



**Written submission from
Northwatch**

**Mémoire de
Northwatch**

In the Matter of

À l'égard d'

Ontario Power Generation

Ontario Power Generation

**Ontario Power Generation – Application to
change the licensing basis for the Pickering
Waste Management Facility**

**Ontario Power Generation – Demande
visant à modifier le fondement
d'autorisation de l'installation de
gestion des déchets de Pickering**

Public Hearing – Hearing in writing based on
written submissions

Audience publique – Audience fondée sur
des mémoires

June 2024

Juin 2024

NORTHWATCH

June 7, 2024

Canadian Nuclear Safety Commission
280 Slater St
PO Box 1046 Stn B Ottawa ON K1P 5S9

Sent by email interventions@cnsccsn.gc.ca

Ref. 2024-H-102

Commission Members:

Re. **Ontario Power Generation's application to change the licensing basis for the Pickering Waste Management Facility to Allow Transfer of 6-Year-Old Irradiated Fuel**

On November 21, 2023 the Canadian Nuclear Safety Commission (CNSC) issued a public notice of its intention to conduct a hearing based on written submissions to consider an application from Ontario Power Generation (OPG) to change the licensing basis for the Pickering Waste Management Facility (PWMF).

The current licensing basis for OPG's waste facility operating licence for the PWMF authorizes OPG to process and store, at the PWMF, dry storage containers containing used CANDU fuel that has been cooled in wet storage at the PNGS for at least 10 years.

OPG has applied for authorization to process and store, at the PWMF, up to 100 dry storage containers containing 6-year-old used fuel. Processing and storage of dry storage containers containing used fuel that has been cooled for less than 10 years is outside of the current licensing basis for the PWMF and requires Commission authorization. The stated purpose of OPG's change request is "to allow for additional space in the PNGS-B irradiated fuel bay to support the OPG Safe Storage Project for the PNGS".

CNSC staff has concluded that OPG's application has demonstrated that processing and storing 6-year cooled fuel would have negligible effects on safe operations at the PWMF, and a negligible impact on the public and environment and has met the applicable regulatory requirements and is therefore recommending that the Commission amend OPG's PWMF licensing basis to authorize OPG to process and store a maximum of 100 DSCs containing a minimum of 6-year cooled fuel at PWMF.

Northwatch disagrees with these conclusions and with the CNSC staff recommendation. In general terms, Northwatch is requesting that the Commission:

- Direct OPG to eliminate any backlog on transferring 10-year-old irradiated fuel from the irradiated fuel bays to dry storage,
- Require OPG to provide additional information and analysis related to this proposed activity, including in response to the requests set out in this submission



- Include in any approval decision a condition that rather than a receiving a general authorization for the transfer of 6-year-old fuel, the approval would require that OPG carry out a trial transfer of 9 year old fuel and outcomes are measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 8 year old fuel and outcomes measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 7 year old fuel and outcomes are measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 6 year old fuel; this staged approach would result in a better understanding of how the fuel age differential affects heat, dose and aging effects and install necessary decision points and exit ramps in the trial program

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. Ontario Power Generation's proposed approach to the long-term management of low and intermediate level radioactive wastes generated by their operations, including refurbishment and decommissioning of their nuclear generation units, is to transfer these wastes to a facility on the eastern shore of Lake Huron for incineration, compaction and storage. Previously, OPG had proposed deep burial of low and intermediate wastes in a repository less than one kilometre from the shore of Lake Huron; that proposal has been withdrawn.

OPG's intent with respect to the highly radioactive irradiated fuel waste generated by OPG owned and operated reactors is to transfer responsibilities for these highly radioactive and chemically toxic waste materials to a third party, namely the Nuclear Waste Management Organization, of which Ontario Power Generation is the majority shareholder. The Nuclear Waste Management Organization is currently investigating two candidate site – the Teeswater site in southwestern Ontario and Revell site in northwestern Ontario - as possible burial locations for nuclear fuel waste.

Northwatch's key areas of focus in licencing reviews are OPG's management of the irradiated fuel under the PROL license and OPG's overall approach to the 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 the effects

of transferring 6-year old fuel on worker and public health, the environment, and the aging and other effects on the condition and performance of the storage facilities, including the dry storage containers.

For the record, Northwatch wishes to note that while listed among those to whom the CNSC awarded participant funding Northwatch will not be drawing on that award and is an unfunded participant.

Context

The Pickering Waste Management Facility is co-located with the Pickering Nuclear Generating Station (NGS) on the North shore of Lake Ontario, in the City of Pickering, and is located 32 km northeast of downtown Toronto and 21 km southwest of Oshawa. Owned and operated by Ontario Power Generation Incorporated (OPG), the Pickering NGS consists of eight CANDU pressurized heavy water reactors and their associated facilities. Of the eight reactor units, Units 2 and 3 are in a “safe storage state”, meaning they are shut down. The operating reactors have a nominal electrical output of 515 MWe (megawatt-electric) for Pickering Units 1, 4 and 516 MWe for Pickering Units 5-8. Pickering Waste Management Facility is licensed separately under a Class 1B waste facility operating licence and accepts and stores irradiated fuel waste from the Pickering Nuclear Generating Station. ¹

Northwatch has been identifying concerns with fuel waste management at the Pickering Generating Station over several license terms for both the PROL and PWMF licenses. As context, we are restating a summary of those concerns in this section of our submission on Ontario Power Generation’s application to change the licensing basis for the Pickering Waste Management Facility to allow transfer of 6-year-old irradiated fuel.

