELA is funded by Legal Aid Ontario as a specialty legal aid 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.

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<sup>30</sup> Kerrie Blaise et. al, at page 239

CELA has been involved in a 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.<sup>31</sup>

## 1.2 BACKGROUND

Pickering Nuclear Generating Station is located on the north shore of Lake Ontario, in the City of Pickering in the regional municipality of Durham, Ontario. The facility lies 32 km northeast of downtown Toronto and 21 km southwest of Oshawa. The facility is owned and operated by OPG. Pickering consists of eight nuclear reactors, Units 1 - 4 (Pickering A) and Units 5 - 8 (Pickering B).<sup>32</sup>

OPG's power reactor operating licence (PROL) to operate PNGS Units 5 to 8 remains valid until December 31, 2026. Units 1 and 4 were permanently removed from commercial service in October and December 2024, respectively, joining Units 2 and 3 in safe storage.<sup>33</sup> The 2026 application represents an early renewal request to align with the planned refurbishment, which is scheduled to begin in early 2027 pending CNSC approval.<sup>34</sup> OPG is conducting a comprehensive PSR3 which will result in an Integrated Implementation Plan (IIP) that has not yet been completed and that will define improvements to be implemented and the associated implementation timelines before the refurbished Units 5 to 8 are returned to service.<sup>35</sup>

## 1.3. SCOPE OF REVIEW

The intervenors received participant funding to review OPG's licence renewal application and related documentation, including OPG and CNSC Staff CMDs, with a focus on compliance with regulatory requirements and the CNSC's safety and control areas, a review of relevant safety systems and measures, emergency planning, population growth in the region, and relevant international guidance, in order to make recommendations to assist the Commission in their decision in respect of the question of whether the proposal to obtain a license that encompasses refurbishment of PNGS will adequately protect the public and the environment. Our recommendations to the CNSC, including suggested licence conditions and licence condition

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<sup>31</sup> Canadian Environmental Law Association, online: [www.cela.ca](http://www.cela.ca)

<sup>32</sup> OPG, "Application to refurbish Pickering Nuclear Generating Station and to renew licences for the Pickering Nuclear Generating Station and the Waste Management Facility" (May 15, 2026) CMD 26-H7.1 at page iii [**OPG, CMD 26-H7-1**]

<sup>33</sup> Canadian Nuclear Safety Commission, *Commission Public Hearing Information: Pickering Nuclear Generating Station Licence Renewal and Refurbishment*, online: Government of Canada <https://www.cnsccsn.gc.ca/eng/the-commission/hearings-meetings/hearings/pngs-renewal/>

<sup>34</sup> OPG, CMD 26-H7-1 at page iii.

<sup>35</sup> OPG, CMD 26-H7-1 at page iv.

revisions, are summarized below in the **APPENDIX A: SUMMARY OF RECOMMENDATIONS**.

DNA, SHA, and CELA’s findings and recommendations aim to advance the objects of the CNSC<sup>36</sup> and are directly relevant to the CNSC’s licensing powers under section 24(4) of the *NSCA* to ensure the applicant will “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.”<sup>37</sup>

## **2. ACTION REQUESTED OF THE COMMISSION**

After reviewing submissions by CNSC staff and OPG, the intervenors submit that the CNSC should deny OPG’s request to renew the Pickering PROL for a 10 year term that would include the refurbishment activities for Units 5-8. The intervenors submit there is insufficient data before the Commission to make a sound decision to prevent unreasonable risk to the environment and to the health and safety of persons. The Commission should not issue a license that would allow for refurbishment of units 5-8 until it has an opportunity to review the Integrated Implementation Plan, and consider the adequacy of protection of the public in light of the additional safety analysis and insights provided by the completed Probabilistic Safety Assessment for a refurbished Pickering B. We further submit the Commission should deny the licence renewal application until a PNGS-specific Implementing Plan under Ontario's Provincial Nuclear Emergency Response Plan 2025 has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

Within the relevant documents publicly available for OPG’s application, the intervenors identified several areas of concern that would contravene the objective of the CNSC, namely: insufficient public participation opportunities; a troubling trend of non-compliance with safety and control areas mandated by the CNSC; inadequate emergency planning and evacuation planning measures; and inadequate consideration of environmental and climate change impacts.

Based on the findings within this submission, in the interest of protecting the environment and ensuring public health and safety, the intervenors submit that the Commission should not approve the renewal of the PNGS Power Reactor Operating Licence without having all the relevant information available for public dissemination and comment.

### **2.1 REGULATORY OVERSIGHT OF PICKERING NUCLEAR GENERATING STATION**

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<sup>36</sup> *NSCA* at s.9

<sup>37</sup> *NSCA* at s 24(4).

As the Commission must make a value judgment on the reasonableness of the risk of renewing the PNGS licence, the intervenors urge the Commission to examine and consider in its decision the history of non-compliance at the site.

At the first day of the hearing, the Commissioners asked questions of OPG regarding some of the non-compliances noted below. The Commissioner must ensure that they inquire into vague and unsubstantiated assurances about safety or safety culture.<sup>38</sup>

### ***i. Non-compliance Trends During Licensing Period***

When considering whether OPG is equipped to safely refurbish and return Pickering Units 5-8 to a safe state of operations for another 30 years, the Commission must consider compliance with CNSC Safety and Control Areas (SCAs). The intervenors have reviewed the Regulatory Oversight Reports for Canadian Nuclear Power Generating Sites (NPGS RORs) for the years of 2020 to 2024 (the 2025 NPGS ROR has yet to be released) to consider Pickering’s compliance with SCAs and other CNSC regulations. Despite OPG making claims that “during the current licence term, the Pickering NGS and PWMF continued to demonstrate strong safety performance,”<sup>39</sup> a review of the last five years of regulatory oversight reporting reveals a concerning trend of non-compliance at the PNGS across multiple SCAs.

The intervenors have previously expressed concerns about SCA non-compliance at Pickering; during the hearing to extend Pickering’s licence to operate until 2026, we urged the Commission to consider instances of non-compliance and balance their frequency of occurrence with the risk of accidents impacting the environment and public.<sup>40</sup> When reviewing the 2020-2024 NPGS RORs, there is a trend of increasing instances of non-compliance, rather than a reduction in non-compliance.

**Table 1** below provides an overview of the SCA non-compliances recorded in the 2020-2024 NPGS RORs, noting the degree of severity (e.g., negligible (neg.), low, or medium). Cells in the table highlighted in yellow indicate SCAs with more than 5 non-compliances per year, cells highlighted in orange indicate non-compliances deemed to be of medium safety significance by CNSC staff, and cells with a (-) indicate that an SCA did not have any reported instances of non-compliance.

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<sup>38</sup> CNSC, Hearing Part 1 Transcript, pages 8, 26, 89, 92, 106.

<sup>39</sup> OPG, CMD 26-H7-1 at page v

<sup>40</sup> Durham Nuclear Awareness, Slovenian Home Association & Canadian Environmental Law Association, “Comments on Ontario Power Generation’s Application for the Authorization to Operate Pickering Nuclear Generating Station Units 5 to 8 until 2026”, (April 26, 2024) CMD 24-H5.29, at pages 15-17 [**Pickering Extension Intervention**]

**Table 1: Number of “Negligible”, “Low Safety Significance”, and “Medium Safety Significance” instances of SCA non-compliance during licensing period for Pickering Nuclear Generating Station from 2020 to 2024**

| Safety Compliance Area                          | 2020              | 2021                 | 2022              | 2023                           | 2024                |
|-------------------------------------------------|-------------------|----------------------|-------------------|--------------------------------|---------------------|
| <b>Management System</b>                        | Neg.: 3<br>Low: 3 | Neg.: 1<br>Low: 9    | Neg./Low: 5       | Neg.: 10<br>Low: 10            | Neg.: 22<br>Low: 17 |
| <b>Human Performance Management</b>             | Low: 5            | Neg.: 1<br>Low: 3    | Neg.: 3<br>Low: 5 | Neg.: 5<br>Low: 4              | Neg.: 3<br>Low: 9   |
| <b>Operating Performance</b>                    | Neg.: 2<br>Low: 2 | Neg.: 1<br>Low: 3    |                   | Low: 7<br>Medium: 1            | Neg.: 5<br>Low: 6   |
| <b>Safety Analysis</b>                          | -                 | -                    | -                 | -                              | -                   |
| <b>Physical Design</b>                          | -                 | -                    | -                 | Low: 3                         | Low: 3              |
| <b>Fitness for Service</b>                      | Neg.: 4<br>Low: 3 | Neg.: 1<br>Medium: 2 | -                 | Neg.: 4<br>Low: 6<br>Medium: 1 | Neg.: 4<br>Low: 7   |
| <b>Radiation Protection</b>                     | Low: 2            | Neg.: 1              | -                 | Neg.: 3<br>Low: 6              | Neg.: 1<br>Low: 4   |
| <b>Conventional Health and Safety</b>           | -                 | -                    | -                 | Neg.: 1<br>Low: 1              | Neg.: 5             |
| <b>Environmental Protection</b>                 | Low: 1            | -                    | -                 | Neg.: 1<br>Low: 1              | Neg.: 2<br>Low: 2   |
| <b>Emergency Management and Fire Protection</b> | Neg.: 4<br>Low: 2 | Neg.: 2              | Low: 3            | Neg.: 1<br>Low: 9<br>Medium: 1 | Neg.: 2<br>Low: 1   |
| <b>Waste Management</b>                         | Neg.: 1           | Neg.: 2              | -                 | -                              | Neg.: 1             |

|                                         |                                |           |                                            |                    |                   |
|-----------------------------------------|--------------------------------|-----------|--------------------------------------------|--------------------|-------------------|
| <b>Security</b>                         | 1 (safety level not specified) | Medium: 2 | 4 across multiple specific areas<br>Low: 5 | Neg.: 3<br>Low: 17 | Neg.: 9<br>Low: 6 |
| <b>Safeguards and Non-Proliferation</b> | -                              | -         | -                                          | -                  | -                 |
| <b>Packaging and Transport</b>          | 1 (undefined)                  | -         | Neg.: 1                                    | Neg.: 2            | Neg.: 1           |

As Table 1 shows, there has been an increase in non-compliance in the Management, Human Performance, Fitness for Service, and Security SCAs. While many instances of non-compliance were deemed to be “negligible” by CNSC staff, the intervenors note these findings were still not compliant with SCA standards and are worth considering from a cumulative compliance lens.

Notably, in this five year regulatory oversight period, there were seven counts of non-compliance of medium safety significance, with 2023 being responsible for 3 of these counts alone. None of the reported instances of non-compliance were deemed to be of “high” safety significance, however from a public health and safety perspective, a nuclear power generating station should be striving to have *zero* findings of non-compliance for every SCA, and not just a collection of “negligible”, “low”, and “medium” safety significance incidents.

The intervenors recognize that these non-compliances have been occurring during Pickering’s later stages of operation, at a facility with aging equipment that OPG is now seeking to refurbish. However, these instances of non-compliance remain relevant during this licence renewal hearing, as the frequency of these occurrences at Pickering suggest that safety measures are not being treated as a top priority in day-to-day operations at Pickering. With OPG requesting to undertake refurbishment of Units 5-8, and to continue decommissioning Units 1-4, the proposed activities can impact the health and safety of workers, the environment, and the public in the long term if safety is not at the core of Pickering’s operations. As a result, any refurbishment activities *must* be compliant with *all* SCAs. The following is an overview of some notable instances of non-compliances with various SCAs, revealing how historical and present safety violations (regardless of the level of safety significance) will set the stage for how workplace culture and safety measures are treated at Pickering in the foreseeable future.

#### Management System SCA

The Management SCA is concerned with the framework that establishes the processes and programs required to ensure that Pickering achieves its safety objectives, continuously monitors

its performance against these objectives, and fosters a healthy safety culture.<sup>41</sup> When reviewing the numerous instances of non-compliance with the Management SCA, there are recurring issues with record keeping, as seen in 2024, for example: “CNSC staff field inspections identified non-compliances related to completeness and adequacy of records and labelling.”<sup>42</sup> In 2023, CNSC staff reported non-compliances related to discrepancies in training documents and in conducting training meetings.<sup>43</sup> Accurate and complete records are essential in having an organized work environment, and with OPG seeking to refurbish Units 5-8, record keeping must be thorough to keep track of refurbishment activities, as well as monitoring the tasks of OPG workers and contracted workers.

### Human Performance Management SCA

The Human Performance Management SCA is concerned with activities that enable effective human performance, ensuring a sufficient number of licensee personnel are in all relevant job areas and have the necessary knowledge, skills, procedures and tools in place to safely carry out their duties.<sup>44</sup> As **Table 1** shows, the last few years has seen an increasing trend of non-compliance with the human performance management SCA, with 2024 reporting 9 low-safety significant non-compliances, with two of those findings being related to “not ensuring that workers are trained with respect to managing worker fatigue and not managing worker fatigue.”<sup>45</sup> Two findings in 2023 deemed to be of negligible safety significance were related to discrepancies in training documents, and discrepancies in conducting training meetings.<sup>46</sup> The RORs have noted multiple years of Minimum Shift Complement (MSC) violations at Pickering:

- 2020: 3 MSC violations
- 2021: 2 MSC violations: One event involved a supervisor mistakenly allowing a mechanical maintainer to leave the station. The error was recognized and corrected within 2 hours, and the safety significance of this event was determined to be low. In a separate event, when a critical safety parameter qualified nuclear operator was moved up to the position of supervising nuclear operator to replace a staff member who took sick leave, the supervisor did not realize that they were below the minimum shift complement for about an hour
- 2022: None reported in ROR
- 2023: 6 MSC violations in their security organizations
- 2024: 3 MSC violations in their security organizations<sup>47</sup>

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<sup>41</sup> CNSC, “Safety and Control Areas”, (date modified: 2023-03-06) [www.cnscccsn.gc.ca \(online\): https://www.cnscccsn.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas/](https://www.cnscccsn.gc.ca/eng/resources/publications/reports/powerindustry/safety-and-control-areas/) [“Safety and Control Areas”]

<sup>42</sup> CNSC, NPGS ROR 2024 at page 51

<sup>43</sup> CNSC, NPGS ROR 2023 at page 49

<sup>44</sup> CNSC, “Safety and Control Areas”

<sup>45</sup> CNSC, NPGS ROR 2024 at page 52

<sup>46</sup> CNSC, NPGS ROR 2023 at page 49

<sup>47</sup> CNSC, NPGS ROR 2020 at page 105; NPGS ROR 2021 at page 79; NPGS ROR 2022 at page 83; NPGS ROR 2023 at page 50; and NPGS ROR 2024 at page 52.

While most of the MSC were of short duration, it is troubling that every year there are multiple instances of Pickering falling below minimum shift complement for often specialized or supervisory positions. It is also concerning that two years in a row, there were MSC violations in Pickering's security organizations.

### Operating Performance SCA

The Operating Performance SCA covers an overall review of the conduct of Pickering's licenced activities and the activities that enable effective performance.<sup>48</sup> Most of the non-compliances with this SCA were found in 2023. A medium safety significance non-compliance was related to the safe operating envelope (SOE). According to the NPGS ROR 2023:

During a field inspection, CNSC staff found that OPG was non-compliant with SOE requirements, including requirements to notify CNSC of changes. OPG made non-conservative changes to station operating documentation pertaining to reactor building temperature limits that did not reflect the defined SOE.<sup>49</sup>

While OPG staff were satisfied with OPG's corrective actions, these non-compliances are deeply concerning to the intervenors, as it shows a lack of transparency in OPG's operations at Pickering. While 2024 did not see a repeat of medium safety significance non-compliance, there were still 6 low safety significance findings, and the ROR does not provide details on the incidents.<sup>50</sup>

### Fitness for Service SCA

The Fitness for Service SCA is concerned with activities affecting the physical condition of structures, systems and components (SSCs) to ensure that they remain effective over time.<sup>51</sup> It is not surprising that during this most recent licensing period, Pickering has been subject to an increase in non-compliance associated with fitness for service; Pickering has been operating well-past its shelf life with ageing equipment. The ageing parts and facilities at Pickering were one of the concerns the intervenors flagged during OPG's application to extend Pickering's operations to 2026.<sup>52</sup>

As **Table 1** highlights, there have been multiple instances of medium safety significant non-compliances (2021 and 2023, respectively). In 2021, one medium safety significance finding was the result of debris passing through the degraded stator cooling water (SCW) filter of Unit 5,

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<sup>48</sup> CNSC, "Safety and Control Areas"

<sup>49</sup> CNSC, NPGS ROR 2023 at page 50

<sup>50</sup> CNSC, NPGS ROR 2024 at page 53

<sup>51</sup> CNSC, "Safety and Control Areas"

<sup>52</sup> Pickering Extension Intervention at pages 13-14

resulting in low SCW flow and a flashover in one of the SCW boxes. This was caused by the improper retirement of conducting preventative maintenance action of periodic filter replacement, on the incorrect assumption that a passing filter was not a major failure mode.<sup>53</sup>

Of very serious concern, the other medium safety significance finding arose during a Type II Pickering Fire Response Program Inspection, in which CNSC staff learned through signage that OPG personnel were still using Building 37, a structure noted as condemned to the CNSC following a structural assessment report in August 2019.<sup>54</sup>

In 2023, the medium safety significance finding is quite concerning from the public's perspective: "CNSC staff found that OPG engineering staff were not performing routine field walkdowns at the required frequency using approved checklists and were not maintaining appropriate records."<sup>55</sup>

### Emergency Management and Fire Protection SCA

The Emergency Management and Fire Protection SCA is concerned with the emergency plans and emergency preparedness programs that exist for emergencies and for non-routine conditions.<sup>56</sup> Maintaining and adhering to robust emergency plans and emergency preparedness is of great concern to members of the public, especially for those living in close proximity to the Pickering site. It does not instill confidence in OPG's approach to safety and emergency preparedness when in 2023 CNSC staff found a non-compliance with this SCA of medium safety significance associated with the maintenance of staged fire equipment: "CNSC staff found that monthly inspections being performed by OPG personnel, were not identifying and resolving issues related to the maintenance fire extinguishers, monitors, attack and supply hoses."<sup>57</sup>

### Security SCA

The Security SCA is concerned with the programs needed to implement and support the security requirements stipulated in CNSC regulations, in Pickering's licence, in orders, or in expectations for the Pickering NPGS.<sup>58</sup>

During the mid-term update for Pickering in 2023, which coincided with the review of the NPGS ROR 2022, CELA noted that due to confidentiality surrounding security breaches, little detail on these issues is available to the public. With the ongoing lack of transparency for the public about

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<sup>53</sup> CNSC, NPGS ROR 2021 at page 82

<sup>54</sup> *Ibid.*, at page 83

<sup>55</sup> CNSC, NPGS ROR 2023 at page 54

<sup>56</sup> CNSC, "Safety and Control Areas"

<sup>57</sup> CNSC, NPGS ROR 2023 at page 59

<sup>58</sup> CNSC, "Safety and Control Areas"

these non-compliances, it is crucial that non-compliance with the security SCA is heavily scrutinized by the Commission.<sup>59</sup>

The security SCA engages international and domestic security risks and elevates this issue to one of a high importance for the Commission. In 2021, “CNSC staff concluded that OPG did not meet all applicable regulatory requirements and CNSC staff expectations for the security SCA at the PNGS in 2021.”<sup>60</sup> The NPGS ROR 2021 notes that in 2022, OPG received a regulatory warning letter about the two medium safety significance non-compliances related to security practices, and the need for OPG to implement compensatory and corrective measures at Pickering and Darlington NPGS.<sup>61</sup>

In 2023, Pickering had 17 non-compliance findings of low safety significance, along with the issuance of an Administrative Monetary Penalty (AMP) for failing to comply with a licence condition related to OPG’s security program at Pickering and Darlington NPGS, dating back to 2022.<sup>62</sup> The AMP totaled \$21,790, and was issued to promote compliance and deter reoccurrence.<sup>63</sup> The issuance of an AMP by the CNSC is uncommon, so the requirement to issue a monetary penalty to encourage OPG to maintain compliance at not one but two nuclear power plants does not exude confidence in the ability to maintain proper safety measures at Pickering.

As **table 1** highlights, there were 15 reportable events (6 low and 9 negligible safety significance) related to the Security SCA in 2024, which CNSC staff merely noted as being “comparable to previous years.”<sup>64</sup> This neutral statement by CNSC staff seems to imply that having 15 instances of non-compliance with a highly confidential SCA is not a problem; that it is to be expected. After having such heavy scrutiny of security measures at OPG sites, and the issuance of an AMP to maintain compliance, the intervenors submit CNSC staff should be ensuring that OPG is being 100% compliant with the Security SCA at all of its facilities. A finding that the non-compliance was “comparable to previous years” is not acceptable to the public.

With the documents for this hearing not focusing on instances of non-compliance with the 14 SCAs under CNSC staff’s regulatory oversight, it is unclear whether OPG has been complying with the various SCAs in 2025 and 2026. During Part 1 of the public hearing for considering OPG’s application to refurbish Pickering and renew the licences for Pickering NPGS and WMF

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<sup>59</sup> CELA, “Submission by the Canadian Environmental Law Association to the Canadian Nuclear Safety Commission Regarding the Regulatory Oversight Report for Canadian Nuclear Power Generating Sites: 2022 and the Mid-Term Update of Licensed Activities for the Pickering Nuclear Generating Station” (October 29, 2023) CMD 23-M36.4, at page 13-14 [**Pickering Mid-Term Update Intervention**]

<sup>60</sup> CNSC, NPGS ROR 2021, at page 88

<sup>61</sup> *Ibid.*, at page 89

<sup>62</sup> CNSC, NPGS ROR 2023, at page 61

<sup>63</sup> CNSC, “Regulatory Action—Ontario Power Generation Inc.” (May 31, 2023) [www.cnsccsn.gc.ca \(online\): https://www.cnsccsn.gc.ca/eng/acts-and-regulations/regulatory-action/ontario-power-generation/](https://www.cnsccsn.gc.ca/eng/acts-and-regulations/regulatory-action/ontario-power-generation/)

<sup>64</sup> CNSC, NPGS ROR 2024, at page 61

(Hearing Part 1), the oral presentation by CNSC staff briefly discusses the security SCA. Daniel MacDonald, the Senior Regulatory Program Officer in the Pickering Regulatory Program Division, notes:

CNSC staff have made the Commission aware of past security performance at the Pickering NGS that has been below expectations. Following enhanced regulatory scrutiny, CNSC staff have noted improvements with OPG's performance since 2023. A major change in requirements pertaining to the security SCA are the publishing of new Nuclear Security Regulations, which replaced the previous regulations in 2025. Requirements for existing sites, such as the Pickering Nuclear Site, will come into force in October 2027.

