Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 18-H6.141

File / dossier: 6.01.07
Date: 2018-05-10
Edocs: 5531765

# Oral Presentation

# Submission from the Mohawks of the Bay of Quinte

In the Matter of

**Ontario Power Generation Inc., Pickering Nuclear Generating Station**

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Pickering Nuclear Generating Station

**Commission Public Hearing – Part 2**

**June 2018**

# Exposé oral

# Mémoire des Mohawks of the Bay of Quinte

À l'égard de

**Ontario Power Generation Inc., centrale nucléaire de Pickering**

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 Pickering

**Audience publique de la Commission – Partie 2**

**Juin 2018**

Canada

XCG CONSULTING LIMITED
T 613 542 5888 F 613 542 0944 | kingston@xcg.com
4 Cataraqui Street Woolen Mill East Wing Suite 100 Kingston Ontario Canada K7K 1Z7

May 10, 2018 **XCG File No.: 1-664-62-01**

Chief and Council
Mohawks of the Bay of Quinte
24 Meadow Drive
Tyendinaga Mohawk Territory, ON
K0K 1X0

**Re: Environmental Review of Licensing Documentation Related to Ontario Power Generation Pickering Nuclear Generating Station Operating License Renewal**

Dear Chief and Council:

## 1. INTRODUCTION

XCG Consulting Limited (XCG) was retained by the Mohawks of the Bay of Quinte (MBQ) to conduct a review and analysis, from the perspective of MBQ and their interests, of relevant licensing documentation in relation to Ontario Power Generation's (OPG's) request for renewal of the Pickering Nuclear Generating Station's (Pickering NGS's) Nuclear Power Reactor Operating License. This engagement was made possible through the Canadian Nuclear Safety Commission (CNSC) Participant Funding Program (PFP), which provided participant funding to various stakeholders, including MBQ.

The Pickering NGS is located in the City of Pickering in the Regional Municipality of Durham, about 32 kilometres east of Toronto on the north shore of Lake Ontario. The Pickering NGS consists of eight Canada Deuterium Uranium (CANDU) reactors, with Units 2 and 3 currently in safe storage state.

OPG is applying for renewal of Pickering NGS's operating license, which expires on August 31, 2018. The request is for renewal of the operating license for a term of 10 years to August 31, 2028. Within the proposed operating license term, OPG has requested that the 10-year licence include the following three stages: 1) continued commercial operation to the end of 2024; 2) stabilization activities from 2024 to 2028 (e.g. post-shutdown defueling and dewatering); and 3) beginning in 2028, safe storage with surveillance.

OPG is requesting approval to operate Units 5 to 8 to a maximum Effective Full Power Hours (EFPH) of 295,000. The current limit is 247,000 EFPH. Units 1 and 4 are not projected exceed the current EFPH limits.

As noted in the CNCS member documents, extended operation of the Pickering NGS was initiated by the Province of Ontario, which requested operation beyond 2020.

CNSC has indicated in the provided documentation that overall Pickering NGS safety performance has been satisfactory to fully satisfactory.

The MBQ community, the Tyendinaga Mohawk Territory (TMT), is on the north shore of the Bay of Quinte, approximately 160 kilometres east of the Pickering NGS. Protection of the natural environment is a high priority for the MBQ. As expressed in MBQ's Environmental Unit mission statement:

> *The Environment is a gift and it is our responsibility as caretakers to protect it. A healthy environment means healthy people. Honouring diversity, respecting creation's life-cycle, embracing our interconnectedness to creation and practicing Kanyen'kenaka traditional beliefs and using the Ohenton Karihwate'hkwen as our guide are the foundation of a healthy and sustainable community for future generations.*

Thus it is of critical importance to the MBQ that environmental management of future operations at the Pickering NGS be carried out in a manner that will minimize the risk of environmental and human health impacts that could affect the MBQ and its traditional lands. This principle was a key consideration during the completion of XCG's environmental review.