The Pickering Nuclear Generating Station has a history of fuel defects and failures in the fuel detection system that have the potential to further exacerbate the already large challenge of long-term management of nuclear fuel waste.² This history – and challenge – of fuel defects is particularly relevant in the current discussion of amending the license to allow the transfer of 6 year old fuel from wet to dry storage.

In the Pickering Nuclear Generating Station, the irradiated fuel bays are located between reactor buildings 2 and 3 in Pickering A, and between reactor buildings 6 and 7 in Pickering B. In addition, an auxiliary fuel bay, associated with Pickering A, is located southwest of Unit 4.³

¹ CMD 18-H6, page 1

² See Northwatch 13-H2.123 Section on fuel defects; excerpts in Appendix 1

³ Page 118 of 641, Period Safety Review, *OPG Document No. P-REP-03680-00005 R01*

Figure 1 from OPG CMD 18-H61 depicts “main structure” of the Pickering Nuclear Generating Station, minus the irradiated fuel bays or waste management facilities.

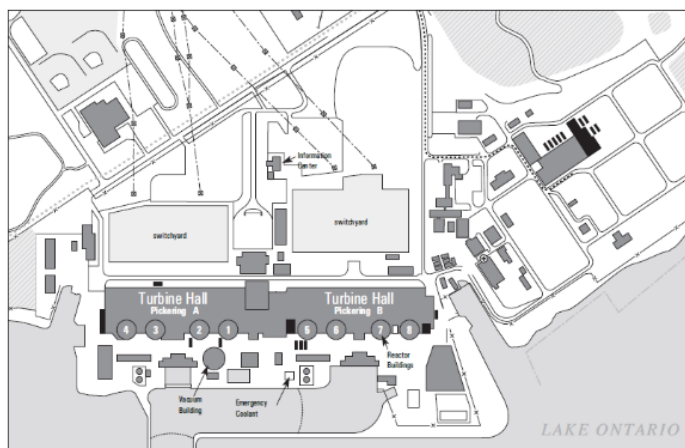


Figure 1 - Site map illustrates the main structures of the Pickering nuclear station

Irradiated Fuel Bay Performance

Despite achieving the rather puzzling summation that “the Irradiated Fuel Bays and supporting equipment are generally in good condition” in the executive summary⁴ of one of the 2018 PSR safety reports, the irradiated fuel bays were overall documented to be operating sub-optimally, at best, throughout several documents, including the PSR reports. Perhaps most troubling is that the irradiated fuel pools at Pickering have been performing poorly for over a decade and even at this late date Ontario Power Generation appears lapse in their maintenance and unable to address fundamental operating issues.

Since at least as far back as 2007, there has been leakage from the irradiated fuel bays. Despite multiple instances of being directed by the CNSC to correct issues associated with the IFBs, Ontario Power Generation continues to lag in repairs and in addressing IFB issues, and continues to carry a backlog of maintenance issues related to the fuel bay structures and supporting equipment. Examples include:

- uncompleted repairs to liner cracks
- at the time of the PSR, the seismic capacity of the current spent fuel basket stacking had not been documented; OPG has advised Northwatch by email that these issues have been addressed, but provided no supporting documentation of the issues having been resolved
- issues identified with associated equipment and availability of parts; specifically, in at least one case OPG had no spare parts available for IFP supporting equipment

In addition, there was a lack of clarity in the 2018 documentation around the degree to which enhancements to water makeup/cooling capability for the Irradiated Fuel Bays have been completed. While OPG’s documentation includes general references to makeup water enhancements, we were unable to clearly establish that this important safety measure was actually fully in place with respect to the irradiated fuel bays in particular. Similarly we were unable to find any indication in the Pickering NGS: Periodic Safety Review 2-B (PSR2-B) Global Assessment Report (GAR) or

⁴ PICKERING NGS PSR2 SAFETY FACTOR 2 REPORT – ACTUAL CONDITION OF STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY, March 2017, Page 6

Pickering NGS: Periodic Safety Review 2-B (PSR2-B) Integrated Implementation Plan (IIP) that this issue had been addressed.⁵

The 2018 Period Safety Review reported that there was a corrective maintenance backlog across all bays and systems, described the problems with irradiated fuel bay leakage as chronic and noted equipment deficiencies associated with all three irradiated fuel bays.⁶

Despite the seriousness of this issue, the 2023 Pickering NGS Periodic Safety Review 2-B (PSR2-B) provided no updates or reports on the state of the irradiated fuel bays or progress in addressing equipment deficiencies associated with the three irradiated fuel bays. The CNSC staff Commission Member Document also failed to provide any report on progress in addressing these previously reported operational failures.⁷ In Ontario Power Generation’s application they stated that “*upcoming projects include improvements to the Irradiated Fuel Bay (IFB) cooling and purification system, chemistry analyzer and stack monitor improvements, system performance monitoring data acquisition upgrades, investments in Fuel Handling (FH) reliability, and further investments in equipment reliability across a number of systems*” which might indicate that addressing these deficiencies is still on OPG’s “to-do” list, but the account lack sufficient detail.⁸

