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Written Submission from the Nuclear Transparency Project

Mémoire du Projet de transparence nucléaire

In the matter of

À l'égard de

Ontario Power Generation

Ontario Power Generation

Application to refurbish Pickering Nuclear Generating Station and to renew licences for the Pickering Nuclear Generating Station and Waste Management Facility

Demande concernant la réfection de la centrale nucléaire de Pickering et le renouvellement de ses permis pour la centrale et l'installation de gestion des déchets

Commission Public Hearing
Part 2

Audience publique de la Commission
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Canada

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By email

August 12, 2026

Re: Ontario Power Generation's request for a licence renewal for the Pickering Nuclear Generating Station and Waste Management Facility and application to refurbish units 5-8

We would like to begin by thanking the Canadian Nuclear Safety Commission (CNSC) for this opportunity to provide comments on this matter. We would also like to thank Ontario Power Generation (OPG) for providing timely responses to our information requests. Finally, we are grateful for the other intervenors submitting comments in this matter from whom we always learn so much.

The Nuclear Transparency Project (NTP) was awarded funding to examine OPG's application to renew its operating licence for the Pickering Nuclear Generating Station (PNGS) and Pickering Waste Management Facility (PWMF). In their application, OPG is also requesting permission to begin to refurbish four of its reactors, units 5-8, collectively referred to as "Pickering B". While we discuss the licence renewals in these submissions, our main focus is on proposed Pickering refurbishment activities.

Our comments are divided into five parts. The first part addresses the relationship between OPG's current application and the 2009 Environmental Assessment (EA) of OPG's former application to refurbish Pickering reactors, focusing on the need for regulatory consistency and transparency. The second part of these submissions outlines some general concerns over the lack of technical/scientific information and data to support OPG's current application. Part three provides an assessment of OPG's proposal to build a new lakebed intake for its cooling water system. Part four addresses persisting and recurrent localized groundwater contamination issues at the Pickering site. And finally, part five addresses the proposed ten-year licence length for the PNGS and PWMF.

Ultimately, we submit that there is not currently enough information on the public record in this matter for the Commission to render an adequately transparent and informed

decision about whether to approve OPG's request to refurbish its Pickering B reactors. More information and data should be publicly disclosed on the record, including:

- a more detailed characterization of the lakebed sediment in the vicinity of the Pickering site;
- a more detailed characterization of biodiversity and habitat use along the shoreline abutting the Pickering site;
- more detailed comparison between Pickering and Darlington-area aquatic ecosystems;
- the review of OPG's proposed deep water intake performed by the federal Department of Fisheries and Oceans;
- more detailed comparison between the financial costs and ecological benefits of different intake structures for reactor-cooling systems, including closed cycle cooling designs;
- more information concerning the potential use of non-chemical alternatives to the chemicals to manage Pickering's once-through cooling infrastructure; and
- more analysis concerning contaminated groundwater on-site and methods to better isolate it from (i.e. prevent its release into) surrounding lake water.

Through information requests to OPG, we have learned that OPG has much of this information on hand in several studies (which we discuss more below). As such, it should not be too onerous to disclose these studies for public comment during this current regulatory review and have them constitute part of the evidentiary record for Commissioners' consideration as well.

Regarding OPG's requested licence renewals for the PNGS and PWMF, NTP submits any granted licence term should not exceed five years. Regulatory Oversight Reports (RORs) are usually cited by CNSC staff as a substitute public regulatory process for more frequent hearings, however the future of RORs is currently unclear. Further, NTP has expressed concerns in the past relating to the quality of mid-term licence updates and the meaningfulness of Commission meetings to consider these updates. The ROR uncertainties and our past experiences with mid-term licence updates has led us to believe that 5-year licence terms are the best way to ensure transparent regulatory oversight of licenced facilities and support public engagement in this oversight.

About NTP

NTP is a Canadian-registered not-for-profit organization dedicated to supporting open, informed, and equitable public discourse on nuclear technologies. NTP advocates for robust public access to data and other types of information and helps to produce accessible analysis of publicly available information, all with a view to supporting greater transparency in the Canadian nuclear sector.

NTP engages with a multi-disciplinary group of experts to address economic, ecological, and social facets of the Canadian nuclear sector, producing public reports, academic articles, and other publicly accessible resources as well as intervening in regulatory decision-making processes. The organization seeks to support youth and early career scholars, especially those from underrepresented communities and groups. NTP also recognizes a responsibility to model the transparency and accountability practices for which it advocates. It is committed to interdisciplinary, cross-sectoral, and equitable collaborations and dialogue between regulators, industry, civil society, members of host and potential host communities, as well as academics and professionals from STEM fields, the social sciences, and humanities.

About this intervention

NTP's intervention was made possible by Canadian Nuclear Safety Commission (CNSC) funding through its Participant Funding Program (PFP). These submissions were drafted by NTP founder and coordinator Pippa Feinstein, JD LLM in collaboration with biologist (in environmental toxicology) Dr. Shamaila Fraz and hydroecologist (in biogeochemistry) Dr. Ekaterina Markelova. Both Dr. Fraz's and Dr. Markelova's reports are provided as appendices to these submissions. Information requests and responses between NTP and OPG are also appended to these submissions.

NTP has a direct and immediate interest in regulatory review procedures and their ability to support or impede transparency. Information disclosure is an important part of this, but so is regulatory consistency and the public's ability to understand and follow regulatory assessments as they progress. This informs our assessment of the evidentiary record for this proceeding. We have assessed OPG and CNSC staff submissions to date as well as certain additional online materials posted by both OPG and CNSC staff. These underlying interests also inform our approach to the current review in light of the former 2009 EA for Pickering's refurbishment.

However, before we continue to discuss these matters further, we would like to note two contextual issues relating to the Commission's jurisdiction and provide some short comments on the Commission's practice of holding multiple separate licence-related

hearings as well as Commission procedures for determining the confidentiality of portions of licensees' submissions.

A note on Indigenous jurisdiction

In OPG's application, they note the Pickering site is owned by OPG and the Province of Ontario, with the title/deed available upon request."[1] NTP would like to take this opportunity to recognize the sovereignty and jurisdiction of the Indigenous Peoples on whose lands and waters the Pickering site sits. OPG and Ontario's claimed ownership of this land cannot limit Indigenous Peoples' authority over, or continued responsibility for and stewardship of, the area. Nor can the CNSC override the authority and jurisdiction of Indigenous nations. We support the Williams Treaties Nations' interventions in this matter and also recognize them as relevant decision-makers when determining allowable activities by nuclear industry in their territories. NTP also recognizes the applicability of Indigenous laws as part of these nations' governance systems of their homelands on which the Pickering facilities operate.

A note on provincial energy planning and the Pickering refurbishment

To support its application, OPG references Independent Electricity System Operator energy demand forecasts and makes arguments about Ontario's energy sovereignty.[2] However, the CNSC has long held that it leaves issues of energy planning and policy to the province. As the provincial energy mix is not a matter before the Commission, NTP does not believe it should be discussed in OPG's materials. We appreciate that this matter was not included in CNSC staff's Commission Member Document. NTP urges Commissioners to maintain this jurisdictional distinction.