With respect to planned activities during the proposed licence period, OPG intends to modify security facilities and equipment during the conduct of refurbishment and decommissioning work. This includes the expansion of existing points of entry to accommodate additional workers.<sup>65</sup>

This discussion does not enlighten the public on what OPG has done to improve compliance with the Security SCA, and whether there continues to be non-compliance. Further, it is unclear as to whether CNSC staff are confident that OPG will meet compliance expectations once the new Nuclear Security Regulations come into force for Pickering in 2027.<sup>66</sup>

#### REGDOC 3.1.1 Reporting for 2025 and 2026

While the NPGS ROR has not been released for 2025 to compare compliance findings at Pickering with previous years, OPG is still required to track and provide quarterly reports of reportable events to the CNSC, per REGDOC-3.1.1.<sup>67</sup> **Table 2** summarizes the events reported by OPG for 2025 and 2026.<sup>68</sup>

***Table 2: List of Pickering Nuclear Generating Station Events Reported to CNSC by OPG in 2025 and 2026, as required by REGDOC-3.1.1***

| Reporting Quarter | Event Title                                                                                                                                                                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Q1 2025           | <ul style="list-style-type: none"> <li>- Degradation: Impairment of Unit 5 Boiler Emergency Cooling System, No Operability Impact</li> <li>- Matter of Regulatory Interest: <ul style="list-style-type: none"> <li>o Fish Entrainment Study Late Start Date</li> </ul> </li> </ul> |

<sup>65</sup> CNSC, Hearing Part 1 Transcript at pages 53-54

<sup>66</sup> Nuclear Security Regulations, SOR/2025-219

<sup>67</sup> REGDOC-3.1.1m. Reporting Requirements for Nuclear Power Plants, Version 3, at section 2

<sup>68</sup> OPG, "2026 Pickering Event Report"; "2025 Pickering Event Report" (online): <https://www.opg.com/reporting/regulatory-reporting/event-reports/>

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <ul style="list-style-type: none"> <li>○ Minor Fire Incident at Unit 4, No Operability Impact</li> <li>- Exceedance of Monthly Gross Beta/Gamma Environmental Action Level for Sewage Emissions, No Safety or Environmental Impact</li> <li>- Counterfeit, Fraudulent or Suspect Items: Lifting Eye Nuts Received, Unexpected Identification Markings and Appearance, Safely Resolved</li> <li>- Unplanned Change in Reactor Power: Unit 7 Reactor Setback following Turbine Trip</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Q3-2025 | <ul style="list-style-type: none"> <li>- Environmental Release of Demineralized Water, No Environmental Impact</li> <li>- Reactor Trip: Unit 6 Tripped Via Shutdown System 1 and Shutdown System 2</li> <li>- Flame Observed Inside the Unit 6 Emergency Low Pressure Service Water Pump Motor Casing, Safely Resolved</li> <li>- Safeguards: Temporary Loss of Power to Safeguards Equipment</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Q4-2025 | <ul style="list-style-type: none"> <li>- Radiation Hazard Boundaries and Signs Not Positioned in Accordance with the Regulations</li> <li>- System Degradation: System Does Not Meet Design Intent of Unit 7 Auxiliary Boiler Feedwater System, No Operability Impact</li> <li>- Hours of Work Exceedances - Workers Had Less Than 8 Hours Free From Work Between Shifts, No Fitness For Duty Impact</li> <li>- Emergency Response Team Mobilized To Assist Crane Worker, Safely Resolved</li> <li>- Environmental Release of Fire Retardant Fluid, No Environmental Impact Observed</li> <li>- Environmental Release of Fire Retardant Foam, No Environmental Impact Observed</li> <li>- Unplanned Change in Reactor Power: Unit 7 Power Unexpected Decrease to 86%</li> <li>- Radiation Hazard Sign Not Posted in Accordance with the Regulations</li> </ul>                                                                                                 |
| Q1-2026 | <ul style="list-style-type: none"> <li>- Radiological Incident: Unit 8 Loss of D2O Due To West Fuelling Machine Separator Failure, No Safety or Environmental Impact</li> <li>- Pickering Nuclear 24 Hour Daily Average Effluent Temperature Exceeded the Environmental Compliance Approval Limit, No Environmental Impact</li> <li>- Unplanned Change in Reactor Power: Unit 8 Reactor Setback to 90% Due to Loss of Reheat Return Flow, no Operability Impact</li> <li>- Unplanned Change in Reactor Power: Unit 6 Reactor Power Unexpectedly Raised by DCCX, no Operability Impact</li> <li>- Emergency Response Team Mobilized To Retrieve Crane Worker, no Injury to Worker and Safely Resolved</li> <li>- Discovery Issue Resolution Process Initiated for Legacy Unit 2 &amp; 3 Bulkhead Structural Analysis, no Operability Impact</li> <li>- Licence Non-Compliance: 2025 CSA N287.7 PRD/VB Missed Inspection Scope, no Operability Impact</li> </ul> |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <ul style="list-style-type: none"> <li>- Hours of Work Exceedances, no Fitness for Duty Impact</li> <li>- Reactor Trip: Unit 8 Unexpected SDS2 Trip Following Planned SDS1 Trip, no Operability Impact</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   |
| Q2-2206 | <ul style="list-style-type: none"> <li>- Hours of Work Exceedances, no Fitness for Duty Impact</li> <li>- Safeguards: Temporary Loss of Power to Safeguards Equipment, no Nuclear or Public Safety Impact</li> <li>- Radiation Hazard Sign Not Posted in Accordance with the Regulations, no Exposure Levels or Dose Limits Exceeded</li> <li>- Unplanned Change in Reactor Power: Unit 7 Reactor Power above 100% on Digital Control Computer (DCC) Y, no Operability Impact</li> <li>- Radiation Hazard Sign Not Posted in Accordance with the Regulations, no Exposure Levels or Dose Limits Exceeded</li> </ul> |

There are limitations with considering these reportable events in the context of regulatory oversight: there are no details provided to the public surrounding each event; the severity of the event's impact on safety; or a determination of whether the event has been adequately resolved and was preventable.

Additionally, these are events reported by OPG. As it has been revealed in multiple NPGS RORs, many findings of non-compliance are discovered during CNSC staff inspections and not due to OPG reporting - suggesting that safety compliance is not proactively protected in day to day operations at Pickering.

The Commissioners must ensure that both the licensee and the CNSC staff inspectors are vigilant. In a recent laudable example of proactively raising serious fire and emergency preparedness breaches, Canadian Nuclear Laboratories (“CNL”) reported breaches that had not been identified by CNSC staff during its annual inspections. As highlighted in the Regulatory Oversight Report CNL 2022,<sup>69</sup> there have been serious concerns surrounding non-compliance at Whiteshell—as CELA had noted, every single inspection revealed non-compliant areas except baseline radiation at Whiteshell.<sup>70</sup> As a result of CNL disclosing serious deficiencies in fire and emergency training, and in equipment inspection, lack of testing and maintenance and use of incomplete or expired personal protective equipment—which were identified through CNL's self-assessment—Whiteshell was placed into a safe shutdown state during the years of 2020, 2021, and 2022.<sup>71</sup>

OPG's reporting highlighted in **Table 2** does reveal several trends: ageing equipment and components failing, issues surrounding hours of work exceedances, environmental releases, and

<sup>69</sup> CNSC, “Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2022”, CMD 23-M30 (August 2, 2023), online: <https://api.cnsccsn.gc.ca/dms/digital-medias/CMD23-M30.pdf/object>

<sup>70</sup> CELA, “Re: Regulatory Oversight Report CNL 2022 Reference # 2023-M-30” (October 2, 2023), online: <https://cela.ca/wp-content/uploads/2023/11/CELA-comments-re-CNL-ROR-Oct-1-2023.pdf>, p 1 [CELA ROR submission]

<sup>71</sup> *Ibid* at p 3

unplanned reactor outages. The reporting of these events reveals that Pickering is not in full compliance with SCAs like Management, Human Performance, Operation, and Fitness for Service.

### Non-Compliance and its influence on Refurbishment

With compliance with SCAs seemingly declining over the course of the current licencing period, these incidents point to a work culture that minimizes the importance of administrative actions that are connected to worker safety, emergency planning, and site management. While most instances of non-compliance at Pickering have been deemed by CNSC staff to be low risk, some of the non-compliances are medium risk, and the frequency of these occurrences in Pickering's later stages of its operation suggest that safety measures are not being treated as a top priority in day-to-day operations at Pickering. The Intervenor submit that the Commission needs to consider these instances of non-compliance, and the frequency of their occurrence, in determining the risk of accidents impacting the environment and the public, in their determination of whether to renew the licence.

While reviewing Pickering's compliance with the Fitness for Service SCA may not seem important during a request to refurbish ageing components, the intervenors submit there must be scrutiny of how OPG has been managing this nuclear power facility at the end of its life, including how it has approached maintaining a safe work culture--or as the non-compliances over the last five years suggest, a lack thereof.

The proposed refurbishment is intended to extend nuclear power generation inside Pickering's ageing buildings and structures for another thirty years. This refurbishment project will require an influx of personnel on site—both those employed by OPG and those who are contracted for specific tasks—and these personnel need a safe work environment and need to contribute to creating a safe work environment to ensure that refurbishment activities are completed thoroughly and in accordance with CNSC regulations and standards.

While OPG has asserted that there is a five-year training program “which has been updated to reflect the continuing training aspect of all of our certified staff at Pickering throughout the refurbishment, and also has been updated to include return-to-service-type activities,”<sup>72</sup> this does not mean that OPG will fulfill all the requirements and management of that tracking plan. As previous NPGS RORs have noted, many instances of SCA non-compliance have stemmed from improper record-keeping and failing to fulfill inspections/monitoring of various systems and plans OPG has in place. The intervenors are concerned that in the refurbishment phase and beyond, there will continue to be a work culture at Pickering that will be lax on following the mundane—yet

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<sup>72</sup> CNSC, Hearing Part 1 Transcript at page 122

essential—record keeping tasks, which could ultimately lead to low, medium, or even high safety significance violations.

As OPG seeks to set up Pickering to operate for another 30 years, which the intervenors submit is too long for this old facility in a region with rapid population growth, the workforce will be in flux as people retire and new individuals take over those vacant positions. There is the concern that the legacy of non-compliance within the existing work force will trickle into the next generation of Pickering NPGS operators and supervisors. The intervenors submit there must be a change in how Pickering is monitored by CNSC staff, as non-compliances persist following instances where warning letters and AMPs are issued to the licensee. From the public's perspective, it appears that to date, as though as long as non-compliance is not of high safety significance, it is not considered essential by CNSC staff for OPG to not comply with the 14 SCAs intended to protect the health and safety of workers, the public, and the environment. The intervenors seek clarity on how the CNSC plans on overseeing compliance with all the SCAs at this facility during decommissioning of Pickering A, and refurbishment and operations of Pickering B. There should not be a perpetual trend of non-complying with safety measures each reporting year. The cumulation of non-compliance across the various safety and control areas diminishes public trust in the Commission's regulation of nuclear power facilities.

**RECOMMENDATION NO. 4:** In its decision under s. 24(4), the Commission must consider SCA non-compliances—even those of low or negligible safety significance—with a cumulative lens to assess whether there is a safe work culture at Pickering.

**RECOMMENDATION NO. 5:** The CNSC must elaborate on how it plans on overseeing full compliance with all the SCAs at this facility during decommissioning of Pickering A, and refurbishment and operations of Pickering B. There should not be a perpetual trend of non-compliance with safety measures each reporting year. The cumulation of non-compliance across the various safety and control areas diminishes public trust in the Commission's regulation of nuclear power facilities.

## ***ii. Reviewing Undertakings and Commitments Made by OPG***

When assessing whether OPG is equipped to safely refurbish Pickering B and return it to service following the proposed activities within its licence renewal application pursuant to s.24(4) of the *NSCA*, it is essential to consider the undertakings and commitments made by OPG to fulfill a safe refurbishment of ageing equipment, and whether they will align with the CNSC's obligation to protect the health and safety of the public and the environment.

## Outstanding Design Decisions

One of the major barriers to public participation in CNSC licensing hearings is a lack of transparency. Sometimes the lack of transparency stems from restricting access to information and documents under the guise of information being ‘proprietary’ or ‘security sensitive’. Other times, the lack of transparency stems from a licensing proponent not confirming design decisions within its application. CNSC licensing hearings perpetuate the lack of transparency due to the Commission’s inquisitorial approach. Hearing participants are unable to fairly and effectively test the factual, technical and scientific evidence often presented (or in this case, not presented) at licensing hearings.<sup>73</sup> As Blaise et al. note:

As the majority of CNSC regulatory documents and standards are not prescriptive, licensees can ‘put forward a case to demonstrate that the intent of a requirement is addressed’. This negotiated approach to regulation between the CNSC and licensees results in consultations which are neither transparent nor open to broader dialogue with Canadians. This in turn limits the extent of recommendations which can be made by public intervenors appearing before the Commission at licensing hearings.<sup>74</sup>

In the case of OPG’s licence renewal application, the application consists of outstanding decisions to be made, as pointed out by Commission Member Remenda during the Hearing Part 1 in June 2026. With this observation, the question was posed to CNSC staff as to whether having outstanding designs would complicate staff’s verification plans, or whether it is something staff are accustomed to, “to be ready with review of new ideas or new designs or improved or different designs.”<sup>75</sup> According to Dr. Alexandre Viktorov, the Director General of the Directorate of Power Reactor Regulation, reviewing design modification is not a unique feature, and that “similar activities happen at other sites.”<sup>76</sup>

The intervenors submit there should not be a normalization of allowing licencees to be indecisive or uncertain of how they will be managing or altering their nuclear sites when submitting licensing applications. OPG decided to submit its licence application early. When licensing hearings allow a proponent to make critical decisions after a hearing has concluded, it precludes the Commissioners and members of the public from being able to assess and express their concerns, as these modifications or revisions become exempt from public review and outside of the s.24(4) decision. A proponent must be prepared and have a full understanding of what projects they intend on commencing and completing as part of their licence renewal application.

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<sup>73</sup> Kerrie Blaise et al., at page 239

<sup>74</sup> Kerrie Blaise et al. at page 240

<sup>75</sup> CNSC, Hearing Part 1 Transcript at page 66

<sup>76</sup> *Ibid* at pages 66-67

One such element of OPG's licencing application that lacks sufficient design detail is the proposed Deep Water Intake, as discussed below.

### Deep Water Intake Project

A highly anticipated proposed project for refurbishment is the construction of a deep-water intake (DWI) to supply the forebay with water from deeper in Lake Ontario to improve plant reliability and reduce impingement and entrainment of aquatic species.<sup>77</sup> The intervenors have previously expressed concerns about the impacts of climate change on the PNGS, in particular with rising temperatures threatening reactor cooling.<sup>78</sup> We are supportive of OPG implementing this project to mitigate both the impacts of climate change on Pickering's operations and the impacts the PNGS has on local aquatic species due to water cooling. However, OPG indicated at the hearing that the DWI project may not happen. Sara Irvine, OPG's Vice-President of Nuclear Regulatory Affairs, vaguely cited challenges to be resolved within "acceptable technical and financial parameters".<sup>79</sup>

At the hearing, Luca Ceccato, OPG's Senior Vice-President Nuclear Refurbishment, stated that OPG intended to have a final decision on whether the DWI project would proceed in "September and it will be prior to the second hearing."<sup>80</sup> The question of whether OPG had a date for the finalization of the design was not disclosed. The Commission recognized that OPG delaying a decision until September on the DWI would be contrary to procedural fairness since interventions for Part 2 of the hearing are due by August 12, 2026. As a result, the Commission required OPG to inform the Commission should it decide *not* to proceed with the DWI by July 31, 2026.<sup>81</sup>

As of August 10, 2026, the Commission Registry has not published a decision by OPG indicating that it is not going forward with the DWI. Therefore, the intervenors are unable to comment on OPG's decision or review any plans to proceed with the DWI. Due to OPG's delays in committing to the DWI, the intervenors have so far been excluded from consideration of the DWI project. It is insufficient for the Commissioner to rely on CNSC staff evaluating that the DWI construction plan in accordance with a predictive Environmental Risk Assessment (PERA) whenever OPG releases the design information, potentially after the public hearing.<sup>82</sup>

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<sup>77</sup> CNSC Staff, "CNSC Staff Submission: Ontario Power Generation Application to Refurbish Pickering Units 5 to 8 and Renew the Operating Licences of the Pickering Nuclear Generating Station and Pickering Waste Management Facility" (June 23, 2026), CMD 26-H7, at page 15 [CNSC Staff, CMD 26-H7]

<sup>78</sup> See Pickering Extension Intervention, at pages 17-19

<sup>79</sup> CNSC, Hearing Part 1 Transcript, at page 151

<sup>80</sup> CNSC, Hearing Part 1 Transcript, at page 149

<sup>81</sup> Jude Samson, "Re: Ontario Power Generation's Application for Authorization to Refurbish the Pickering Nuclear Generating Station and Renew its Pickering Nuclear Generating Station and Waste Management Facility licences (26-H7)" Letter dated July 7, 2026, online: <https://api.cnscccsn.gc.ca/dms/digital-medias/CMD26-H7-CR-LETTER-OPG-DWI.pdf/object>

<sup>82</sup> CNSC Staff, CMD 26-H7 at page 83

The intervenors submit the Deep Water Intake is a project of great interest to members of the public and First Nations communities, and as a result, its finalization and design details should have been disclosed to the Commission at the start of the hearing process so that it could be assessed in detail. It is the intervenors' understanding that CNSC staff had previously been reviewing the DWI project proposal as a certain element of the proposed activities for this licence period. There has been no explanation for OPG's decision to delay this decision. This lack of commitment by OPG to its refurbishment plans reinforces public distrust with the proponent and perpetuates procedural unfairness within the CNSC's decision-making process.

### Climate Change Summary Report

The Commissioner and the intervenors are also concerned about establishing robust climate change mitigation strategies for nuclear facilities, especially because Pickering is located on Lake Ontario in a densely populated area where the impacts of climate change are becoming more apparent with each passing year.

The Commission stated:

In June 2024, CNSC staff requested OPG to conduct a climate change resilience assessment of the Pickering NGS units 5-8 design against available climate projections. The purpose of this assessment is to demonstrate the resilience of the Pickering NGS to the impacts of climate change for the proposed extended operational life.

OPG submitted the results of this assessment in April 2025, which included a report summarizing these results. OPG's assessment identified climate susceptible SSCs ["structures, systems, and components"] of the Pickering NGS and related short- and long-term adaptation measures. OPG concluded that nuclear safety analyses remain valid and that the Pickering NGS is prepared for extreme weather events. Routine monitoring and maintenance programs are expected to be sufficient to discover any changes to the Pickering NGS due to climate change prior to any impacts. OPG is planning further detailed analysis prior to the implementation of adaptation measures and has committed to provide a Pickering climate change risk assessment to CNSC staff in January 2028. CNSC staff reviewed OPG's submission and provided several recommendations for OPG's consideration.<sup>83</sup>

The intervenors request that OPG provide this "further detailed analysis" prior to the licencing hearing.

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<sup>83</sup> CNSC Staff, CMD 26-H7, at page 53, *emphasis added*.

The intervenors have reviewed the PNGS Climate Resilience Assessment Summary and provide several comments and recommendations to assist the Commission in assessing OPG's approach to climate resilience for Pickering.

First, the intervenors are concerned with the timeline for analyzing climate data: "Analysis of recent data from 2010 through 2020 shows that extreme events have an essentially negligible impact on nuclear generation capacity factors (the percentage of the time the nuclear power plant (NPP) is running at full power and providing electricity to the grid), which are by far the highest of any carbon-free source of generation."<sup>84</sup> The intervenors submit the report should have considered more recent data, up to the year 2025, to have a more fulsome picture for predicting climate and extreme weather event modelling for Pickering. With the severity of weather events becoming more frequent in Ontario over the last five years, climate change modelling should encompass the most up to date information.

Additionally, while the report considers the potential impacts to systems, structures and components at Pickering, the report does not consider how severe events and climate hazards may impact personnel. Extreme weather events, such as flooding or severe snow fall, may make access to the NPGS in an emergency difficult.<sup>85</sup> Climate change resiliency planning must consider the human element of nuclear operations when assessing severe climate effects.

When reviewing the Adaptation Measures Specific to Equipment within the summary, there are several adaptation options that should be "considered", such as the DWI:

- Consider additional means of reducing the ambient air in the pump motor location, such as installing or improving the air conditioner unit;
- Consider alternative supply sources for the service water to increase water volume and reduce water temperature. This could include the DWI or adding additional pumps; and
- Consideration for adding anti-corrosion coatings on the screens and strainers to fortify equipment against long term changes brought on by climate change, alternatively replace screens and strainers with corrosion resistant materials.<sup>86</sup>

The intervenors request OPG explain whether all these considerations are being implemented and what informed any decision about implementation during refurbishment.

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<sup>84</sup> OPG, "Pickering NGS Units 5-8: Climate Susceptibility and Adaptation Summary Report" March 31, 2025, at page 3 [Climate Resilience Assessment Summary]

<sup>85</sup> See for example: Kopytko, Natalie, *Uncertain Seas, Uncertain Future for Nuclear Power*, (2015) 71(2) *Bulletin of the Atomic Scientists* 29–38, <https://doi.org/10.1177/0096340215571905>;  
Kopytko, Natalie, and John Perkins, *Climate Change, Nuclear Power, and the Adaptation–Mitigation Dilemma*, (2011) 39(1) *Energy Policy* 318–33, <https://doi.org/10.1016/j.enpol.2010.09.046>

<sup>86</sup> OPG, *Climate Resilience Assessment Summary* at pages 23-27

Finally, the intervenors submit that when assessing climate change resiliency at nuclear power facilities, the Commission should be conducting its own climate change assessment and mapping, as proposed in the United States. In April 2024, the U.S. Government Accountability Office (GAO) released a report titled “Nuclear Power Plants: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change.” The GAO notes that “climate change is likely to exacerbate natural hazards—such as floods and drought. The risks to nuclear power plants from such hazards include damage to systems and equipment that ensure safe operation.”<sup>87</sup> The GAO noted that the Nuclear Regulatory Commission (NRC) does not fully consider potential increases in risk from climate change, and therefore recommended the NRC assess whether its existing processes adequately address climate risks and develop and implement a plan to address any gaps identified.<sup>88</sup> The Intervenor recommend that the CNSC conduct an assessment and mapping of vulnerability of Canadian nuclear power plants to climate change hazards, similar to the one recommended in the GAO report.