The 2018 period safety review noted that leakage from IFB-B to the collection sumps has been increasing since 2007. Reportedly, the intended strategy was to maintain the water levels in the collection sumps below groundwater level so that any leakage is inward and not outward. Northwatch questioned this selection of strategies in the 2018 review, suggesting that a decade-old leak warranted direct attention, rather than makeshift management. There was no report of mitigative actions or of the status of this leakage included in the 2023 PSR2-B.⁹

OPG also described in the 2018 PSR their “intention to mitigate leaks from the P058 IFB, and its collection sumps, to minimize the leak rate and to reduce the potential for environmental risk.” The review indicated at the time of the 2018 review. There was no report of whether this intention to mitigate these leaks was realized, and no report on the status of this leakage included in the 2023 PSR2-B.¹⁰

Irradiated Fuel Bay Capacity

The 2018 Period Safety Review flags additional issues around storage capacity in the irradiated fuel bays at the Pickering Nuclear Generating Station. According to the PSR, “the irradiated fuel bays are designed to have a storage capacity for all the irradiated fuel accumulating over approximately 12

⁵ Pickering NGS Periodic Safety Review 2-B (PSR2-B): Global Assessment Report, Kinectrics File No. K-20506/RP/0002 R02, OPG File No. P-REP-03680-00048 R000, April 28, 2023

⁶ OPG Document No. P-REP-03680-00005 R01, PSR SF2, Section 4.1.4 REVIEW TASK #4 - SPENT FUEL STORAGE FACILITIES

⁷ CNSC Staff CMD 24-H5

⁸ Application to extend the operation of Pickering Nuclear Generating Station Units 5 to 8 until December 31, 2026, June 2023, 24-H5-1, page 94

⁹ Pickering NGS Periodic Safety Review 2-B (PSR2-B): Global Assessment Report, Kinectrics File No. K-20506/RP/0002 R02, OPG File No. P-REP-03680-00048 R000, April 28, 2023

¹⁰ Pickering NGS Periodic Safety Review 2-B (PSR2-B): Global Assessment Report, Kinectrics File No. K-20506/RP/0002 R02, OPG File No. P-REP-03680-00048 R000, April 28, 2023

station-years.” There was no discussion of fuel bay capacity in the 2023 Period Safety Review.

The Nuclear Waste Management Organization estimates typical annual production at the Pickering station to be 21,700 bundles per year; actual average production rate between 2013 and 2017 was 17,295 bundles per year. Using an approximate median of 20,000 bundles per year, the capacity statement in the PSR would mean that the design storage capacity is 240,000 bundles. In contrast to that, the 2018 license application stated that the maximum quantity of irradiated fuel in the reactor cores are 9,360 bundles in Pickering A, Units 1 and 4 and 18,240 bundles in Pickering B, Units 5 through 8 (for a total of 27,600; assuming an 18 month residency, throughput over 12 years would be 220,800). According to the Nuclear Waste Management Organization’s fuel waste annual inventory reports, there were 399,703 irradiated fuel bundles in the Pickering irradiated fuel bays as of June 2017. According to the NWMO’s most recent report, there were 376,162 irradiated fuel bundles in the Pickering irradiated fuel bays as of June 2022.¹¹ Unfortunately, the only available current inventory does not differentiate between Pickering A and Pickering B waste inventories, so we are unable to precisely assign the backlog to A vs B. However, the inventory does identify that the typical annual production for Pickering A is 7,200 and from Pickering B is 14,500 for a total annual production of 21,700 fuel bundles. A simple subtraction of the ten-year total of 217,000 from the 2022 volume of fuel waste still in irradiated fuel bays of 376,162 makes it very clear that there is a very large backlog of ten-year-old-plus fuel remaining in the IFBs at Pickering.

REQUEST: That the Commission require OPG to address the backlog of 10-year-old-plus fuel waste transfers from wet to dry storage prior to initiating a program to begin transfer of younger-aged irradiated fuel.

| Year | Fuel Waste in IFBs | Fuel Waste in DSCs | Total Fuel Waste |
|--|--------------------|--------------------|------------------|
| 2022 | 376,162 | 469,327 | 845,489 |
| 2021 | 385,045 | 443,524 | 828,569 |
| 2020 | 392,386 | 417,345 | 809,731 |
| 2019 | 396,935 | 395,494 | 792,429 |
| 2018 | 400,597 | 372,738 | 773,335 |
| 2017 | 399,703 | 337,114 | 736,817 |
| 2016 | 399,655 | 319,266 | 718,921 |
| 2015 | 400,440 | 300,977 | 701,417 |
| 2014 | 403,303 | 280,726 | 684,029 |
| 2013 | 406,315 | 261,324 | 667,639 |
| Source: Nuclear Waste Management Organization’s annual “Nuclear Fuel Waste Projections in Canada” updates for 2013 through 2022. | | | |

The 2018 PSR goes on to state that “there is sufficient bay space available provided movement to dry storage is performed in a timely manner”. As noted above the 2023 PSR-2B did not address the issue of IFB capacity.