## 2. SOURCES OF INFORMATION

### 2.1 Licensing Documentation and Reports Reviewed

To assist with XCG's environmental review, OPG and CNSC made available electronic copies of the commission member documents (CMD) pertaining to the Pickering NGS operating license renewal. These documents were provided by CNSC on April 18, 2018, as part of the PFP and were the focus of this review:

- "Ontario Power Generation Inc., Pickering Nuclear Generating Station, Written Submission, Commission Public Hearing Part 1," OPG, dated March 5, 2018. (Referred to in this review as the "OPG CMD").
- "Ontario Power Generation Inc., Pickering Nuclear Generating Station, Supplementary Presentation Information, Commission Public Hearing Part 1," OPG dated March 27, 2018, dated March 5, 2018. (Referred to in this review as the "OPG CMD SUP").
- "Ontario Power Generation Inc., Pickering Nuclear Generating Station, Written Submission, Commission Public Hearing Part 1," CNSC, dated March 5, 2018. (Referred to in this review as the CNSC CMD).
- "Ontario Power Generation Inc., Environmental Assessment Report, Pickering Nuclear Generating Station – PROL 48.00/2018 Licence Renewal," CNSC, contained in the CNSC CMD, dated March 2018. (Referred to in this review as the CNSC ERA).
- "Pickering Nuclear Generating Station Licence Renewal, CNSC Staff Presentation," CNSC, CMD 18-H6.A, dated April 4, 2018. (Referred to in this review as the CNSC Staff Presentation)."

Additional information obtained from OPG's website that was reviewed includes the following:

- "Environmental Risk Assessment Report for Pickering Nuclear P-REP-07701-00001 R0," EcoMetrix Incorporated and Golder Associates, dated April 2017. (Referred to in this review as EcoRA).
- Minutes of the Canadian Nuclear Safety Commission (CNSC) Meeting held on December 17 and 18, 2014.

## 3. CNSC OPEN HOUSE

XCG on behalf of MBQ attended the CNSC Pickering NGS Licence Renewal open house held at the Pickering Recreation Complex on March 8, 2018. This CNSC open house was generally related to CNSC's role as a regulator of nuclear power. No representatives from OPG were present at the open house.

The presentations generally focussed on CNSC's role as a nuclear regulator and not on specific Pickering NGS licensing details. Mrs. Siobhan Arnott (Policy Aboriginal and International Relations) was in attendance and able to introduce XCG to one of the on-site CNSC project managers for the Pickering NGS Licence Renewal. Based on those discussions, it was explained that the Pickering NGS Licence Renewal is different from the previous Cameco and Darlington licence renewals that XCG/MBQ have reviewed. Those renewals had numerous infrastructure, remediation and building modifications, whereas the Pickering NGS Licence Renewal involves extended operations of existing infrastructure until 2024 when the units are to be shut down permanently. The CNSC project manager indicated that there may be some internal modifications as a pre-emptive to the shutdown, but no significant site modifications are envisioned.

## 4. CNSC PUBLIC HEARING PART 1

As part of the CNSC regulatory requirements, public hearings are a component of the licensing process. XCG watched via webcast Part 1 of the CNSC public hearing regarding the Pickering NGS license renewal, held on April 4, 2018. This hearing was a closed hearing. As such, XCG could not pose any questions to the presenters or to the Commission members. The content of this hearing mainly included OPG and CNSC staff presenting their written submissions, followed by a series of questions from members of the CNSC.

## 5. ABORIGINAL COMMUNITY ENGAGEMENT

### 5.1 Community Meeting

Due to time constraints and MBQ's limited resources and capacity, a community meeting could not be held prior to the required PFP submission date of May 7, 2018. To ensure that this submission included some preliminary comments arising from community engagement, select community members were contacted directly to gather traditional knowledge and local community insight regarding the Pickering NGS licence renewal. Based on those discussions, the following concerns and/or insights were identified:

- Members of the MBQ community harvest salmon from Lake Ontario/Shelter Valley area; and
- Members of the MBQ community harvest crappie and wild rice from Rice Lake.

## 6. ENVIRONMENTAL REVIEW FINDINGS

Presented below are the key findings of XCG's review of the information obtained from the sources described in Section 2.