### CANDU Safety Issues (CSI)

Within the CNSC Staff CMD, there is a discussion surrounding the resolution of CANDU safety issues (CSI), as previously detailed at the 2018 relicensing hearing. The CMD explains that “CSIs are generic safety issues related to CANDU NPPs, which are addressed in three categories based on the adequacy and effectiveness of existing control measures. Since 2014, three category 3 CSIs have remained with respect to the Pickering NGS.”<sup>89</sup> The CMD further notes that “as of March 2026, CNSC staff continue to assess OPG’s request to recategorize the remaining category 3 CSIs with respect to the Pickering NGS to category 2 and anticipate completion of this assessment by June 2026.”<sup>90</sup>

The intervenors request an update on the assessment of the remaining category 3 CSIs, as the assessment should have been completed by June 2026, but was not discussed during Part 1 of this hearing.<sup>91</sup>

**RECOMMENDATION NO. 6:** Prior to submitting a licensing application, a proponent must have finalized design details or plans to be available for public review during the public intervention period. The intervenors submit the Deep Water Intake is a project of great interest to members of the public and First Nations communities, and as a result, its

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<sup>87</sup> U.S. Government Accountability Office, “Nuclear Power Plants: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change.” GA-24-106326 (2 April 2024), online: [https://www.gao.gov/products/gao-24-106326?utm\\_campaign=usgao\\_email&utm\\_content=topic\\_naturalresources&utm\\_medium=email&utm\\_source=govdelivery](https://www.gao.gov/products/gao-24-106326?utm_campaign=usgao_email&utm_content=topic_naturalresources&utm_medium=email&utm_source=govdelivery)

<sup>88</sup> Ibid.

<sup>89</sup> CNSC Staff, CMD 26-H7 at page 54

<sup>90</sup> Ibid

<sup>91</sup> CNSC, Hearing Part 1 Transcript

finalization and design details should have been disclosed to the Commission at the start of the hearing process so that intervenors could assess the project in greater detail.

**RECOMMENDATION NO. 7:** the Climate Susceptibility and Adaptation Summary report should have considered more recent data, up to the year 2025, to have a more fulsome picture for predicting climate and extreme weather event modelling for Pickering.

**RECOMMENDATION NO. 8:** Climate change resiliency planning must consider disruption to workers or emergency responders in accessing the site when assessing severe climate effects.

**RECOMMENDATION NO. 9:** OPG should explain whether all the suggested considerations for specific adaptation options for Pickering equipment and systems are being implemented during refurbishment, and provide reasoning for either opting in or out of implementing the various adaptation options.

**RECOMMENDATION NO. 10:** The CNSC should conduct an assessment and mapping of vulnerability of Canadian nuclear power plants to climate change hazards, similar to those recommended in the GAO report.

**RECOMMENDATION NO. 11:** OPG and CNSC staff to provide an update on the assessment of the remaining category 3 CSIs, as the assessment should have been completed by June 2026, prior to Part 1 of this hearing.

## **2.2 THE FINDINGS OF THE PROBABILISTIC RISK ASSESSMENT IN RELATION TO ADEQUACY OF PROTECTING THE PUBLIC FROM UNREASONABLE RISK OF ADVERSE IMPACTS FROM NUCLEAR ACCIDENTS**

### ***i. Documentary Disclose and What has Been Assessed?***

In this section the intervenors examine the question of whether and how the proposal to refurbish Pickering B and continue to operate it for many decades is made safer because of “Probabilistic Risk Assessments.” This is important since PRAs (also known as Probabilistic Safety Assessments or “PSAs”) are one method to assess issues such as systemic risks, risks often overlooked in “deterministic” analysis, and “common mode” failures.

CELA, DNA and SHA submit that the Commission should ensure that it has the results of the PSA3 which evaluates safety issues related to the future operation of Pickering B if refurbishment

proceeds, before deciding on the issuance of renewed licence which will allow for operation of the PNGS to operate for many years into the future.

In previous licensing decisions, the Commission has been provided with PSA results related only to the previous configurations of the Pickering NGS with part of Pickering A operating together with Pickering B, with the pre-existing facilities and dependences between the units, or as related to the request for continued operations to 2026.

At the Part 1 hearing for this application, the most recent PSA related to a refurbished plant was not made available.

On the request of the intervenors, at a workshop with CELA, and a follow up meeting, as well as in email exchanges in preparation for this hearing, CELA made the following request to OPG in June, 2026:

Further to our inquiries, and our discussion today, in addition to the items for which you committed to provide more information, please provide copies of the following:

1. OPG Report, “Pickering NGS Global Assessment Report”, CD# P-REP-03680-00032 R001, February 8, 2018. A-2 OPG Report,
2. “Pickering Periodic Safety Review 2 (PSR2) Integrated Implementation Plan”, CD# P-REP-03680-00031 R001, February 28, 2018. A-3 OPG Report,
3. “Pickering NGS Periodic Safety Review 2-B (PSR2-B): Global Assessment Report”, CD# P-REP-03680-00048 R000, April 28, 2023.
4. “The Pickering PSR3 Pickering Nuclear Generating Station 251 Power Reactor Operating Licence Renewal Basis Document, P-REP-03680-00054 Pickering NGS Periodic Safety Review 3 (PSR3) Basis Document, was accepted by CNSC staff in May 2024.”
5. Safety Factors Report May 19, 2025
6. Copies or links to previous PSRs related to Pickering.

We also request a copy of the Global Assessment Report arising from the 2024 and 2025 reviews as soon as possible, within the first three weeks of July [2026], as that is important content for us to review prior to the due date for our Intervention material.

Despite extensive discussion in particular about items #4 and #5, and the document complete well before the licensing hearing, those documents have not been disclosed to the intervenors. Instead, after several email exchanges, Aditi Bhardwaj, Senior Manager, Strategic Projects at Nuclear Regulatory Affairs at OPG again referred CELA to the OPG’s CMD’s that were submitted as part of the hearing. This is the crux of the transparency and accountability issue and totally unacceptable to the public; OPG is relying on a PSR3 review in its application but refusing to disclose those assessments to the public:

The information related to PSR3 is referenced throughout the OPG Commission Member Document. Is there a specific section or topic you are looking for?

OPG plans to upload the document at the conclusion of the PSR project, after the Integrated Implementation Plan has been accepted by the CNSC.<sup>92</sup>

The intervenors therefore request a ruling from the Commission on disclosure of the following two documents, which are complete, have been submitted to the Commission, and are being relied on in OPG's licence renewal application:

1. "The Pickering PSR3 Pickering Nuclear Generating Station 251 Power Reactor Operating Licence Renewal Basis Document, P-REP-03680-00054 Pickering NGS Periodic Safety Review 3 (PSR3) Basis Document, was accepted by CNSC staff in May 2024."
2. Safety Factors Report May 19, 2025

The Intervenor further request OPG complete the "Global Assessment Report", which analyzes implications arising from the PSA work done to date in relation to a refurbished Pickering B and continued operations. The Intervenor request the opportunity to provide further submissions to the Commission once OPG makes all PSR3 documents available to the Commission and Intervenor (presently anticipated for August, 2026 but not disclosed at the time of writing).

Furthermore, OPG does not anticipate completing its Integrated Implementation Plan related to PSR3 completed for the Pickering refurbishment until 2027. The intervenors submit that the Commission should not renew OPG's license prior to reviewing that Plan. The public should have the opportunity to review the plan and provide input on it prior to a decision, as well.

**RECOMMENDATION NO. 12:** OPG should immediately disclose all PSR3 documents. It should not be relying on reports that are complete and have been submitted to the CNSC, but refuse to disclose them to the public.

**RECOMMENDATION NO. 13:** The Commission should not issue a license until it has an opportunity to review the Integrated Implementation Plan, and consider the adequacy of protection of the public in light of the additional safety analysis and insights provided by the completed PSA for a refurbished Pickering B.

**RECOMMENDATION NO. 14:** The Commission should provide an opportunity for public input on the Global Assessment Report and Integrated Implementation Plan prior to considering the further licensing of the plant.

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<sup>92</sup> Email from Aditi Bhardwaj, Senior Manager, Strategic Projects at Nuclear Regulatory Affairs at OPG to CELA dated August 5, 2026.

## ii. What are PSAs?

PSAs, used synonymously with Probabilistic Risk Assessments (PRAs), are one type of safety analysis that focuses on evaluating the risks that arise from various events in order to confirm that safety goals are being met.<sup>93</sup> They aim to identify combinations of events, both internal (e.g., human error) and external (e.g., strong winds), that may lead to severe accidents, assess the probability of each combination occurring, and evaluate the consequences.<sup>94</sup> They are performed using best-estimate data and assumptions and consider all existing plant systems to produce realistic predictions.<sup>95</sup> These assessments are conducted at three levels. Level 1 PSAs provide a set of event sequences/accident scenarios that may lead to fuel damage and the corresponding probabilities/frequencies of each of the events.<sup>96</sup> Level 2 PSAs provide the potential for the release of radioactive materials both within a plant and into the environment and estimates the characteristics of atmospheric release.<sup>97</sup> Level 3 PSAs yield the complete PSA, and account for atmospheric dispersion, deposition, and movement of the released radioactive material for each release group as outlined in the Level 2 PSA, outlining adverse environmental impacts, onsite impacts, and, if significant, off-site impacts.<sup>98</sup>

PSAs can constitute a posteriori analysis or a priori analysis. The former uses data from existing plants with established operating histories from the past, whereas the latter uses data from plants with no operating histories along with predictions for a period in the future using basic information from generic models.<sup>99</sup> PSAs may engage event trees (i.e., model plant responses to initiating events), fault trees (i.e., modelling plant systems in detail), human reliability analysis (i.e., evaluation of human errors), and *Monte Carlo* methods (i.e., computer modelling) to provide important information on plant safety.<sup>100</sup> Once a PSA is completed, there are two ways to assess the results in practice. First, analysts may draw technical conclusions from the relative importance of contributions to risk of the different accident sequences which could be initiated by failures in the plant's equipment/modes of operation.<sup>101</sup> Alternatively, analysts may draw conclusions about absolute risks with regard to a facility and the tolerability of risks, taking into account uncertainties, and this process would require a Level 3 PSA.<sup>102</sup> To ensure uncertainties are minimized, analysts

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<sup>93</sup> Government of Canada, "Safety analysis" (last modified 10 December 2025), online: <[cnscc-ccsn.gc.ca/en/resources/research/safety-analysis/](https://cnscc.ca/en/resources/research/safety-analysis/)>.

<sup>94</sup> International Nuclear Safety Advisory Group, *Probabilistic Safety Assessment* (Vienna: International Atomic Energy Agency, 1992) at pages 2-3. [International Nuclear Safety Group]

<sup>95</sup> Ibid.

<sup>96</sup> Gordon R. Thompson, *Risks of Operating CANDU 6 Nuclear Power Plants: Gentilly Unit 2 Refurbishment and its Global Implications* (Toronto: Greenpeace Canada, 2008).

<sup>97</sup> Ibid.

<sup>98</sup> Ibid.

<sup>99</sup> International Nuclear Safety Group, at page 4

<sup>100</sup> Nuclear Regulatory Commission, "Backgrounder on Probabilistic Risk Assessment" (last modified 19 January 2024), online: <[nrc.gov/reading-rm/doc-collections/fact-sheets/probabilistic-risk-asses](https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/probabilistic-risk-asses)>.

<sup>101</sup> Ibid.

<sup>102</sup> Ibid.

(1) enhance models to more accurately reflect reality, (2) incorporate research results to improve the modelled physical processes, or (3) collect additional data to improve model precision.<sup>103</sup>

### ***iii. Pickering B PSAs***

The Pickering B summary report for the PSA completed in 2018 was a level 2 PSA. A further PSA update considered life extension of some units until the end of 2026. Many of the aspects considered in those PSAs related to prior configurations of the plant (such as continued operations of Pickering A units all or in part for a period of time), as well as findings, gaps and recommendations related to the fact that the side A equipment still in operation, and side B plant components, were ageing. Many of these factors would be fundamentally different in a refurbished plant.

Accordingly, it is now critical that the Commission consider the PSR 3 report and findings, particularly in relation to gaps and opportunities for safety improvements, and that the public have the opportunity to provide submissions on these, as this is the assessment most relevant to the proposed continued operation after refurbishment of Pickering B units 5 to 8. The analysis and insights from PSR 3 are directly relevant to the Commission's opinion as to whether the public will be adequately protected if the licence is renewed.<sup>104</sup>

### ***iv. Changes to Pickering B If Refurbished***

It is important for the Commission to appreciate the plant structures and systems that will be in place at Pickering B if the licence allows for refurbishment of units 5-8. There were some changes made to PNGS after the 2011 Fukushima nuclear disaster as a result of the CNSC Fukushima action plan. For example, emergency electrical power supply was enhanced in case of a full station blackout as a result of the Fukushima Action Plan.<sup>105</sup> OPG also must comply with the changes to CNSC requirements related to emergency management post Fukushima as described by CNSC.<sup>106</sup>

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<sup>103</sup> Ibid.

<sup>104</sup> Lye A, Chang J, Xiao S, Chung KY. An Overview of Probabilistic Safety Assessment for Nuclear Safety: What Has Been Done, and Where Do We Go from Here? *Journal of Nuclear Engineering*. 2024; 5(4):456-485. <https://doi.org/10.3390/jne5040029> [Lye et al.]; Hayat Chatri, Michael Xu, Abderrazzaq Bounagui, *Regulatory Role of PSA in Canada and lessons learned from its use in advanced reactor facilities*, (CNSC Staff) October 2024, presented at: 17th International Conference on Probabilistic Safety Assessment and Management & Asian Symposium on Risk Assessment and Management [Chatri et al.]

<sup>105</sup> Jasmina Vucetic and R. Kameswaran, "Emergency Mitigating Equipments—Post Fukushima Actions at Canadian Nuclear Power Plants—Portable AC Power Sources", CNSC Submission to IAEA (Published March 12, 2015) Version v1, online: <https://inis.iaea.org/records/1rk4w-0jc67>

<sup>106</sup> CNSC, Fukushima: Lessons Learned to Improve Emergency Preparedness" (date modified: May 24, 2018), online: <https://www.cnsccsn.gc.ca/eng/resources/news-room/feature-articles/fukushima-lessons-learned/>

Some of the proposed safety related changes to the station arising as a result of the opportunity on refurbishment include replacing components such that the existing concerns of aged and degraded materials are reduced in relation to fuel channels and feeders, boilers, and standby generators. Other upgrades planned include replacement of the digital control computers, and upgrades to fuel handling equipment, fire protection equipment, and overhaul of one of the three emergency power generators.<sup>107</sup>

However, since the current aged state of equipment and systems were the matters of particular relevance to the pre-existing PSAs, the refurbishment plans will fundamentally alter the PSAs previously conducted. The focus of the Commission's inquiry should be reoriented to the changes planned for the station and their safety implications. The Intervenor also encourage the Commission to request additional information specifically as to how safety is being improved based on "OP-Ex" since the CMD makes that assertion without detailed explanation or analysis. OPG also submits that there are "Safety Improvement Opportunities" but at this time they are not confirmed as part of planned activities: "the SIOs listed below are currently progressing through various design engineering phases to ensure that practical solutions can be implemented to achieve the expected benefits."<sup>108</sup>

The intervenors submit that the Commissioners should expect the completion of this planning work and the presentation of its conclusions in refurbishment planning to the Commission before the hearing and before a decision is made on this licence. The question of what safety improvement opportunities exist in relation to Pickering B is core to the Commission's mandate of reaching an opinion on the adequacy of the protection to the public. These issues are of critical safety significance, including in relation to core cooling, containment enhancement and external hazard protection.

The Intervenor are highly concerned with and interested in ensuring that these issues are thoroughly investigated and presented to the Commission, with an opportunity for public input, as these are among the issues of most importance to the community. As OPG stated in its submission, "These SIOs and major component replacements will be key inputs to the development of the IIP scope."<sup>109</sup> This reinforces the position of the Intervenor that the Commissioners, as well as the public, should have the IIP in hand for input and consideration prior to the refurbishment decision. Without this information, the Commission cannot determine whether the PGNS will be safer or how it will be safer.

In forming an opinion pursuant to the *NSCA*, the Commission should not rely on future design work, or the hopes or expectations of safety features being improved. The Commission should be

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<sup>107</sup> OPG, CMD 26-H7-1, page 9

<sup>108</sup> *Ibid*, at page 10

<sup>109</sup> *Ibid*.

able to determine if OPG's investigations did provide "practical solutions" and what the "expected benefits" are, to assess the reasonableness of the risk to the public and environment.

OPG submission CMD 26-H7 – 1 is the written submission to the Commission in support of the application. At Page 8 OPG writes that "The PSR3 process **will identify enhancements to safety** by comparing the station against modern codes and standards".<sup>110</sup> As submitted earlier, this information should be available to the Commissioners before a decision that permits refurbishment is granted. As stated, this information is core to the mandate of the Commission in making its decision about whether the public is adequately protected.

At present, OPG only plans to post the results (summary) of the PSR 3 Implementation Plan publicly for information on its website, but not to provide this information to the Commission for consideration in this licensing decision. The Commission should insist on having that information before authorizing refurbishment to continue. PSAs assist in prioritizing safety improvements.<sup>111</sup>

In particular, whether and what changes are to be made to the pre-existing configuration between Plant A and Plant B are important for the Commission's decision making and the public's understanding of how safety is implicated. As reported in the 2018 Summary PSA for Pickering B, the pre-existing inter-plant state was such that: "The EME building, vacuum building and the HPECI {high pressure emergency coolant injection pumphouse and water storage tank} structures serve the **entire eight unit station**."<sup>112</sup>

At page 6 of the written application, OPG stated that there will be separation of systems as between the units of Plant A and the units of Plant B. However, a great deal of information is not yet determined and not yet available to the Commission for consideration in its decision. These issues are of utmost importance to the public to ensure that there are no compromises in the functioning of any of the safety systems or barriers to release in case of a severe accident.

The Intervenor request that the Commissioners require this additional information and specificity to fully understand the post-refurbishment state as between the equipment in today's Plants A and B. At this time, OPG states that "a boundary between Units 1 to 4 and Units 5 to 8 **will be defined, with the intent of removing common** systems and infrastructure, e.g., electrical, service water, etc. and creating independence."<sup>113</sup> There is a "concept" of an AB gate.<sup>114</sup> However, various options are still being considered by OPG, including whether and how to separate containment. Furthermore, the criteria are vague, with OPG saying that "as station conditions permit"; and the timeline is unspecified for switching the plant containment systems entirely to the B side. The

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<sup>110</sup> Ibid, at page 8, emphasis added.

<sup>111</sup> Lye et al.

<sup>112</sup> OPG, Pickering B 2018 PSA Summary, at page 13 of 121, *emphasis added*.

<sup>113</sup> OPG, CMD 26-H7-1 at page 6, *emphasis added*

<sup>114</sup> Ibid, at page 6, Fig. 3

Intervenors request that the Commission insist on understanding this aspect of the proposal before granting any approval that encompasses refurbishment.

Other changes are listed but without explanation or detail, and without consideration of the implications for safety. There is no analysis of how these changes reduce risk or add risk:<sup>115</sup>

- The Emergency Injection Circuit will undergo changes (related to Emergency Coolant Injection System).
- The Negative Pressure Containment System and Vacuum System will undergo changes.
- No changes are mentioned in relation to Shutdown Systems #1 or #2.
- Several changes are planned in relation to the Reactor related to: Calandria End Shield Cooling; Fuel Handling & Storage; Fuel Transfer System; Fueling Machine Head (Fueling Machine and Carriage; Fueling Machine Auxiliaries; Fueling Machine Bridge; Fueling Machine RAM; and Moderator System.
- Changes are planned to the Primary Heat Transfer System and the Emergency Water System.
- There are also changes planned to the Power House and Switchyard in relation to the Class 1 Electrical Power System as well as to the Class II and Class III Electrical Power Distribution System.
- Changes are planned to the Emergency Power Supply, Emergency Generators, and Standby Generators.
- Change is planned to the Main Power Output from the station.
- Changes will be made to the Digital Computer System for the station.
- The Steam Supply Systems will undergo changes in relation to the Boiler Steam and Water Systems, Condenser System and Feedwater System.
- Turbine Generator Systems and Steam Generator and Auxiliary Equipment systems will also undergo changes.<sup>116</sup>

There is further description at a high level of the scope of the refurbishment in Appendix D to the OPG submission,<sup>117</sup> providing more information as to what equipment is changing or being upgraded or replaced, or how systems are to be modified. OPG states that these changes will “improve long-term plant reliability and to increase safety and operational margins of the Pickering NGS Units 5 to 8.”, but without adequate explanation.<sup>118</sup>

OPG states that continued reliance on equipment, services and facilities related to Pickering Unit A is required and are further described in CMD H7-1 Reference 4. Section 4.1.2 describes the required shared systems which include various water, air, fire, communication, and emergency systems. However, there is no material in the application which explains potential changes to safety and support systems, which appear to still be under consideration. The Commission should

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<sup>115</sup> See for example, OPG Written Submission CMD, Special Safety Systems, at page 324 of 354.

<sup>116</sup> See OPG Application OPG – TMP – 0007-R005, Appendix B System Design and Performance at page 305 (337 or 354 electronic version)

<sup>117</sup> *Ibid*, at page 259 ff

<sup>118</sup> *Ibid*, at page 259

ensure it understands what a refurbished plant will look like, and ensure that it has a completed safety analysis. The Commission should also clearly understand how much safety is improved or what risks remain as a result of any changes.

**RECOMMENDATION NO. 15:** The Commission should request additional information specifically as to how safety is being improved based on “OP-Ex” since the CMD makes that assertion without sufficient information.

**RECOMMENDATION NO. 16:** The Commissioners require additional information and specificity regarding the proposed separation of systems as between the units of Plant A and the units of Plant B, so as to fully understand the post-refurbishment state as between the equipment in today’s Plants A and B. The Intervenors request that the Commission insist on understanding this aspect of the proposal before granting any approval that encompasses the refurbishment scope.

#### *v. Need for Disclosure of PSR 3 to Commissioners and the Public*

PSR 3 is described as dealing with the anticipated operation of refurbished units 5 to 8 at Pickering for another 30 years. Key outputs of PSR 3 are anticipated to include identification of the “gaps” and resulting potential “safety enhancements”. Of particular note is that part of what the PSR 3 is assessing in terms of gaps and strengths relates to the comparison to and assessment against “select modern codes and standards.”<sup>119</sup>

According to the CNSC Staff CMD, OPG planned to complete the PSR3 GAR by August 2026 and submit it to CNSC staff for review. CNSC staff also noted that a review of this report to provide feedback to OPG is anticipated for January 2027.<sup>120</sup> The intervenors note that at the time this submission was drafted, the Global Assessment Report was not available for review. The timelines of this report and its review by CNSC staff do not align with the timeline of this hearing, and prohibits intervenors from providing an assessment of the report to assist in the Commission’s decision for the licence hearing. Critical safety assessments should be available for the hearing, for review by the Commission and the public.

**RECOMMENDATION NO. 17:** The Intervenors seek an opportunity to provide further submissions to the Commission upon receipt of the Global Assessment Report; and continue to seek release of the already completed Safety Factor Reviews document related to PSR3.

