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Submission from Northwatch

Exposé oral

Mémoire de Northwatch

In the Matter of

Bruce Power Inc. – Bruce A and B Nuclear Generating Station

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Bruce A and B Nuclear Generating Station

Commission Public Hearing – Part 2

May 28-31, 2018

À l'égard de

Bruce Power Inc. - Centrale nucléaire de Bruce A et Bruce B

Demande de renouvellement, pour une période de dix ans, de son permis d'exploitation d'un réacteur nucléaire de puissance à la centrale nucléaire de Bruce A et Bruce B

Audience publique de la Commission – Partie 2

28-31 mai 2018

Canada

Comment on the Application by Bruce Power Inc. (Bruce Power) to Renew its Power Reactor Operating Licence (PROL) for the Bruce Nuclear Generating Stations A and B

Ref. 2018-H-02

Submitted to the Canadian Nuclear Safety Commission by

Northwatch

4/16/2018

Front cover photo credit: CBC, December 2011

1. Introduction

1.1 Review Focus

On September 17, 2017, the Canadian Nuclear Safety Commission (CNSC) issued a notice that it would hold a two-part public hearing on the application by Bruce Power Inc. (Bruce Power) to renew, for a period of ten years, its power reactor operating licence (PROL) for the Bruce Nuclear Generating Stations (NGS) A and B located in Kincardine, Ontario.

The current licence, which allows Bruce Power to operate the eight nuclear power reactor units and their associated equipment at the Bruce NGS A and B site, does not expire until May 31, 2020. However, the current license does not authorize Bruce Power to carry out refurbishment or "life extension" activities at the Bruce units. In the licence renewal application now under review, Bruce Power has requested authorization to "update" the Bruce NGS licensing basis in 2018 to include life extension projects and future major component replacement work, and to extend the license to a ten year period from 2018 to 2028.

The notice indicated that a Part 1 hearing would be held on March 14, 2018 in Ottawa, and a Part 2 hearing would be held on May 30–31, 2018 in a location "to be confirmed". That location has now been identified as Kincardine, Ontario.

1.2 Context

The Bruce Nuclear Generating Station is a 923 hectare nuclear complex located within the Municipality of Kincardine, on the eastern shore of Lake Huron. With its fleet of eight nuclear reactors, it is the largest nuclear facility in North America in terms of potential output and the second largest nuclear facility in the world; the total output is 6,232 MW (net) and 7,276 MW (gross) when all units are online.

The nuclear complex includes the Bruce Nuclear Generating Station with Bruce A and B each consisting of 4 reactors, the Western Waste Management Facility, an additional Radioactive Waste Storage Area, Heavy Water Plants A and B which are currently being decommissioned, and the Douglas Point Reactor which was shut down in 1984.

In June 2000, OPG entered into a long term lease agreement with private sector consortium Bruce Power to take over operation of the Bruce station. In May 2001, Bruce Power began operations. Ontario Power Generation remains responsible for the nuclear legacies, including the out-of-service Douglas Point Reactor, the heavy water plants, and all of the waste and waste facilities. The Western Waste Management Facility, owned and operated by Ontario Power Generation (OPG) and located on OPG retained lands and located within the boundary of the overall Bruce Power site, was developed in stages since 1974 to accommodate waste produced during reactor operation and maintenance and it receives and manages shipments of low and intermediate level radioactive waste from the Bruce, Pickering and Darlington nuclear power stations. Beginning in 2003 used fuel waste from Bruce has also been stored in the Used Fuel Dry Storage Facility located adjacent to the WWMF.

1.3 Northwatch's Interest

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario[1]. 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, we have 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 mineral exploration and mining, uranium refining and nuclear power generation, including on the Bruce region, and various nuclear waste management initiatives and proposals.