A note on multiple Pickering licensing proceedings

In May 2024, OPG submitted a request to amend their licence for the PWMF in order to construct and operate a Pickering Component Storage Structure (PCSS). The structure is meant to store low and intermediate level waste associated with decommissioning units 1-4 and refurbishing units 5-8. The Commission scheduled a hearing in writing to consider the application in July 2025. OPG noted construction would only begin later in 2027, if approved.[3] Given the 2027 construction goal and the fact that the facility is meant for the decommissioning and refurbishment work at the heart of the current application, we are

[1] OPG's application in this matter, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-APP-OPG-NGS-PWMF.pdf/object, p 2.
[2] *Ibid* at p 1.
[3] *Ibid* at p 1.

confused about why this earlier OPG application was subject to a separate written hearing process.

NTP has long been critical of the CNSC's practice of holding multiple proceedings for licence amendments when a single proceeding to consider them all together could be held. In addition to the administrative burden multiple hearings place on public intervenors, NTP has witnessed a pattern whereby smaller portions of projects can get approved by the Commission before the larger projects of which they are a part are considered. These early approvals are then leveraged as arguments in favour of the further approval of the larger projects. We submit that single hearings for all project aspects of a project are more procedurally fair. They are also more conducive to meaningful public participation, allowing intervenors the time and funding to consider comprehensive proponent applications.

A note on the CNSC's confidentiality process

OPG requested the ability to only publicly disclose a redacted version of their Safety Assessment for PWMF Storage Building 5 with 1410 Dry Storage Containers. OPG's arguments in favour of redaction are not publicly disclosed. Further, the Commission's ultimate decision is brief and does not include any specific reference to the contents of the report in question. Their decision notes,

> The Commission finds that, in accordance with subrule 12(1)(b) of the Rules, the document contains confidential information of a scientific and technical nature that is treated consistently as confidential and the person affected has not consented to the disclosure. The Commission is satisfied that the information available to the public in the redacted version of the document is sufficient to satisfy the public interest. The redacted version is appended to OPG's request for confidentiality.[4]

This non-specific and very broad language prevents the public from understanding the exact basis for redacting specific content in the safety assessment report. While the release of this decision provides some transparency (compared to the earlier CNSC practice of not releasing these decisions at all), the substantive value of this decision is very limited.

The CNSC has a mandate that includes a responsibility to publicly disseminate technical and scientific information.[5] Approaching issues of requested confidentiality with this duty

[4] Commission Ruling on Request to Protect Confidential Information, May 22, 2026, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-CR-RFC-ROD-ENG.pdf/object.
[5] *Nuclear Safety and Control Act*, section 9(b).

top of mind (and explicitly incorporated into its discussions and evaluations of applications such as these) would constitute a meaningful step toward greater transparency.

PART ONE: Regulatory consistency and transparency when considering Pickering's proposed refurbishment

There are currently eight reactors at the PNGS. The first four reactors were constructed and commissioned between 1966-1973, these are referred to as "Pickering A". Four additional reactors were built at the site and commissioned between 1983-1986, referred to as "Pickering B" and not connecting significantly with the earlier Pickering A reactors. The operating life for the Pickering B reactors was expected (and designed) to extend for 30 years, requiring shut down between 2013-2016.

In 2006, the provincial government asked OPG to assess the feasibility of refurbishing the four Pickering B reactors. A screening level environmental assessment was conducted for the Pickering B refurbishment from 2006 to 2009, with a full public hearing. The CNSC rendered a decision in which residual impacts of the refurbishment were noted, and licence amendments were proposed to mitigate these effects and permit the project to continue. An environmental assessment follow-up monitoring program was also required to verify the accuracy of EA predictions.

Ultimately, however, OPG found it would require five to six years to procure new steam generators for the Pickeringrefurbishment, resulting in an overlap between Pickering and Darlington refurbishments. OPG recognized it may not have the capacity to successfully complete refurbishments if they overlapped. It thus determined investments could be made to extend the operating life of Pickering by four years without a refurbishment at that time. In 2010 OPG publicly announced it would invest $300 million in extending the operating life of Pickering to the year 2020.[6]

In 2018, a licence renewal hearing was held in which OPG applied to extend Pickering commercial operations until 2024. At that time, OPG assured it would 'stabilize' the site from 2024-2028, ceasing operations, removing fuel bundles and reactor components for

[6] Ontario Power Generation, Recommendation for Submission to the Board of Directors, March 5, 2010, online: https://www.rds.oeb.ca/CMWebDrawer/Record/443266/File/document. In the application to renew the PNGS licence in 2013, OPG applied to extend the operating lives of Pickering B reactors to 2020 and support some continued operations in units one and four of Pickering A. This was ultimately granted by the Commission, see: Canadian Nuclear Safety Commission, Record of Decision, May 29, 2013, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/2013-05-29-Decision-OPG-Pickering-e-Edocs4177096.pdf/object.

cooling in irradiated fuel bays, and removing heavy water from the reactors. OPG explained it was planning to transition the facility to a 'safe storage' state from 2024 until approximately 2050, at which time it hoped to dismantle and ultimately restore the Pickering site. OPG was granted a licence for ten years on this basis, with Commissioners noting that another public hearing would have to be held to consider any future applications by OPG to extend commercial operations beyond 2024.[7]

In 2022, the Ontario provincial government asked OPG to extend Pickering's operations and reassess the feasibility of its refurbishment.[8] In 2023, OPG applied to the Commission to extend Pickering B's operating life to 2026 (noting operations at Pickering A would still stop by 2024) and a hearing was held in 2024. The Commission ultimately agreed that OPG could extend Pickering B's commercial operations until December 31, 2026.[9] The Darlington refurbishment project concluded in early 2026,[10] leaving OPG more able to pursue a refurbishment of Pickering at this time.

As this chronology illustrates, the long-term plans for the future of the PNGS have changed several times over the last 20 years. This is reflected in the regulatory reviews conducted over this time. A lot of regulatory work has been done to ensure the CNSC's oversight of the Pickering site as OPG's plans have changed. It is important to ensure consistency and some degree of continuity between successive regulatory reviews to support public understanding and ensure sufficient transparency over this time. Building each new review on work done that has been done before would significantly increase public understanding and transparency. This is true for the 2009 EA and subsequent predictive environmental reviews which will be discussed more below.

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[7] Canadian Nuclear Safety Commission, Record of Decision, Application to Renew the Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station, 2018, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/DetailedDecision-OPG-Pickering-2018-e.pdf/object?subscription-key=3ff0910c6c54489abc34bc5b7d773be0. Note, the original hearing required OPG to give the Commission notice by 2022 should it want to extend the operating life of reactors beyond 2024. In 2022, OPG applied for an extension of this timeframe to 2023. This was granted by the Commission, see: Canadian Nuclear Safety Commission, Record of Decision, Application to Extend Deadline under PROL 48.01/2028 Licence Conditions 15.1 and 15.4 Related to the End of Commercial Operations for the Pickering Nuclear Generating Station, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/Decision-OPG-Pickering-CMD22-H107-e.pdf/object.