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<sup>119</sup> OPG, CMD 26-H7-1, Appendix C– Periodic Safety Review and Safety Factors Review Summary, at page 249 of the consolidated document. *This addresses the PSR 3*

<sup>120</sup> CNSC Staff, CMD 26-H7 at pages 13-14

## 2.3 EMERGENCY RESPONSE AND PREPAREDNESS

### *i. Regulatory Framework and Threshold Issues*

The CNSC's authority over off-site emergency planning derives from sections 24(4)(a) and (b) of the *NSCA*.<sup>121</sup> Section 24(4)(b) provides that the CNSC shall not issue a new licence or renew a licence unless the applicant has made 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.

A licence renewal seeking approval to commence refurbishment should constitute a new license triggering the stipulations under s. 24(4)(b). The CNSC must also apply current international standards, including IAEA GSR Part 7 (2015),<sup>122</sup> as benchmarks for determining whether OPG has made adequate provision for off-site nuclear or radiological emergency preparedness and response.

#### Absence of a Pickering Implementation Plan under PNERP 2025

Ontario's Provincial Nuclear Emergency Response Plan (PNERP), signed July 31, 2025, revoked the previous PNERP.<sup>123</sup> The governing framework established under PNERP 2025 has implications for OPG's application. PNERP 2025 is the authority for all nuclear emergency responses in Ontario, but it is not a stand-alone operational document. PNERP 2025 is operationally applied through its Site-Specific Implementing Plans (IPs) that are designed specifically for each major nuclear facility in Ontario, including the PNGS.<sup>124</sup>

The PNERP IP is meant to provide detailed guidance and direction for dealing with a specific nuclear or radiological emergency ensuring that all relevant participants (licensee, municipality, province) respond in a unified manner to protect the public.<sup>125</sup> PNERP 2025 delegates operative, facility-specific emergency planning content, including Emergency Planning Zones (EPZ);<sup>126</sup> Urgent response actions (sheltering-in-place, evacuation protocols);<sup>127</sup> site-specific public alerting

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<sup>121</sup> *NSCA*, at s. 24(4)(b).

<sup>122</sup> International Atomic Energy Agency, *Preparedness and Response for a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No GSR Part 7 (Vienna: International Atomic Energy Agency, 2015), online: IAEA [https://www-pub.iaea.org/MTCD/Publications/PDF/P\\_1708\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/P_1708_web.pdf). [GSR Part 7].

<sup>123</sup> Emergency Management Ontario, Provincial Nuclear Emergency Response Plan (PNERP): A Strategic Response Framework for Nuclear & Radiological Emergency Management (Toronto: Ministry of Emergency Preparedness and Response, 2025), online: Government of Ontario <https://www.amherstburg.ca/media/jpobg5dk/provincial-nuclear-emergency-response-plan-pnerp-2025.pdf> [PNERP 2025].

<sup>124</sup> PNERP 2025, at page v.

<sup>125</sup> PNERP 2025, at page viii.

<sup>126</sup> PNERP 2025, at s. 6.4.

<sup>127</sup> PNERP 2025, at Annex N.1.

requirements,<sup>128</sup> and potassium iodide (KI) pre-distribution and institutional pre-stocking arrangements,<sup>129</sup> exclusively to Site-Specific Implementing Plans. The IP is the essential document that defines the concrete measures that must be undertaken to mitigate off-site effects of a nuclear emergency at that specific location.

Currently, the only active Site-Specific IP for the PNGS dates back to January 2019.<sup>130</sup> No PNGS-specific IP has yet been filed under PNERP 2025 in this proceeding and been made available for review. Relying on the 2019 plan while applying for a 2026 license creates a regulatory gap where PNGS emergency planning is not aligned with up-to-date provincial safety standards.

The PNERP 2019 Pickering Implementing Plan was a public document setting out the 0 - 3 km Automatic Action Zone (AAZ), 3 - 10 km Detailed Planning Zone (DPZ), 10 - 20 km Contingency Planning Zone (CPZ), and 20 - 50 km Ingestion Planning Zone (IPZ), alerting specifications, and KI distribution. Under PNERP 2025, none of the following operative elements for the PNGS are currently in the public record under a Site-Specific IP: the EPZ public alerting requirements; KI pre-distribution; or updated sector population data.

Without a PNGS-specific IP that reflects the population growth in the Durham Region, the KI distribution requirements, evacuation time estimates, and traffic management protocols are obsolete. The intervenors submit that a finding of “adequate provision” under s 24(4)(b) of the *NSCA* is not possible where the Site-Specific Implementation Plan for the facility under review does not exist on the public record.

**RECOMMENDATION NO. 18:** The intervenors recommend that the Commission deny the licence renewal application until a PNGS-specific Implementing Plan under PNERP 2025 has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

### Absence of a Probabilistic Safety Assessment

A Probabilistic Safety Assessment (PSA) is a systematic process used to identify event sequences leading to severe core damage and large radioactive releases, providing a quantitative estimate of

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<sup>128</sup> PNERP 2025, at s. 8.7.2.1.

<sup>129</sup> PNERP 2025, at Annex L.2.4.6

<sup>130</sup> Emergency Management Ontario, *Provincial Nuclear Emergency Response Plan (PNERP): Pickering Nuclear Generating Station Implementing Plan* (Toronto: Ministry of the Solicitor General, 2019, revised December 2021), online: Government of Ontario <https://files.ontario.ca/books/solgen-emo-pnerp-pickering-implementing-plan-2019-en-2021-12-14.pdf> [PNERP 2019 IP].

risk to the public.<sup>131</sup> Under REGDOC 2.4.2, licensees are required to update their PSAs at least every five years. However, the regulation explicitly states that models “shall be updated sooner if the facility undergoes major changes.”<sup>132</sup> The fundamental safety objective of these updates is “to protect people and the environment from harmful effects of ionizing radiation.”<sup>133</sup> Refurbishment constitutes a “major change” under REGDOC-2.4.2, necessitating an update to the PSA to ensure it accurately reflects a post-refurbishment nuclear facility’s risk profile.

OPG has not completed a PSA that accounts for the post-refurbishment of the PNGS. While OPG completed a full update of its PNGS PSA in 2022 and 2023 to demonstrate to the CNSC that current operations pose an “acceptable level of risk to the public,” these analyses reflect the plant as it exists today, not as it will exist for the proposed 30-year life extension.<sup>134</sup> The incomplete, but continuing, PSA is evidenced by OPG’s phased schedule which CNSC staff have improperly accepted.<sup>135</sup>

- 2027: Update to Hazard Screening and Non-Reactor Source PSA
- 2029: Interim update to support the restart of the first refurbished unit (Unit 5)
- 2032: Completion of the full-scope PSA reflecting the final post-refurbishment end-state of all units

OPG insists and CNSC have found that the 2022/2023 PSA results are valid for the initial period of a renewed PROL. OPG intends to use these existing models to “assess the impact of planned refurbishment activities” and identify Safety Improvement Opportunities (SIOs).<sup>136</sup> OPG insists that the individual and aggregate safety benefits of these SIOs cannot be “fully quantified until the detailed design is completed,” which is why the final PSA is delayed until 2032.<sup>137</sup>

The objective of a PNGS refurbishment PSA is to demonstrate that the “large release risk” is significantly reduced compared to the pre-refurbished plant.<sup>138</sup> Without a completed PSA, it is impossible for the CNSC to ensure that the proposed SIOs are sufficient to prevent “cliff-edge effects,” small changes in conditions that lead to catastrophic increases in consequences.<sup>139</sup> The intervenors are concerned that these inadequate assessments may lead to overlooking risks. By delaying the final PSA until 2032, OPG is asking for a 30-year extension before it has proven that its proposed refurbishment will achieve modern safety requirements. The Commission should reject this approach.

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<sup>131</sup> Canadian Nuclear Safety Commission, *REGDOC-2.4.2, Nuclear Emergency Preparedness and Response* (Version 2, Ottawa: Canadian Nuclear Safety Commission, 2024), online: Canadian Nuclear Safety Commission <https://www.cnsccs.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-4-2/> [REGDOC 2.4.2].

<sup>132</sup> REGDOC 2.4.2, at s. 4.4.

<sup>133</sup> REGDOC 2.4.2, at s. 3(a).

<sup>134</sup> OPG, CMD 26-H7-1, at pages 96-97.

<sup>135</sup> OPG, CMD 26-H7-1, at pages 96-97.

<sup>136</sup> CNSC Staff, CMD 26-H7, at page 52.

<sup>137</sup> *Ibid* at Attachment 1 page 19.

<sup>138</sup> *Ibid*.

<sup>139</sup> REGDOC 2.4.2, at s. 3.

Additionally, the size of the DPZ and the CPZ should be based on the risk posed by the PNGS site. Without a completed Level 2 PSA that quantifies the magnitude and frequency of radioactive releases for the refurbished plant,<sup>140</sup> emergency planning remains perfunctory rather than based on the reality of a potential multi-unit accident.

**RECOMMENDATION NO. 19:** OPG has not completed an adequate PSA. This failure denies the Commission and the public the ability to review the final risk profile of the PNGS during the current 2026 licensing process. The intervenors recommend that the CNSC deny the licence renewal application until a full-scope PSA for the refurbished PNGS is completed and made available for review at a subsequent hearing.

### Absence of a Periodic Safety Review (PSR)

Under subsection 8.01(1) of the *Class I Nuclear Facilities Regulations*, licensees are required to conduct a Periodic Safety Review at intervals specified in their licence.<sup>141</sup> A PSR is a comprehensive evaluation of a nuclear power plant to assess actual plant safety, the quality of safety documentation, and to determine improvements to ensure safety until the next PSR or the end of operation.<sup>142</sup> A completed PSR consists of four mandatory phases: (1) a Basis Document; (2) a Safety Factors Review; (3) a Global Assessment Report (GAR); and (4) an Integrated Implementation Plan (IIP).<sup>143</sup>

As previously stated, OPG has not yet completed its Periodic Safety Review for the PNGS (PSR3) as of its application to renew the PNGS PROL,<sup>144</sup> because the GAR and IIP remaining outstanding.<sup>145</sup> The PSR3 remains incomplete because OPG and CNSC staff have agreed to a phased PSR3 that permits the submission of prerequisite safety documentation *after* the licensing proceedings have commenced.<sup>146</sup> OPG intends for the PSR3 to serve as the foundation for the return to service of refurbished units, rather than as a prerequisite for the initial authorization of a licence for the refurbishment project itself.<sup>147</sup> Consequently, OPG is seeking a licence renewal based on a *commitment* to implement a plan that has not yet been completed, assessed, or approved.

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<sup>140</sup> International Atomic Energy Agency, *Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants*, IAEA Safety Standards Series No SSG-4 (Vienna: International Atomic Energy Agency, 2010), online: International Atomic Energy Agency [https://www-pub.iaea.org/MTCD/publications/PDF/p15818-PUB2105\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/p15818-PUB2105_web.pdf), at s. 2.2.

<sup>141</sup> Canadian Nuclear Safety Commission, *REGDOC-2.3.3, Periodic Safety Reviews* (Ottawa: Canadian Nuclear Safety Commission, 2015), online: Canadian Nuclear Safety Commission <https://api.cnsccsc.gc.ca/dms/digital-medias/REGDOC-2-3-3-Periodic-Safety-Reviews-eng.pdf/object>, at s. 2 [REGDOC 2.3.3].

<sup>142</sup> REGDOC 2.3.3, at s. 1.

<sup>143</sup> OPG, CMD 26-H7-1, at page 8.

<sup>144</sup> *Ibid.*

<sup>145</sup> *Ibid* at pages 249-251.

<sup>146</sup> *Ibid* at p. v.

<sup>147</sup> *Ibid* at p. iv.

Without the GAR and IIP, the CNSC will be authorizing a 30-year life extension without knowing the specific modifications required to meet modern safety standards nor the timelines for their implementation.

The fundamental purpose of the PSR3 is to determine if the gap between the aging PNGS and modern requirements on the “practical elimination of significant radioactive releases” has been adequately addressed and reduced to the extent achievable.<sup>148</sup> Approving the renewal of the PROL for 10 years before the gap analysis is complete leaves the public at risk of unmitigated radiological releases that current emergency plans for the PNGS are unprepared to handle.

While CNSC staff have included a licence condition in the proposed PROL (condition 3.4) to require OPG to conduct a PSR at least every 10 years and implement the associated IIP,<sup>149</sup> the intervenors submit this is too infrequent for the proponent to complete a PSR. To improve transparency and safety oversight, the PSR should be conducted on a more frequent basis, such as at least every five years.

The intervenors submit that the current schedule denies the Commission the opportunity to review the specific safety upgrades that will be required to justify continued operation of the PNGS. Meaningful review cannot occur if the GAR and the IIP are reviewed by CNSC staff only after the licence has already been granted.

**RECOMMENDATION NO. 20:** The intervenors submit that granting a renewal of the PROL for 10 years before the PSR3 is complete poses an unacceptable risk to public safety and prevents the CNSC from ensuring that “adequate provision” for safety has been made for the proposed 30-year extension. CELA recommends that the Commission deny the licence renewal until the GAR and IIP are finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

**RECOMMENDATION NO. 21:** For transparency and more frequent safety oversight, the PSR should be conducted at least every five years.

### The Nuclear Emergency Preparedness and Response Framework

CNSC REGDOC-2.10.1, Version 2 (2016) governs emergency preparedness and response at Canadian nuclear power plants.<sup>150</sup> In August 2024, the CNSC published REGDOC-2.10.1, Version

<sup>148</sup> CNSC Staff, CMD 26-H7 at Attachment 1 p. 19.

<sup>149</sup> CNSC Staff, CMD 26-H7 at pages 13-14

<sup>150</sup> Canadian Nuclear Safety Commission, *REGDOC-2.10.1, Nuclear Emergency Preparedness and Response*, Version 2 (Ottawa: Canadian Nuclear Safety Commission, 2016), at 1, online: Government of Canada <https://api.cnscccsn.gc.ca/dms/digital-medias/REGDOC-2-10-1-Nuclear-Emergency-Preparedness-and-Response-v2-eng.pdf/object> [REGDOC-2.10.1 v2].

3 as a Draft for Consultation.<sup>151</sup> REGDOC-2.10.1, Version 3 has not been finalized and is not legally binding. OPG has acknowledged the updated requirements of REGDOC-2.10.1, Version 3 and stated in its licence application that it “will conduct a gap analysis and prepare an implementation plan for meeting the requirements of the REGDOC-2.10.1, Version 3 as well as the revised Pickering PNERP Implementing Plan.”<sup>152</sup>

Draft REGDOC-2.10.1, Version 3 is significant for a number of reasons. First, it represents what the CNSC considers to be the up-to-date regulatory standard appropriate for nuclear emergency preparedness. Second, Draft REGDOC-2.10.1, Version 3 introduces more stringent or new obligations not found in the previous version, including a planning basis review upon major facility changes and independent third-party evacuation time estimates every five years. Finally, as the Commission is considering granting a licence for a 30-year refurbishment program, it would be anomalous/irresponsible/unsafe to do so on the basis of a safety standard (REGDOC-2.10.1, version 2) that the CNSC has determined to be inadequate and has revised.

The following obligations under Draft REGDOC-2.10.1, Version 3 are directly relevant to OPG’s licence application:

- Section 2.1(5) requires licensees to undertake a formal review of the planning basis every five years or when a facility undergoes major changes, and submit it to the CNSC for review and acceptance.<sup>153</sup> A refurbishment involving multiple reactor units reasonably constitutes a major change. Despite the proposal for a major change, no updated planning basis for the refurbishment has been filed for review and accepted in OPG’s licencing application.
- Section 2.1(3)(3) requires the licensee to provide a recommendation on the EPZ sizes and extended planning distances for the offsite response authorities.<sup>154</sup> OPG’s recommendation does not appear in the public record as part of the licencing application. This obligation is connected to the s 2.1(5) review of the planning basis; OPG’s recommendation on the EPZ must be based on an up-to-date planning basis for the refurbishment.
- Section 2.1(7) requires that an evacuation time study be conducted by an independent qualified third party every five years to inform the planning basis and emergency preparedness program (EP) requirements. OPG has filed the 2023 KLD ETE study,<sup>155</sup> which uses 2021 Canada Census data.<sup>156</sup>

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<sup>151</sup> Canadian Nuclear Safety Commission, *REGDOC-2.10.1, Nuclear Emergency Preparedness and Response*, Version 3 (Consultation Draft, October 2024), online: Government of Canada <https://www.cnsccsn.gc.ca/eng/acts-and-regulations/consultation/regdoc2-10-1-v3-consultation/> [Draft REGDOC-2.10.1 v3].

<sup>152</sup> OPG, CMD 26-H7-1, at page 186.

<sup>153</sup> Draft REGDOC-2.10.1 v3, at s. 2.1(5).

<sup>154</sup> *Ibid* at s. 2.1(3)(3).

<sup>155</sup> Ontario Power Generation, *Pickering NGS Development of Evacuation Time Estimates* (2024), online: Ontario Power Generation <https://www.opg.com/documents/pickering-ngs-development-of-evacuation-time-estimates/> [2023 ETE Study].

<sup>156</sup> OPG, CMD 26-H7-1 at page 229.

The study, however, was commissioned directly by OPG, not by an independent qualified third party as s. 2.1(7) requires.

- Section 2.1(2)(2) requires that the planning basis include multi-unit and multi-module accident scenarios. This is relevant to the PNGS site, where multiple units will be simultaneously placed in different states. PNGS Units 1 to 4 will be undergoing decommissioning activities while Units 5 to 8 will be refurbished. OPG's application is silent on the additive risk of a severe event at a refurbished unit impacting the decommissioned units. Because OPG has not documented these co-mingled, multi-unit failures in its planning basis, it has failed to satisfy the qualitative criteria of section 2.1(2)(2).
- Section 2.2.5(7) requires that evacuation time studies be conducted by an independent qualified third party every five years to "inform the planning basis and associated EP program requirements." To inform the planning basis, an ETE must be an accurate reflection risk posed by a facility. While the 2023 ETE assumes "a rapidly progressing severe accident" for the PNGS,<sup>157</sup> the risk posed by the refurbished PNGS will not be quantified via a PSA until 2032.<sup>158</sup> Additionally, the 2023 ETE Study confirms that evacuation times for 100% of the population could now take **up to 17 hours** due to "significant congestion," a period that is inadequate during an accident with a prompt release.

The current emergency planning, governed by REGDOC-2.10.1 Version 2, the *Provincial Nuclear Emergency Response Plan (PNERP) 2025* and the existing 2019 PNGS-specific Implementing Plan, remains technically and legally insufficient to protect the 3.2 million people residing within the emergency planning zones of the facility.

The proposed refurbishment and long-term operating license must not be granted in the absence of a comprehensive, modern, and publicly validated emergency preparedness and response framework. The historical safety performance of the PNGS, the oldest operating nuclear power station in North America, coupled with the population density surrounding the facility, demands that the offsite emergency planning basis be evaluated with the highest level of regulatory scrutiny.<sup>159</sup>

**RECOMMENDATION NO. 22:** The CNSC should address the requirements under REGDOC-2.10.1, Version 3 by requiring compliance with Version 3's substantive obligations as conditions of any licence; or (b) providing a reasoned explanation of why a renewed PROL should be granted on the basis of a standard the Commission's own staff has determined requires material upgrade. The Commission should firmly reject OPG's request for a licence for a 30-year refurbishment program on the basis of a standard that the CNSC has determined is inadequate and requires revision.

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<sup>157</sup> 2023 ETE Study, at pages 2-3.

<sup>158</sup> OPG, CMD 26-H7-1 at page 97.

<sup>159</sup> Canadian Environmental Law Association, Submission to the Canadian Nuclear Safety Commission Regarding Ontario Power Generation's Application to Refurbish and Continue Operation of the Pickering Nuclear Generating Station (26 April 2024), online: Canadian Environmental Law Association <https://cela.ca/wp-content/uploads/2024/05/CELA-Pickering-Extension-Submission-April-26-2024.pdf> [CELA Submission 2024] at page 6.

### Siting of the Pickering Nuclear Generating Station

The population of Durham Region as a whole has expanded from 614,970 in 2009 to a projected 949,100 by 2026, while the broader population within 40 kilometers of the Pickering site exceeded 3.2 million as early as 2001.<sup>160</sup> This growth is part of a trend in the Toronto Census Metropolitan Area, which reached 6.2 million people in 2021.<sup>161</sup> Between 2016 and 2021, the population of the Durham Region Census Division grew by 7.3 percent. This rapid population growth means that emergency planning that does not account for increasing population density will quickly become obsolete.

As CELA has previously submitted, under current IAEA siting guidelines, a multi-unit nuclear station would not be authorized in such a high-density location because evacuation would effectively be impossible because of logistical gridlock.<sup>162</sup>

As of 2021, the combined population of the 10 km DPZ and the 20 km CPZ is 1,280,705 permanent residents.<sup>163</sup> The proximity of the PNGS to the municipal boundaries of the City of Toronto, located approximately 45 kms east of Toronto City Hall, compounds the risk posed by the facility as the 10 km DPZ extends directly into dense urban communities.<sup>164</sup>

The PNGS is also situated immediately adjacent to transportation corridors of national economic significance.<sup>165</sup> The path of the radioactive plume from a severe accident at Pickering would intersect Highway 401, Highway 2, and the primary Canadian National and Canadian Pacific rail corridors.<sup>166</sup> Additionally, the station sits on the north shore of Lake Ontario, which serves as the primary source of drinking water for millions of residents in the Greater Toronto Area.<sup>167</sup> This concentration of population and critical infrastructure makes the PNGS site uniquely vulnerable to a severe accident with offsite consequences, meaning that any failure of the offsite emergency planning framework would result in an unprecedented humanitarian and economic crisis.<sup>168</sup>

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<sup>160</sup> Theresa McClenaghan, *Emergency Planning at the Pickering Nuclear Generating Station* (Commission Member Document (CMD) 14-H2.31, 3 May 2013), Canadian Environmental Law Association Publication No 899, at 42-43, online: Canadian Environmental Law Association <https://cela.ca/wp-content/uploads/2019/07/899PickeringEmergencyPlanning.pdf> [CELA Submission 2013] at page 2.

<sup>161</sup> CELA Submission 2024, at page 10.

<sup>162</sup> CELA Submission 2013, at pages 60-62.

<sup>163</sup> 2023 ETE Study, at page 3-21.

<sup>164</sup> City of Toronto, *Toronto Nuclear Emergency Response Plan* (approved 20 August 2020), online: City of Toronto <https://www.toronto.ca/wp-content/uploads/2021/03/972e-TNERP20aug2020approved-Web-Version-FINAL.pdf> at 2.0.1 [TNERP].

<sup>165</sup> CELA Submission 2013, at page 61.

<sup>166</sup> *Ibid* at page 46.

