NORTHWATCH

May 8, 2025

Canadian Nuclear Safety Commission
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Sent by email interventions@cnsc-ccsn.gc.ca **Ref. 2025-H-02**

Commission Members:

Re. **Ontario Power Generation's application to renew power reactor operating licence for the Darlington Nuclear Generating Station**

On March 18, 2024 the Canadian Nuclear Safety Commission (CNSC) announced that it would hold a 2-part public hearing on March 26, 2025, and June 24–26, 2025, to consider an application from Ontario Power Generation (OPG) to renew its power reactor operating licence for the Darlington Nuclear Generating Station (DNGS), located on the north shore of Lake Ontario in the Municipality of Clarington and 72 kilometres east of Toronto.

OPG's current power reactor operating licence for the DNGS is valid until November 30, 2025 and authorizes OPG to operate the DNGS, which consists of 4 nuclear reactors and their associated equipment.

It is notable that the Notice of Hearing does not indicate that Ontario Power Generation is applying for a license with the extraordinary 30-year license term.

For comparison, we reviewed the July 2022 Notice of Hearing on Ontario Power Generation's application to renew its Darlington Waste Management Facility operating licence (Ref.2023-H-09) and the May 2015 Notice of Hearing on the application by Ontario Power Generation Inc. to renew its power reactor operating licence for the Darlington Nuclear Generating Station (Ref. 2015-H-04). Both these notices clearly identified the length of term being requested by Ontario Power Generation, as do CNSC Notice of Hearings for license applications and renewals more generally.

Granting a 30-year license for a nuclear generating station in Ontario would be unprecedented and would be unacceptable. It seems unlikely that the omission of this very important detail would be the result of a political decision on the part of CNSC staff to hide such an important and controversial aspect of the license application, given that CNSC staff's role is to support the Commission with fact-based information and analysis, rather than advocate for the licensee. However, it is understandable that the public's perception is affected by incidents such as this.

CNSC staff has concluded that OPG's application should be approved. Northwatch disagrees with these conclusions and with the CNSC staff recommendation, for the reasons set out in later sections of this submission.

Northwatch's Interest

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario. Founded in 1988 to provide a representative regional voice in environmental decision-making and to address regional concerns with respect to energy, waste, mining and forestry related activities and initiatives, Northwatch has a long term and consistent interest in the nuclear chain, and its serial effects and potential effects with respect to northeastern Ontario, including issues related to uranium mining, refining, nuclear power generation, and various nuclear waste management initiatives and proposals as they may relate or have the potential to affect the lands, waters and/or people of northern Ontario.

Northwatch is interested in Ontario Power Generation's proposed approach to nuclear waste management and containment over various time frames. Northwatch's key areas of focus in licencing reviews are OPG's management of the radioactive wastes it generates, over various time frames. Throughout OPG's operations, Northwatch is interested in how operations and operational decisions affect fuel conditions, waste volumes, and waste attributes. In this review, Northwatch is particularly interested in how OPG has addressed the issues of waste generation, waste management in various time frames, and how safety and aging considerations are addressed in OPG's application and supporting documents and CNSC's staff review of the OPG application.

Northwatch's issues and concerns include the generation and management of the nuclear wastes that will result from Ontario Power Generation's operations at the Darlington Nuclear Generating Station. The wastes of concern include wastes from refurbishment activities and those wastes which will result in the extended / continued operations of the reactors at the Darlington Nuclear Generating Station.

Ontario Power Generation's established practice of transferring radioactive wastes from the Darlington NGS to the Western Waste Management Facility on the eastern shore of Lake Huron, the OPG controlled Nuclear Waste Management Organization's declared intention to transport, process, bury and then abandon all of Canada's high-level nuclear fuel waste at the Revell site in northern Ontario – including irradiated fuel from the Darlington station – make the generation of radioactive wastes through operations at the DNGS and their long term management are of direct interest to Northwatch.

For the record, Northwatch did not apply for or receive participant funding to support our review.

Context

The Darlington NGS is comprised of four CANDU nuclear reactors, four turbine generators, and associated equipment, services and facilities, including those related to the on-site management of the radioactive wastes generated through operations. The four reactor units were brought into service between October 1990 and June 1993, and are described by OPG as having a net electrical output of 881 MW per unit.[1]

Northwatch has previously intervened in license reviews for the Darlington Nuclear Generating Station, including in the 2015 review of Ontario Power Generation's application for a licence to operate the Darlington Nuclear Generating Station from 2015 to 2028, during which period they proposed to sequentially refurbish the four nuclear reactor units on-site. The 2015 review was, to some degree, a continuation of the 2012 review of the environmental assessment conducted by the Canadian Nuclear Safety Commission of the the proposal by Ontario Power Generation (OPG) for the Refurbishment and Continued Operation of the Darlington Nuclear Generating Station, in which Northwatch also intervened.