As was conveyed to the Commission during the 2017 license review for the Pickering Waste

¹¹ Nuclear Fuel Waste Projections in Canada – 2023 Update, NWMO-TR-2023-09 R001, December 2023

Management Facility and during the 2018 PROL review, Northwatch has concerns about the timeliness of OPG’s transfer of irradiated fuel from wet to dry storage at the Pickering station, and about OPG’s level of effort in this area. We acknowledge that there may have been incremental process in addressing this backlog in recent years but continue to hold the view that there is a system-wide malaise with respect to the pace of transfer of irradiated fuel from wet to dry storage.

In addition to the advantages of dry storage over wet storage for sufficiently-aged irradiated fuel waste from an overall safety perspective (i.e. the advantage of a passive system versus an active system) Northwatch was unable to conclude during the 2018 review that there will be sufficient capacity in the irradiated fuel bay going forward, even under “normal” operating conditions. Given the failure of OPG or CNSC staff to address these issues in documents produced to support the current review we are still unable to conclude that there will be sufficient capacity in the irradiated fuel bay going forward, even under “normal” operating conditions.

Three different scenarios elevate the question of irradiated fuel bay capacity to an even higher level of urgency. Those scenarios are:

- Impingement on fuel bay capacity
- Upset conditions which require rapid emptying of reactor core
- Upset conditions which require return to the irradiated fuel bay the contents of one or multiple dry storage containers

According to the 2018 Period Safety Review report the first scenario – impingement of fuel bay capacity – has already occurred and is ongoing at present. As reported:

Recent field walkdowns have identified unusable space in each of the bays. Unusable bay space is defined as basket/module spaces in each bay that are inaccessible, damaged, filled with non-fuel material, filled with scrap fuel and/or non-fuel matter, and any space that cannot be occupied by used intact irradiated fuel. According to an assessment performed following the walkdowns¹², the number of bundles that cannot be optimally stored represent the amount of fuel stored in approximately one reactor in each of IFB-B and AIFB, and approximately three reactors for the IFB-A. As per the Bay Storage Assessment at End of Life,¹³ given the unavailable space in the bays, and DSC and ITB transfer rates, there are challenges to meeting the Bay Storage requirements for EOL core defueling.¹⁴

¹² (P-REP-34400-00002) [66]

¹³ (P-REP-34400-00003) [67]

¹⁴ 122 of 641 OPG Document No. P-REP-03680-00005 R01

In addition to the concerns noted above about the impacts the limited capacity in the fuel bays may have on end-of-life core defueling, more immediately this limited capacity caused by impingement on usable space in the fuel bays by unspecified clutter raises direct concern about the ability of PNGS to respond to situations where there is an emergency need – caused by an accident or some malfunction – to empty the reactor core of fuel. Similarly, it raises a direct concern about the ability of PNGS to respond to situations where there is an emergency need – caused by an accident or some malfunction – to empty one or more dry storage containers of irradiated fuel.

Northwatch appreciates that we do not have all of the information related to this situation; in fact, we are frustrated and made impatient by the brief section of one portion of the 2018 Periodic Safety Review report being the sole source of information available about this significant concern, and even more so by the complete absence of information in the 2023 Periodic Safety Review.

Irradiated Fuel Transfers

In general, the 2018 Periodic Safety Review raised a number of concerns about the performance of the irradiated fuel bays and of their associated equipment and systems; taken as a whole, the PSR left Northwatch – and we would presume the Commission as well – with serious questions about the robustness of OPG’s operations at Pickering, including and particularly in relationship to the management of the irradiated fuel.

For example, the PSR safety report that examines spent fuel handling outlined the effect of aging on a number of system components, including:

- The equipment used to latch, lift, transport and deposit irradiated fuel baskets / modules has reached the end of its life and requires a major overhaul to “fix issues encountered on a regular basis”¹⁵; a plan to replace the equipment was noted, with a general timeline of 2018, which was some time out from the time of the issue being identified
- There are age related maintenance issues associated with the transport truck
- There were numerous aging related issues identified related to the conveyer, the unloader pulley, and other equipment, as well as issues around the availability of replacement parts and to maintenance backlogs

¹⁵ 4.1.4.5 SPENT FUEL HANDLING, 123 of 641 OPG Document No. P-REP-03680-00005 R01

These issues were not addressed or reported out in the 2023 PROL licencing documents, including the application, the CNSC staff CMD and the Periodic Safety Review. Therefore, they continue as live issues which require the attention and address of the Commission.

It is in this context that Northwatch – and the Commission – must consider the current application. Clearly, Northwatch supports the timely transfer of irradiated fuel waste from wet to dry storage and has brought concerns with respect to the slow pace of these transfers to the Commission’s attention on several occasions. However, our support for the transfer of irradiated fuel waste from wet to dry storage does not extend to the current proposal. As outlined in the following sections, Northwatch’s assessment is that Ontario Power Generation has failed to provide a sufficiently detailed and robust rationale for this very significant amendment and has not demonstrated that there will not be undue adverse effects on human health (worker health and the public) and the environment and has not established that the higher levels of radiation will not have unduly accelerate the aging of the storage and management systems.