[8] Government of Ontario, News Release, Ontario Supports Plan to Safely Continue Operating the Pickering Nuclear Generating Station, September 29, 2022, https://news.ontario.ca/en/release/1002338/ontario-supports-plan-to-safely-continue-operating-the-pickering-nuclear-generating-station.

[9] Canadian Nuclear Safety Commission, Record of Decision, Application to Extend the Operation of the Pickering Nuclear Generating Station Units 5 to 8 until December 31, 2026, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/Record-of-Decision-OPG-PNGS-U5-8-Extension-Licence-Amendment-CMD-24-H5.pdf/object

[10] Government of Ontario, News Release, Ontario Delivers Darlington Refurbishment Project Ahead of Schedule and Under Budget, February 2, 2026, online: https://news.ontario.ca/en/release/1006993/ontario-delivers-darlington-refurbishment-project-ahead-of-schedule-and-under-budget.

The 2009 Environmental Assessment for refurbishing Pickering

The EA for Pickering's refurbishment undertaken between 2006 and 2009 was conducted under the *Canadian Environmental Assessment Act, 1992*. It identified nine adverse residual effects that would result from the refurbishment as proposed by OPG:

1. fish impingement and temperature impacts;
2. tritium in groundwater;
3. radiation dose to workers during the refurbishment phase;
4. traffic during the refurbishment phase;
5. reduced use and enjoyment of community and recreational features;
6. reduced use and enjoyment of property;
7. release of transformer oil;
8. release of tritiated water to Lake Ontario; and
9. nuclear accidents which may result in exposure to the public.[11]

The EA also identified potential effects of the environment on the PNGS after refurbishment including invasive species of mussels and algae in cooling water intake structures as well as climate change impacts such as flooding and changes in lake temperature and water levels.[12]

In the 17 years since this EA was completed, there have been significant ecological changes in this area. Climate change has impacted lake temperatures, coupled with increased urbanization, nuisance algae growth has continued. The presence of species in the area continues to change due to stocking efforts for some species and the continued growth in the presence of invasive species.[13] The EA still contains the most detailed evaluations of the site and predicted refurbishment work, but some of this work and the ultimate EA findings have since become outdated.

Changes in impact assessment legislation since 2009 have also been significant. The 1992 *Canadian Environmental Assessment* Act was significantly amended in 2012 and then replaced by the *Impact Assessment Act* of 2019. The changing legislated lists of EA considerations and the caselaw supporting interpretations of these Acts illustrate how applicable legal norms have evolved over this time. Significantly, nuclear reactor refurbishments no longer require impact assessments under this legislation.

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[11] CNSC staff, Recommendation for the Acceptance of the Proposed Environmental Assessment Screening Report regarding the Refurbishment and Continued Operations Project at the Pickering Nuclear Generating Station B, Pickering, Ontario, December 10, 2008, pp 7-12.
[1] *Ibid* at pp 11-12.
[13] For more detail, see Dr. Fraz's report, Appendix A to these submissions, and NTP submissions in the Darlington New Nuclear Project hearing: Nuclear Transparency Project, Written Submissions on the Applicability of the Darlington New Nuclear Project environmental assessment and plant parameter envelope to selected reactor technology, November 20, 2023, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD24-H2-35.pdf/object.

Relationship between the 2009 Pickering Refurbishment EA and current review

For many years after the 2009 EA, it appeared no refurbishment would be pursued. Significantly, OPG's own internal site assessments for Pickering after the 2009 EA show vastly different pictures of the Pickering site's future. In 2017, OPG conducted a Predictive Effects Assessment for Pickering Nuclear Safe Storage (PEA) assessing the shutdown of the PNGS in 2024. It assessed a two to three-year stabilization phase followed by 25-30 years of storage with surveillance, followed by 10 years of staged dismantling and demolition, and five years of site restoration to "allow lands to be released [from CNSC regulatory control] and repurposed for alternative uses".[14]

In 2022, a PEA Addendum was prepared in which certain baselines from the 2017 PEA were updated. The length of time for each project phase (stabilization, storage and surveillance, dismantling and restoration) remained the same but were set to begin in 2026 rather than 2024.[15]

It was only in 2025 that a Predictive Environmental Risk Assessment (2025 PERA) was undertaken for Pickering's refurbishment, decommissioning, and continued operations. In it, stabilization, storage and surveillance, and dismantling and demolition processes were evaluated for Pickering A. While refurbishment, continued operations, and decommissioning were evaluated for Pickering B.[16] Decommissioning for the refurbished Pickering B is only "conceptually developed" in a new preliminary decommissioning plan, also completed in 2025. The 2025 PERA is the only source for any updates on refurbishment plans since the 2009 EA. However, it does not explicitly address or update the 2009 EA findings.

At this time, a new impact assessment for the Pickering refurbishment is not required by legislation and an older EA has already been done but aspects have become outdated. NTP argues that this requires a regulatory approach in the current hearing that provides some continuity, consistency, and that maintains sufficient transparency. At this point, one would expect clear descriptions of all refurbishment activities, clear characterizations of baseline conditions, and potential future project effects, but this is not the case. Deep

[14] Ontario Power Generation, Predictive Effects Assessment for Pickering Nuclear Safe Storage, 2017, online: https://archive.opg.com/pdf_archive/Nuclear%20Licencing%20Documents/Pickering%20Nuclear%20Operating%20Licence%20Renewal%20(2018)/I030_P-REP-07701-00002.pdf, at p ES-1..

[15] Ontario Power Generation, Predictive Effects Assessment for Pickering Nuclear Safe Storage, 2022, online: https://www.opg.com/documents/predictive-effects-assessment-for-pickering-nuclear-safe-storage-2022-addendum-report-pdf/.

[16] Ontario Power Generation, Predictive Environmental Risk Assessment, Revision 0, 2025, online: https://www.opg.com/documents/pera-for-pickering-refurbishment-decommissioning-and-continued-operations-pdf/.

water intake assessments are ongoing, and decommissioning plans are still only conceptual. It does not appear as though there is a current proposal for follow-up monitoring, as the 2009 EA had required and provided for public comment. There is currently no follow-up monitoring plan disclosed for public comment that outlines how PERA 2025 findings will be verified or communicated to the public, should the refurbishment proceed.

PART TWO: concerns over a lack of information and data in the current proceeding

In her environmental review for this intervention, Dr. Fraz relied heavily on past Environmental Risk Assessments (ERAs) for the Pickering Nuclear site.[17] These filled in some of the gaps from the 2025 PERA. However, several significant information and data gaps remain that limited her review. Her findings as well as identified information gaps are discussed below.