<sup>167</sup> PNERP 2019 IP, at 2.1.

<sup>168</sup> CELA Submission 2013, at page 3.

## *ii. The Planning Basis*

Under the Canadian nuclear regulatory framework, the planning basis identifies and analyzes the specific hazards a nuclear emergency management program must address based on their potential impact on public health, safety, property, and the environment.<sup>169</sup> Under Draft REGDOC-2.10.1, Version 3, the planning basis establishes the parameters that dictate the scale of response arrangements, the size of EPZs, and the speed of public alerting protocols. Licensees must establish a planning basis using the results of safety analyses, including Deterministic Safety Analysis (DSA) and Probabilistic Safety Analysis (PSA).<sup>170</sup> The planning basis DSA and PSA must be undertaken for amongst other, Design Basis Accidents (DBA) and Beyond Design Basis Accidents (BDBA), including severe accidents; extended loss of power events; and multi-unit and multi-modules accidents scenarios.<sup>171</sup> All licensees are also required to review and obtain CNSC approval for the planning basis at least every five years, or sooner if the facility undergoes major changes.<sup>172</sup>

The establishment of a planning basis begins by identifying all potential radiological hazards resulting from a station accident, malfunction, or loss of control.<sup>173</sup> The licensee analysis of the PSA and DSA identifies a series of “limiting accidents,” specific, representative accident scenarios to define the technical and EPZ boundary requirements for an EP program. For each limiting accident, the planning basis estimates isotopic release quantities (source term), the timing of the release, radiological consequences, and the geographical area potentially affected.<sup>174</sup> These results directly dictate the size and boundaries of Emergency Planning Zones, such as the Detailed Planning Zone, the Contingency Planning Zone, and the Ingestion Planning Zone.<sup>175</sup>

PNERP 2025 characterizes BDBAs as involving “significantly reduced hold up time of radioactivity in containment,” “little time available to alert the public,” “early release of radioactivity,” and environmental contamination that “could be quantitatively significant in both extent and duration.”<sup>176</sup> The licence renewal and refurbishment of PNGS will involve heightened operational complexity, where multiple units will simultaneously be undergoing various stages of safe storage, refurbishment, and recommissioning. The BDBA planning basis for the refurbishment has not been disclosed. The absence of a Pickering Implementing Plan under PNERP 2025 means that the BDBA-specific planning that was included in the PNERP 2019 Implementing Plan has not been updated or confirmed for the PNGS refurbishment and application

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<sup>169</sup> PNERP 2025, at Annex K.2.

<sup>170</sup> Draft REGDOC-2.10.1 v3, at s. 2.1.

<sup>171</sup> *Ibid* at s. 2.1(2).

<sup>172</sup> *Ibid* at s. 2.1(5).

<sup>173</sup> PNERP 2025, at Annex K.1.

<sup>174</sup> Draft REGDOC-2.10.1 v3, at s. 2.1(3)(2).

<sup>175</sup> *Ibid* at s. 2.1(3).

<sup>176</sup> PNERP 2025, at Annex K.3.2.

to renew the PROL.<sup>177</sup> Draft REGDOC-2.10.1, Version 3, requires that the planning basis include multi-unit and/or multi-module accidents, a scenario that is squarely applicable to the PNGS refurbishment, and one that has not been satisfied.<sup>178</sup>

Currently, REGDOC-2.10.1 version 2 governs the emergency preparedness requirements at the PNGS, Version 3 is not yet in force. OPG is not in compliance with the latest draft version of REGDOC-2.10.1, nor is its PROL renewal application, despite requesting a license that will endure for 30 years. OPG instead provides assurance in its application that it will conduct “a gap analysis and prepare an implementation plan for meeting the requirements of REGDOC-2.10.1 Version 3 as well as the revised Pickering PNERP Implementing Plan,” prior to the start of the proposed licence period, which is scheduled to begin on January 1, 2027.<sup>179</sup> Commission staff assume that OPG intends to implement the majority of the standards prior to the start of the proposed licence period and expects OPG to fully implement the remaining standards *during* the proposed licence period.<sup>180</sup>

Commitments to conduct gap analyses and implementation plans in the future (even if before the start date) mean the Commission is deciding on the *intent* to demonstrate legal compliance rather than the *proven* capability to do so. Section 24(4) of the *NSCA* requires the Commission to be satisfied that the licensee will make adequate provisions for the protection of the environment and the health and safety of persons. Satisfaction requires a complete evidentiary record at the time the Commission exercises its discretion to award a licence.

The intervenors submit that authorizing a 10-year PROL under these conditions represents a failure of regulatory accountability and a risk to the millions of residents within the EPZ.

As in previous Pickering NGS PROL applications, the current planning basis for OPG’s PROL renewal application remains reliant on a single-unit Design Basis Accident approach. A DBA is defined as an accident against which the facility is specifically designed to withstand or an accident for which radiological releases are kept within authorized limits.<sup>181</sup> The DBA approach assumes that a catastrophic, multi-unit severe accident with an early large release is highly improbable, thereby limiting offsite emergency preparedness to a much smaller scale of accident.<sup>182</sup> By benchmarking emergency plans against accidents that safety systems are specifically designed to handle, rather than the catastrophic sequences experienced at Chernobyl and Fukushima, OPG and the provincial government fail to provide adequate provision for the protection of public health and safety.

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<sup>177</sup> PNERP 2019 IP.

<sup>178</sup> PNERP 2025, at s. 2.1(2)(b).

<sup>179</sup> OPG, CMD 26-H7-1 at page 186.

<sup>180</sup> CNSC Staff, CMD 26-H7 at page 43.

<sup>181</sup> PNERP 2025, at Annex K.3.1.

<sup>182</sup> CELA Submission 2013, at pages 21-23.

The current planning basis for Pickering NGS relies on the assumption of a 48-hour containment hold-up time during which accidental radiological releases are delayed.<sup>183</sup> This window is intended to allow for radioactive decay before a controlled, filtered release. However, PNERP 2025 acknowledges that BDBAs involve “significantly reduced hold up time of radioactivity in containment,” “little time available to alert the public” and “early release of radioactivity.”<sup>184</sup> By utilizing a 48-hour holdup as a benchmark, licensees can justify a restricted EPZ and rely on the belief that several days are available to coordinate evacuations. If containment were to fail early, the 17-hour evacuation time identified in the 2023 ETE Study would ensure thousands of people would be trapped in traffic during the arrival of a plume.

OPG’s assumptions of a 48-hour “hold-up” time fails to prepare the surrounding population for a “prompt” release where containment fails immediately or earlier than expected. Utilizing a non-conservative planning basis means that regional infrastructure, including hospital capacity and evacuation routes, is not sized for a Level 7 accident on the International Nuclear and Radiological Event Scale (INES-7).<sup>185</sup> Relying on authorities to “improvise” a response to an accident that exceeds this narrow basis is socially and ethically unacceptable and contradicts the principles of Defence in Depth. CELA maintains this approach is fundamentally deficient as it fails to account for Beyond Design Basis Accidents or unmitigated severe accidents involving multiple units on par with an INES-7 event.

CELA's 2018 submission found that REGDOC-2.10.1 Version 1 (2014) predated GSR Part 7 (2015) and that no site-specific compliance demonstration existed for Pickering. In 2026, REGDOC-2.10.1 Version 3 remains in draft consultation form, OPG remains compliant only with the superseded Version 2, and critically, a PNGS-specific Implementing Plan is absent altogether. As noted earlier, the *NSCA* requires the Commission to be satisfied that a complete evidentiary record is available at the time the CNSC exercises its discretion to award a PROL.

**RECOMMENDATION NO. 23:** The Commission should treat the absence of a current, published, PNERP 2025-conformant Pickering Implementing Plan and a REGDOC-2.10.1 Version 3 gap analysis as a condition precedent to be satisfied prior to the renewal of the PROL, not as a matter to be resolved post-licensing. The intervenors recommend that the Commission withhold approval for the PROL renewal until the OPG’s gap analysis is complete, the implementation plan and PSRs are all finalized, publicly vetted, and the OPG is found to be in full compliance with the most recent Canadian and international standards.

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<sup>183</sup> PNERP 2019 IP, at s. 2.6.

<sup>184</sup> PNERP 2025, at Annex K.3.2.

<sup>185</sup> International Atomic Energy Agency, *The International Nuclear and Radiological Event Scale (INES)* (Vienna: IAEA, 2008), online: IAEA <https://www.iaea.org/sites/default/files/ines.pdf>

**RECOMMENDATION NO. 24:** The Commission should require OPG to demonstrate that offsite emergency plans can mitigate the impacts of an INES Level 7 accident, ensuring regional infrastructure is sized for a worst-case scenario.

**RECOMMENDATION NO. 25:** The Commission should formally adopt the Draft REGDOC-2.10.1 Version 3 requirement to account for “multi-unit and/or multi-module accident scenarios” occurring during refurbishment activities.

**RECOMMENDATION NO. 26:** OPG is required to conduct a comprehensive PSR in accordance with CNSC REGDOC-2.3.3, which involves comparing the station’s current state against “modern codes and standards” to identify necessary safety enhancements. OPG’s PSR3 process for the refurbishment is being conducted using direct guidance from IAEA SSG-25 (Periodic Safety Review for Nuclear Power Plants).<sup>186</sup> The intervenors recommend that the Commission withhold approval for the PROL until the licensing basis for the renewal application formally incorporates modern international standards through the Periodic Safety Review process.

### *iii. Emergency Planning Zones*

The boundaries of the current EPZs around the PNGS are comprised of the 0 - 3 km AAZ, 3 - 10 km DPZ, 10 - 20 km CPZ, and 20 - 50 km IPZ, has not changed in the past decade.<sup>187</sup> PNERP 2025 delegates the implementation of all EPZ-specific operational and protective actions that might be required during a nuclear emergency, in order to protect public health, safety, and the environment to the PNGS Implementing Plan.<sup>188</sup> Since no updated PNGS IP currently exists under PNERP 2025, the EPZ for PNGS are not available for review.

The March 2023 Evacuation Time Estimate (ETE) study performed by KLD Engineering provides critical evidence that necessitates amendment of the Emergency Planning Zones (EPZ) around the PNGS.<sup>189</sup> The study found that the ETEs computed for the 2023 study are longer than the ETEs computed in the previous study. The population within the EPZ has increased by approximately 2% and the external traffic that traverses the region has doubled. This increase in evacuating traffic demand, without a comparable increase in transit capacity, will increase ETE.<sup>190</sup>

The findings in the 2023 ETE Study demonstrate that the current zone boundaries are effectively arbitrary and functionally inadequate on the basis of real-world population and logistics of the region surrounding the PNGS. Given the significant evacuation times, the CNSC should increase

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<sup>186</sup> CNSC Submission, at page 10.

<sup>187</sup> PNERP 2019.

<sup>188</sup> PNERP 2025 at s. 6.4.

<sup>189</sup> 2023 ETE Study.

<sup>190</sup> *Ibid* at ES-1.

the EPZ surrounding the PNGS to mitigate the health impacts on all the surrounding population in the event of a severe accident.

### The Detailed Planning Zone (DPZ)

The current 10-km DPZ is the designated area surrounding a nuclear facility where detailed arrangements are established in advance to ensure the rapid removal of people to avoid short-term radiation exposure. This zone incorporates the smaller Automatic Action Zone and serves as the primary boundary for mandatory emergency planning, including mass evacuation and the proactive pre-distribution of KI pills. This DPZ includes the highly populated neighborhoods in eastern Toronto and southern Durham Region. In a real emergency involving a rapid release of radioisotopes, atmospheric conditions would dictate plume trajectory, carrying contaminants far beyond the 10 km limit of the DPZ.

The 2023 ETE study reveals that for the DPZ, the longest time required to evacuate 90% of the population from the DPZ ranges from 4 hours and 45 minutes to 8 hours and 25 minutes. The time required to evacuate 100% of the population ranges from 4 hours and 30 minutes to 10 hours and 15 minutes.<sup>191</sup> While the DPZ technically evacuates in up to 10 hours and 15 minutes, the significant congestion within the Contingency Planning Zone (CPZ) extends the time to evacuate 100% of the population to as long as 17 hours. This is critically important because congestion within the DPZ for nearly 8 hours under even “good” weather conditions in the winter shows that a 10 km boundary provides little meaningful “detailed” protection if the residents cannot physically exit the zone before the arrival of a plume. Furthermore, the gridlock within CPZ effectively traps residents of the DPZ within 20 km of the PNGS for nearly three-quarters of a day.<sup>192</sup>

### The Contingency Planning Zone (CPZ)

The Contingency Planning Zone (CPZ) is a pre-designated area surrounding a reactor facility, extending from DPZ out to 20 km from the PNGS. Unlike the DPZ, which requires detailed emergency preparations, the CPZ lacks mandatory default protective measures, relying instead on ad-hoc contingency planning and arrangements made in advance on the basis of a list of “considerations.”<sup>193</sup> This essentially means that no pre-planned, funded, or regularly practiced evacuation protocols exist for residents in this zone.

The 2023 ETE Study expressly defines its primary scope as the DPZ Outer Ring. On the CPZ, the report states: “contingency planning and arrangements are to be made for the [CPZ]. As such, this

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<sup>191</sup> 2023 ETE Study, at ES-4, ES-5.

<sup>192</sup> *Ibid* at ES-2.

<sup>193</sup> PNERP 2025, at s. Annex M.4.

report focuses on the DPZ Outer Ring, but provides information, including data, analyses and results, for the CPZ for contingency planning purposes.”<sup>194</sup> This limited scope of the 2023 ETE Study is a consequence of the PNERP 2025, which treats the CPZ as a contingency for emergency planning rather than a zone requiring urgent protective action. The intervenors submit that this circular relationship, where the ETE Study ignores the CPZ because the PNERP does not prioritize it, is not a rational basis for an answer to whether the public beyond 10 km can be adequately protected.

The 2023 ETE study found that the 100th percentile evacuation time from the broader 20 km CPZ now takes nearly three times longer than the estimates provided to the CNSC for the 2008 PNGS refurbishment hearings (17 hours vs. 6.5 hours).<sup>195</sup>

The planning basis for a BDBA in PNERP 2025 characterizes beyond design basis accidents as involving “little time available to alert” and releases lasting “days or weeks.”<sup>196</sup> A planning framework in which evacuating the DPZ and CPZ takes 17 hours, combined with an accident that provides little to no warning time, is inconsistent with the standard that OPG has made “adequate provision for the protection of the environment and the health and safety of persons” under s 24(4)(b) of the *NSCA*.

If a severe accident necessitated rapid evacuation from the CPZ, the lack of pre-planned protective measures would lead to improvised measures under high-stress conditions, with possible tragic consequences.<sup>197</sup> The CNSC should not accept the continued reliance on an improvised strategy for responding to accidents that require protective measures beyond the DPZ. CELA has consistently recommended that the zones be expanded to include pre-planned protective measures that reflect international experience and realistic plume dispersion models.

The intervenors have previously expressed its concerns surrounding emergency planning and urged the CNSC to exercise oversight power to ensure emergency planning has been proven prior to exercising its discretion with regards to a PNGS licence approval.<sup>198</sup> These concerns remain relevant for OPG’s application to renew its PROL in connection with the refurbishment of the PNGS Units 5 - 8.

The intervenors submit that if the CNSC were to provide additional protection, then the planning, actions, readiness, and resourcing that would be required in this contingency zone are the same as

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<sup>194</sup> 2023 ETE Study, at ES-1.

<sup>195</sup> CELA Submission 2013.

<sup>196</sup> PNERP 2025, at Annex K.3.2.

<sup>197</sup> Canadian Environmental Law Association, *Supplemental Submission on Emergency Planning Regarding the Pickering Nuclear Generating Station Licence Renewal* (CMD 18-H03.26A, 18 July 2018), online: Canadian Environmental Law Association <https://cela.ca/wp-content/uploads/2019/07/1195-SupplementalSubmissionOnEmergencyPlanning.pdf> p. 3.

<sup>198</sup> CELA Submission 2024, at page 9; CELA, Pickering Extension Intervention, at page 43.

in the current 10 km DPZ. Accordingly, the intervenors submit that instead of this new, minimally useful “contingency planning zone,” the DPZ should be increased to 20 km; the CPZ to 100 km; and KI pre-distribution should occur within a 50 km radius of every nuclear reactor.

**RECOMMENDATION NO. 27:** The Commission should require OPG to update its Evacuation Time Estimate Report to reflect recent population objectives and growth trends. The updated ETE should also review the impact of increased evacuation zones at a radial distance of 50 km. These findings should be reported to the CNSC and publicly reviewed.

**RECOMMENDATION NO. 28:** The intervenors recommend the Commission conduct a comparative analysis of the protective measures in place for the DPZ and CPZ and ensure licence conditions provide for (1) the health and safety of persons and the environment in the event of a large, offsite radioactive release and (2) are congruent with international guidance.

**RECOMMENDATION NO. 29:** The intervenors recommend the CNSC require the expansion of nuclear emergency planning zones. First, the CPZ must require the same level of detailed protective measures as the AAZ or DPZ. Secondly, the current CPZ boundary should be re-evaluated based on better modelling and at a minimum, require a 20 km evacuation zone.

**RECOMMENDATION NO. 30:** The intervenors recommend that the Commission publicly review the PNERP 2025’s emergency planning zone sizes and its implications for all nuclear power plant licensees’ on-site and off-site emergency planning arrangements. The intervenors recommend any further PNERP technical studies and findings be publicly reviewed by the CNSC on an annual basis.

### Ingestion Planning Zone (IPZ)

According to PNERP 2025, the ingestion planning zone is an area where plans or arrangements are made to protect the food chain and drinking water supplies and restrict the consumption of potentially contaminated produce in the event of an emergency.<sup>199</sup> While the intervenors support the inclusion of these protective measures, unfortunately, the IPZ only extends to a distance of 50 km. Data from the Fukushima accident (an INES Level 7 event) confirms that radiological impacts and deposition are not confined to a 50 km radius.<sup>200</sup> While Japanese authorities initially established a 3 km evacuation zone and a 10 km sheltering area, the severity of the unmitigated

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<sup>199</sup> PNERP 2025, at Annex M.5.

<sup>200</sup> Canadian Nuclear Safety Commission, *CNSC Fukushima Task Force Report* (Ottawa: Canadian Nuclear Safety Commission, October 2011), online: Government of Canada [https://publications.gc.ca/collections/collection\\_2011/ccsn-cnsc/CC172-77-2011-eng.pdf](https://publications.gc.ca/collections/collection_2011/ccsn-cnsc/CC172-77-2011-eng.pdf) [CNSC Fukushima Task Force].

release required rapid expansion to an evacuation zone to 20 km and then to 30 km.<sup>201</sup> Following a 2014 joint meeting of the Western European Nuclear Regulators (WENRA), the Heads of the European Radiological Protection Competent Authorities (HERCA) concluded “an accident comparable to Fukushima would require protective actions such as evacuation up to 20 km and sheltering [and ITB] up to 100 km.”<sup>202</sup>

IAEA Safety Guide GS-G-2.1 outlines expectations for including arrangements to ensure that the public will be instructed not to ingest potentially contaminated food or milk in the event of a major release. 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.”<sup>203</sup>

The intervenors note that the 50 km PNGS IPZ, which is stated to be primarily for ingestion control, would not address this situation because most of the impacts from ingestion following Chernobyl were actually beyond 50 km. Following Fukushima this is an appropriate response since there were instances of contamination as far away as 50 and 80 km.<sup>204</sup>

**RECOMMENDATION NO. 31:** The intervenors recommend that in view of the experience at Chernobyl and Fukushima, the Commission should request that the Province of Ontario immediately revisit the 50 km secondary ingestion zone with a recommendation to expand it to 100 km. This should be done as part of detailed planning for severe offsite accidents so that appropriate monitoring of food, agricultural products, milk, and water is established and in place in the event of such an accident.

### Expansion of Emergency Planning Zones

The current EMZ radii have been in place since 1988 and have not been altered despite the experience of Chernobyl and Fukushima. This means the EPZ around Ontario nuclear facilities and specifically around the PNGS have not been re-examined in light of actual experience with severe accidents in which radionuclides breached containment.<sup>205</sup>

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<sup>201</sup> *Ibid* at pages 7-8.

<sup>202</sup> Heads of the European Radiological Protection Competent Authorities (HERCA) & Western European Nuclear Regulators Association (WENRA), *HERCA–WENRA Approach for a Better Cross-Border Coordination of Protective Actions During the Early Phase of a Nuclear Accident* (Version 2.0, 23 June 2022), online: WENRA [https://wenra.eu/sites/default/files/news\\_material/herca-wenra\\_approach\\_for\\_better\\_cross-border\\_coordination\\_of\\_protective\\_actions\\_during\\_the\\_early\\_phase\\_of\\_a\\_nuclear\\_accident.pdf](https://wenra.eu/sites/default/files/news_material/herca-wenra_approach_for_better_cross-border_coordination_of_protective_actions_during_the_early_phase_of_a_nuclear_accident.pdf) at pages 9, 37, 45, and 46.

<sup>203</sup> International Atomic Energy Agency, *Arrangements for Preparedness for a Nuclear or Radiological Emergency*, IAEA Safety Standards Series No GS-G-2.1 (Vienna: International Atomic Energy Agency, 2007), online: International Atomic Energy Agency <https://www-pub.iaea.org/MTCD/publications/PDF/Pub1265web.pdf> at p. 102 [IAEA GS-G-2.1].

<sup>204</sup> CELA Submission 2013, at page 51.

<sup>205</sup> *Ibid* at pages 39-40.

The 2011 Fukushima Daiichi disaster provides a realistic example of the need for adequate EMZs. The Fukushima Task Force Report noted that at day 5 after the Fukushima accident, authorities were forced to extend the evacuation zone to 30 km around the plant.<sup>206</sup> One month later, some residents at even greater distances were moved as a result of discovering higher levels of radiation in those areas.<sup>207</sup> This scenarios illustrates the necessity to provide detailed plans for emergency planning zones well beyond the 10 km DPZ and the 50 km IPZ currently contemplated.