Proposed License Change to Allow Transfer of 6-Year-Old Irradiated Fuel

The stated purpose of OPG’s change request is to allow for additional space in the PNGS-B irradiated fuel bay to support the OPG Safe Storage Project for the PNGS. Processing and storage of dry storage containers containing used fuel that has been cooled for less than 10 years is outside of the current licensing basis for the PWF and requires Commission authorization.¹⁶

OPG describes the purpose as follows:

To support the OPG Safe Storage Project for Pickering Nuclear Generating Station (PNGS), additional space in the PNGS-B Irradiated Fuel Bay (IFB-B) is required in order to accept the discharged used fuel from the required core dumps. As PWF is currently waiting for IFB-B used fuel to mature to the 10-year required period before transferring, there is a need to accept younger fuel to allow for the additional space. At this time, however, OPG is only licensed to process minimum 10-year cooled fuel at all its Nuclear Waste Facilities.¹⁷

At no point in their application does OPG define or describe the “OPG Safe Storage Project”. The application does clarify that the project is to “support the Safe Storage Project” at PNGS Units 5-8¹⁸,

¹⁶ Notice of Hearing in Writing and Participant Funding issued November 21, 2023. Ref. 2024-H-102

¹⁷ OPG Application cover letter, page 1, CMD 24-H102.1,

¹⁸ CMD 24-H102.1, page 2

that the objective is to only accept minimum 6-year cooled fuel at PWMF from PNGS Units 5-8 (and not PNGS Units 1 and 4),¹⁹ and that additional space in the PNGS-B Irradiated Fuel Bay (IFB-B) is required in order to accept the discharged used fuel from the required core dumps.²⁰ However, at no point in the documentation does OPG provide an explanation of the various near and far future scenarios for Pickering B which are – or are not – driving the “OPG Safe Storage Project”, i.e. reactor decommissioning, or extended operation, or refurbishment.

This explanation is important. The future of operations at Pickering B is uncertain, with three distinctly different futures all on the table, i.e. decommissioning, or extended operation, or refurbishment.

REQUEST: The Commission should require of Ontario Power Generation a clear statement of the need to accept younger fuel to allow for additional space in each of these different scenarios and provide a comparative discussion of this “need” for each of the quite different scenarios of reactor decommissioning, or extended operation for a limited period of time, or refurbishment. OPG’s application has multiple internal contradictions, including but not limited to:

| | |
|---|---|
| Processing minimum 6-year cooled fuel is essentially the same as processing 10-year cooled fuel | Contact temperatures could potentially reach approximately 85 degrees Celsius (°C), which impacts worker safety in handling the DSC. The increased temperatures potentially impact interfacing equipment such as Advanced Inspection and Maintenance (AIM) equipment and International Atomic Energy Agency (IAEA) equipment including seals and NDE profiling. ²¹ |
| Processing minimum 6-year cooled fuel is essentially the same as processing 10-year cooled fuel | The AIM equipment has a temperature limitation 50°C, shown in Table 1 above. If temperatures are measured less than 50°C, then nothing changes except conventional and Radiation Protection (RP) safety aspects. ²² |
| The licensee shall control radiological releases to ALARA principle | Anticipated dose rates would be approximately 2.5 times higher in comparison to the storage of 10-year cooled fuel. ²³ |

¹⁹ CMD 24-H102.1, page 3

²⁰ CMD 24-H102.1, page 3

²¹ CMD 24-H102.1, Attachment 2, page 9

²² CMD 24-H102.1, Attachment 2, page 11

²³ CMD 24-H102.1, Attachment 2, page 21

Additional Issues

OPG's application states that "Operationally, only one DSC is required to be loaded with 6-year cooled fuel to commission the modification. However, to avoid reverse loading (see Reverse Loading below), a conservative approach is recommended to be used. A potential option would be to load and vacuum dry the commissioning DSCs, starting with 9-year cooled fuel and working down to 6-year cooled fuel while measuring temperatures and dose rates. Based on OPG report with Controlled Document I-REP-79171-00001, the time taken for the outer liner of the DSC to reach equilibrium temperature is of the order of three weeks on average. Therefore, this option will take several months to complete the commissioning."²⁴

REQUEST: Should the Commission permit this license amendment, this "option" of starting with nine-year fuel and working down to 6-year cooled fuel should be the required approach, with hold points in the amended license, detailed reporting at after each instance, and public comment prior to a Commission decision; a Commission decision should be required prior to moving to the next decommissioning instance, i.e. between the loading with 9-year-old fuel and the loading of 8-year-old fuel, between the loading of 8-year-old fuel and the loading of 7-year-old fuel, etc.

OPG's application states that "as part of the commissioning, the intent is to ensure that the temperatures meet AIM equipment requirements before proceeding with the welding and continuation of processing the DSC to interim storage. The AIM equipment has a temperature limitation 50°C, shown in Table 1 above... Options have been considered for cooling the DSC flange if temperatures are measured in excess 50°C. Details on flange cooling are discussed below. If temperatures exceed 50°C, and the flange cooling methods are ineffective then the DSC will be Reverse loaded (discussed below). Flange cooling: options for cooling the DSC flange are available if temperatures are measured in excess 50°C. Having an effective means to cool the DSC temperatures reduces the risk of having to resort to the back-out option (Reverse Loading)."²⁵

REQUEST: If temperatures exceed 50°C the license amendment should be reversed, the less-than-10-year-old fuel returned to the irradiated fuel bay, and the current licence restriction on moving less-than-10-year-old reinstated.