The Pickering site hosts diverse ecology

Dr. Fraz found the Pickering site remains a "vital migratory and foraging path for rare or threatened species" and that the site provides important foraging and spawning grounds in the spring, and refuge for high priority conservation species in the autumn.[18] While overall species diversity may have declined over the last 15 years, available data is still able to suggest that "while species richness varies by area, seasonal thermal shifts are the primary drivers of fish community structure and site utility".[19] There are some indications from changes in terrestrial species presence and use of the Pickering site that it may grow as an important migratory stopover or expanding breeding territory for birds, as the climate continues to warm and temperature and habitat ranges shift north.[20]

While it appears OPG may have conducted its own internal studies to understand changes to species' presence and local habitat over the last two decades, there are considerable quantitative information gaps in publicly-accessible materials.

[17] It is thus a shame that the CNSC has recently reversed its 2017 decision (relating to REGDOC 3.2.1) that required licensees to make their ERAs publicly available. Without this requirement, proactive reviews like the one undertaken by Dr. Fraz will be more difficult if not impossible.
[18] Expert report of Dr. Fraz, Appendix A to these submissions, p 8.
[19] *Ibid* p 9.
[20] *Ibid* p 16.

Limited availability of quantitative data

In her review, Dr. Fraz found that ERAs tended to recycle old data, without transparently disclosing why that data was used and not subsequently updated. She also found "shifting toxicity benchmarks, and entirely new activity based COPCs" over time which means "cumulative impact assessments might not be feasible, using existing frameworks."[21] She noted a consistent approach to regular data collection, and the maintenance of consistent reference points over time would support greater transparency.

NTP has long commented on concerns over licensees' ecological assessment's preference for qualitative over quantitative data. The ERAs for the PNGS provide several examples where vague descriptive language about ecological 'significance' prevents the greater understanding of measurable change. For example, there are important quantitative metrics for habitat quality such a substrate composition and water quality parameters which are simply not reported in ERAs.[22] Groundwater quality is noted as being within a 'historical range', without numerical values provided to expand on what this range is.[23]

Another significant example of a lack of quantitative analysis, and overreliance on qualitative methods, relates to the absence of Hazard Quotient (HQ) calculations from OPG materials. OPG's ERAs should contain HQ calculations for exposure parameters including intake rates, bioaccumulation factors, and specific activity data such as stable carbon content. The lack of this kind of analysis can constitute a technical gap in the risk characterization for the Pickering site, essentially offering a "fragmented methodology where physiological modeling is decoupled from toxicological endpoints".[24] As Dr. Fraz explains, the lack of HQ calculations also prevents estimated doses from being understood in their full biological context.[25]

The need for more direct environmental monitoring

Biodiversity of fish species appears to be primarily determined indirectly by impingement data rather than more direct methods such as netting, underwater observation or eDNA. Dr. Fraz warns this introduces several biases as fish who can escape the cooling water intake suction (e.g. stronger swimmers like salmonoids and bass) or smaller juveniles will not be as represented among impinged fish.[26]

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[21] *Ibid* p 22.
[22] *Ibid* p 6-7.
[23] Expert report of Dr. Markelova, Appendix B to these submissions, pp 7-8
[24] Dr. Fraz report, Appendix A to these submissions, pp 33-34.
[25] *Ibid.*
[26] *Ibid* at p 7.

NTP asked OPG whether it had ever employed, or considered the employment of, species-specific netting practices, underwater observation, or eDNA methods to monitor biodiversity and better understand impingement patterns. OPG responded by noting that,

> during the evaluation of options to mitigate the impacts to the aquatic environment from the taking of cooling water several technological methods were considered. The decision to proceed with the Fish Diversion System was recommended as it provided the best opportunity to meet the CNSC requirement to reduce fish impingement by 80 percent. This requirement was met in 2012.[27]

This is not a clear response to our question, but seems to imply that because fish impingement appeared to have been reduced with the installation of their diversion system, no further actions are required to understand species-specific fish presence or behaviour. As we discuss more in part three below, the continued reliance on indirect fish monitoring also prevents a fulsome understanding of potential effects of the proposed deep water intake.

Concerns over sediment monitoring

Dr. Fraz has found OPG's assessment of Lake Ontario sediment has significant data gaps and also appears to remove high risk areas from active monitoring. For example, outfall sediment concentrations of tritium were recorded at a maximum of $1.14x10^3$ Bq/kg in the 2013 ERA, while the subsequent 2017 ERA then proceeds to report a significantly lower maximum (1.14 Bq/kg) citing data from 2006–2009.[28] There are also long (nine-year) data gaps in tritium measurements from Frenchman's Bay, frustrating any attempt to understand historical or potential future trends.[29] This issue is especially concerning as the construction of new cooling water infrastructure would require sediment to be disturbed, releasing settled contaminants back into the water.

Tritium releases to surface water

During refurbishment, OPG relies on a projected consistent on-site flowrate of 2,050,000 m^3/day to dilute tritium releases to the lake. However, no consideration is made for circumstances in which this flow rate would not be maintained (resulting in a concentration spike), nor does it assess potential impacts of total contaminant loadings on local lake sediment, including neighbouring Frenchman's Bay.[30] This leads Dr. Fraz to find "this approach does not satisfy the principles of conservatism".[31]

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[27] Nuclear Transparency Project Information Request #3. See Appendix C to these submissions.
[28] Dr. Fraz report, Appendix A to these submissions, p 30.
[29] *Ibid* at p 31.
[30] *Ibid* at p 33.
[31] *Ibid.*

NTP asked OPG about this flow rate and whether there were any contingency plans should this flow rate change. OPG responded by noting,

> 2,050,000 m3/day is the assumed minimum flowrate for the licensing period and flow is not anticipated to be lower than this. For consideration, the modeling that was conducted in previous assessments (2017 Safe Storage Predictive Effects Assessment, 2022 PEA Addendum) had assumed much lower flows and both of these also predicted that there would not be adverse effects to human nor ecological receptors.[32]

The basis for the assumed consistency of this flow rate remains unclear. It also remains unclear exactly what contingencies are in place, should the flow rate change and affect the concentration of contaminants in released water. The issue of tritium releases to the lake are further discussed in part four below.

Finally, the 2025 PERA notes detailed dismantling and demolition assessments will only be conducted in 2050, thus preventing the public from understanding potential long-term or cumulative impacts of sediment bound tritium over the whole course of the refurbishment project's life.[33]

PART THREE: Evaluating OPG's proposal to construct a Deep Water Intake

There are four general adverse environmental effects associated with reactor cooling water systems at Canadian-regulated nuclear generating stations: impingement of fish, entrainment of fish eggs and larvae, thermal releases, and chemical releases.

In 2009, the EA for Pickering's refurbishment did not consider significant structural changes to Pickering's cooling water intake which draws water from the lake's surface along the shoreline to cool its reactors. Once the water passes through the Pickering station, absorbing heat from the reactors, it is discharged directly into a forebay where is can cool down to some extent before reaching the rest of the lake.