IAEA Safety Guide GS-G-2.1 provides that the Urgent Protection Action Planning Zone (UPZ), analogous to the Ontario DPZ, should have a radial distance between 5 and 30 km.<sup>208</sup> This distance allows authorities to conduct monitoring and implement protective actions within a reasonable time.<sup>209</sup> As illustrated in Table 3 below, guidance from the IAEA also recommends detailed planning beyond Ontario's current 10 km DPZ. According to IAEA *Safety Guide GS-G-2.1*, the following zones and accompanying safety measures are recommended:<sup>210</sup>

**Table 3: Emergency Planning Zones and Measures per IAEA *Safety Guide GS-G-2.1***

| Zone                                   | Size      | Description                                                                                                                                                                                                                    | Response Measures                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Precautionary Action Zone              | 3 – 5 km  | Area within which arrangements should be made to implement precautionary urgent protective actions before or shortly after a major release with the aim of avoiding or minimizing severe deterministic effects. <sup>211</sup> | Urgent protective actions include: Isolation of a contaminated area or radioactive source; Prevention of inadvertent ingestion; Evacuation; Sheltering; Respiratory protection and protection of skin and eyes; Decontamination of individuals; Prophylaxis with stable iodine; Protection of the food supply and prevention of the consumption of significantly contaminated foodstuffs and water; Management of the |
| Urgent Protective Action Planning Zone | 5 – 30 km | Area where protective action must be taken promptly (usually within hours to a day) in order to be effective, and the effectiveness of which will be markedly reduced if it is delayed. <sup>213</sup>                         |                                                                                                                                                                                                                                                                                                                                                                                                                       |

<sup>206</sup> CNSC Fukushima Task Force, at pages 7-8.

<sup>207</sup> *Ibid* at page 8.

<sup>208</sup> IAEA GS-G-2.1, at pages 75-78.

<sup>209</sup> *Ibid* at page 78.

<sup>210</sup> *Ibid* at page 76.

<sup>211</sup> GSR Part 7, at page 30.

<sup>213</sup> GSR Part 7, at page 92.

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|--|--|--|---------------------------------------------------------------------|
|  |  |  | medical response; Protection of international trade. <sup>212</sup> |
|--|--|--|---------------------------------------------------------------------|

The intervenors submit that it is now incumbent on the Commission to require that the emergency planning zones be expanded before proceeding with the PNGS license renewal and refurbishment. Based on experience from Fukushima, evacuation beyond 10 km is a requirement in severe accident scenarios. If emergency planning were undertaken for severe offsite multi-unit accidents, as recommended by the CNSC Fukushima Task Force,<sup>214</sup> it would be apparent that emergency planning zones must extend significantly beyond their current limits.

The absence of pre-planned protective measures in the CPZ, the absence of a current Pickering Implementing Plan specifying zone radii, and the lack of publicly filed ETE studies reflecting current demographics mean that the public in the 10-20 km zone cannot be adequately protected. Furthermore, for the nearly one million residents in the CPZ, there are currently no requirements for pre-designated Reception Centres, Evacuation Centres, or dedicated transport protocols.

**RECOMMENDATION NO. 32:** Emergency planning zones should be extended beyond their current limits. The DPZ should be extended to 30 km, the CPZ to 50 km, and the IPZ extended to 100 km.

**RECOMMENDATION NO. 33:** The Commission should require pre-planned CPZ protective action protocols equivalent in detail to DPZ protocols. This must include the pre-designation and funding of reception facilities and mandatory facility-specific evacuation plans for all hospitals and long-term care homes in the CPZ.

#### *iv. Evacuation Planning*

The 2021 Census data for Durham Region and the City of Toronto indicates a sustained trend of urban densification surrounding the Pickering NGS. According to the 2023 ETE Study, the total population within the 20 km CPZ is 1,280,705.

As a direct result of this growth, evacuation times have dramatically increased. The 2023 ETE Study found that the 100th percentile evacuation time for the DPZ has increased to 10 hours 15 minutes (a 3 hr 15 min increase) and 17 hours for the CPZ (a 2 hr 20 min increase).<sup>215</sup> The intervenors submit that a planning basis where evacuating the 20 km CPZ can take up to 17 hours is inconsistent with the NSCA standard that OPG has made “adequate provision” for public safety, particularly when a BDBA may provide “little time available to alert.”

<sup>212</sup> IAEA GS-G-2.1, at page 32; GSR Part 7, at page 92.

<sup>214</sup> CNSC Fukushima Task Force, at page 39.

<sup>215</sup> 2023 ETE Study, at page 7-15.

GSR Part 7 requires pre-planned, optimized protective strategies, including for populations for whom evacuation itself carries risk (e.g., hospital inpatients, long-term care residents).<sup>216</sup> The PNERP 2025 has a time-limit for sheltering-in-place following an emergency: “Evacuation of the affected population should be considered for those areas where sheltering-in-place is expected to be required for more than 48 hours.”<sup>217</sup> This assumption has justified the continued use of a 10 km DPZ.

The TNERP, however, acknowledges that during a BDBA, the “holdup period of any radioactive material may be significantly reduced and radioactive material may be released in an uncontrolled manner.”<sup>218</sup> The intervenors submit that this evacuation timeframe is unrealistic because it is predicated on DBAs that assume containment integrity. This “holdup” logic fails to prioritize “prompt release” scenarios where containment is bypassed within 48 hours of a severe, unmitigated accident.

REGDOC-2.10.1, Version 3, requires ETE studies to “inform the planning basis”. The intervenors submit that the 2023 ETE Study fails this mandate by using a 30% shadow evacuation (voluntary evacuation by residents) factor for populations in the CPZ.<sup>219</sup> Given the population density in the vicinity of the PNGS, a general emergency would likely trigger spontaneous self-evacuation of nearly 100% of the 1,280,705 residents living within the 20 km CPZ. The 2023 ETE Study found that “the increase in shadow evacuation percentage increases the evacuating traffic outside of the area being evacuated, thereby reducing the available capacity for evacuees.”<sup>220</sup> By ignoring the regional traffic gridlock caused by hundreds of thousands of additional vehicles, the 2023 ETE Study provides the CNSC with a dangerously optimistic outlook regarding the feasibility of clearing the CPZ.

PNERP 2025 states that shelter-in-place “may be preferable” for “vulnerable populations (e.g., hospitals, long-term care homes, etc.) for whom evacuation may pose greater risks than that of the hazard itself.”<sup>221</sup> The intervenors submit that this permissive, non-mandatory language fails to satisfy the requirement for optimized protective action strategies under GSR Part 7. There are currently no mandatory facility-specific evacuation protocols, pre-arranged receiving facilities, dedicated transport plans, staffing ratios, or medical transfer agreements required for institutional populations in either the DPZ or CPZ.

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<sup>216</sup> GSR Part 7, at Requirements 9 & 14.

<sup>217</sup> PNERP 2025, at Annex L.2.1.2.

<sup>218</sup> TNERP, at s. 4.12.2.

<sup>219</sup> 2023 ETE Study, at pages 1-11.

<sup>220</sup> *Ibid* at pages 1-7.

<sup>221</sup> PNERP 2025, at Annex L.2.1.2(c)(v).

Without a PNGS-specific Implementation Plan under PNERP 2025, the outdated PNERP 2019 Implementing Plan remains operative. Furthermore, PNERP 2025 requires a site-specific Unified Transportation Management Plan (UTMP) for each nuclear facility, that, without a PNGS IP, has not been filed for review as part of this licencing application.<sup>222</sup>

**RECOMMENDATION NO. 34:** The intervenors recommend that the Commission require OPG to work with the Province and Durham Region to develop legally binding, facility-specific evacuation protocols (including pre-arranged receiving facilities, dedicated transport, staffing ratios, medical transfer arrangements) for all hospitals, long-term care homes, and retirement residences in the DPZ and CPZ.

**RECOMMENDATION NO. 35:** The CNSC should require an updated Evacuation Time Estimate study that reflects the post-refurbishment, multi-unit PNGS scenario. The ETE study must model a 100% shadow evacuation rate for the CPZ using the 2021 Census as a population baseline, with specific analysis of transit-dependent and mobility compromised populations.

**RECOMMENDATION NO. 36:** The intervenors recommend that the Commission deny the licence renewal application until a PNGS-specific Unified Transportation Management Plan has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

#### ***v. Potassium Iodide Pre-Distribution***

Currently, the CNSC REGDOC-2.10.1 Version 2 requires all licensees to pre-distribute potassium iodide (KI) pills or iodine thyroid-blocking (ITB) agents to all residences, businesses and institutions only within the 10 km DPZ.<sup>223</sup> OPG's application to renew its PROL highlights its intention to distribute new KI pills to these residents.<sup>224</sup> As stated earlier, the intervenors maintain that the 10km radius for the DMZ is an arbitrary boundary that fails to reflect the reality of a severe accident. The IAEA identifies that the zone for urgent protective actions should extend up to 30 km.<sup>225</sup> By restricting pre-distribution to 10 km, OPG and the Province will exclude the vast majority of the population who live within the path of a potential plume.

For residents in the 10-50 km IPZ, KI pills are available via the Prepare to Be Safe website ([preparetobesafe.ca](http://preparetobesafe.ca)).<sup>226</sup> This request-based approach has proven ineffective, previous surveys

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<sup>222</sup> PNERP 2025, at s. 8.11.

<sup>223</sup> REGDOC-2.10.1 v2, at 2.3.4.

<sup>224</sup> OPG, CMD 26-H7-1, at page 188.

<sup>225</sup> IAEA GS-G-2.1, at pages 77-78.

<sup>226</sup> OPG, CMD 26-H7-1, at page 188.

reviewed by CELA found a concerning lack of awareness among households residing in the CPZ.<sup>227</sup> The CNSC’s KI Pill Working Group noted that while DPZ pre-distribution is documented, “specific plans for KI emergency distribution [in the IPZ] are not”.<sup>228</sup> The intervenors submit that relying on emergency-based distribution for the IPZ is logistically impractical given that warning for an unmitigated release may be as low as 30 minutes.<sup>229</sup>

Children, pregnant women, and breastfeeding women are at the highest risk of negative health effects to their thyroids from radioiodine.<sup>230</sup> While OPG provides KI pills to schools, daycare centres, long-term care facilities, hospitals, etc. within the 10 km DPZ, there is no mandatory requirement for pre-distribution for these within the rest of the 50 km IPZ.<sup>231</sup>

**RECOMMENDATION NO. 37:** The Commission should require robust evidence demonstrating that residents in the DPZ and CPZ zone have awareness of emergency planning procedures. Absent this level of knowledge, the PNGS should not be operated beyond its current licencing period.

**RECOMMENDATION NO. 38:** The intervenors recommend that the CNSC require OPG to disseminate information on a more frequent basis, about the online KI-pill ordering website PrepareToBeSafe.ca in its outreach material to the public.

**RECOMMENDATION NO. 39:** The intervenors recommend that the Commission prioritize “prompt release” scenarios where unmitigated release occurs as a result of containment failure. In such events, the time to distribute KI pills to the millions of residents in the IPZ would exceed the biological window for effective thyroid blocking.

**RECOMMENDATION NO. 40:** The intervenors continue to recommend that the Commission require all licensees to provide KI pill pre-distribution to all schools, daycare centres, long-term care facilities, hospitals, and other places frequented by vulnerable groups within a 50 km radius and extend KI pill stockpiles to 100 km.

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<sup>227</sup> CELA Submission 2018, at page 53.

<sup>228</sup> Canadian Nuclear Safety Commission, *Potassium Iodide Pill Working Group: Phase I Report* (Ottawa: Canadian Nuclear Safety Commission, 2018), online: Canadian Nuclear Safety Commission <https://www.cnsccsn.gc.ca/eng/resources/emergency-management-and-safety/potassium-iodide-pill-working-group-phase-1-report/> at s. 2.2.1 [KI Pill Working Group].

<sup>229</sup> Canadian Environmental Law Association, *Letter to the Canadian Nuclear Safety Commission Re: Proposed Off-site Nuclear Emergency Planning Regulation* (20 May 2014), online: Canadian Environmental Law Association <https://cela.ca/wp-content/uploads/2019/07/CELA-letter-to-CNSC-on-Offsite-Emergency-Planning-Regulation-May-20-2014.pdf>.

<sup>230</sup> KI Pill Working Group, at s. 5.1.

<sup>231</sup> PNERP 2025, at Annex L.2.4.7.

## 2.4 POPULATION GROWTH IN THE VICINITY OF THE PICKERING NGS AND THE ADEQUACY OF OFF-SITE EMERGENCY PREPAREDNESS

Under section 24(4) of the *NSCA*, the Commission may not issue or renew a licence unless it is satisfied that the applicant will make adequate provision for the protection of the environment and the health and safety of persons.<sup>232</sup> This requires the Commission to consider whether the proposed licensed activities can be carried out safely over the entire term of the licence, taking into account foreseeable changes in the surrounding environment and population.

Having reviewed the materials filed in support of OPG's application, as well as the transcript of Part 1 of the Commission's public hearing held June 23, 2026<sup>233</sup>, the intervenors submit that the current record does not demonstrate that this statutory requirement has been met. The off-site emergency preparedness and evacuation framework for PNGS has not been shown to be adequate for the population that currently exists around the facility and, more importantly, for the substantially larger population expected to exist throughout the proposed licence and refurbishment period.

CELA raised similar concerns during the 2018 renewal hearing and again in 2024, when OPG sought authorization to extend the operation of Units 5 to 8.<sup>234</sup> These concerns remain unresolved and have become increasingly significant as the population surrounding PNGS continues to grow. The facility is located in close proximity to one of the largest and fastest-growing urban populations in Canada, yet the off-site emergency plans relied upon to protect surrounding communities were not developed to address the scale and density of the population that exists today, nor the further growth anticipated over the proposed licence period.

OPG's current application seeks a single consolidated 10-year licence, together with authorization to refurbish Units 5 to 8, potentially extending the operating life of these reactors for more than three decades into the 2060s.<sup>235</sup> The Commission must therefore assess whether emergency preparedness measures will remain adequate not only for the population surrounding PNGS today, but for the population reasonably expected to live, work, and attend school within the emergency planning zones throughout the proposed licence period and the additional decades of operation contemplated through refurbishment.

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<sup>232</sup> *NSCA*, at s 24(4).

<sup>233</sup> CNSC, Hearing Part 1 Transcript

<sup>234</sup> CELA Submission 2018; CELA, Pickering Extension Intervention.

<sup>235</sup> OPG CMD 26-H7-1 at p. iv.

### *i. Pickering's Large and Growing Population*

As noted previously in this submission, off-site emergency planning for PNGS is organized through four nested emergency planning zones established under the PNERP: the AAZ, the DPZ, the CPZ, and the IPZ.<sup>236</sup> These zones reflect increasing geographic areas over which different emergency planning measures apply.

What distinguishes PNGS from most nuclear generating stations in North America is the extraordinary number of people living within these zones. Unlike many nuclear generating stations located in relatively remote areas, PNGS is situated within one of Canada's largest and fastest-growing urban regions. More people live within 30 kilometres of PNGS than around any other nuclear power plant in North America, and PNGS is among the few nuclear generating stations in the world located within a major metropolitan area.<sup>237</sup> The station is approximately 30 to 35 kilometres from downtown Toronto and is surrounded by communities forming part of the Greater Toronto and Hamilton Area ("GTHA").

The population potentially affected by a nuclear emergency extends far beyond the City of Pickering itself. As of 2026, Pickering had an estimated population of approximately 122,000 residents and contains the communities closest to PNGS, including portions of the AAZ, DPZ, and CPZ.<sup>238</sup> However, Pickering represents only a small fraction of the population that could be affected by an emergency at the facility.

The DPZ extends beyond Pickering into portions of the Regional Municipality of Durham and the City of Toronto. Approximately 300,000 people live within the 10-kilometre DPZ, where KI tablets are pre-distributed and detailed emergency planning measures apply.<sup>239</sup> The CPZ extends outward to include Pickering, Ajax, most of Whitby and Markham, portions of Toronto, and

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<sup>236</sup> PNERP 2025.

<sup>237</sup> Ontario Clean Air Alliance Research, *A Fukushima-Level Nuclear Disaster at Pickering: An Assessment of Effects* (March 2018), at 3, online (pdf): Ontario Clean Air Alliance <https://www.cleanairalliance.org/wp-content/uploads/2018/05/fukushima-March12.pdf>; Matthew McClearn, "Canada's nuclear regulator overlooked dubious data when renewing Pickering plant's licence, documents show," *The Globe and Mail* (23 March 2021), online: *The Globe and Mail* <https://www.cleanairalliance.org/wp-content/uploads/2021/04/Globe-and-Mail-piece-on-Pickering-1.pdf>.

<sup>238</sup> World Population Review, "Pickering Population 2026" (2026), online: World Population Review <https://worldpopulationreview.com/canadian-cities/pickering>.

<sup>239</sup> "Selling a Home Near the Nuclear Plant? That False Alarm Just Reminded Everyone of the Risks," *Financial Post* (14 January 2020), online: *Financial Post* <https://financialpost.com/real-estate/selling-a-home-near-the-nuclear-plant-that-false-alarm-just-reminded-everyone-of-the-risks>; Statistics Canada, *Population estimates, July 1, by census metropolitan area and census agglomeration, 2021 boundaries*, Table 17-10-0148-01 (Ottawa: Statistics Canada), online: Government of Canada <https://www150.statcan.gc.ca/t1/tb11/en/tv.action?pid=1710014801> (2025 estimate); Ontario Power Generation, *Pickering NGS Development of Evacuation Time Estimates* (2024), online: Ontario Power Generation <https://www.opg.com/documents/pickering-ngs-development-of-evacuation-time-estimates/> [2023 ETE Study] at pages 3-21.

Oshawa. Approximately 1.13 million people live within the 20-kilometre CPZ, encompassing a substantial portion of Durham Region and surrounding urban communities.<sup>240</sup>

The scale of the IPZ is even more significant. The 50-kilometre IPZ includes all of Durham Region, York, Peel, the entire City of Toronto, and the City of Kawartha Lakes.<sup>241</sup> The scale of this zone is significant. As of 2025, the Toronto Census Metropolitan Area (which includes the City of Toronto, Peel Region, York Region, Halton Region and parts of Durham Region) had an estimated population of approximately 7.1 million people, representing roughly 17 percent of Canada's total population.<sup>242</sup> This figure does not include the entirety of Durham Region, which has an estimated population of approximately 815,000 residents, or the City of Kawartha Lakes, which has an estimated population of approximately 83,000 residents.<sup>243</sup>

## ***ii. Population Growth Will Continue Throughout the Proposed Licence Period***

The population within PNGS's emergency planning zones is not static. Provincial and municipal growth policies are directing substantial residential intensification into communities surrounding PNGS, including the development of new housing, schools, childcare centres, and other facilities serving sensitive populations.

Durham Region's Official Plan, *Envision Durham*, projects regional growth from to 1.3 million residents by 2051, together with more than 460,000 jobs.<sup>244</sup> The City of Pickering alone is projected to grow to more than 150,000 residents by 2036.<sup>245</sup>

Much of this growth is being directed toward areas close to PNGS. Pickering's City Centre and GO Station corridor, located approximately 3 kilometres from the reactors, is designated as an Urban Growth Centre intended to accommodate high-density residential and employment development.<sup>246</sup> The emerging Seaton community, located within 10 kilometres from the PNGS, is planned to accommodate up to 70,000 residents and 35,000 jobs, with development expected to continue throughout the proposed licence period.<sup>247</sup>

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<sup>240</sup> Ibid.

<sup>241</sup> Ibid.

<sup>242</sup> Ibid.

<sup>243</sup> Regional Municipality of Durham, "Planning for Growth" (2025), online: Region of Durham <https://www.durham.ca/living-here/planning-for-growth/> (2025 estimate); City of Kawartha Lakes, "Demographics and Statistics" (2023), online: City of Kawartha Lakes <https://www.kawarthalakes.ca/business-development/business-and-economic-development/about-kawartha-lakes/demographics-and-statistics/> (2023 estimate).

<sup>244</sup> Regional Municipality of Durham, *Regional Official Plan: Envision Durham* (December 13, 2024), online (pdf): Region of Durham <https://www.durham.ca/media/00sign4c/approved-durham-rop-2024.pdf>.

<sup>245</sup> Ibid.

<sup>246</sup> Ibid.

<sup>247</sup> City of Pickering, "Seaton Community" (last modified 2025), online: City of Pickering <https://www.pickering.ca/business-building-development/seaton-community/>.

These growth patterns have direct implications for emergency preparedness, including evacuation time estimates, public alert and notification systems, traffic management capacity, and the distribution of emergency resources. Emergency planning assumptions that do not account for increasing population density and changing settlement patterns risk becoming outdated well before the end of the proposed operating period.

The challenges associated with PNGS's location are further compounded by the concentration of critical infrastructure and transportation corridors within the potential impact area.<sup>248</sup> The path of the radioactive plume from a severe accident at Pickering would intersect Highway 401, Highway 2, and the primary Canadian National and Canadian Pacific rail corridors.<sup>249</sup> The facility is also located on the north shore of Lake Ontario, which serves as a primary source of drinking water for millions of residents in the Greater Toronto Area.<sup>250</sup> The combination of a densely populated surrounding region, major transportation networks, and critical infrastructure creates a uniquely complex emergency planning environment in which any failure of the off-site emergency preparedness framework could have significant humanitarian, environmental, and economic consequences.<sup>251</sup>

Geography further constrains emergency response. Lake Ontario borders the site to the south, leaving northern, eastern, and western transportation corridors as the principal evacuation routes. In a large-scale emergency, residents would be required to travel through one of the most heavily congested transportation networks in Canada.<sup>252</sup> These challenges are particularly significant as transit-oriented development increases the number of residents with limited vehicle access and varying mobility needs.

### ***iii. Emergency Planning Must Account for Future Population Growth***

The implications of this population growth are directly relevant to the Commission's assessment of whether OPG can demonstrate adequate protection of health and safety under section 24(4) of the *NSCA*. CNSC regulatory guidance recognizes that emergency preparedness must account for current and future populations throughout the operating life of a nuclear facility. REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, requires reactor licensees to collaborate with municipal and regional authorities to "develop and maintain public evacuation time estimates based on current census data, and future population growth projections on a per-decade estimation

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<sup>248</sup> Theresa McClenaghan, *Emergency Planning at the Pickering Nuclear Generating Station* (Commission Member Document (CMD) 14-H2.31, 3 May 2013), Canadian Environmental Law Association Publication No 899, at 42-43, online: Canadian Environmental Law Association <https://cela.ca/wp-content/uploads/2019/07/899PickeringEmergencyPlanning.pdf> at page 61. [CELA Submission 2013].

<sup>249</sup> CELA Submission 2013, *ibid* at page 46.

<sup>250</sup> PNERP 2019 IP, at 2.1.

<sup>251</sup> CELA Submission 2013, at page 3.

<sup>252</sup> Canadian Automobile Association, *Grinding to a Halt: Evaluating Canada's Worst Bottlenecks* (January 2017), online (pdf): CAA [https://www.caa.ca/app/uploads/2021/01/16170\\_Canadian\\_National\\_Bottlenecks\\_Study\\_EN\\_1\\_4\\_17.pdf](https://www.caa.ca/app/uploads/2021/01/16170_Canadian_National_Bottlenecks_Study_EN_1_4_17.pdf).

until end of life of the facility.”<sup>253</sup> REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*, similarly requires consideration of population density, distribution, and characteristics within emergency planning zones, including projected future populations and vulnerable populations such as schools and health care facilities, throughout the life of the facility.<sup>254</sup> The draft Version 3 of REGDOC-2.10.1 further reinforces the need to consider sensitive populations, including children and pregnant persons, within the IPZ.<sup>255</sup>

These requirements reflect the simple principle: the adequacy of emergency preparedness cannot be assessed solely against historical or current population figures. Where a licence would authorize continued operation for at least 10 years, and enable operation into the 2060s, the Commission must be satisfied that emergency planning remains adequate for the population reasonably expected to exist throughout that period.