OPG's application states that The impact of higher temperatures on IAEA safeguards and security interfacing equipment includes a risk that weld flanges could deform and some IAEA equipment used for the sealing processes would degrade as it is not designed for the increased temperatures.²⁶

REQUEST: If temperatures exceed 50°C the license amendment should be reversed, the less-than-10-year-old fuel returned to the irradiated fuel bay, and the current licence restriction on moving less-than-10-year-old reinstated.

²⁴ CMD 24-H102.1, Attachment 2, page 10

²⁵ CMD 24-H102.1, Attachment 2, page 11

²⁶ CMD 24-H102.1, Attachment 2, page 11

OPG's application states that "if the temperatures are higher than the limits required as discussed above, there will need to be a backout option to reverse load the DSC back to the IFB-B. A reverse loading plan is being developed to outline the steps required to reverse load a DSC loaded with 6-year cooled fuel. This is being developed using OPEX from 2012 to address an issue with a partially loaded DSC 1538. This DSC had to be emptied (SCR N-2012-00289). The reverse loading plan will be issued before the loading of any DSC's containing minimum 6-year cooled fuel."²⁷

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide a detailed reverse loading plan, outlining the steps to load the DSC back to the IFB-B with a clear outline of risks and mitigating measures that could be employed this detailed reverse loading plan should be the subject of public review and comment prior to a Commission decision on the plan's acceptability.

OPG's application states that "the maximum annual dose to individual member of the public with the addition of these 100 DSCs is still a small percentage of the 1 mSv limit" and that "due to the specialised array of storing the DSC's containing minimum 6-year cooled fuel, the target dose rate to the public of 0.5mSv will also be met"²⁸ but does not state in the application the actual estimate for the maximum dose rate to the public. As per below, the application estimates that worker dose will increase by 250 %, but no similar estimate – either in actual exposure levels or as a comparative increase to current dose levels – is provided with respect to public exposure.

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide a detailed statement on changes / increases to public dose that will result from this operational change, and further require public release of this information and supporting documentation as a stand-alone item with an opportunity for the public to comment to the Commission.

OPG's application states that "Higher dose rates from the minimum 6-year cooled fuel DSCs directly impacts workers and equipment that interface with the DSC. It has been analyzed that the anticipated dose rates would be approximately 2.5 times higher in comparison to the storage of 10-year cooled fuel. This is manageable with a different Radiation Exposure Permit (REP) to address worker safety; and no meaningful impact on OPG equipment. Dose rates will be managed with the As Low as Reasonably Achievable (ALARA) principles associated with an updated REP... New REP's for workers interfacing with the younger cooled fuel will be developed and implemented prior to commissioning of any DSC's containing younger cooled fuel."²⁹

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide the Commission with the "different" Radiation Exposure Permit; the REP should clearly set out how new protocols or methods will limit worker exposure and provide

²⁷ CMD 24-H102.1, Attachment 2, page 12

²⁸ CMD 24-H102.1, Attachment 2, page 15

²⁹ CMD 24-H102.1, Attachment 2, page 21

supported estimates in various time frames and scenarios; the revised REP should be the subject of public review and comment prior to a Commission decision on the plan's acceptability.

OPG's application states that "Estimated public doses have been analyzed in Enclosure 2 (section 5.3.3) and in Enclosure 3 (section 4.3.2). Both analyses assess that the dose to public, as a result of the storage of minimum 6-year cooled fuel in SB3, remains far below regulatory limits.³⁰ The application further states that "Based on previous correspondence with the CNSC, and reaffirmed in this application, dose rates will be measured during the initial placement of 6-year-old fuel and actions will be taken are taken prior to the dose rate criterion being exceeded".³¹

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide the Commission with a clear description of how dose rates will be measured, what the thresholds are for taking action, and what actions will be taken "prior to the dose rate criterion being exceeded".

OPG's application states that "the storage of minimum 6-year fuel will be incorporated into the aging management program as applicable as part of the ECC process"³² but provides insufficient detail and supporting information. It is an established fact that radiation and temperature are both factors in aging. The proposal to move 6-year-old fuel from wet to dry storage will result in significant increases in both radiation levels and temperature levels. OPG's application acknowledges that there will be increases in dose and temperature but rather than setting out its analysis of the effect of these increases on aging, the OPG application opts out of this important area of consideration by dismissing the topic with the statement that it "has been analyzed to be within the regulatory limits for the public and environment".³³

The existing TLDs around PWF Phase I and Phase II will measure the dose rates, which are reported quarterly to the CNSC in the facility Operations Report. Monitoring of these results will confirm the impact on the regulatory dose rates. However, as SB3 is a shielded building, it is not anticipated to be a concern.³⁴

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide the Commission with a clear description of how increased radiation and temperature interact with aging and what the effects will be on aging in the short, medium and longer term, and what responding measures have been identified and will be implemented.