In its current application before the Commission, OPG proposes to change the cooling water intake from a surface intake to an intake built out into the lake bed. The 2025 PERA appears to offer the only assessment of the construction of this new deep water intake (DWI) structure for the refurbished Pickering reactors.

[32] Nuclear Transparency Project Information Request #7. See Appendix C to these submissions.
[33] Dr. Fraz report, Appendix A to these submissions, p 33.

According to the 2025 PERA, construction of the new cooling water infrastructure (including infilled areas and a dock) would destroy 17.5 hectares of fish habitat for spawning, foraging, and migration and involve 4.8 hectares of habitat alteration from dredging and a potential bridge over the outfall. The proposed lakebed intake itself would temporarily "disrupt" 2.5 hectares of fish habitat. OPG asserts none of this habitat is "rare" or "unique", but fails to characterize it in more detail.[34]

Lack of detail in OPG's lakebed characterization

OPG has argued that the proposed DWI will reduce fish impingement.[35] CNSC staff note the DWI would also "improve plant reliability and reduce impingement and entrainment", drawing in cooler water in summer and warmer water in winter and up taking less algae and "debris".[36] OPG refers to the proposed DWI as a "Darlington-style" intake and part of the rationale for its installment is the implied better performance of Darlington's intake structure in comparison to Pickering's. Underlying these arguments is the assumption that lake conditions and the local ecology at the Darlington and Pickering sites are sufficiently similar, and thus what works for Darlington will work for Pickering. However, there is insufficient publicly available data to support this assumption.

NTP asked OPG about its work characterizing aquatic habitat and species' presence around the Darlington and Pickering site. OPG responded by noting several studies it had undertaken characterizing aquatic habitat (substrate), fish communities, ichthyoplankton (egg and larval fish), benthic macroinvertebrate, macrozooplankton communities, and fish spawning.[37] OPG provided a short summary of the main findings of their studies, reproduced below:

[34] Ontario Power Generation, Predictive Environmental Risk Assessment, Revision 0, 2025, online: https://www.opg.com/documents/pera-for-pickering-refurbishment-decommissioning-and-continued-operations-pdf/, at p vii.
[35] OPG's application in this matter, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-APP-OPG-NGS-PWMF.pdf/object, p 217.
[36] CNSC staff Commission Member Document in this matter, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-CNSC-SUB.pdf/object, pp 15, 18.
[37] Nuclear Transparency Project Information Request #1. See Appendix C to these submissions.

Table 1. Similarities and Differences in Fauna/Flora and Lakebed Ecology and Habitat between PNGS and DNGS.

Aquatic Component (Fauna/Flora and Lakebed Ecology and Habitat)	Similarities (PNGS/DNGS)	Differences (PNGS/DNGS)
Lakebed Ecology- Attached Algae (*Cladophora*) Macrophytes (aquatic plants)	Attached algae common throughout nearshore, mid-depth and deepwater areas including the proposed intake area. Few macrophytes due to exposed shoreline	Higher abundance of attached algae at PNGS (possibly due to nutrient loading from nearby water treatment facility)
Fish Community (nearshore, mid-depth, deepwater areas including proposed intake area)	Seasonal offshore-onshore-offshore movement of fish with varies with depth. Most fish species consistent of north shore environment of Lake Ontario (e.g. Alewife, Round Goby, various salmonids including Lake Trout).	Round Whitefish more common at PNGS than DNGS. Lake Whitefish also present at PNGS but not DNGS. Lake Sturgeon (one) also collected in deepwater at PNGS
Lakebed Ecology- Ichthyoplankton near bottom (fish eggs and larvae)	Dominated by species such as Alewife, Rainbow Smelt (DNGS), and Round Goby which are common to the north shore of Lake Ontario.	Lake Whitefish and Burbot larvae reported at PNGS but not at DNGS. Deepwater Sculpin observed at DNGS but not at PNGS
Lakebed Ecology - Benthic Invertebrates	Common community structure dominated by Quaggas and Zebra mussels	-
Water Column- Macrozooplankton	Common community structure dominated by Copepods and Cladocerans	-
Lakebed Habitat- Nearshore	No unique fish habitat- consistent of exposed north shore environment with wind and wave action. Silt/sandy substrate with cobbles, rocks and boulders which vary with depth	Higher concentrations of silt/sand deposits at shoreline at PNGS than at DNGS.
Lakebed Habitat- Mid-depth and Deepwater including proposed intake area	No unique fish habitat. Silt/sandy substrate with cobbles, rocks and boulders which vary with depth	At deeper depths (> 15m), appears to be higher concentration of cobble substrate at PNGS (south-east) than at DNGS.

Broadly, the table shows there are some differences between Darlington and Pickering shorelines and local aquatic habitat that could be relevant when considering a potential DWI at Pickering. Notably, lake water adjacent to the Pickering site hosts more round

whitefish and lake whitefish than found in the lake by the Darlington site. Further, sturgeon is present by the shore and burbot larvae can be found along the lakebed near the PNGS but not the Darlington site. The 2025 PERA is also silent on how new intake plans may overlap with fish habitat and how potentially affected species' habitat use may change over time.[38]

Ultimately, the table's characterizations are still very limited. Access to the full studies OPG performed would be more helpful in understanding the aquatic ecology around the Pickering site and determining the significance of differences between lake conditions, species' presence, and habitat around the Pickering and Darlington sites.

Alternative reactor cooling technologies

NTP asked OPG about whether closed-cycle cooling technologies had been considered when planning for the Pickering refurbishment. OPG affirmed it had "explored" this option, namely a loop tunnel design similar to the one considered for the Darlington New Nuclear Project. However, they determined it was "not the preferred option for DWI due to technical and financial parameters".[39] No more detail was provided. OPG's current Wesleyville project proposal promises to assess a number of closed-cycle cooling technologies, namely natural draft cooling towers, mechanical draft cooling towers, and mechanical draft cooling towers with plume abatement technology.[40] As such, closed-cycle cooling technologies have regularly been considered by OPG for new nuclear projects (i.e. Darlington and Wesleyville), but do not figure at all in their current refurbishment application.

The issue of cooling towers and other closed-cycle cooling designs was also a point of interest during the 2009 Pickering refurbishment EA.[41] Closed-cycle cooling is a preferred nuclear infrastructure choice in many US-regulated generating stations due to its better environmental performance.[42] Should the Pickering refurbishment be approved, and Pickering operations continue for another 30 years, closed-cycle cooling technologies may be more effective in minimizing environmental impacts and ensuring operational reliability and efficiency than the construction of a DWI. In any event, the public record for

[38] Dr. Fraz report, Appendix A to these submissions, p 36.
[39] Nuclear Transparency Project Information Request #2. See Appendix C to these submissions.
[40] Ontario Power Generation, Wesleyville Project Description, online: https://iaac-aeic.gc.ca/050/documents/p89802/162725E.pdf at p 70.
[41] Canadian Nuclear Safety Commission, Record of Proceedings Including Reasons for Decision, In the Matter of Screening Environmental Assessment of the Pickering Nuclear Generating Station B Refurbishment and Continued Operations Project, Pickering, Ontario, December 10, 2008, paras 35-36.
[42] US Energy Information Administration, "Over half the cooling systems at U.S. electric power plants reuse water", November 17, 2011, online: https://www.eia.gov/todayinenergy/detail.php?id=3950.

this proceeding should include a more detailed discussion of these alternative cooling water designs.