Northwatch's review of the 2012 environmental assessment focussed on matters related to the generation and management of nuclear wastes that would be associated with or result of the proposed refurbishment and extended operations. For that review, Northwatch retained Dr. Gordon Thompson to provide technical support and a review of the irradiated fuel waste management on-site. Dr. Thompson's findings in that review remain relevant in this 2025 license review. They included:

- CNSC staff appropriately identified the Irradiated Fuel Bays (IFBs) and Dry Storage Casks (DSCs) as locations of potential events that could be major contributors to Spent Nuclear Fuel (SNF) radiological risk but did not conduct studies to identify and characterize a range of scenarios that could involve a release of radioactive material, with relevant characteristics of a release scenario including the magnitude, composition, timing, and pathway of the release.
- CNSC staff excluded malevolent acts from its consideration, assuming a probability of zero for an entire class of events that are technically feasible; the assumption was imprudent, and may lead to substantial under-estimation of SNF radiological risk.
- Completion of a credible EA process for refurbishment and continued operation of DNGS would require, among other ingredients, that OPG and CNSC demonstrate a thorough technical understanding of SNF radiological risk and risk-reduction options associated with DNGS.

While Northwatch's 2012 submission and Dr. Thompson's report are directly relevant to the current review of OPG's license application, those comments are not repeated in this submission. Dr. Thompson's 2012 submission is included as Appendix 1.

[1] Darlington Nuclear Generation Station Application for Licence Renewal, Ontario Power Generation, December 2013, NK38-CORR-00531-16490 P

At the time of the 2015 license review the refurbishment of Darlington Units 1-4 was proposed but not yet underway. Ontario Power Generation has now rebuilt three of the four reactors at the Darlington Nuclear Generating Station with the fourth, Unit 4, scheduled to be completed by the end of 2026. The status of Unit 4 as of OPG's statement in November 2024 was in "the reactor rebuilding phase". OPG described the refurbishment of the four reactors as a ten-year mega-project with a $12.8-billion price tag.[2]

Concurrent Projects at the Darlington Site

During the next ten years Ontario Power Generation intends to have four different major sets of activities underway at the Darlington site:

- Refurbishment of Unit 4
- Operation of the refurbished reactor units, and after 2026 – according to OPG's plan – the operation of all four reactors in the western portion of the Darlington site
- Construction of additional dry storage buildings at the Darlington Waste Management Facility in the central portion of the Darlington site
- Construction of between one and four boiling water reactors on the eastern portion of the Darlington site

Given the management challenges each of these sets of operations will pose (see, for example, the following section on operational incidents during the current license period) the prospect of Ontario Power Generation attempting to manage all four of these activity sets during the same period and on the same site is of concern. Northwatch notes that Ontario Power Generation does not acknowledge this challenge in their application or address issues related to their capacity or competency to concurrently manage these four large projects.

Non-Compliance Events During Current License Period

Northwatch has reviewed the very summary descriptions of events reports for the previous license period[3]. Previously referred to as "S-99 Reports" because they were incident reports filed in accordance with regulatory standard *entitled S-99 Reporting Requirements for Operating Nuclear Power Plants* and now referred to as "event report", these reports identify events at nuclear facilities that deviate from regulatory requirements or operating procedures.

In the period of 2015 through 2024 (excluding the fourth quarter of 2024, which is not yet available) there were over 400 event reports. Ontario Power Generation posts very minimal information about each event, generally speaking limited to one brief line of text. Based on this minimal information, Northwatch has done some summary analysis of the events reported on over the last license period.

[2] DARLINGTON NUCLEAR GENERATING STATION APPLICATION FOR LICENCE RENEWAL – ADDENDUM – January 2015
[3] See Appendix 2

Based on the very summary descriptions, Northwatch grouped approximately half of the event reports into fifteen categories: unplanned power changes, emergency systems and responses, labelling and signage, power supply issues, unplanned releases, monitoring infractions, breaches of containment, worker-related issues, instances of mischief, radioactive contamination or dose exceedances, tritium issues, security failures, infractions related to fire safety, package and / or transport incidents, and unapproved storage of radioactive material.

Each of these categories has safety concerns associated with it.

For example, a "breach of containment" at Darlington Nuclear Generating Station (DNGS) generally refers to a scenario where the containment building, a structure designed to contain radioactive materials, is compromised, potentially leading to a release of radioactive material into the environment. Of the fifteen reported events of breaches of containment, many provided no description or detail in available reports. Others included a minimal description, such as “breach of Containment at Airlock”.