On the current record, the intervenors submit that OPG has not demonstrated that PNGS’s emergency preparedness framework reflects the significant population growth already underway or the additional growth anticipated over the proposed licence period and beyond. The emergency planning measures before the Commission therefore do not yet demonstrate a level of preparedness commensurate with the unique risks associated with operating a large nuclear generating station within one of North America’s most densely populated urban regions.

#### ***iv. OPG’s Evacuation Time Estimate Does Not Account for Current and Future Population Growth***

OPG relies primarily on the Pickering Evacuation Time Estimate<sup>256</sup> (“ETE”), issued in March 2023, to demonstrate that surrounding populations can be adequately protected in the event of a severe nuclear accident. However, the ETE does not reflect the population that would exist throughout the period for which OPG seeks authorization. The analysis is based on 2021 Census data and incorporates population growth and infrastructure changes only through 2028.<sup>257</sup> This timeframe extends only one year beyond the expiry of the current licence and does not address the proposed 10-year licence period or the substantially longer operating life that would result from refurbishment of Units 5 to 8.

The relevant question before the Commission is therefore not whether the 2023 ETE was reasonable when it was prepared, but whether it provides a sufficient basis to conclude that

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<sup>253</sup> Canadian Nuclear Safety Commission, *REGDOC-2.10.1: Nuclear Emergency Preparedness and Response*, Version 2, online: CNSC <https://www.cnsccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-10-1/> [CNSC REGDOC-2.10.1].

<sup>254</sup> Canadian Nuclear Safety Commission, *REGDOC-1.1.1: Site Evaluation and Site Preparation for New Reactor Facilities*, Version 1.2, online: CNSC <https://www.cnsccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc1-1-1-v1-2/> [CNSC REGDOC-1.1.1].

<sup>255</sup> CNSC REGDOC-2.10.1 V3.

<sup>256</sup> 2023 ETE Study.

<sup>257</sup> OPG, CMD 26-H7-1, at page 191.

emergency preparedness measures will remain adequate for the population that must be protected throughout the period of authorization sought. An assessment based on 2021 population data and projections only to 2028 does not even capture current population conditions, much less the anticipated population growth during the proposed licence term or the additional decades of operation that refurbishment could enable. OPG seeks authorization to continue operating PNGS until December 31, 2036, while also seeking approval for refurbishment activities that could extend operation into the 2060s. The Commission must therefore determine whether emergency preparedness measures have been assessed against both existing population conditions and foreseeable demographic changes over the full period of operation contemplated by OPG's application.

The current record does not demonstrate that this assessment has been undertaken. Neither OPG's Application nor CNSC staff's submission<sup>258</sup> identifies current population figures within the AAZ, DPZ, CPZ, or IPZ, or provides projections showing how those populations are expected to change over the proposed licence period or the additional decades of operation contemplated through refurbishment. This omission is particularly significant because substantial population growth is already planned within the emergency planning zones, including major residential intensification in Pickering City Centre, the GO Station corridor, and the Seaton community.

This shortcoming is also inconsistent with REGDOC-2.10.1's requirement that reactor licensees develop and maintain evacuation time estimates based on current census data and future population growth projections "on a per-decade estimation until end of life of the facility."<sup>259</sup> A licence decision authorizing operation for 10 years, and contemplating operation into the 2060s, requires a forward-looking assessment that accounts for foreseeable demographic changes, particularly where substantial growth has already been identified through provincial and municipal planning processes.

OPG acknowledges that the next federal census will occur in 2026 and states that it intends to update the ETE "to reflect the post-refurbishment operations of the Pickering NGS site."<sup>260</sup> The intervenors submit that this commitment does not resolve the deficiencies in the current record. OPG has not identified when the updated ETE would be completed, the commitment has not been proposed as a licence condition, and the record does not indicate whether any future update would be submitted to the Commission for review or independently assessed by CNSC staff before the licence takes effect. Moreover, an ETE based solely on 2026 Census data would provide only a point-in-time population snapshot unless it incorporates long-term population projections consistent with REGDOC-2.10.1.

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<sup>258</sup>CNSC Staff, CMD 26-H7.

<sup>259</sup> CNSC REGDOC-2.10.1, at s. 2.2.4 (8).

<sup>260</sup> OPG, CMD 26-H7-1, at page 191.

The inadequacy of the current ETE is not a technical or administrative matter. The ETE provides the analytical foundation for critical protective measures under the PNERP, including evacuation planning, sheltering decisions, KI distribution, public notification, and traffic management. If the underlying population assumptions are outdated, emergency response measures may be calibrated to a population that no longer exists, undermining the reliability of the emergency preparedness framework intended to protect public health and safety.

The uncertainty surrounding the ETE is further compounded by the status of the provincial emergency planning framework applicable to PNGS. Ontario's revised PNERP was approved on July 31, 2025, replacing the previous framework.<sup>261</sup> PNERP 2025 establishes the province-wide framework for nuclear emergency response but relies on facility-specific Site-Specific Implementing Plans ("IPs") to establish the detailed operational measures required for individual nuclear facilities.<sup>262</sup> These IPs provide the facility-specific direction regarding emergency planning zones<sup>263</sup>, urgent response actions<sup>264</sup>, site-specific public alerting requirements<sup>265</sup>, KI pre-distribution arrangements<sup>266</sup>, and other operational measures necessary to respond to an emergency at a particular site.

The only publicly available PNGS-specific IP currently before the Commission is the January 2019 Pickering Implementing Plan prepared under the previous PNERP framework.<sup>267</sup> No updated PNGS-specific IP prepared under PNERP 2025 has been filed in this proceeding or made available for review. As a result, the Commission is being asked to authorize continued operation and refurbishment of PNGS without a current facility-specific emergency planning document that reflects the updated provincial framework and the significant population growth occurring throughout the surrounding region.

Without a current PNGS-specific IP that reflects existing and projected population conditions, key emergency preparedness measures, including KI distribution, evacuation time estimates, public alerting, and traffic management planning, cannot be demonstrated to remain adequate. The intervenors submit that the Commission cannot conclude that OPG has made adequate provision for the protection of health and safety under section 24(4) of the *NSCA* where the facility-specific emergency planning framework required to implement the provincial response plan has not been finalized and reviewed on the public record.

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<sup>261</sup> PNERP 2025.

<sup>262</sup> PNERP 2025, at p. v.

<sup>263</sup> PNERP 2025, at s. 6.4.

<sup>264</sup> PNERP 2025, at Annex N.1.

<sup>265</sup> PNERP 2025, at s. 8.7.2.1.

<sup>266</sup> PNERP 2025, at Annex L.2.4.6.

<sup>267</sup> PNERP 2019 IP.

Accordingly, before making a determination under section 24(4) of the *NSCA*, the Commission should require OPG to provide an updated evacuation analysis based on current population data and long-term projections corresponding to the full period for which authorization is sought. This analysis should be considered alongside a current PNGS-specific Site-Specific Implementing Plan under PNERP 2025 demonstrating that emergency preparedness measures remain adequate for the substantially larger population expected to live, work, and attend school within PNGS's emergency planning zones over the coming decades.

**RECOMMENDATION NO. 41:** The Commission should impose a licence condition requiring OPG to complete an updated ETE incorporating 2026 Census data and forward-looking population projections through the end of the licence term, within a defined and reasonably near-term timeframe. The updated ETE, together with any resulting changes to protective-action assumptions, should be filed with CNSC staff and made publicly available. The updated ETE should also be coordinated with and reconciled against the finalized Pickering-specific PNERP Site-Specific Implementing Plan once completed by Emergency Management Ontario.

#### *v. Related Concerns Bearing on Off-Site Preparedness*

##### Public alerting is scaled to the current, not the future, population.

OPG's application describes pole-mounted sirens audible within 3 km of the site, an automated telephone-dialing system reaching landline numbers within 10 km, and reliance on the province's Alert Ready system and traditional and social media beyond that.<sup>268</sup> These radii are fixed engineering and contractual parameters, not population-responsive ones. As density increases along growth corridors within and near the DPZ, the adequacy of a 3 km outdoor-siren footprint and a landline-based dialing system (an increasingly minority form of communication among younger, growing households) warrants explicit reassessment. The record also does not indicate whether siren messaging, auto-dial content, or Alert Ready alerts are available in the languages most commonly spoken by Durham's growing population, a relevant consideration given the region's high share of recent immigrants<sup>269</sup> and draft REGDOC-2.10.1 Version 3's direction to give specific consideration to sensitive and potentially harder-to-reach populations.<sup>270</sup>

##### KI distribution is being replenished, not resized.

OPG reports that it will, in 2026, distribute a new supply of KI to the 10 km DPZ to replace pills distributed in 2015 that are expected to expire in 2027.<sup>271</sup> This is a like-for-like replacement of an

<sup>268</sup> OPG, CMD 26-H7-1, at pages 189–190.

<sup>269</sup> City of Toronto, *2021 Census: Language*, online (pdf): City of Toronto <https://www.toronto.ca/wp-content/uploads/2022/08/868f-2021-Census-Backgrounder-Language-FINAL.pdf>.

<sup>270</sup> REGDOC-2.10.1 V3, at s. 2.6.

<sup>271</sup> OPG, CMD 26-H7-1, at pages 188–189.

existing inventory approaching expiry. Nothing in the record indicates that this distribution, or the online ordering program for the IPZ, has been resized to reflect the additional households present today or anticipated during the 10-year licence period.

RegDoc-2.10.1 Version 3 implementation has no committed schedule.

OPG states it “will conduct a gap analysis and prepare an implementation plan” for the draft RegDoc-2.10.1 Version 3, which is expected to strengthen requirements around sensitive populations, such as children and pregnant persons, within the IPZ, once finalized.<sup>272</sup> No date is committed for either the gap analysis or implementation.

**RECOMMENDATION NO. 42:** The Commission should require OPG to demonstrate, with reference to current household and demographic data, that KI pre-distribution volumes, the online ordering program, and public alerting infrastructure remain adequate to the current and near-term projected population, and to provide a schedule for scaling these programs to match approved growth allocations in surrounding communities.

**RECOMMENDATION NO. 43:** Given the dense population within 50 kilometres of the Pickering NGS and children’s particular vulnerability to radiation, we recommend the pre-stocking of KI in all schools within the 50 km zone be made a condition of licensing.

***vi. PNGS Could Not Be Sited or Licensed Today***

The intervenors submit that PNGS could not be sited or licensed today under the CNSC’s current siting criteria and applicable international standards. Accordingly, the continued operation and refurbishment of the facility require careful scrutiny, particularly given that the circumstances surrounding the site have changed dramatically since the facility was originally approved. A historical siting decision cannot substitute for a contemporary assessment of whether effective emergency response remains feasible for the population that now surrounds the facility and the substantially larger population expected over the proposed operating period.

Modern nuclear siting standards recognize that population density, population growth, geographic constraints, and the feasibility of emergency response are fundamental elements of site suitability. These considerations are not limited to the construction of new facilities, they remain relevant throughout the life of an operating reactor where changing conditions may affect whether emergency response measures remain effective.

The CNSC’s own guidance reflects this principle. REGDOC-1.1.1, *Site Evaluation and Site Preparation for New Reactor Facilities*, requires that site evaluations consider the emergency preparedness planning basis described in REGDOC-2.10.1, *Nuclear Emergency Preparedness and Response*, together with population density, characterization, and distribution within emergency

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<sup>272</sup> OPG, CMD 26-H7-1, at page 186.

planning zones.<sup>273</sup> This assessment must include existing and projected future populations, including both resident and transient populations.

These requirements are significant for two reasons. First, they establish that population analysis is not merely a demographic exercise. Population characteristics must be assessed in relation to whether emergency response actions, including notification, sheltering, evacuation, and protective measures, can realistically be planned and implemented. Second, the assessment is explicitly forward-looking. A site's suitability cannot be evaluated based solely on present conditions, it must account for foreseeable changes in population and infrastructure over the life of the facility.

Applying these criteria to PNGS raises fundamental concerns. If a new reactor proposal were submitted today for this location, the proponent would be required to demonstrate that effective emergency response could be achieved despite the facility's location within one of Canada's most densely populated and fastest-growing urban regions. That demonstration would need to account for the hundreds of thousands of residents within the immediate emergency planning zones, the millions of people within the broader region, ongoing residential intensification near the facility, and the transportation and geographic constraints affecting evacuation. The intervenors submit that such a demonstration could not reasonably be made.

International standards reinforce this conclusion. As the intervenors have previously submitted, under current IAEA siting guidelines, a multi-unit nuclear station would not be authorized in such a high-density location because evacuation would effectively be impossible because of logistical gridlock.<sup>274</sup>

The IAEA's *Site Evaluation for Nuclear Installations* (SSR-1) identifies population characteristics and the feasibility of emergency response as fundamental considerations in determining whether a nuclear installation site remains suitable.<sup>275</sup> Requirement 4 provides that the suitability of a site "shall be assessed at an early stage of the site evaluation and shall be confirmed for the lifetime of the planned nuclear installation," including consideration of "population density, population distribution and other characteristics of the external zone, in so far as these could affect the feasibility of planning effective emergency response actions."<sup>276</sup> Requirement 13 similarly requires evaluation of "the feasibility of planning effective emergency response actions on the site and in the external zone," taking into account the characteristics of both the site and surrounding area.<sup>277</sup>

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<sup>273</sup> REGDOC-1.1.1, at s. 3.3.5.

<sup>274</sup> CELA Submission 2013, at pages 60-62.

<sup>275</sup> International Atomic Energy Agency (IAEA), *Site Evaluation for Nuclear Installations*, IAEA Safety Standards Series No SSR-1, Specific Safety Requirements (Vienna: IAEA, 2019), online: IAEA <https://www.iaea.org/publications/13413/site-evaluation-for-nuclear-installations> [IAEA SSR-1].

<sup>276</sup> IAEA SSR-1, *ibid*, at Requirement 4, p. 9.

<sup>277</sup> IAEA SSR-1, *ibid*, at Requirement 13, pp. 15-16.

The IAEA’s Safety Guide supporting SSR-1, published December 2025, provides further guidance that is directly relevant to PNGS. It recognizes that the proximity of large populations and major urban centres is a significant factor in evaluating whether effective off-site emergency arrangements can be established.<sup>278</sup> It emphasizes that emergency response planning must account for practical constraints, including the availability and adequacy of evacuation routes.<sup>279</sup> Where geographic or administrative limitations prevent effective emergency response arrangements from being established and cannot be reasonably mitigated, SSG-92 states that “the site should be considered unsuitable” for a nuclear installation.<sup>280</sup>

PNGS presents precisely the type of circumstances requiring this assessment. Lake Ontario immediately borders the facility to the south, limiting evacuation movements primarily to routes extending north, east, and west. As a result, evacuation from the facility is constrained to a roughly 180-degree land corridor through one of Canada’s most densely populated and congested metropolitan regions. These geographic and transportation constraints make it essential that evacuation feasibility be demonstrated based on current conditions and foreseeable future demands, rather than assumed based on historical assessments.

The record before the Commission does not provide that demonstration. It does not establish that evacuation routes can accommodate the population currently residing within PNGS’s emergency planning zones, the substantial population growth anticipated through municipal and provincial planning policies, or additional evacuation demand associated with foreseeable factors such as shadow evacuation. Nor does the record demonstrate that transportation limitations arising from PNGS’s geography and surrounding infrastructure can be effectively mitigated through existing emergency response measures.

SSG-92 further recognizes that site characteristics relevant to emergency preparedness must be maintained and periodically reviewed throughout the operational life of a nuclear installation.<sup>281</sup> Emergency planning assumptions must remain current and account for changes to surrounding conditions, including infrastructure development and population growth. A licence renewal that would authorize continued operation for another decade, while refurbishment could enable operation for several additional decades, requires precisely this type of reassessment. As noted above, the surrounding communities are undergoing substantial planned growth and intensification that may materially affect the feasibility of emergency response arrangements.

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<sup>278</sup> International Atomic Energy Agency (IAEA), Investigation of Site Characteristics and Evaluation of Radiation Risks to the Public and the Environment in Site Evaluation for Nuclear Installations, IAEA Specific Safety Guide SSG-92, (Vienne: IAEA, 2025), online: IAEA [https://www-pub.iaea.org/MTCD/publications/PDF/p15865-PUB2122\\_web.pdf](https://www-pub.iaea.org/MTCD/publications/PDF/p15865-PUB2122_web.pdf) at para 9.12 [IAEA SSG-92].

<sup>279</sup> IAEA SSG-92, *ibid*, at para 9.

<sup>280</sup> IAEA SSG-92, *ibid*, at para 9.14.

<sup>281</sup> IAEA SSG-92, *ibid*, at para 9.15.

The issue before the Commission is therefore not whether PNGS satisfied the requirements and assumptions applicable when it was originally approved. The question is whether the emergency response arrangements supporting continued operation remain feasible under present-day conditions and reasonably foreseeable future circumstances. While existing nuclear facilities may not be required to satisfy every requirement applicable to newly proposed facilities, continued operation cannot be authorized on the assumption that historical conditions remain unchanged where population growth, infrastructure pressures, and other site characteristics may affect the feasibility of protecting the public.

The intervenors are concerned that population growth surrounding PNGS has already altered, and will continue to alter, the conditions upon which emergency preparedness measures depend. Before authorizing continued operation or refurbishment, the Commission must require a demonstrated assessment that current and projected populations, transportation infrastructure, geographic constraints, and emergency response capabilities remain compatible with the level of protection required under the *NSCA*.

### 3. CONCLUSION

DNA, SHA, and CELA submit it would be contrary to s.24(4) of the *NSCA* to allow OPG to renew its Power Reactor Operating Licence for the Pickering Nuclear Generating Station for a 10 year term to refurbish Units 5-8, 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 October 2026 public hearing;
- (3) Granting Durham Nuclear Awareness, Slovenian Home Association, and the Canadian Environmental Law Association the opportunity to probe the evidence provided by the applicant and the CNSC staff through cross-examination at the hearing.
- (4) Denying OPG's request for a 10-yr licence on the basis that:
  - a. There is insufficient data before the Commission to make a sound decision to prevent unreasonable risk to the environment and to the health and safety of persons; and
  - b. Off-site emergency planning and preparedness at Pickering is insufficient to protect human health and the environment;
- (5) Deferring a decision on the licence renewal application until the Commission has an opportunity to review the Integrated Implementation Plan, and consider the adequacy of protection of the public in light of the additional safety analysis and insights provided by the completed Probabilistic Safety Assessment for a refurbished Pickering B.

- (6) Deferring a decision on the licence renewal application until a PNGS-specific Implementing Plan under Ontario's Provincial Nuclear Emergency Response Plan 2025 has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.
- (7) Denying CNSC staff's recommendation for a 10-year licence renewal;
- (8) Directing OPG to immediately disclose all PSR3 documents; and
- (9) Directing OPG to revise its licence renewal application, considering all of the deficiencies and recommendations herein.

Sincerely,

**CANADIAN ENVIRONMENTAL LAW ASSOCIATION**

A handwritten signature in blue ink, reading "Jacqueline Wilson". The signature is fluid and cursive, with the first name "Jacqueline" being more prominent than the last name "Wilson".

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Jacqueline Wilson, Counsel

## Appendix A: Summary of Recommendations

**RECOMMENDATION NO. 1:** The intervenors urge the CNSC to focus on the reasonableness of the risk of its licensing decision and not to interpret reasonableness as the same or overlapping with the concept of the cost effectiveness of safety measures.

**RECOMMENDATION NO. 2:** The Commission must ensure that hold points are not used where they fall within the core legislated authority of the Commission under the *NSCA*.

**RECOMMENDATION NO. 3:** The proposed intervenors request the opportunity to not only present an oral intervention, but also to probe the evidence provided by the applicant and the CNSC staff through cross-examination at the hearing.

**RECOMMENDATION NO. 4:** In its decision under s. 24(4), the Commission must consider SCA non-compliances—even those of low or negligible safety significance—with a cumulative lens to assess whether there is a safe work culture at Pickering.

**RECOMMENDATION NO. 5:** The CNSC must elaborate on how it plans on overseeing full compliance with all the SCAs at this facility during decommissioning of Pickering A, and refurbishment and operations of Pickering B. There should not be a perpetual trend of non-compliance with safety measures each reporting year. The cumulation of non-compliance across the various safety and control areas diminishes public trust in the Commission's regulation of nuclear power facilities.

**RECOMMENDATION NO. 6:** Prior to submitting a licensing application, a proponent must have finalized design details or plans to be available for public review during the public intervention period. The intervenors submit the Deep Water Intake is a project of great interest to members of the public and First Nations communities, and as a result, its finalization and design details should have been disclosed to the Commission at the start of the hearing process so that intervenors could assess the project in greater detail.

**RECOMMENDATION NO. 7:** the Climate Susceptibility and Adaptation Summary report should have considered more recent data, up to the year 2025, to have a more fulsome picture for predicting climate and extreme weather event modelling for Pickering.

**RECOMMENDATION NO. 8:** Climate change resiliency planning must consider disruption to workers or emergency responders in accessing the site when assessing severe climate effects.

**RECOMMENDATION NO. 9:** OPG should explain whether all the suggested considerations for specific adaptation options for Pickering equipment and systems are being implemented during refurbishment, and provide reasoning for either opting in or out of implementing the various adaptation options.

**RECOMMENDATION NO. 10:** The CNSC should conduct an assessment and mapping of vulnerability of Canadian nuclear power plants to climate change hazards, similar to those recommended in the GAO report.

**RECOMMENDATION NO. 11:** OPG and CNSC staff to provide an update on the assessment of the remaining category 3 CSIs, as the assessment should have been completed by June 2026, prior to Part 1 of this hearing.

**RECOMMENDATION NO. 12:** OPG should immediately disclose all PSR3 documents. It should not be relying on reports that are complete and have been submitted to the CNSC, but refuse to disclose them to the public.

**RECOMMENDATION NO. 13:** The Commission should not issue a license until it has an opportunity to review the Integrated Implementation Plan, and consider the adequacy of protection of the public in light of the additional safety analysis and insights provided by the completed PSA for a refurbished Pickering B.

**RECOMMENDATION NO. 14:** The Commission should provide an opportunity for public input on the Global Assessment Report and Integrated Implementation Plan prior to considering the further licensing of the plant.

**RECOMMENDATION NO. 15:** The Commission should request additional information specifically as to how safety is being improved based on “OP-Ex” since the CMD makes that assertion without sufficient information.