[1] *See www.northwatch.org*

Northwatch has a longstanding interest in the management of nuclear waste, as well as other environmental and social impacts of using nuclear power for the purpose of electricity generation. Our interests are primarily with respect to the impacts and potential impacts of the nuclear chain on the lands, water, and people of northeastern Ontario. Our interest in nuclear waste was initiated by proposals dating back to the 1970's to site nuclear waste "disposal" projects in northern Ontario. There have been numerous proposals over the last several decades, including proposals for the import and burial of high level waste in the 1970s and 1980s and for low level waste in the 1990s. Currently there are five municipalities engaged with the Nuclear Waste Management Organization in a siting process for a proposed deep geological repository for high level nuclear fuel waste. There are multiple areas in northern Ontario that are under exploration as potential burial sites, all associated with three municipalities in northern Ontario who remain associated the NWMO program.[2]

The operation of multiple reactors at the Bruce Nuclear Site is of interest because of its close proximity to Lake Huron and the subsequent potential for adverse effects on the North Channel and North Shore of Lake Huron, Manitoulin Island, and the broader Great Lakes ecosystem, and because the continued operation of the reactors will result in continued generation of low and intermediate level radioactive waste and of high level nuclear (irradiated) fuel waste.

[2] The Nuclear Waste Management Organization is currently investigating several areas in northern Ontario that have been associated by the NWMO with the communities of Ignace, Manitowadge and Hornepayne as part of their nine step siting process for a geological repository for high level nuclear fuel waste. See www.knownuclearwaste.ca for details.

2. Review of Bruce Power Application

In preparing to comment on the Bruce Power Application to renew their operating licenses for Bruce A and Bruce B reactors, Northwatch reviewed numerous related documents, including the application filed by Bruce Power, the Commission Member Documents (CMDs) filed by Bruce Power and CNSC staff, the webcast and transcript for the March 2018 "Day One" hearing, and select supporting documents generated by Bruce Power and documents referenced in the CNSC staff CMD. Supporting documents reviewed in Northwatch's assessment of the subject license application included the June 2017 "Performance Review of Bruce A and Bruce B", the supplement to the Application, the update to the Performance Review, the Bruce A and B Global Assessment Report and Integrated Implementation Plan (2017), several Safety Factor reports and in particular the Safety Factor report related to Plant Design (2016), the Bruce A Integrated Safety Review Basis Document and Bruce B Periodic Safety Review Basis Document.

Northwatch's review focused primarily on matters related to radioactive wastes and their generation, management and characterization by Bruce Power in support of the subject application. This review included how Bruce Power has described and characterized the wastes, information provided and approach proposed for the safeguarding and management of the wastes, and the related issue of on and off-site transfers of radioactive wastes and materials. Additional issues that emerged in the course of our review are described in a later section of this submission.

2.1 Adequacy of Information Provided

The General Nuclear Safety and Control Regulation Requirement (herein "General Regulations") sets out in Section 3 that:

1) *An application for a licence shall contain the following information: […]*
   (j) the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste;

In the corresponding section of their application[3] Bruce Power provided a very brief and general description of the low level radioactive wastes their operations had generated in 2016:

> 2.10.1 Radioactive waste
>
> In 2016, Bruce Power generated approximately 2500 m^3 of low level radioactive waste between Bruce A and Bruce B. This waste consists mostly of PPE, Masslin cloths, paper towels, mop heads, and other items. Approximately 90% of this waste is either incinerated or melted (if metal). The majority of the radioactivity remains in the incinerated ash and is subsequently sent to the Ontario Power Generation (OPG) Western Waste Management Facility (WWMF) for disposal. Waste that is not incinerated or melted is sent to WWMF for storage. Low-level radioactive waste volumes have remained generally consistent from year to year since the return to an eight-unit site in 2012.

With respect to intermediate level wastes, the application[4] provided a very brief and general description, followed by a generalized description of objectives around radioactive waste management:

> In 2016, Bruce Power generated roughly 50 m^3 of intermediate level waste. This waste consists mostly of filters used to clean various station systems, spent ion exchange resins and waste taken from Contamination Control Areas (CCAs). All of this waste is sent to OPG's WWMF for storage. Waste volumes increased by 35% in 2016 as a result of re-implementation of spent resin transfers.
>
> Management of radioactive waste is an element of BP-PROG-12.05. The Radioactive Protection program and its implementing procedures govern waste minimization, handling and segregation, collection and processing, packaging, transport and storage, and receipt and processing. The following objectives apply:
>
> - Radioactive waste activities are controlled in a safe and environmentally, financially, and socially-responsible manner to ensure full compliance with legal requirements;
> - Individual and collective doses are maintained at levels As Low As Reasonably Achievable (ALARA), social and economic factors being taken into account;
> - Decisions on the management of radioactive waste are based on minimizing risk to the environment, the public, and workers, and on minimizing total life-cycle costs for storage and disposal; and,
> - Bruce Power achieves the high standards of radiation protection performance in accordance with industry best practices and WANO GL 2004-01 (Rev 1), *World Association of Nuclear Operators Guidelines for Radiological Protection at Nuclear Power Plants*.