OPG's application states that "NuFlash is a system used for tracking nuclear fuel location and storage history. Currently, NuFlash does not allow the preparation of DSC packages for younger than 10-year cooled fuel. The changes required to update the NuFlash database to allow for 100 DSCs to be processed with 6-year to 10-year old fuel will be completed prior to the commissioning of the first

³⁰ CMD 24-H102.1, Attachment 2, page 21

³¹ CMD 24-H102.1, Attachment 2, page 22

³² CMD 24-H102.1, Attachment 2, page 20

³³ CMD 24-H102.1, Attachment 2, page 22

³⁴ CMD 24-H102.1, Attachment 2, page 22

DSC containing younger cooled fuel.³⁵ One of the nuclear industry’s boasts is that they “know where all the fuel waste is”. From a security perspective, this is an important but quite fundamental achievement, which appears to be in jeopardy if moving younger fuel to dry storage will render it inoperable or incomplete.

REQUEST: Prior to making a decision to permit this license amendment, the Commission should require that OPG provide the Commission with a clear description of what changes will be made to update the NuFlash system and any or all consequences or potential consequences for tracking fuel waste location and history.

OPG’s application states that “OPG is responsible for continued safe operation of the PWSMF and confirms that the storage of minimum 6-year cooled fuel will be implemented based on a robust safety case. The proposed activities to support the storage of minimum 6-year cooled fuel will not compromise continued safe operation at PWSMF, public and employee safety, and environmental protection”³⁶ and concludes that “ Licensing Basis: The storage of younger than 10-year cooled fuel at PWSMF will have negligible impact on PWSMF’s licensing basis, governance, programs and processes”.³⁷

REQUEST: In consideration of the many gaps in the OPG application, including but not limited to those identified in the requests set out above, the Commission should require that all of the above noted information gaps be responded to and resolved prior to re-considering this application.

Requirement for a Public Hearing

In a Notice of Hearing dated November 21, 2023, the Commission advised that it intends to hold a hearing based on written submissions to consider “Ontario Power Generation’s application to change the licensing basis for the Pickering Waste Management Facility.”

It is Northwatch’s position that the Commission is legally required to hold a public hearing in this matter as opposed to a written hearing, for reasons including those set out in this submission.

Under section 40(5) of the *Nuclear Safety and Control Act*, a public hearing is required when the Commission intends to amend a licence. Section 40(5) provides as follows:

- (5) The Commission shall, subject to any by-laws made under section 15 and any regulations made under s. 44, hold a public hearing with respect to
 - (a) the proposed exercise by the Commission [...] of the power under section 24(2) to issue, renew, suspend, amend, revoke or replace a license; and
 - (b) any other matter within its jurisdiction under this Act, if the Commission is satisfied that it would be in the public interest to do so [Emphasis added].

³⁵ CMD 24-H102.1, Attachment 2, page 36

³⁶ CMD 24-H102.1, Attachment 2, page 39

³⁷ CMD 24-H102.1, Attachment 2, page 40

It is clear based on section 40(5)(a), that when amending a licence, a public hearing must be held, subject to any by-laws made under section 15 and any regulation made under section 44.

We have reviewed the relevant by-laws and regulations issued under the *Nuclear Safety and Control Act*. Based on our review, the only relevant document appears to be the Canadian Nuclear Safety Commission's Rules of Procedure, SOR 200-211 (*Rules of Procedure*).

Section 3(1) of the *Rules of Procedure* provides:

[t]he Commission or, where applicable, a designated officer may vary or supplement any of these Rules, in order to ensure that a proceeding be dealt with as informally and expeditiously as the circumstances and the considerations of fairness permit.

However, as the requirement to hold a public hearing is required under the *Nuclear Safety and Control Act*, the power to vary under the *Rules of Procedure* does not allow the Commission to deviate from the requirement to hold a public hearing.

In addition, section 30(2) of the *Rules of Procedure* indicates that after "receiving a notice of appeal or rehearing and redetermination, the Commission shall determine whether its consideration will be by way of public hearing under paragraph 40(5)(b) of the Act or written submissions or by another manner that will enable the Commission to determine the matter before it in a fair, informal and expeditious manner." However, section 30(2) only deals with an appeal or rehearing and redetermination and is, thus, not applicable in this matter.

Consequently, it is our position that the Commission does not have authority to hold a written hearing in this matter given that OPG's is seeking to amend its license for the Pickering Waste Management Facility. Instead, the Commission is statutorily required by section 40(5)(a) of the *Nuclear Safety and Control Act* to hold a public hearing.

There are also compelling public interest reasons for holding a public hearing in this matter given that OPG's application raises health, safety, and environmental concerns.

OPG is proposing a deviation from the established practice for processing and storing CANDU fuel. Currently, OPG is required to process and store, at the Pickering Waste Management Facility, dry storage containers containing used CANDU fuel that has been cooled in wet storage at the Pickering Nuclear Generation Station for at least 10 years. OPG is now requesting it be allowed to process and store dry containers containing used fuel that has been cooled for less than 10 years. OPG's application potentially increases the risk/exposure for workers, as the younger fuel is more radioactive. Furthermore, the dry storage containers are designed and constructed for the containment of ten-year old fuel waste, not six-year old fuel waste.

In addition, OPG's application also presents the potential for increased risk to residents should OPG decide to exercise its option of moving the used fuel waste in the dry containers to an interim off-site storage site; this is an option that has been reserved for OPG in the Nuclear Waste Management Organization's Adaptive Phased Management Plan (2005) as selected by the Government of Canada (2007).