The 21 reports of power supply issues included emergency power generators being unavailable and standby power being unavailable; while minimal information was provided, it is reasonable to associate these power supply issues with safety concerns related to the power requirements of maintaining cooling functions of the irradiated fuel bay. While counted separately in Northwatch’s inventorying of the event reports, the 27 event reports Northwatch categorized as related to emergency systems and responses also included failures in emergency power systems and cooling systems, as well as incidents related to emergency lighting, emergency service water and fire hose and other fire related issues such as fire access routes and access to fire cabinets being blocked. An additional three fire related events were with respect to two actual fire incidents and one fire alarm activation.

Similarly, while included in the group of nine incidents categorized by Northwatch as mischief, some of those “mischief” incidents, such as interference with the public address system and smoke detectors, were also impairments to the emergency systems and responses. Other mischief incidents included damages which were both surprising and concerning, given the increased risk they pose to workers. These included events that were reported as “equipment misuse”, such as multiple reports of damage to whole body monitors and to hand and foot monitors.

There were sixteen reports of non-compliance with monitoring requirements and 23 reports of infractions related to labelling and / or signage, including missing radiation hazard labels and inadequate posting of radiological hazards, unposted waste areas and radioactive drums and radioactive wastes being unlabeled, and radiation hazard signs not being visible or including in incorrect information.

The thirteen workforce related reports were for the most part related to Ontario Power Generation not having maintained the minimum staff complement but also included issues of an unqualified

worker performing radioactive work and a "non-Dose Management System Active Worker" entering a radiological area, which we surmise means a worker entering a radiological area without either the proper training, protection or monitoring. In addition, there were eight accounts of radioactive contamination or dose exceedances.

Three transportation issues were flagged: the Trefoil symbols not being visible on a transportation package, an issue with contents of a legacy multi-purpose transportation package certificates and authorized radioactive, and a malfunction with a roadrunner transportation package. It was unclear from the minimal information provided if these were issues were limited to on-site transportation or extended to off-site shipments. Four security incidents related to drivers being left unescorted in the Protected Area and members of the public speeding on-site. In one of the latter cases, it was reported that "prohibited items" were discovered in the vehicle, but it was not stated whether these items heightened the security risk (e.g. a weapon).

Finally, there were twenty unplanned releases to the environment, including hydrocarbons and oil, multiple refrigerant leaks, and radiological releases to air, plus five non-compliance events or exceedances of tritium. There were also two incidents radioactive materials being found in "unapproved storage" or "abandoned".

CNSC Assessment of Safety and Control Areas

Despite the more than 400 reportable events or incidents during the licence period, the licensee fared very well in the CNSC Assessment of Safety and Control Areas.
In the areas of Management System, Human Performance Management, Physical Design, Fitness for Service, Environmental Protection, Emergency Management and Fire Protection, Safeguards and Non-Proliferation, and Packaging and Transport OPG received a "satisfactory" grading in each area every year.

In the area of Radiation Protection, the licensee was deemed to be satisfactory in all years, except one, in which it was found to be "fully satisfactory". In the area of Waste Management, the licensee was deemed to be satisfactory in all years, except two, in which it was found to be "fully satisfactory". In the areas of Conventional Health and Safety, Operating Performance, and Safety Analysis the licensee was deemed to be satisfactory in all years, except three, in which it was found to be "fully satisfactory".

Only the area of Security was found to be "below expectations" and that was for just two of the ten years.

Substantive Issues

30-Year Licence Period

Ontario Power Generation is requesting a power reactor operating licence (PROL) for the Darlington Nuclear Generating Station (Darlington NGS) for an unprecedented period of 30 years.

CNSC staff provided the Commission with the following recommendation regarding the duration of the licence period:

> *Accept OPG's proposed licence length of 30 years. Introduce a new licence condition for OPG to conduct ongoing Indigenous engagement activities. The new licence condition would be a notable change to the licensing basis and ensure that OPG will continue engagement with Indigenous Nations and communities throughout the licence period.*

As staff noted in their CMD, in its recent decision to grant a 10-year licence to the Point Lepreau Nuclear Generating Station the Commission rejected New Brunswick Power's requestion for a longer licence period, noting "that providing opportunities for intervenors to voice their views and for the Commission to hear them is necessary to sustain a dialogue with members of the public and Indigenous Nations and communities", and therefore issued a decision which included a 10-year licence with a public proceeding at the mid point to provide such opportunities.