Insufficient assessment of the DWI proposed design and construction

NTP is concerned that detailed design features for a DWI do not yet appear to have been determined, and thus cannot be assessed fully at this time. This lack of detail concerning DWI design was a considerable impediment to NTP's assessment in this intervention.[43]

CNSC staff note they also had to request more information about the DWI and as of their CMD release date, were still waiting for further details to assess it against Safety Control Areas.[44] Troublingly, CNSC staff still stated they were "satisfied that there are measures in place to ensure that the effects of habitat loss associated with the DWI would be minimal with implementation of mitigation measures, which CNSC staff and [Department of Fisheries and Oceans] will verify during the proposed licence period."[45] Concerning the necessary *Fisheries Act* authorization for the DWI, CNSC staff noted "[c]ertain impacts, such as aquatic habitat disturbance associated with DWI construction, are anticipated but are expected to be minimized through mitigation measures and monitoring". Having said this, CNSC continued to explain OPG has yet to submit its mitigation plans for CNSC staff review.[46] NTP is concerned about CNSC staff making these assurances without having reviewed OPG plans and studies.

At the Day One hearing for this matter, a representative of the federal Department of Fisheries and Oceans admitted their assessment of OPG's proposed DWI had not yet begun.[47] By not having this assessment available for public comment during this proceeding, NTP and other intervenors are effectively denied the possibility of understanding or commenting on potential mitigation or offsetting measures that may be required for the DWI pursuant to any ultimate *Fisheries Act* authorizations.

The lack of public access to CNSC staff or Department of Fisheries and Oceans evaluations of the DWI has also constituted a significant impediment to NTP's assessment of the DWI in this intervention. The current lack of information relating to both the DWI design and its assessment by relevant regulatory bodies effectively deprives the public of the ability to understand and comment on this significant aspect of OPG's refurbishment proposal – a new element that was not considered in the 2009 EA.

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[43] Dr. Fraz expert report, Appendix A to these submissions, p 35.
[44] CNSC staff Commission Member Document in this matter, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-CNSC-SUB.pdf/object, p 19.
[45] *Ibid.*
[46] *Ibid*, p 83.
[47] Day One hearing transcript in this matter, June 23, 2026, p 119.

Impingement

While CNSC staff and OPG regularly state that Darlington operations impinge far fewer fish than Pickering's, OPG does not appear to post the Darlington station's impingement data online like it does for the PNGS. While we were able to find some comparison between Pickering and Darlington impingement data, it was very limited.[48]

Dr. Fraz noted it is possible that a lakebed intake may prevent the episodic impingement spikes experienced at Pickering caused by shoreline environmental conditions. However, there was insufficient data or analysis to determine this with any authority. While Darlington impingement is characterized by a lower overall biomass than Pickering's, Dr. Fraz has found the difference is not consistently pronounced.[49]

The 2025 PERA's claim that a deeper lakebed intake at Pickering would reduce impingement by 89% is impossible to confirm. The invasive round goby constitutes a little over half of impinged biomass at Darlington, which can mask the Darlington intake's impact on non-invasive species.

There are significant limits to the possibility for species-specific comparisons between Darlington and Pickering impingement due to OPG's focus on total impingement biomass (in both the 2025 PERA as well as its own routine impingement monitoring reports). While it may be that the lakebed intake at the Darlington site may better protect nearshore dependent species such as American Eel (which appears to be impinged in greater numbers at the PNGS), this is difficult to confirm with such limited data. More species-specific impingement information would assist the public in understanding the real-world operational effects of both Darlington and Pickering cooling water infrastructure.[50]

Entrainment

As was the case in Dr. Fraz's assessment of impingement, there does not appear to be sufficient data to establish whether a deeper lakebed intake would actually prevent more entrainment than PNGS's current intake. The 2025 PERA claims that larval abundance decreases with depth, however data collection has not been regular and species-specific data is missing, preventing any comprehensive assessment of entrainment at either the

[48] See: Canadian Nuclear Safety Commission, Environmental Protection Review for the Darlington Nuclear Generating Station, online: https://www.cnsc-ccsn.gc.ca/eng/resources/environmental-protection/reviews/environmental-protection-review-summary-darlington/.
[49] Dr. Fraz report, Appendix A to these submissions, p 40.
[50] NTP's recommendations for species-specific monitoring methods and OPG's response are discussed above on pp 11-12 of this submission.

Darlington or Pickering sites.[51] What is known is that there may be a higher concentration of fish eggs and larvae or species more susceptible to entrainment due to poor or limited swimming ability around the proposed Pickering lakebed intake.[52] As such, a DWI for the PNGS may potentially increase entrainment rates.

The 2025 PERA predicts a 60% entrainment reduction would result from the installation of a DWI at Pickering. However, without a clear entrainment baseline at Pickering and without a comprehensive comparison between habitats and fish presence between Darlington's intake and Pickering's new proposed intake, Dr. Fraz warns that this promise remains theoretical.[53]

Finally, there is also no discussion in OPG or CNSC staff materials of the potential intersection of entrainment and thermal pollution effects. The DWI would result in greater temperature differentials between cooling water at the intake and outfall points. It remains unclear whether the effects of these temperature differentials could be significant for entrained species, impacting rates of survival and recovery.

Thermal pollution

OPG's proposed DWI would result in more significant temperature differentials between incoming and outgoing cooling water compared to current operations. Dr. Fraz found that the proposed DWI may cause acute cold shocks during transitions, which could require staggered shutdown for the refurbishment. Further, she notes the outfall could be responsible for long-term thermal loading due to the warming climate, which would require close monitoring over time.[54]

Chemical pollution

Numerous chemicals are added to cooling water, primarily to avoid corrosion and mussel growth in cooling water infrastructure. Given the significant volume of lake water that is constantly flowing through the system, overall concentrations of these chemicals remain low. However, their use still constitutes a contaminant release to the lake. Dr. Markelova recommends a move from "monitoring and dilution" of non-radiological contaminants to a source reduction model. She explains, "[s]ince Pickering's once-through cooling-water scale is about 116 m^3/s, or roughly 10,000,000 m^3/day, even small concentrations change

[51] Dr. Fraz report, Appendix A to these submissions, p 43.
[52] *Ibid*, p 36.
[53] *Ibid,* p 44.
[54] *Ibid,* pp 47-48.

can still become large cumulative mass flows to Lake Ontario over next 30 years of operation."[55]

NTP asked OPG about whether it had ever considered lower-chemical or non-chemical options for biofouling, mussel control, or corrosion support, such as non-stick silicone coatings and electromagnetic treatments. OPG responded that it had considered non-chemical methods for mussel biofouling control in the past, including ultrasonic deterrence, cavitation, non-stick coatings, UV light, self-cleaning filters, electromagnetic deterrence, gamma irradiation, and thermal shock. However, OPG found these "methods were only partially successful, often providing localized protection or working only against specific mussel life stages". OPG also found them to be less "feasible or broadly implementable as the existing chlorination system, which remained the more effective treatment approach for largescale station use".[56]

It would be helpful for these studies to be included on the public record for this current hearing. If there was some benefit to non-chemical methods, it would be good to know whether the addition of these methods could allow for less reliance on chemical biofouling (either less frequent use or lower concentrations). Further, non-chemical methods may still be a better option for anti-scaling control.