**RECOMMENDATION NO. 16:** The Commissioners require additional information and specificity regarding the proposed separation of systems as between the units of Plant A and the units of Plant B, so as to fully understand the post-refurbishment state as between the equipment in today’s Plants A and B. The Intervenor request that the Commission insist on understanding this aspect of the proposal before granting any approval that encompasses the refurbishment scope.

**RECOMMENDATION NO. 17:** The Intervenor seek an opportunity to provide further submissions to the Commission upon receipt of the Global Assessment Report; and continue to seek release of the already completed Safety Factor Reviews document related to PSR3.

**RECOMMENDATION NO. 18:** The intervenors recommend that the Commission deny the licence renewal application until a PNGS-specific Implementing Plan under PNERP 2025 has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

**RECOMMENDATION NO. 19:** OPG has not completed an adequate PSA. This failure denies the Commission and the public the ability to review the final risk profile of the PNGS during the current 2026 licensing process. The intervenors recommend that the CNSC deny the licence renewal application until a full-scope PSA for the refurbished PNGS is completed and made available for review at a subsequent hearing.

**RECOMMENDATION NO. 20:** The intervenors submit that granting a renewal of the PROL for 10 years before the PSR3 is complete poses an unacceptable risk to public safety and prevents the CNSC from ensuring that “adequate provision” for safety has been made for the proposed 30-year extension. CELA recommends that the Commission deny the licence renewal until the GAR and IIP are finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

**RECOMMENDATION NO. 21:** For transparency and more frequent safety oversight, the PSR should be conducted at least every five years.

**RECOMMENDATION NO. 22:** The CNSC should address the requirements under REGDOC-2.10.1, Version 3 by requiring compliance with Version 3's substantive obligations as conditions of any licence; or (b) providing a reasoned explanation of why a renewed PROL should be granted on the basis of a standard the Commission's own staff has determined requires material upgrade. The Commission should firmly reject OPG's request for a licence for a 30-year refurbishment program on the basis of a standard that the CNSC has determined is inadequate and requires revision.

**RECOMMENDATION NO. 23:** The Commission should treat the absence of a current, published, PNERP 2025-conformant Pickering Implementing Plan and a REGDOC-2.10.1 v3 gap analysis as a condition precedent to be satisfied prior to the renewal of the PROL, not as a matter to be resolved post-licensing. The intervenors recommend that the Commission withhold approval for the PROL renewal until the OPG's gap analysis is complete, the implementation plan and PSRs are all finalized, publicly vetted, and the OPG is found to be in full compliance with the most recent Canadian and international standards.

**RECOMMENDATION NO. 24:** The Commission should require OPG to demonstrate that offsite emergency plans can mitigate the impacts of an INES Level 7 accident, ensuring regional infrastructure is sized for a worst-case scenario.

**RECOMMENDATION NO. 25:** The Commission should formally adopt the Draft REGDOC-2.10.1 Version 3 requirement to account for “multi-unit and/or multi-module accident scenarios” occurring during refurbishment activities.

**RECOMMENDATION NO. 26:** OPG is required to conduct a comprehensive PSR in accordance with CNSC REGDOC-2.3.3, which involves comparing the station’s current state against “modern codes and standards” to identify necessary safety enhancements. OPG’s PSR3 process for the refurbishment is being conducted using direct guidance from IAEA SSG-25 (Periodic Safety Review for Nuclear Power Plants). The intervenors recommend that the Commission withhold approval for the PROL until the licensing basis for the renewal application formally incorporates modern international standards through the Periodic Safety Review process.

**RECOMMENDATION NO. 27:** The Commission should require OPG to update its Evacuation Time Estimate Report to reflect recent population objectives and growth trends. The updated ETE should also review the impact of increased evacuation zones at a radial distance of 50 km. These findings should be reported to the CNSC and publicly reviewed.

**RECOMMENDATION NO. 28:** The intervenors recommend the Commission conduct a comparative analysis of the protective measures in place for the DPZ and CPZ and ensure licence conditions provide for (1) the health and safety of persons and the environment in the event of a large, offsite radioactive release and (2) are congruent with international guidance.

**RECOMMENDATION NO. 29:** The intervenors recommend the CNSC require the expansion of nuclear emergency planning zones. First, the CPZ must require the same level of detailed protective measures as the AAZ or DPZ. Secondly, the current CPZ boundary should be re-evaluated based on better modelling and at a minimum, require a 20 km evacuation zone.

**RECOMMENDATION NO. 30:** The intervenors recommend that the Commission publicly review the PNERP 2025’s emergency planning zone sizes and its implications for all nuclear power plant licensees’ on-site and off-site emergency planning arrangements. The intervenors recommend any further PNERP technical studies and findings be publicly reviewed by the CNSC on an annual basis.

**RECOMMENDATION NO. 31:** The intervenors recommend that in view of the experience at Chernobyl and Fukushima, the Commission should request that the Province of Ontario immediately revisit the 50 km secondary ingestion zone with a recommendation to expand it to 100 km. This should be done as part of detailed planning for severe offsite accidents so that appropriate monitoring of food, agricultural products, milk, and water is established and in place in the event of such an accident.

**RECOMMENDATION NO. 32:** Emergency planning zones should be extended beyond their current limits. The DPZ should be extended to 30 km, the CPZ to 50 km, and the IPZ extended to 100 km.

**RECOMMENDATION NO. 33:** The Commission should require pre-planned CPZ protective action protocols equivalent in detail to DPZ protocols. This must include the pre-designation and funding of reception facilities and mandatory facility-specific evacuation plans for all hospitals and long-term care homes in the CPZ.

**RECOMMENDATION NO. 34:** The intervenors recommend that the Commission require OPG to work with the Province and Durham Region to develop legally binding, facility-specific evacuation protocols (including pre-arranged receiving facilities, dedicated transport, staffing ratios, medical transfer arrangements) for all hospitals, long-term care homes, and retirement residences in the DPZ and CPZ.

**RECOMMENDATION NO. 35:** The CNSC should require an updated Evacuation Time Estimate study that reflects the post-refurbishment, multi-unit PNGS scenario. The ETE study must model a 100% shadow evacuation rate for the CPZ using the 2021 Census as a population baseline, with specific analysis of transit-dependent and mobility compromised populations.

**RECOMMENDATION NO. 36:** The intervenors recommend that the Commission deny the licence renewal application until a PNGS-specific Unified Transportation Management Plan has been finalized, reviewed, and made available for full public scrutiny in a subsequent hearing.

**RECOMMENDATION NO. 37:** The Commission should require robust evidence demonstrating that residents in the DPZ and CPZ zone have awareness of emergency planning procedures. Absent this level of knowledge, the PNGS should not be operated beyond its current licencing period.

**RECOMMENDATION NO. 38:** The intervenors recommend that the CNSC require OPG to disseminate information on a more frequent basis, about the online KI-pill ordering website PrepareToBeSafe.ca in its outreach material to the public.

**RECOMMENDATION NO. 39:** The intervenors recommend that the Commission prioritize “prompt release” scenarios where unmitigated release occurs as a result of containment failure. In such events, the time to distribute KI pills to the millions of residents in the IPZ would exceed the biological window for effective thyroid blocking.

**RECOMMENDATION NO. 40:** The intervenors continue to recommend that the Commission require all licensees to provide KI pill pre-distribution to all schools, daycare centres, long-term

care facilities, hospitals, and other places frequented by vulnerable groups within a 50 km radius and extend KI pill stockpiles to 100 km.

**RECOMMENDATION NO. 41:** The Commission should impose a licence condition requiring OPG to complete an updated ETE incorporating 2026 Census data and forward-looking population projections through the end of the licence term, within a defined and reasonably near-term timeframe. The updated ETE, together with any resulting changes to protective-action assumptions, should be filed with CNSC staff and made publicly available. The updated ETE should also be coordinated with and reconciled against the finalized Pickering-specific PNERP Site-Specific Implementing Plan once completed by Emergency Management Ontario.

**RECOMMENDATION NO. 42:** The Commission should require OPG to demonstrate, with reference to current household and demographic data, that KI pre-distribution volumes, the online ordering program, and public alerting infrastructure remain adequate to the current and near-term projected population, and to provide a schedule for scaling these programs to match approved growth allocations in surrounding communities.

**RECOMMENDATION NO. 43:** Given the dense population within 50 kilometres of the Pickering NGS and children's particular vulnerability to radiation, we recommend the pre-stocking of KI in all schools within the 50 km zone be made a condition of licensing.

## Appendix B: Supporting Documents for Record (Documents Attached Separately)

| TAB | DOCUMENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Canadian Nuclear Safety Commission, Public Hearing, April 4, 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2   | CNSC, Transcript of Public Hearing Day 1, June 23, 2026: Ontario Power Generation Inc.'s application to renew its Power Reactor Operating Licence (PROL 48.03/2028) for 10 years to December 31, 2036, in connection with the refurbishment of the Pickering Nuclear Generating Station Units 5–8 and decommissioning of Units 1–4 (23 June 2026)                                                                                                                                                                          |
| 3   | Glenn Archinoff, “Whole-Site Risk Considerations for Nuclear Power Plants”, September 2017                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4   | Dr. Victor G. Snell & Dr. Nikola K. Popov, <i>Regulatory Requirements and Licensing</i> (University Network of Excellence in Nuclear Engineering, 2024)                                                                                                                                                                                                                                                                                                                                                                    |
| 5   | Saher Khan, “Acknowledged and Deferred: Intervenor Influence in CNSC Licensing Decisions”, Publication Forthcoming.                                                                                                                                                                                                                                                                                                                                                                                                        |
| 6   | Kerrie Blaise et. al, “Chapter 12: Nuclear Law, Oversight and Regulation: Seeking Public Dialogue and Democratic Transparency in Canada”, in J.L Black-Branch and D. Fleck (eds.), <i>Nuclear Non-Proliferation in International law – Volume IV</i> , 2019                                                                                                                                                                                                                                                                |
| 7   | Durham Nuclear Awareness, Slovenian Home Association & Canadian Environmental Law Association, “Comments on Ontario Power Generation’s Application for the Authorization to Operate Pickering Nuclear Generating Station Units 5 to 8 until 2026”, (April 26, 2024) CMD 24-H5.29                                                                                                                                                                                                                                           |
| 8   | CELA, “Submission by the Canadian Environmental Law Association to the Canadian Nuclear Safety Commission Regarding the Regulatory Oversight Report for Canadian Nuclear Power Generating Sites: 2022 and the Mid-Term Update of Licensed Activities for the Pickering Nuclear Generating Station” (October 29, 2023) CMD 23-M36.4                                                                                                                                                                                         |
| 9   | OPG, “2026 Pickering Event Report”; “2025 Pickering Event Report” (online): <a href="https://www.opg.com/reporting/regulatory-reporting/event-reports/">https://www.opg.com/reporting/regulatory-reporting/event-reports/</a>                                                                                                                                                                                                                                                                                              |
| 10  | CELA, “Re: Regulatory Oversight Report CNL 2022 Reference # 2023-M-30” (October 2, 2023), online: <a href="https://cela.ca/wp-content/uploads/2023/11/CELA-comments-re-CNL-ROR-Oct-1-2023.pdf">https://cela.ca/wp-content/uploads/2023/11/CELA-comments-re-CNL-ROR-Oct-1-2023.pdf</a>                                                                                                                                                                                                                                      |
| 11  | U.S. Government Accountability Office, “Nuclear Power Plants: NRC Should Take Actions to Fully Consider the Potential Effects of Climate Change.” GA-24-106326 (2 April 2024), online: <a href="https://www.gao.gov/products/gao-24-106326?utm_campaign=usgao_email&amp;utm_content=topic_naturalresources&amp;utm_medium=email&amp;utm_source=govdelivery">https://www.gao.gov/products/gao-24-106326?utm_campaign=usgao_email&amp;utm_content=topic_naturalresources&amp;utm_medium=email&amp;utm_source=govdelivery</a> |
| 12  | Email from Aditi Bhardwaj, Senior Manager, Strategic Projects at Nuclear Regulatory Affairs at OPG to CELA dated August 5, 2026.                                                                                                                                                                                                                                                                                                                                                                                           |
| 13  | International Nuclear Safety Advisory Group, <i>Probabilistic Safety Assessment</i> (Vienna: International Atomic Energy Agency, 1992)                                                                                                                                                                                                                                                                                                                                                                                     |
| 14  | Gordon R. Thompson, <i>Risks of Operating CANDU 6 Nuclear Power Plants: Gentilly Unit 2 Refurbishment and its Global Implications</i> (Toronto: Greenpeace Canada, 2008).                                                                                                                                                                                                                                                                                                                                                  |
| 15  | Nuclear Regulatory Commission, “Backgrounder on Probabilistic Risk Assessment” (last modified 19 January 2024), online: < <a href="https://www.nrc.gov/reading-rm/doc-collections/fact-sheets/probabilistic-risk-asses">nrc.gov/reading-rm/doc-collections/fact-sheets/probabilistic-risk-asses</a> >.                                                                                                                                                                                                                     |

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| 16 | Lye A, Chang J, Xiao S, Chung KY. An Overview of Probabilistic Safety Assessment for Nuclear Safety: What Has Been Done, and Where Do We Go from Here? <i>Journal of Nuclear Engineering</i> . 2024; 5(4):456-485. <a href="https://doi.org/10.3390/jne5040029">https://doi.org/10.3390/jne5040029</a>                                                                                                                                                                                                        |
| 17 | Hayat Chatri, Michael Xu, Abderrazzaq Bounagui, <i>Regulatory Role of PSA in Canada and lessons learned from its use in advanced reactor facilities</i> , (CNSC Staff) October 2024, presented at: 17th International Conference on Probabilistic Safety Assessment and Management & Asian Symposium on Risk Assessment and Management                                                                                                                                                                        |
| 18 | Jasmina Vucetic and R. Kameswaran, “Emergency Mitigating Equipments—Post Fukushima Actions at Canadian Nuclear Power Plants—Portable AC Power Sources”, CNSC Submission to IAEA (Published March 12, 2015) Version v1, online: <a href="https://inis.iaea.org/records/1rk4w-0jc67">https://inis.iaea.org/records/1rk4w-0jc67</a>                                                                                                                                                                              |
| 19 | International Atomic Energy Agency, <i>Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No GSR Part 7</i> (Vienna: International Atomic Energy Agency, 2015), online: IAEA <a href="https://www-pub.iaea.org/MTCD/Publications/PDF/P_1708_web.pdf">https://www-pub.iaea.org/MTCD/Publications/PDF/P_1708_web.pdf</a> .                                                                                                                                         |
| 20 | Emergency Management Ontario, Provincial Nuclear Emergency Response Plan (PNERP): A Strategic Response Framework for Nuclear & Radiological Emergency Management (Toronto: Ministry of Emergency Preparedness and Response, 2025), online: Government of Ontario <a href="https://www.amherstburg.ca/media/jpobg5dk/provincial-nuclear-emergency-response-plan-pnerp-2025.pdf">https://www.amherstburg.ca/media/jpobg5dk/provincial-nuclear-emergency-response-plan-pnerp-2025.pdf</a> [ <b>PNERP 2025</b> ]. |
| 21 | Emergency Management Ontario, <i>Provincial Nuclear Emergency Response Plan (PNERP): Pickering Nuclear Generating Station Implementing Plan</i> (Toronto: Ministry of the Solicitor General, 2019, revised December 2021), online: Government of Ontario <a href="https://files.ontario.ca/books/solgen-emo-pnerp-pickering-implementing-plan-2019-en-2021-12-14.pdf">https://files.ontario.ca/books/solgen-emo-pnerp-pickering-implementing-plan-2019-en-2021-12-14.pdf</a> [ <b>PNERP 2019 IP</b> ].        |
| 22 | International Atomic Energy Agency, <i>Development and Application of Level 2 Probabilistic Safety Assessment for Nuclear Power Plants</i> , IAEA Safety Standards Series No SSG-4 (Vienna: International Atomic Energy Agency, 2010), online: International Atomic Energy Agency <a href="https://www-pub.iaea.org/MTCD/publications/PDF/p15818-PUB2105_web.pdf">https://www-pub.iaea.org/MTCD/publications/PDF/p15818-PUB2105_web.pdf</a>                                                                   |
| 23 | Ontario Power Generation, <i>Pickering NGS Development of Evacuation Time Estimates</i> (2024), online: Ontario Power Generation <a href="https://www.opg.com/documents/pickering-ngs-development-of-evacuation-time-estimates/">https://www.opg.com/documents/pickering-ngs-development-of-evacuation-time-estimates/</a>                                                                                                                                                                                    |
| 24 | Canadian Environmental Law Association, Submission to the Canadian Nuclear Safety Commission Regarding Ontario Power Generation's Application to Refurbish and Continue Operation of the Pickering Nuclear Generating Station (26 April 2024), online: Canadian Environmental Law Association <a href="https://cela.ca/wp-content/uploads/2024/05/CELA-Pickering-Extension-Submission-April-26-2024.pdf">https://cela.ca/wp-content/uploads/2024/05/CELA-Pickering-Extension-Submission-April-26-2024.pdf</a> |
| 25 | Theresa McClenaghan, <i>Emergency Planning at the Pickering Nuclear Generating Station</i> (Commission Member Document (CMD) 14-H2.31, 3 May 2013), Canadian Environmental Law Association Publication No 899, at 42-43, online: Canadian Environmental Law Association <a href="https://cela.ca/wp-content/uploads/2019/07/899PickeringEmergencyPlanning.pdf">https://cela.ca/wp-content/uploads/2019/07/899PickeringEmergencyPlanning.pdf</a>                                                               |
| 26 | City of Toronto, <i>Toronto Nuclear Emergency Response Plan</i> (approved 20 August 2020), online: City of Toronto <a href="https://www.toronto.ca/wp-content/uploads/2021/03/972e-TNERP20aug2020approved-Web-Version-FINAL.pdf">https://www.toronto.ca/wp-content/uploads/2021/03/972e-TNERP20aug2020approved-Web-Version-FINAL.pdf</a> at 2.0.1 [ <b>TNERP</b> ].                                                                                                                                           |
| 27 | International Atomic Energy Agency, <i>The International Nuclear and Radiological Event Scale (INES)</i> (Vienna: IAEA, 2008), online: IAEA <a href="https://www.iaea.org/sites/default/files/ines.pdf">https://www.iaea.org/sites/default/files/ines.pdf</a>                                                                                                                                                                                                                                                 |

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| 28 | Canadian Environmental Law Association, <i>Supplemental Submission on Emergency Planning Regarding the Pickering Nuclear Generating Station Licence Renewal</i> (CMD 18-H03.26A, 18 July 2018), online: Canadian Environmental Law Association <a href="https://cela.ca/wp-content/uploads/2019/07/1195-SupplementalSubmissionOnEmergencyPlanning.pdf">https://cela.ca/wp-content/uploads/2019/07/1195-SupplementalSubmissionOnEmergencyPlanning.pdf</a>                                                                                                                                                                                                                                                      |
| 29 | Canadian Nuclear Safety Commission, <i>CNSC Fukushima Task Force Report</i> (Ottawa: Canadian Nuclear Safety Commission, October 2011), online: Government of Canada <a href="https://publications.gc.ca/collections/collection_2011/ccsn-cnsc/CC172-77-2011-eng.pdf">https://publications.gc.ca/collections/collection_2011/ccsn-cnsc/CC172-77-2011-eng.pdf</a>                                                                                                                                                                                                                                                                                                                                              |
| 30 | Heads of the European Radiological Protection Competent Authorities (HERCA) & Western European Nuclear Regulators Association (WENRA), <i>HERCA–WENRA Approach for a Better Cross-Border Coordination of Protective Actions During the Early Phase of a Nuclear Accident</i> (Version 2.0, 23 June 2022), online: WENRA <a href="https://wenra.eu/sites/default/files/news_material/herca-wenra_approach_for_better_cross-border_coordination_of_protective_actions_during_the_early_phase_of_a_nuclear_accident.pdf">https://wenra.eu/sites/default/files/news_material/herca-wenra_approach_for_better_cross-border_coordination_of_protective_actions_during_the_early_phase_of_a_nuclear_accident.pdf</a> |
| 31 | International Atomic Energy Agency, <i>Arrangements for Preparedness for a Nuclear or Radiological Emergency</i> , IAEA Safety Standards Series No GS-G-2.1 (Vienna: International Atomic Energy Agency, 2007), online: International Atomic Energy Agency <a href="https://www-pub.iaea.org/MTCD/publications/PDF/Pub1265web.pdf">https://www-pub.iaea.org/MTCD/publications/PDF/Pub1265web.pdf</a>                                                                                                                                                                                                                                                                                                          |
| 32 | Canadian Environmental Law Association, “Evaluating Environmental Protection and Emergency Preparedness at the Pickering Nuclear Generating Station (Ref. 2018-H-03)” (7 May 2018), online: <a href="https://cela.ca/wpcontent/uploads/2019/07/1189-CELA-Submission-to-the-CNSC-Pickering-Licence-Renewal-2018-H-03.pdf">https://cela.ca/wpcontent/uploads/2019/07/1189-CELA-Submission-to-the-CNSC-Pickering-Licence-Renewal-2018-H-03.pdf</a> [CELA Submission 2018];                                                                                                                                                                                                                                       |
| 33 | Canadian Environmental Law Association, <i>Letter to the Canadian Nuclear Safety Commission Re: Proposed Off-site Nuclear Emergency Planning Regulation</i> (20 May 2014), online: Canadian Environmental Law Association <a href="https://cela.ca/wp-content/uploads/2019/07/CELA-letter-to-CNSC-on-Offsite-Emergency-Planning-Regulation-May-20-2014.pdf">https://cela.ca/wp-content/uploads/2019/07/CELA-letter-to-CNSC-on-Offsite-Emergency-Planning-Regulation-May-20-2014.pdf</a> .                                                                                                                                                                                                                     |
| 34 | Ontario Clean Air Alliance Research, <i>A Fukushima-Level Nuclear Disaster at Pickering: An Assessment of Effects</i> (March 2018), at 3, online (pdf): Ontario Clean Air Alliance <a href="https://www.cleanairalliance.org/wp-content/uploads/2018/05/fukushima-March12.pdf">https://www.cleanairalliance.org/wp-content/uploads/2018/05/fukushima-March12.pdf</a>                                                                                                                                                                                                                                                                                                                                          |
| 35 | Matthew McLearn, “Canada’s nuclear regulator overlooked dubious data when renewing Pickering plant’s licence, documents show,” <i>The Globe and Mail</i> (23 March 2021), online: <i>The Globe and Mail</i> <a href="https://www.cleanairalliance.org/wp-content/uploads/2021/04/Globe-and-Mail-piece-on-Pickering-1.pdf">https://www.cleanairalliance.org/wp-content/uploads/2021/04/Globe-and-Mail-piece-on-Pickering-1.pdf</a>                                                                                                                                                                                                                                                                             |
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