CNSC staff state that CNSC staff's basis for the support of the 30-year licence period were the following criteria:

- International Benchmarking
- Mature Canadian regulatory framework and regulatory oversight
- Transparency and Open Communication
- Input from Indigenous Nations and Communities
- OPG's basis for a 30-year licence period

Northwatch offers the following comments in response to each of those criteria:

- The Commission should not accept staff's very selective adoption of "International Benchmarking" with the adoption only in this instance where the selected samples support OPG's request; we would welcome a discussion paper and potentially subsequent regulatory review on a range of international benchmarks, including access to information and the operation of a public registry (such as the U.S. Nuclear Regulatory Commission's ADAMS registry) or the practice of setting performance standards for waste management as is seen in other jurisdictions
- CNSC staff argue that the "maturity" of the Canadian regulatory framework and regulatory oversight is evidenced (1) the use of the licence conditions handbook (LCH) to outline

compliance verification criteria and guidance on how to meet the licence conditions, and (2) establishment of a requirement to conduct a Periodic Safety Review (PSR), as well as pointing to other reporting requirements such as the Environmental Protection Report and the Probabilistic Safety Assessment; it must be noted that the only opportunity for the public to comment on or question these reports and their findings and suppositions is through the license review hearings; in addition, these are the only occasions where we have observed the Commission similarly questioning and discussing these reports and their findings

- CNSC staff suggest that "Transparency and Open Communication" is achieved through the Regulatory Oversight Reports, Status Report on Power Reactors updates, Event Initial Reports and license amendments; we vigorously disagree that these sufficiently provide "transparency and openness" or serve as a substitute for license terms of five to ten years; public interest intervenors and non-Indigenous residents of Durham region have no opportunity to speak before the Commission at the Commission meetings where the Regulatory Oversight Reports and status reports are presented to the Commission, and the regulatory oversight reports are relatively superficial and provide limited coverage or no coverage of issues that are included in licensing reviews, such as waste generation and waste management; we also note that license amendments are frequently done a hearings in writings, with no opportunity to present to the Commission or to observe or understand the Commission's examination of the case or evidence presented by the licensee or CNSC staff
- Input from Indigenous Nations and Communities which we have reviewed has not, by our assessment, supported OPG and CNSC staff's case for extending license length and reducing public hearings to occurring just three times per century; further, while CNSC staff appears to be offering additional meetings with First Nations, this is not a substitute for engagement directly with the Commission, and moving discussions with First Nations for a public hearing to private meetings with between First Nations and the CNSC staff denies both the Commission and the public the opportunity to hear directly from First Nations and learn from their teachings; Northwatch places great value on the interventions by Indigenous peoples, and have found the presentations by Williams Treaty nations and others – in particular Saugeen Ojibway Nation – to be wise and insightful and important to the proceedings
- OPG's basis for a 30-year licence period are a set of unconvincing arguments; the DNGS is going to be dramatically changed over the next license period, and could reasonably be expected to see significant changes in future decades as well; parts of the DNGS infrastructure are aging – such as the steam generators and the irradiated fuel bays – and significant issues could arise in the near and middle future as a result, which could constitute a significant change; as noted above, the various reporting items OPG cites are inadequate substitutes for a public license review process; OPG commitment with Indigenous Nations is not a substitute for engagement of the Commission with the Nations (OPG is not the Crown; while it could be argued that the federal Minister cannot delegate the Duty to Consult to the Commission, it cannot be argued that OPG is a stand-in for the Crown in the Duty to Consult or upholding the Honour of the Crown).

In addition to the points made above in response to CNSC staff's rationale for supporting OPG's request for a 30-year license term, we offer the following:

- A longer license period disadvantages public participation; already, license period have been lengthened from one to two to five years and more recently ten years, making the reviews larger, more detailed and more complex, and making it more difficult for public interest intervenors to build capacity and retain institutional memory over successive license reviews; a thirty-year license term would practically erase the potential for any capacity or carry-over of learning or institutional memory from one license period t the next
- A longer license period could reduce the effectiveness of Commission members, given that most members would be Commission members for only one license review per generating station, thereby reducing Commission members' ability to retain institutional memory over successive license reviews
- Commission hearings are the only opportunity for the Commission, the licensees, First Nations, CNSC staff, public interest groups and the public to hear directly from each other and interact directly; while there are many improvements could be made to the hearing process (such as affording intervenors the opportunity to pose questions) it is still a valuable and unique opportunity within Canada's nuclear regulatory system; moving to a hearing every thirty years reduces this opportunity to such a degree that it becomes moot; for practical purposes, the Commission will no longer be able to claim that it hears from Indigenous peoples, from the public, and from neighbours to the nuclear facilities it licenses if the occasion is reduced to three times per century per facility

In his letter of 25 March 2025 to the Commission registrar, Steve Gregoris, Chief Nuclear Officer for Ontario Power Generation Inc., acknowledged that through their engagement on the Licence Renewal Application, OPG had received feedback from Indigenous Rights Holders and key stakeholders with respect to the proposed 30-year licence term for the Darlington NGS, and that as a result "OPG is supportive of decennial reviews throughout the 30-year licence term, where Rights Holders and the public will have the opportunity to be heard before the Commission."