ISSUE FOUR: Legacy groundwater contamination and its management

The Pickering site has persisting and recurrent localized groundwater contamination issues. NTP is interested in the scope of refurbishment efforts and whether they would address legacy infrastructure failures and ongoing core maintenance issues, as these have been the most significant contributors to local groundwater contamination.

Leaks resulting in high tritium concentrations in groundwater

Pickering has had a fairly long history of releases to local groundwater. In the last decade alone, progressive leaks from Pickering's moderator and adjacent areas have significantly contaminated groundwater below several of Pickering's reactors. As a result, tritium levels by 2018 were in the millions of Becquerels per litre.[57]

[55] Dr. Markelova report, Appendix B to these submissions, p 13.
[56] Nuclear Transparency Project Information Request #4, Appendix C to these submissions.
[57] Ontario Power Generation, 2019 Pickering Nuclear Groundwater Monitoring Program Results, March 9, 2020.

Then, in 2020, a malfunction of pipes in Unit 1 caused contamination beyond 300 million Bq/L (the highest reported value was U1-RBFD-1 at 377,400,000 Bq/L). The leak was isolated and investigated, corrective actions were taken, and monitoring frequency in the area was increased.[58] There were also a series of leaks from units 5 and 6 between 2016 and 2020 leading to elevated tritium concentrations in the tens of million Bq/L range for groundwater below Pickering B: the peak reported value from the 2020 moderator purification system valve leak was 62 million Bq/L (at RBU6-GT-2).[59] The 2020 peak was roughly 1,500–6,000 times higher than the shallow-well water of units 5-8 (depending on which shallow-well value is used for comparison, from 10,000 to 40,000 Bq/L). [60] Then new leaks at unit 1 in 2023 led to tritium levels in the range of 20-30 million Bq/L (2023 U1-RBFD-2: 29,822,000 Bq/L, 2023 U1-RBFD-1: 26,344,000 Bq/L).[61] Currently, Western IFB-B remains a significant pathway for contaminated groundwater in Area B.[62]

However, as groundwater contamination has grown, so have applicable benchmarks employed by OPG. With the 2020 releases, the previous 2013/2017 benchmark was increased 33-fold in 2022/2025. The justification for this significant increase in the benchmark between 2017 and 2022 is not explained or discussed in OPG's materials.[63] However, the approach of increasing benchmarks when contamination grows, raises concerns about the utility and appropriateness of the benchmarks themselves.

Unclear relationship between refurbishment and maintenance

OPG explains it has a system for categorizing maintenance where tasks are considered either Corrective Critical (CC), Corrective Non-Critical (CN), Deficient Critical (DC), or Deficient Non-Critical (DN) "depending on component criticality as it relates to nuclear safety".[64] The maintenance backlog is meant to be kept low so OPG can engage in more preventative activities.[65] Apparently the maintenance backlog has decreased since 2019.[66] However, neither OPG nor CNSC staff provide descriptions of what these maintenance activities are. They only provide data that discloses the number of maintenance actions required and undertaken. Given the significance of tritium leaks to groundwater, the issue of maintenance is an important one.

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[58] Dr. Markelova expert report, Appendix B to these submissions, pp 5-6.
[59] *Ibid* p 8.
[60] *Ibid.*
[61] *Ibid* p 6.
[62] *Ibid* p 9.
[63] Dr. Fraz report, Appendix A to these submissions, p 24.
[64] OPG's application in this matter, https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-H7-APP-OPG-NGS-PWMF.pdf/object, p 153.
[65] *Ibid.*
[66] *Ibid*, p 154.

NTP has consistently argued for years that the number of maintenance tasks cannot convey the relative seriousness of these tasks or the general state of repair of the Pickering site. For the last four years, NTP's ROR submissions for generating facilities have asked for general descriptions of required maintenance works, brief notes relating to their importance or why they are needed, and notes concerning how timely repairs are undertaken in real measurable timeframes (e.g. days, weeks, years).[67] To date none of this information has been publicly disclosed.

It remains unclear whether there is any intersection between the issues to be addressed in existing maintenance backlogs and those to be pursued as part of refurbishment activities. This issue is not addressed substantively in CNSC staff or OPG submissions.[68] NTP understands there will be distinctions between OPG's fitness in service program and its refurbishment activities. However, knowing exactly what these distinctions are and how they are determined is important for the public to understand and would greatly contribute to increased transparency around the refurbishment project and its scope.

Releasing contaminated groundwater to the lake

Dr. Markelova found that contamination below Pickering A may not directly affect groundwater conditions in and around Pickering B and planned refurbishment work.[69] OPG argues that this highly contaminated groundwater will remain isolated from the surface and Lake Ontario and therefore not pose any danger to the local environment. However, OPG may pump this contaminated groundwater up to the surface for release into the lake as a method to manage the quantity of contaminated groundwater. NTP is deeply concerned about this practice and any pathway by which highly tritium-contaminated groundwater could be released into the lake.

The 2025 PERA introduces the possibility of releasing diluted groundwater into the PNGS' forebay during PNGS-A's storage with surveillance phase.[70] OPG argues doses will be below ecological benchmarks, but their modelling relies on hydrological flowrate data from 2002 which may be outdated.[71] Additionally, the 2025 PERA also predicts tritium discharges from unit 5-8 channels may reach concentrations as high as 4.76×10^2 Bq/L.[72] Plans for discharge of this contaminated groundwater in the 2017 PEA were more

[67] See: Nuclear Transaprency Project, Written submissions for all five 2024 Regulatory Oversight Reports, January 28, 2026, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD26-M3-111-CMD26-M4-91-CMD26-M5-171-CMD26-M6-71-CMD26-M7-9.pdf/object.
[68] For the discussion of maintenance work in CNSC staff's CMD in this matter, see p 64.
[69] Dr. Markelova report, Appendix B to these submissions, p 6.
[70] Dr. Fraz report, Appendix A to these submissions, p 27.
[71] *Ibid.*
[72] *Ibid.* p 30.

protective than current 2025 plans that rely on dilution alone, and there is no reason given for OPG's change in approach between 2017 and now.[73]

Dr. Markelova found that there appear to be two pathways by which contaminated groundwater may reach Lake Ontario via PNGS infrastructure. First, groundwater below units 5-8 (in the reactor-building foundation) can flow to the Radioactive Waste Liquid Management System (RLWMS) where it is monitored as liquid effluent discharge to Lake Ontario. Second, unit 5/6 (groundwater) can flow into the area beneath IFB-B, toward TAB IAD sumps via TAB foundation-drain influence, and then to the CCW (Condenser Cooling Water**)** intake duct which releases to the forebay and Lake Ontario**.**[74] The first pathway ensures radiological classification, accounting, possible hold-up, sampling, and discharge control, but the second pathway does not.[75]

NTP asked OPG to confirm these two pathways and was told that all pathways are ultimately monitored.[76] However this does not explain any difference between how different pathways may be managed, and whether all pathways offer the potential for groundwater to be held back if too voluminous or highly contaminated.