[3] Section 2.10.1, on page A18 of "Application for Renewal of PROL 18.00/2020", as submitted by Bruce Power on 30 June 2017

[4] Section 2.10.1, on page A19 of "Application for Renewal of PROL 18.00/2020", as submitted by Bruce Power on 30 June 2017

These minimalist description clearly do not make the requirements of the regulation – cited above and in the Bruce application - to "name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed, including waste that may be stored, managed, processed, or disposed of at the site of the activity to be licensed, and the proposed method for managing and disposing of that waste". It fails on several counts:

- The very limited information provided is a generalized description of one year of past operations; the requirement is to provide information about wastes that may result from the activity to be licensed, i.e over the next ten years, including operations and refurbishment
- The information is insufficient in that it does not describe the form, origin or volume in sufficient detail to characterize the hazard of the waste(s)
- No information is provided about the proposed method of managing and disposing of the waste(s) (general objectives are summarized, but management and disposition is not described)
- No information is provided about high level waste, also known as irradiated fuel, spent fuel, or nuclear fuel waste; no description is provided of quantity, form, origin, volume or proposed management or disposition

A later subsection acknowledges that the proposed refurbishment / major component replacement will generate waste, but like the previously noted sub-sections in reference to low and intermediate level wastes, Subsection 2.10.3[5] fails to provide adequate information about this wastes that will be generated through refurbishment of Pickering Reactor Units 3 through 8:

> MCR activities are expected to increase the volume of low-level radioactive waste and intermediate-level radioactive waste. Specifically, the major component replacement project for Unit 6 is expected to generate 11,000 m^3 of low-level waste (including compactible, incinerable, and metal melt waste), 8 m^3 of inter-mediate level waste, and 7500 m^3 of non-radiological waste (including recyclables, compost, hazardous waste, metal, and landfill waste).

Not only is the information on low and intermediate level wastes inadequate in terms of substance and detail, it is questionable in terms of its validity. For example, this section of the application states that the refurbishment of Unit 6 will generate only 8 cubic metres of

[5] Section 2.10.3, on page A21of "Application for Renewal of PROL 18.00/2020", as submitted by Bruce Power on 30 June 2017

intermediate level waste. This figure does not appear to be supported by an additional information in the application or any of the thousands of pages of supporting information, but by comparison to other refurbishment experiences this volume estimate is rendered incredible. For example, according the Canadian Nuclear Safety Commission prepared Joint Convention Report 2016 the volume of refurbishment wastes for Pickering A units 1 to 4 is 1,012 cubic metres, or fourteen times greater than the estimated volume for Bruce A Unit 6, so approximately 350% more intermediate level waste per unit than Bruce is stating will be generated by the refurbishment of Unit 8.

Radioactive wastes are referred to or briefly discussed in other documents provided by Bruce Power in support of their application or by CNSC staff as part of the subject license review. For example, in the Performance Review of Bruce A and B the document notes that as part of refurbishment / Major Component Replacement, in each of the units the steam generators, feeder, pressure tubes and callandria will be replaced.[6] Implicit but not stated is that these replacements will generate large volumes of radioactive / refurbishment wastes. Similarly, in the update to the performance report provided for the Part 1 hearing, Bruce Power added a noted a reduction in production rates of low-lever radioactive waste "through its internal programs to reduce and to minimize the volumes of waste required for long-term storage" and acknowledged that they produce intermediate level radioactive wastes through station operations, stating that it "primarily resin" and that
generation from resin from station operations is relatively fixed on an annual basis".[7]