We appreciate Ontario Power Generation having made this concession in response to the feedback they are receiving. We propose that the "decennial review" referred to by OPG be in the form of a hearing to review an application by Ontario Power Generation for a ten-year license.

REQUEST: that the Commission reject Ontario Power Generation's request for a 30-year license term but instead issue a decision which grants a 10-year licence with a public proceeding at the mid-point which will provide the opportunity for First Nations and the public to make written and oral submissions to the Commission.

Nuclear Fuel Waste and its Long-Term Management

In their May 2024 application to renew their operating license for the Darlington Nuclear Generating Station OPG states that they "remains committed to the safe and permanent disposal of nuclear waste" but provide only one single paragraph of discussion, and that only to say that "the

Nuclear Waste Management Organization (NWMO) is responsible for implementing Canada's plan for the safe, long-term management of used nuclear fuel. Under the NWMO's plan" and that a deep geological repository for used fuel is expected to be in-service in the mid-2040s.[4]

That single paragraph creates multiple false impressions, including:

- It suggests or implies that the Nuclear Waste Management Organization is separate from Ontario Power Generation, as if arm's length; it is not. Ontario Power Generation has majority control of the NWMO and in 2024 provide 93% of the NWMO's funding
- It suggests or implies that the NWMO is wholly responsible for the irradiated fuel once it is created; it is not. OPG is responsible for the waste while it is on the site, and that will be for another century, at minimum; the NWMO published a "Deep Geological Repository Transportation System Conceptual Design Report" in 2021 which included a timeline for transfer of the wastes from the current location to the NWMO's (still conceptual) deep geological repository and the Darlington site was scheduled for 2088 as the "finish year", which will now be extended by 30 years of operations of the four refurbished CANDU reactors and by 60 years (post construction) of operation of the proposed BXRX-300 reactors, plus ten years of cooling on-site after the irradiated fuel is removed from the reactor core[5]
- While NWMO self-describes as being responsible for the transportation, processing, burial and abandonment of the fuel wastes at a centralized location, NWMO has clearly stated that it is not responsible for the extraction of the wastes from its on-site storage or for the transfer of the waste into transportation containers; NWMO states in the same report as referenced above that "At each interim storage facility, the waste owner is responsible for the retrieval of used fuel from storage, preparing and loading the transportation package with used fuel, and loading and securing the transportation package onto the conveyance";[6] the projected start date for transfers from the Darlington site is 2050,[7] meaning it falls within the 30-year period OPG is proposing be the license term (2025-2055); OPG's one paragraph description is inadequate in its description of this technically challenging and unprecedented operation that will be carried out by OPG at the DNGS
- The NWMO further clarifies in that same report that "the conveyance (with secured transportation package) is prepared and ready for transport. As a result, transportation infrastructure, facility infrastructure, equipment for transportation package and conveyance loading at the storage facility are excluded from this (the NWMO) report"; the reason they are excluded from the NWMO's transportation report is that they are the exclusive responsibility of Ontario Power Generation, and OPG has provided not even a passing reference to this major project which – according to the NWMO, who OPG both controls and defers to – is going to commence within the 30 years OPG is proposing be the license term.

[4] 2.11.1.2 Long Term Disposal of Radioactive Waste, Darlington Nuclear Generating Station Power Reactor Operating Licence Renewal Application, Ontario Power Generation, May 2024, page 208
[5] Deep Geological Repository Transportation System Conceptual Design Report Crystalline / Sedimentary Rock APM-REP-00440-0209 R00, September 2021, Ashton Taylor, AECOM Canada Limited – Prepared for NWMO, page 16
[6] Deep Geological Repository Transportation System Conceptual Design Report Crystalline / Sedimentary Rock APM-REP-00440-0209 R00, September 2021, Ashton Taylor, AECOM Canada Limited – Prepared for NWMO, page 10
[7] Deep Geological Repository Transportation System Conceptual Design Report Crystalline / Sedimentary Rock APM-REP-00440-0209 R00, September 2021, Ashton Taylor, AECOM Canada Limited – Prepared for NWMO, page 16

Ontario Power Generation can't fit these puzzle pieces together: they are not responsible for the high-level wastes because the NWMO is, they are responsible for the waste transfer and transportation infrastructure because NWMO says they are, there are no proposed new activities within their proposed thirty-year license term, and the high-level waste will begin leaving the Darlington site in 25 years.

In the Supplemental Update to the OPG PROL Renewal Application Ontario Power Generation disrespects Wabigoon Lake Ojibway Nation and Grand Council Treaty #3.