In summary, it is Northwatch’s position that the Commission is required to hold a public hearing in this matter under section 40(5)(a) of the *Nuclear Safety and Control Act*, given that OPG’s is seeking to amend its license for the Pickering Waste Management Facility.

REQUEST: that the Commission clarify on what legal basis the Commission has decided not to hold a public hearing.

REQUEST: The Commission convene a public hearing with at least 90 days notice after additional information has been provided by OPG (see Northwatch requests included in this submission), that information has been made publicly available in a consolidated form; the public hearing should include the opportunity for both written and oral submissions by intervenors, and an opportunity to direct questions to the licensee.

Conclusions

Ontario Power Generation has failed to adequately support their license amendment application. As outlined above, the Commission has inadequate information to make the decision before them, and the application and CNSC staff’s supporting recommendations provide the Commission with an overly reduced decision-making role.

Northwatch’s requests to the Commission provide a roadmap to improving the information base and the decision-making process, affording both the Commission and the public and Indigenous people more appropriate opportunities to contribute to and make the relevant decisions.

Our requests are placed in relevant sections throughout this submission but are repeated here in a consolidated fashion.

We request that the Commission incorporate the following into their decision with respect to this application:

- Direct OPG to eliminate any backlog on transferring 10-year-old irradiated fuel from the irradiated fuel bays to dry storage,
- Require OPG to provide additional information and analysis related to this proposed activity, including in response to the requests set out in this submission
- Include in any approval decision a condition that rather than a receiving a general authorization for the transfer of 6-year-old fuel, the approval would require that OPG carry out a trial transfer of 9 year old fuel and outcomes are measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 8 year old fuel and outcomes measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 7 year old fuel and outcomes are measured and reported and evaluated by the Commission prior to OPG carrying out a trial transfer of 6 year old fuel; this staged approach would result in a better understanding

of how the fuel age differential affects heat, dose and aging effects and install necessary decision points and exit ramps in the trial program

- Require of Ontario Power Generation a clear statement of the need to accept younger fuel to allow for additional space in each of these different scenarios and provide a comparative discussion of this “need” for each of the quite different scenarios of reactor decommissioning, or extended operation for a limited period of time, or refurbishment.
- Should the Commission permit this license amendment, this “option” of starting with nine-year fuel and working down to 6-year cooled fuel should be the required approach, with hold points in the amended license, detailed reporting at after each instance, and public comment prior to a Commission decision; a Commission decision should be required prior to moving to the next decommissioning instance, i.e. between the loading with 9-year-old fuel and the loading of 8-year-old fuel, between the loading of 8-year-old fuel and the loading of 7-year-old fuel, etc.
- If temperatures exceed 50°C the license amendment should be reversed, the less-than-10-year-old fuel returned to the irradiated fuel bay, and the current licence restriction on moving less-than-10-year-old reinstated.
- Require that OPG provide a detailed reverse loading plan, outlining the steps to load the DSC back to the IFB-B with a clear outline of risks and mitigating measures that could be employed this detailed reverse loading plan should be the subject of public review and comment prior to a Commission decision on the plan’s acceptability.
- Require that OPG provide a detailed statement on changes / increases to public dose that will result from this operational change, and further require public release of this information and supporting documentation as a stand-alone item with an opportunity for the public to comment to the Commission.
- Require that OPG provide the Commission with the “different” Radiation Exposure Permit; the REP should clearly set out how new protocols or methods will limit worker exposure and provide supported estimates in various time frames and scenarios; the revised REP should be the subject of public review and comment prior to a Commission decision on the plan’s acceptability.
- Require that OPG provide the Commission with a clear description of how dose rates will be measured, what the thresholds are for taking action, and what actions will be taken “prior to the dose rate criterion being exceeded”.
- Require that OPG provide the Commission with a clear description of how increased radiation and temperature interact with aging and what the effects will be on aging in the short, medium and longer term, and what responding measures have been identified and will be implemented.
- Require that OPG provide the Commission with a clear description of what changes will be made to update the NuFlash system and any or all consequences or potential consequences for tracking fuel waste location and history.
- In consideration of the many gaps in the OPG application, including but not limited those identified in the requests set out above, the Commission should require that all of the above noted information gaps be responded to and resolved prior to re-considering this application.
- The Commission clarify on what legal basis the Commission has decided not to hold a public hearing.

- The Commission convene a public hearing with at least 90 days notice after additional information has been provided by OPG (see Northwatch requests included in this submission), that information has been made publicly available in a consolidated form; the public hearing should include the opportunity for both written and oral submissions by intervenors, and an opportunity to direct questions to the licensee.

Given the number of information gaps in the application, it is Northwatch's view that the current written hearing can serve the useful purpose of providing the Commission the opportunity to review the application and providing direction to OPG in order to address the gaps in information and analysis, prior to the Commission making its decision with respect to the application itself. This approach allows OPG to address their application's shortcomings, creates the opportunity for a public hearing with public participation, and supports the Commission in its role as the decision-maker.

Thank you for your consideration. We look forward to a positive outcome of this written hearing

Sincerely,



Brennain Lloyd
Northwatch Project Coordinator