Additionally, in the CNSC staff produced "Environmental assessment report" produced as part of the staff filing, CNSC staff acknowledge the waste generating aspect of the refurbishment activities:

> *Current waste management practices will be utilized during continued operations, including during MCR activities for radioactive and non-radioactive solid, liquid and gaseous waste. The wastes generated during the MCR project includes steam generators, reactor components, piping system, fuel channels and feeder piping. Additional waste management measures during the MCR activities include:*

[6] PERFORMANCE REVIEW OF BRUCE A AND BRUCE B June 2017 Page 18 of 192
[7] APPLICATION FOR RENEWAL OF PROL 18.00/2020: February 2018 Page 11 of 15 UPDATE TO PERFORMANCE REVIEW, Bruce Power

- *Reactor retube and feeder replacement waste will be stored in new radiological waste containers on the Bruce nuclear site.*
- *Existing steam generators will be stored at OPG's WWMF, located on the Bruce nuclear site.*
- *Pressure, feeder and calandria tubes will be cut and placed in specially designed waste containers, which will be transferred directly to OPG's WWMF.*
- *Radiological waste (low- and intermediate-level waste) will be sampled, monitored for radioactivity and transferred to a third party contractor.*
- *Non-radiological conventional and hazardous waste will be sampled, monitored and transferred to a third party contractor.*[8]

While this general description of the waste generating aspects of reactor refurbishment is more informative than what is provided by Bruce Power, it does not meet the test of providing the information required regulation, for several reasons:

- It is not included in the application
- It does not provide the name, quantity, form, origin and/or volume of the wastes
- It only very generally describes the proposed method for managing and disposing of that waste

These various generalized information items do not meet the test set by the regulation, i.e. to provide information on the radioactive wastes that will be generated during the licence period, including the name, quantity, form, origin and volume of any radioactive wastes, and to describe the means for managing and "disposing" of these wastes.

This is not a new issue for Bruce Power or for the Commission in license reviews related to power reactor operations at the Bruce Nuclear Generating Station.

In 2015, Northwatch commented that Bruce Power had not provided information about the wastes that would be managed through their operations and the management of these wastes.[9]

[8] CNSC Staff EA Report Page 5
[9] CMD 15-H2.134

Commission members took up this matter during the Part II hearing, asking where or if information on the radioactive wastes generated through reactor operations was available to the public.

Bruce Power variously responded that this information was available in environmental reports, that the information was available from Ontario Power Generation, and that they had been putting a lot of focus on tracking waste numbers before providing a specific response that the waste volumes are posted annually in Bruce Power's corporate sustainability report and that the information included "the volumes of waste produced against plan per cubic metre basis", and confirming for the Commission President that these reports are on Bruce Power's web site. CNSC staff added to Bruce Power's response, indicating that radiological waste are reported in "the Environmental Monitoring Program report from Bruce Power itself" and that this report was on Bruce Power's web site.

Northwatch subsequently investigated these referred to reports, including Bruce Power's 2014 corporate Sustainability report (the only sustainability report found posted on the Bruce Power web site), several years annual reports, several annual monitoring reports, and did not find waste inventories, waste characterization, or descriptions of radioactive waste management in these reports.

Northwatch is aware – and was aware at the time of making submissions in 2015 – of the inventory information that is available in the triennial Joint Convention Reports,[10] the annual nuclear fuel waste projects produced by the Nuclear Waste Management Organization,[11] and the 2011 reference inventory produced in support of Ontario Power Generation's proposed deep geological repository for low and intermediate level wastes.[12] Northwatch is also aware of other national inventories that were previously produced in Canada. Our comment is not that there is no information available in Canada about volumes of radioactive wastes; our comment is – and

[10] See, for example, Canada's 2017 report at http://nuclearsafety.gc.ca/eng/resources/publications/reports/jointconvention/
[11] See, for example, the NWMO's 2016 report at https://www.nwmo.ca/~/media/Site/Reports/2017/01/11/13/21/NWMO_TR_2016_09.ashx?la=en
[12] As found at https://www.ceaa.gc.ca/050/documents_staticpost/17520/49820/inventory.pdf

was – that proponents of undertakings that will generate volumes of radioactive waste should provide information in their applications about the wastes that will be generated, including a detailed characterization of these wastes and their hazards, including waste volumes and properties, and the proposed approach for the management of these wastes, including the very long term requirement for isolation of these materials from the environment and the necessity of protecting workers and the public from exposure to these materials. This is consistent with the regulatory requirement cited above, and with responsible operations and oversight.