In "*Table 12: High Level Summary of Interests and/or Concerns Raised by Indigenous Nations and Communities*" under the heading "*Generation and Storage of Waste*" OPG reports that they have received questions regarding the volume of waste that will be generated throughout the requested 30-year term and OPG responds:

> *OPG is supportive of the Nuclear Waste Management Organization's initiative to advance a permanent and safe storage solution for this waste stream with the willing host communities of Wabigoon Lake Ojibway Nation and the Township of Ignace.*[8]

Ontario Power Generation erroneously describes Wabigoon Lake Ojibway Nation as "willing host community", misrepresenting the Nation and WLON's decision-making process and decision. Further, the statement wholly overlooks the unanimous resolution passed by the Chiefs in Assembly of Grand Council Treaty #3 in October 2024. Grand Council Treaty #3 is comprised of 28 First Nations, including Wabigoon Lake Ojibway Nation. The Revell site is in the heart of Anishnabi Aki (Treaty 3 territory).

On October 3, 2024 Grand Council Treaty #3 Chiefs-in-Council Resolution CA-24-14, "Position on Nuclear Waste and Resource Development in Treaty #3" was passed, expressing "continuing support for the Elders' Declaration CA-11-14 that makes clear that a Deep Geological Repository for the storage of nuclear waste will not be developed at any point in the Treaty #3 Territory."[9]

On November 18, 2024 Wabigoon Lake Ojibway Nation announced that the community had reached a decision to allow the NWMO to move to site characterization phase in its investigation of the Revell site in northwestern Ontario. Wabigoon Lake Ojibway and stated very clearly that "The yes vote does not signify approval of the project."

On November 28th the NWMO announced that it had selected the Revell site as their preferred location for the development of their deep geological repository project. On that date, Wabigoon Lake Ojibway Nation released a statement acknowledging NWMO's site selection decision and announcing that the project will be subject to a determination from WLON's Sovereign regulatory decision-making process[10].

Further, the NWMO's selection of the Revell site is now the subject of a legal challenge from Eagle Lake First Nation.[11]

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[8] OPG PROL Renewal Application - Supplemental Update Page, December 2024, Page 57

[9] https://wethenuclearfreenorth.ca/wp-content/uploads/2024/11/ca-24-14-position-on-nuclear-waste-and-resource-development-in-treaty-3.pdf

[10] As posted at https://www.wabigoonlakeon.ca/_files/ugd/04fe7b_2ec4c7b04a2b45c0bdf8c78ce967478a.pdf

[11] https://globalnews.ca/news/10932606/ontario-first-nation-challenge-nuclear-ignace/#:~:text=A%20First%20Nation%20in%20northern,to%20have%20its%20decisions%20quashed.

Eagle Lake First Nation has filed an application in Federal Court seeking a judicial review of the Nuclear Waste Management Organization's decision to build the deep geological repository in the Township of Ignace and Wabigoon Lake Ojibway Nation area. Eagle Lake First Nation says it was "unjustifiably" rejected as a host community and denied its own right to consent to the project and not for any fair, justifiable or defensible reasons, but because members of the First Nation had raised concerns about the nuclear waste site.

The court filing also names the federal minister of natural resources among the respondents and accuses the NWMO of acting in "bad faith" and seeks to have its decisions quashed.

REQUEST: The Commission should direct Ontario Power Generation to correct the record with respect to the statements made about the NWMO's role in the long-term management of high-level waste vs the responsibilities of OPG itself, and should withdraw its erroneous statements with respect to the "willingness" of First Nations on whose territory the Revell site in northwestern Ontario is located.

Fuel Defects

Fuel defects are a continued concern in reactor operations reviews in Ontario. Historically, there have been issues around fuel integrity at Pickering, Bruce and Darlington nuclear generating stations. During the 2013 licence review for the Pickering Nuclear Generating Station Northwatch raised concerns about fuel defects that had been reported during operations at the PNGS and the implications of those defects for long term waste management. During the 2015 license review for the Bruce NGS issues were flagged with respect to end-plate cracking. Fuel defects were also an issue during the last license review for the Darlington station. As reported in that license application[1], the application addendum[2] and OPG's August 2013 CMD[12], issues with fuel integrity were a matter of concern at the Darlington NGS.