Ultimately, NTP submits OPG should clarify all potential pathways for contaminated groundwater to reach the lake. Dr. Markelova also recommends that OPG ensure the monitoring of TAB IAD/inactive drainage before dilution, particularly where groundwater influenced by the unit 5/6–IFB-B pathway may enter that system, together with a concentration balance from pre-dilution water through the CCW intake duct, forebay and final discharge. She insists that OPG should also define numerical trigger levels and corresponding actions (including holding, resampling, investigation, reporting, increased monitoring, or redirection to RLWMS or another radiological-control pathway) for circumstances in which elevated tritium is detected.[77]

Removal of tritium in the groundwater is not practicable. As such, Dr. Markelova argues that source prevention, hydraulic control, pathway-specific monitoring, early warning, and transparent reporting are necessary.[78] But OPG's materials are not clear about this, saying analysis and treatment are performed before release of radiological and non-radiological contaminants. While concentrations and resulting exposures to tritium may remain relatively low, Dr. Markelova still recommends a regulatory focus on "source

[73] Dr. Markelova report, Appendix B to these submissions, p 11.
[74] *Ibid*, p 9.
[75] *Ibid*, p 9-10.
[76] Nuclear Transparency Project Information Request #5, Appendix C to these submissions.
[77] Dr. Markelova report, Appendix B to these submissions, pp 2-3, 15.
[78] *Ibid*, p 10.

prevention, hydraulic control, pathway-specific monitoring and the transparent routing of contaminated groundwater".[79]

Groundwater data in the aftermath of these events indicates that contaminant plumes may linger and move below the site in dynamic ways that require continued monitoring. As such, Dr. Markelova emphasises that,

> the licence review should not rely only on the statement that there is no off-site impact. It should also require evidence of source control, pathway control, event-based monitoring, and transparent routing decisions, especially where tritiated groundwater may enter TAB IAD / inactive drainage rather than RLWMS.[80]

The behaviour of tritium once released into the lake may also be dynamic. NTP asked OPG whether it conducted any studies to understand tritium concentrations in the lake including any modelling how this tritium might move through lake currents and interact with aquatic biota. OPG responded by referring us to its Environmental Monitoring Program reports.[81] We have reviewed these reports and were unable to find any studies conducted to learn about and characterize the movement of released tritium to the lake and its potential uptake by aquatic species.

Ultimately, the operation of the once-through cooling water system, with its high volumes of water, should not be used as an excuse to release harmful substances into the lake based on the argument that they will be significantly diluted. NTP submits total contaminant loadings still need to be considered and avoidance preferred.

PART FIVE: Licence renewal length

NTP supports the move to consolidate the PNGS and PWMF licenses. Both facilities share several internal Pickering site-wide management systems, including certain environmental monitoring programs. It would be helpful for the public to consider them both together to get a comprehensive sense of all Pickering operations in the future.

In terms of licence length, NTP submits that any granted licence renewal should not exceed a term of five years. The ROR uncertainties and our past experiences with mid-term updates has led us to believe that 5-year licence terms (and the more frequent licence renewal hearings they will require) are the best way to ensure transparent regulatory oversight of licenced facilities and support public engagement in this oversight.

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[79] *Ibid*, p 12.
[80] *Ibid*.
[81] Nuclear Transparency Project Information Request #6. See Appendix C to these submissions.

Regulatory Oversight Reports (RORs) are usually cited by CNSC staff as a substitute public regulatory process for more frequent hearings, and they emerged almost 15 years ago to address the public engagement vacuum that would result from longer licence terms. However, the future of RORs is currently unclear. At a Commission meeting this past March, CNSC staff presented their "Reinventing Regulatory Oversight Reporting Project" as a response to concerns from Commissioners about the timeliness of ROR releases.[82] In their presentation, CNSC staff noted annual reporting would be significantly pared down to short "dashboards" rather than fulsome reports and no specific methods for public engagement were noted. To date, there has been no public notification of any opportunities to intervene in an ROR or ROR-substitute process for the 2025 operating year. Usually by this time of year, all applications to intervene in the annual ROR reviews would have been completed. Coupled with longer licence terms, the absence of ROR intervention opportunities would significantly limit civil society's institutional knowledge over time and threaten our ability to remain informed and contribute to future licensing processes.

NTP has also expressed concerns in the past relating to the quality of mid-term licence updates and the meaningfulness of Commission meetings to consider mid-term licence updates. Because they are not required by statute, mid-term licence updates have not been standardized. For example, while the Bruce Nuclear Generating Station mid-term licence update in September 2023 was the subject of its own Commission meeting with intervenor funding offered, the PNGS mid-term update was added onto the December Commission meeting convened to consider the 2022 ROR for nuclear generating facilities. No additional time or funding was allocated for intervenors to also review the PNGS licence update.

In NTP's submissions for the PNGS mid-licence update, we highlighted these concerns, and also noted additional concerns relating to the quality of information available in OPG's mid-term licence update. We highlighted illegible graphs in OPG materials, a significant lack of detail in discussions relating to PNGS operations, and insufficient data provided to support OPG's arguments and assurances.[83]

NTP was also effectively prevented from engaging with the Commissioners on the mid-term licence update due to a scheduling issue at the December meeting. NTP had been scheduled to speak in the morning and during our oral submissions were informed Commission discussion would be limited to the ROR only that morning. The afternoon was reserved for PNGS-specific discussion, though we were then prevented from

[82] Transcript from Commission Meeting, March 26, 2026, pp 734-768.
[83] Nuclear Transparency Project, Written submission for Regulatory Oversight Report on nuclear generating facilities and Pickering Nuclear Generating Station mid-term licence update, October 30, 2023, online: https://api.cnsc-ccsn.gc.ca/dms/digital-medias/CMD23-M36-12.pdf/object.

speaking in the afternoon to address our Pickering-specific comments (on the basis we had already spoken in the morning). This schedule division was never communicated to intervenors and left NTP unable to address all the aspects were funded to cover in our intervention. We noted our concerns over this issue at the time and on the record.[84]

These mid-term update issues would not arise in licence renewal hearings which require more rigorous written submissions and involve a more prescriptive and standardized process. As such, NTP strongly recommends a return to shorter licence terms and more regular licence renewal hearings.

[84] Transcript from Commission Meeting, December 13, 2023, pp 133, 136-137.