RECOMMENDATION: The Commission should suspend decision-making with respect to Bruce Power's license application until all deficiencies in pertinent information have been addressed.

2.2 On and off-site transfers of radioactive wastes

Northwatch has an interest in the sound and responsible management of radioactive wastes, and application of management practices and technologies that can most effectively isolate these hazards and protect the public and the environment. Related to this, Northwatch has a concern about the transport and trafficking of radioactive wastes, for commercial or other purposes.

Northwatch has previously raised concerns with the Commission regarding the commercial trade and cross-border trafficking of radioactive wastes, most recently during discussion of Canadian Laboratories application for a ten year license to operate the Chalk River Nuclear Laboratory. Northwatch also expressed concerns with respect to the commercial trade and cross-border trafficking of radioactive wastes in our submission to the CNSC on the application from Ontario Power Generation Inc. (OPG) to amend Power Reactor Operating Licences for the Darlington and Pickering Nuclear Generating Stations to the import and export nuclear substances in contaminated laundry, packaging, shielding or equipment.[13]

[13] *Ref. 2017-H-109, CMD 17-H109.7 Submission from Northwatch*

Specific to the application by Bruce Power for a license for a ten year period that would encompass the refurbishment of three or more reactors on-site, Northwatch has several concerns related to the on-site and off-site transfers or radioactive wastes, including related to the purpose of these transfers, potential adverse related effects, and the lack of transparency related to these transfers.

In gathering information about off-site transfers of radioactive wastes with respect to the Chalk River laboratory site, Northwatch made extensive use of the U.S. Nuclear Regulatory Commission (NRC) operates an online information registry known as ADAMS - the Agency-wide Documents Access and Management System. ADAMS is the official recordkeeping system, through which the U.S. NRC provides access to "libraries" or collections of publicly available documents. [14]

A very limited review of documents posted on the ADAMS registry indicated that Northwatch's concern about cross-border traffic of radioactive wastes may relate directly to Bruce Power's intention to refurbish up to six reactors at the Bruce Nuclear Generation station. As outlined later in this section, Bruce Power provides very little information about wastes that will be generated during refurbishment / Major Component Replacement activities or how those wastes will be managed. However, documents available through the ADAMS registry strongly indicate that during previous refurbishment campaigns Bruce Power's waste management approach included exporting large volumes of refurbishment wastes across an international border for "processing" in the United States. For example, several items of correspondence from Energy Solutions to the U.S. Nuclear Regulatory Commission describe how Energy solutions is providing up to fifty radiologically contaminated cargo containers to Bruce Power, and that these containers will then be loaded with wastes related to reactor refurbishment and then shipped to EnergySolutions' Oak Ridge, TN processing facility.[15] It is interesting to note that there is more information provided in the ADAMS registry about the radiological contamination of the seacan container that Bruce Power has provided in its entire suite of application and supporting documents about the

[14] *See online: https://www.nrc.gov/reading-rm/adams.html*
[15] *For example, See https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML082670340*

refurbishment wastes that will be generated through their proposed Major Component Replacement campaign.

As noted previously, Bruce Power provides little information about wastes that will be generated by their operations, or how they will be managed. Of the limited information that is provided, there are several indications that Bruce Power intends to transfer wastes off-site, although there is no information provided about the destination or management conditions or standards. Examples include:

- Bruce Power is reportedly "exploring" the possibility of "reducing spent resin volumes by a factor of five" and that "spent resin may be processed by an external vendor" but no information is provided on the reduction process, or the external location, or even if these two explorations are linked[16]
- Bruce Power reports that they ship "300 – 500 packages of radioactive materials on public roads" but does not indicate what of these shipments are waste shipments versus products such as Cobalt-60[17]

RECOMMENDATION: The CNSC should direct Bruce Power to provide a detailed inventory of waste transfers into and out of the Bruce Nuclear Generating Station which are specific to their operations or under their power (i.e. not the activities of Ontario Power Generation) properties, including transfers from other operations in Canada, and transfers from the U.S. into Canada, other than to the Western Waste Management Facility. The inventory should include information that allows the user to trace waste volumes from point of generation through treatment to long term storage / disposition.