Fuel defects have multiple consequences, including increased potential for worker exposure, additional radiological burdens in intermediate level wastes in the short, medium and long term. As was discussed during the Pickering licence review in 2013, over longer periods of time, even micro-defects in fuel bundles – which effectively become waste containers after removal from the reactor core – have increasingly more significant potential consequences. Long term storage – either dry storage on site or some form of centralized storage – rely on a multiple barrier approach. The weakening of the first barrier by any means – corrosion, dryout, temperature fluctuations – can potentially lead to failure. This, in turn, may lead to or hasten the release of radioactive materials into the storage container or even, ultimately, into the environment. [13]

[12] CMD 15H-8.1

[13] "Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel", United States Nuclear Waste Technical Review Board, December 2010

As described by Ontario Power Generation, thirteen fuel defects were identified between 2010 and 2013[14] and an additional six fuel defects were detected between January and September 2014[15]. OPG reports having been "defect free" from September 2014 to August 2015.[16]

OPG did hypothesize during their 2013 Application that "*the trend suggests a change has occurred at the station or at the manufacturing facility*" and indicated that measures were being taken to "*mitigate this potential including slight adjustments in fuel manufacturing and close monitoring of bundles, bundle position, and channels that are more susceptible to fuel defects*" and that "*steps have been taken at both the manufacturing facilities and at the station to reduce contamination and foreign material during the fabrication and handling of the fuel bundles*". [17]Despite this number of defects identified, OPG also stated in the 2013 application that "the fuel condition remains within the design basis compliance envelope for wear and deformation", which raises questions about the rigour required to be in compliance with the "design basis".

OPG stated in their application for that license that "the station goal is to operate with zero fuel defects, consistent with best industry practices in Canada and worldwide" and that "a significant amount of effort has been invested in achieving defect-free operation following an increase in fuel defects observed in the previous licence period."[18]

The single mention of fuel defects in the current OPG application is in a listing of modifications and projects have been completed or are in progress during the current and upcoming licence terms which indicates that "due to obsolescence and aging issues, the feeder scanner system has been upgraded to a new system with improved data quality and data interpretation technologies to ensure reliable detection of fuel defects during outages.[19]"

We take this to be a positive, if indeed it improves detection of fuel defects, but find the application lacks sufficient discussion of what has been a significant operating concern across OPG's nuclear generating stations.

Similarly, the Darlington Nuclear Generating Station PROL Renewal Application - Supplemental Update included only one single point of information about how OPG would address the longstanding issue of fuel defects, setting out in the table titled "*Table 7: RP Provisions for Planning for Unusual Situations*" under "Radiation and Monitoring Capacities" that "Gaseous

[14] Darlington Nuclear Generation Station Application for Licence Renewal, Ontario Power Generation, December 2013, NK38-CORR-00531-16490 P, page 47
[15] DARLINGTON NUCLEAR GENERATING STATION APPLICATION FOR LICENCE RENEWAL – ADDENDUM – January 2015, page 20-21
[16] CMD 15H-8.1, Page 34
[17] Darlington Nuclear Generation Station Application for Licence Renewal, Ontario Power Generation, December 2013, NK38-CORR-00531-16490 P, page 47
[18] CMD 15H-8.1, Page 34
[19] Darlington NGS – Application for Renewal of the Darlington Nuclear Generating Station Power Reactor Operating Licence 13.03/2025, Ontario Power Generation, May 2024, page 126

Fission Product system includes sensitivity and alarms to key radionuclides associated with fuel defects".[20]

Again, we take this to be a positive, if indeed it improves detection of fuel defects, but find that like the application, the supplemental update lacks sufficient discussion of what has been a significant operating concern across OPG's nuclear generating stations.

It may be that OPG's "station goal to operate with zero fuel defects" of ten years ago has in fact been achieved. However, it is problematic that the issue was not addressed, and the absence of reporting on progress made on this serious issue over the licence period does not lead one to assume that it is "problem solved".

REQUEST: the Commission should require OPG to specifically report on the issue of fuel defects in any future applications, and a section on fuel defects should be included in the annual regulatory oversight reports on nuclear power plants.

Aging Management and Irradiated Fuel Bays

CNSC staff discusses OPG's aging and obsolescence management programs, stating that OPG "continues to implement its aging and obsolescence management programs and processes within a systematic and integrated framework in accordance with CNSC REGDOC-2.6.3, Aging Management."

The CNSC staff CMD then goes on to describe that fuel channels were replaced during the refurbishment (and will be for Unit 4), as is the case with the Fuel Channel Feeders. They also describe how Steam generators remain in a long-term operation managed under Steam Generators Life Cycle Management Plans.

The staff CMD sets out that "*Reactor Components and Structures LCMP, N-PLAN-01060-10003 establishes the strategy or identifies necessary actions to ensure that aging effects on reactor components and structures are appropriately managed for the operating life of OPG's fleet of nuclear units*" and describes CNSC staff's oversight and compliance and verification activities to confirm that OPG continues to meet regulatory expectations for the aging management, testing and inspection of civil structures, including containment.