RECOMMENDATION: The CNSC should establish a publicly accessible registry of waste transfers between operations / sites in Canada, and transfers in and out of Canada.

[16] *Performance Review for Bruce A and B, Section 11.2.3*
[17] *Performance Review for Bruce A and B, Section 14.2.2*

2.3 Progress on Concern with Fuel Defects

In 2015, CNSC staff CMD noted several issues related to the fuel, including fuel defects, such as minor pin holes in the fuel sheath that allow trace amounts of radioactive material to escape and endplate cracks in the fuel bundles removed from the lower power outer zone channels at Bruce B. As summarized in the CMD " The concern is that endplate cracking can produce a through wall crack or break a section of the fuel endplate.Two or more breaks might allow a fuel element (FE) to become free and move into contact with another fuel element or into contact with the pressure tube (PT). This contact could eventually lead to a more serious failure of one of the components".[18]

As Northwatch noted during the 2015 review, from a public interest perspective, these are very serious issues, made all the more serious by the limited inspections of the fuel, even during shutdown operations.

> Fuel cladding has two primary purposes: to maintain the geometry of the fuel, and to act as a container. Fuel cladding is the first physical barrier between the irradiated fuel pellets and the environment. Changes that alter the physical structure and mechanical properties of a fuel bundle can cause damage. For example, oxidation of the cladding weakens its mechanical properties and decreases its thermal conductivity. In-reactor corrosion can also lead to embrittlement. Any of the just described phenomena can lead to damage or even failure of the fuel cladding.[19]
>
> 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 cladding failure. This, in turn, may lead to or hasten the release of radioactive materials into the storage container or even, ultimately, into the environment.

The Commission responded by making specific recommendations related to the fuel defects, including that Bruce Power provided fuel defects updates and updates on Bruce B endplate cracking. In the Commission Member Document prepared by CNSC staff for this 2018 review,

[18] CMD 15-H2, Pages 43-44
[19] "Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel", United States Nuclear Waste Technical Review Board, December 2010

CNSC staff note these recommendations and report the "Action Completed", but provide little information about these reports and their findings, and some of the limited information that is provided is not encouraging.[20]

CNSC staff report that the fuel defect rate for Bruce A Units 1 and 2 continued to be higher than industry average but that "the defect rate is trending downwards" and that they expected the defect rate to "return to industry average".[21] Given issues with fuel defects observed at Pickering and as discussed during the 2013 license review for the PNGS, an aspiration to "industry average" would be thought by many – including Northwatch – to be setting the bar too low.

CNSC staff explaination that the fuel defects are decreasing "because the debris is gradually being removed from the primary heat transport system" is further cause for concern, given that the debris is a residual effect of problems during the refurbishments undertaken at Units 1 and 2 many years ago. Bruce Power is now proposing to refurbish the remaining six reactors.

> The defect rate for Units 1 and 2 was higher than industry average due to fretting defects as a result of damage caused by debris introduced during unit refurbishment. [22]

According to the staff report, the observed rate of endplate cracking "remained consistent over the licensing period" which we took to mean there was no improvement. [23]

Northwatch is concerned that the issue of fuel defects has taken so many years to only partially resolve. It would appear that the negative operational legacy of Bruce Power's first refurbishment campaigns will not be resolved prior to this proponent launching their next refurbishment campaign. The consequences are long-lasting, including with respect to the potential for far future impairment of fuel integrity while in long term management, and so causing negative impacts for generations far into the future.

[20] CMD 2018-H2, page 10
[21] CMD 2018-H2, page 68
[22] CMD 2018-H2, page 150
[23] CMD 2018-H2, page 150

RECOMMENDATION: Require that the issue of fuel defects – and any other operational challenges that were initiated by the previous refurbishment activities – be fully understood and fully resolved prior to any additional refurbishment / Major Component Replacement campaigns be commenced.

RECOMMENDATION: Require that any root cause related to operational failures or issues during the previous refurbishment campaign be fully understood and that understanding be demonstrated by operational safeguards that will be employed during any future similar refurbishment or replacement efforts.

2.4 Licence Term

Bruce Power has applied for a ten year licence term, and CNSC staff are recommending that the Commission grant this wish. As outlined in more detail in a letter to which Northwatch is one of thirty public interest signators - submitted by Nuclear Waste Watch on behalf of the signators – this request should be denied in the interest of accountability and transparency.

Bruce Power sets out the argument that a longer licence period is "warranted based on past performance" and "is requested to ensure continued investor support".[24] The former is a questionable claim and the latter is not the concern of the Commission. It is not the Commission's business to make decisions based on the business interests of a private sector operator; it is both disrespectful and disingenuous of Bruce Power to argue otherwise. It is also ill informed of Bruce Power to think that a lengthier license term would insulate Bruce Power from changing regulatory requirements. If the Commission operates in a manner that is consistent with their motto of safety being their first priority, the Commission would ensure that regulatory change could reach into already issued license conditions, or gaps in license conditions.

Further, as set out in the Environmental Assessment Report produced by CNSC staff, the proposed refurbishment/ MCR activities will not commence before 2020 and would be carried

[24] Bruce A and B Performance Review, page 16

over a 13 year period, i.e. from 2020 to 2033, which would extend well beyond the proposed extended license period of 2018 to 2028.[25] In their supplemental information, Bruce Power confirmed that only three of the six units would be refurbished within the ten year licence period, with work in progress on two additional units and not yet commenced on the sixth.[26]

In concurring with Bruce Power's request, CNSC staff attempt the argument that their recommendation of a 10-year operating licences is "so that the PSR frequency of every 10 years will coincide with licence renewals".[27]

This argument is not supported by the regulatory document that sets out the purpose and requirements of the Periodic Safety Reviews. REGDOC 2.3.3 states:

> *The PSR is complementary to, and does not replace, regulatory activities required and/or performed by the CNSC, including routine and non-routine regulatory reviews and inspections, mid-term reports, event reporting and investigations, or any other CNSC licensing and verification activities.*[28]

Further, the Probablistic Safety Assessments are done on a five year cycle which would match a five year license rotation. The PSAs are updated on a 5-year cycle in accordance with REGDOC-3.1.1. [29]

RECOMMENDATION: Limit operating licence extension to a period of not greater than five years, or for shorter periods to coincide with refurbishment milestones should Bruce Power proceed with refurbishment / Major Component Replacement of additional units at the Bruce Nuclear Generating Station.

[25] CNSC staff produced Environmental Assessment Report, page 53
[26] APPLICATION FOR RENEWAL OF PROL 18.00/2020: SUPPLEMENTAL MATERIAL February 2018 Page 3 of 35
[27] CMD 2018-H2, page 1
[28] REGDOC-2.3.3 Periodic Safety Reviews April 2015, p 3
[29] APPLICATION FOR RENEWAL OF PROL 18.00/2020: SUPPLEMENTAL MATERIAL February 2018 Page 14 of 35

2.5 Integrity of Irradiated Fuel Bays

Northwatch's review of Bruce Power's licence application raised two concerns with respect to the management of irradiated fuel by Bruce Power, i.e. while in the irradiated fuel bays and prior to the irradiated fuel being transferred into dry storage containers with responsibility transferred to Ontario Power Generation. The concerns can be summarized as follows:

- Bruce Power provided inadequate information about the spent fuel and its management during the period between discharge from the reactor and transfer to dry storage
- What information was including in supporting documents raised concerns about the integrity of the irradiated fuel bays and the potential for adverse impacts on the environment as a result of IFB loss of integrity

While Northwatch was unable to locate a document which addressed issues related to the security and integrity of the irradiated fuel bays in a comprehensive manner, various documents identified several issues with the irradiate fuel bay which are cause for concern, including:

- There is a loss of integrity with the irradiated fuel bays; the document describes that "Leakage from the bays is monitored and when practicable stopped. When it cannot be eliminated, it is stabilized, and maintained at acceptable levels. It is collected by designed drainage systems and transferred to the liquid waste handling area" [30]
- It is unclear whether there is consistently sufficient capacity in the irradiated fuel bays to receive irradiated fuel from the reactors, should the reactors need to be fully unloaded in response to an unplanned event; for example, the Bruce A and B Global Assessment Report indicates that "The requirement for sufficient space to accommodate the entire reactor core inventory at all times is not reflected in the design and operating documentation The radioactive sources other than the reactor core are not addressed in Part 3 of the Safety Report."[31]

[30] *K-421231-00202-R00 - Safety Factor 2 - Actual Condition of SSCs Page 58-59 of 90*
[31] *K-421231-00217-R02 Bruce A and B GAR IIP Page 49 of 321*

- It is unclear the degree to which ageing related degradation of the irradiated fuel bays is rigourously evaluated and whether the phenomena of ageing induced degradation of the irradiated fuel bays is sufficiently understood[32]

While there is some acknowledgement in various documents that Period Safety Reviews are to now include evaluations of the irradiated fuel bays, Northwatch was unable to find evidence of this having yet been undertaken, and – on the contrary – found some indications that the additional requirements for PSRs were not being met, such as the argument put forward that investigations at Darlington into whether work previously done to approximate single-unit effects showed results that are consistent with the model outcomes for multi-unit accidents that because "the predictions from these two approaches are sufficiently well aligned such that further development of multi-unit models for Bruce A and Bruce B is not warranted".[33]

RECOMMENDATION: The Commission should require Bruce Power to undertake a comprehensive assessment of the integrity and function of the irradiated fuel bays, including an analysis for the effects of aging and whether the existing structures are and/or will remain sufficiently robust over the proposed period of extended operations at Bruce NGS.

2.6 Relationships between the Commission and Saugeen Ojibway Nation

As CNSC staff acknowledge in the staff CMD, "the Commission is also responsible for ensuring that its decisions uphold the honour of the Crown".[34] It is Northwatch's assessment that in refusing Saugeen Ojibway Nation's request to adjourn the hearing and in the Commission's reasoning for rejecting SON's request they have failed to uphold the honour of the Crown. Northwatch agrees with Saugeen Objiway Nation's assertion SON was excluded from the original decision to construct a nuclear facility within their traditional territory, that a decision by the Commission for a licence for continued operations of Bruce A and B would have an adverse

[32] *K-421231-00202-R00 - Safety Factor 2 - Actual Condition of SSCs Page 58-59 of 90*
[33] *K-421231-00201-R00 - Safety Factor 1 - Plant Design Page B-142 of B-564 Page 4547 of 8060 of PSR*
[34] *CNSC STAFF CMD, pages 141-142*

impact on their Aboriginal and treaty rights, and that the proposed refurbishment of up to six reactor units (major component replacement) is a significant proposal with serious implications for their territory and people.

Northwatch disagrees with Bruce Power's categorization of Saugeen Ojibway Nation as "stakeholders" and that in doing so Bruce Power is providing "appropriate levels of communication". [35]

It is Northwatch's firmly held view that neither the decisions of the Commission with respect to the Saugeen Ojibway Nation's request to adjourn the hearing or Bruce Power's terminology are consistent with a recognition of SON's authority as the original people's in the territory upon which the Bruce Nuclear Generating Station has been imposed or with a respect for SON's Aboriginal and treaty rights. Further, they are contrary to Truth and Reconciliation Commission of Canada's Calls to Action.

RECOMMENDATION: The Commission should seek reconciliation with Saugeen Ojibway Nation on the matter of how decisions are to be made with respect to operations at Bruce Nuclear Generating Station, including operations and activities undertaken by Bruce Power and by Ontario Power Generation.

3. Conclusion

Bruce Power has not provided a basis for approval of their application request. During the remaining years in their current license period, Bruce Power should work to address gaps in information and analysis identified by Northwatch and other intervenors in order to support any future applications.

Northwatch requests the opportunity to make an oral submission and the Commission hearing on this matter on May 30th and 31st 2018 in Kincardine, Ontario.
All of which is respectfully submitted on behalf of Northwatch on 16 April 2018.

[35] *Bruce Power, Section 15.12.1, "Relevance and Management"*