Neither CNSC staff or Ontario Power Generation address aging and aging management with respect to the irradiated fuel bays at the Darlington Nuclear Generating station.
For the previous licence review, Northwatch retained The WreathWood Group to assess the potential for risks and safety concerns associated with the irradiated fuel bays (IFBs) of DNGS that may arise

[20] Darlington Nuclear Generating Station PROL Renewal Application - Supplemental Update, Ontario Power Generation, December 2024, Page 28

from the extension of the operations by thirty years. The second area of focus for The WreathWood Group's review was the effects of aging on structural integrity of the irradiated fuel bays.

Simply put, The WreathWood Group reported that no evidence has been found in the documents listed in their reporting letter in 2015 to show that any reassessment has been made of the structural integrity that might be expected in the period of the license extension (i.e. from 2015 to 2025).

Similarly, Northwatch has reviewed the submission of Ontario Power Generation and CNSC staff and found no indication that the effects of aging on the irradiated fuel bays had even been considered.

The DGNS Application for the previous license renewal stated[21]:

- Response to potential loss of cooling capability in the IFBs has been enhanced and analysis has demonstrated that bay integrity will be maintained under elevated temperature conditions.
- Additional seismic assessments of the Darlington IFBs have been completed to confirm adequacy.

The WreathWood Group noted that there was no discussion about any consideration of any previous physical degradation of the IFBs because of the prior exposure to radiation effects from the fuel stored there.

In summary, the IFBs were not identified as being within the scope of the aging management program, nor is any mention made about DGNS having an aging management program specifically for the IFBs. There was no explanation of the extent to which any reanalysis of the IFB structural integrity has taken account of any aging effects of the IFBs. As a result, there is no basis for judging the integrity of the IFBs over the next 30 years of operation.

The WreathWood Group concluded in their 2015 review that the potential for failure due to aging appeared to not to be included in the aging management program (and therefore the potential for failure may increase). Combined with the absence of any operator guidance to keep the fuel cooled (or at least submerged) during failure of the IFBs, the possibility of releases in the future are increased.

Concerns about the effects of aging on the performance of the irradiated fuel bays are supported by observations with respect to the aging Pickering Nuclear Generating Station.

As disclosed in the 2013 licence application for the Pickering Nuclear Generatng Station, there were two serious incidents at the Pickering NGS involving leaks of tritiated water to groundwater, both associated with the aging pumps and pools . According to the brief descriptions, tritium in groundwater in the *Units 5-8 Irradiated Fuel Bay B (058 IFB) area* was due to the bay sumps not operating as designed, allowing tritium to escape to groundwater, beginning in 2005 and first noted

[21] OPG application, 2013 Page 128,

in 2007. Also in 2007, chronic leaks of active water to inactive *Unit 6 Reactor Building* foundation drainage sumps were identified as the cause of elevated tritium in groundwater.[22]

It is not clear if the two above noted incidents were as a result of station aging or were failures that should be attributed to more general failures in either design or maintenance, but it is reasonable to expect that incidents of this type are more likely to increase as the station goes beyond its design life. That having been the case with Pickering, it is a reasonable cause for concern with the Darlington Nuclear Generating Station as OPG proposes to extend its operations for up to thirty more years. The failure by OPG and CNSC staff to examine this potential for aging effects in the 2015 license review was unacceptable. Now, ten years later, with the unprecedented request for a 30-year license being brought to the Commission, it is impermissible.

REQUEST: that the Commission require Ontario Power Generation to carry out an assessment of the effect of aging on the irradiated fuel bay, and return to the Commission with this report for the Commission's consideration; a hold point should be included in the license to create an exit ramp if the report or its review identify elevated risk.

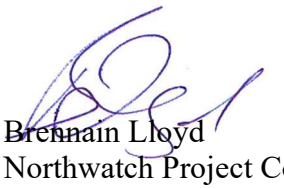
Conclusions

As outlined and for the reasons stated above, Northwatch is requesting that the Commission refuse Ontario Power Generation's request for a 30-year license and instead grant a 10-year licence with a public proceeding at the mid- point.

In addition, we request that the Commission:

- Direct Ontario Power Generation to correct the record regarding the roles and responsibilities of OPG vs NWMO in the management of high-level nuclear waste
- Direct OPG to withdraw its erroneous statements with respect to the "willingness" of First Nations on whose territory the Revell site in northwestern Ontario is located.
- Direct OPG to specifically report on the issue of fuel defects in future applications
- Direct staff to include a section on fuel defects in future regulatory oversight reports on nuclear power plants.
- require Ontario Power Generation to carry out an assessment of the effect of aging on irradiated fuel bays

All of which is respectfully submitted on behalf of Northwatch



Brennain Lloyd
Northwatch Project Coordinator

[22] Attachment 3 to OPG Letter, G. Jager to M. Leblanc, "Application for Renewal of Pickering Nuclear Generating Station Power Reactor Operating Licence",CD# P-CORR-00531-03719, page 117