### 6.1 Aging Infrastructure

As noted in the CNSC CMD, Units 1 to 4 came into service between 1971 and 1973 and Units 5 to 8 came into service in 1982 and 1985. There have been various shutdowns, units placed in lay-up states and return to service activities over the years. Due to the age of the Pickering NGS, it is evident that numerous assessments of the reactor components (calandra tubes, spacers, pressure tubes, etc.) will need to be completed to ensure their continued satisfactory performance. In addition, monitor displays, computer boards and equipment are expected to be obsolete. Both CMDs mention the research and development trials that will be ongoing to determine fitness for service, considering all degradation mechanisms, to 295,000 EFPH. However, nowhere within the reviewed documentation does it mention that this type of CANDU reactor has previously been extended beyond the original EFPH or even if any current CANDU reactors have operated up to the proposed limit. It is concerning for MBQ that this proposed extension beyond the originally intended operating limit appears to be the first for this type of CANDU reactor.

### 6.2 Nuclear Waste Management

Although not specifically identified as part of the Pickering NGS licence renewal, XCG/MBQ wishes to comment on the Pickering Waste Management Facility (PWMF) located on-site which has been in operation since 1996. The PWMF is separately licensed under a Class 1B waste facility operating licence and is not part of the Pickering NGS Operating Licence Application. The PWMF facility stores low-level radioactive waste (e.g. mop heads, rags, paper towels and protective clothing) and radioactive waste (e.g. irradiated fuel interim dry storage).

OPG's licence renewal application says "It is anticipated that shutdown activities following the end of commercial operation will increase the volume and types of waste that are generated, for a short period." This is a concern as it is unclear how much radioactive waste will be generated and stored on-site during the shutdown activities. The CNSC CMD indicates that OPG intends to continue storing used fuel in the dry storage containers at the PWMF until a long-term management facility is available. MBQ has concerns regarding the future use of the PWMF and the transportation of radioactive substances.

Since the TMT is located approximately 1 kilometre south of Highway 401, and a rail line passes through the TMT, there is a high likelihood of a negative environmental impact on the TMT, and a negative health impact on residents of the TMT, in the event of release of nuclear waste occurring in the vicinity of the TMT during transport of any nuclear waste by road or rail.

Based on past occurrences of derailments and other incidents in and near the TMT, demonstrating ongoing problems with rail safety, MBQ has expressed the view that the railways in Ontario require significant infrastructure and operational improvements to bring their reliability to a satisfactory level. As such, the MBQ objects to any nuclear waste or radioactive products being shipped by rail adjacent to, or through, the TMT. In addition, the MBQ is opposed to the transportation of nuclear waste or radioactive products along waterways, especially any waterways that are in the vicinity of the TMT.

### 6.3 Radiological and Atmospheric Releases

As noted in CNSC CMD, it is encouraging to see that the reported estimated dose to a representative member of the public during the licensing period ranged from 1.1 to 1.5 µSv/year, which is well below the public dose limit of 1 mSv per year (1000 µSv/year). Similarly, the OPG CMD states that during the current licensing period, the Pickering NGS has not exceeded the derived release limit (DRL) or the action level for any radiological emission to air on an annual basis.

As noted in the CNSC CMD, one month in 2016 OPG exceeded the effluent radiological liquid release action level for gross-beta. XCG understands that environmental action levels are 10% of the Derived Release Limits (DRL). CNSC have indicated that they will be following up with OPG through established compliance verification activities. As this licence renewal is occurring in 2018, two years later, MBQ has concerns that this follow up appears to not yet have been completed and that an explanation should have been included in the OPG and CNSC CMD.

Review of the event initial reports (EIRs) between September 2013 to February 2017 indicated a leak of heavy water within containment at Unit 7 during a planned outage on November 21, 2014. Approximately 6,200 litres of spilled heavy water was contained within the reactor building. OPG indicated that containment was isolated per approved procedures to ensure retention of airborne tritium inside the reactor building during the station emergency to minimize release to the environment. A station emergency was declared to provide additional management oversight, to direct personnel to evacuate the incident area and to assemble for accounting. This event was reported to the commission through CMD 14-M80 on December 17, 2014. Review of the meeting minutes raises concerns regarding the frequency of declaring this type of station emergency as CNSC staff responded that they occurred one to two times per year. Given the current licence application is for 10 years, it could be presumed that 10 to 20 similar station emergencies may occur during the upcoming licencing period.

The TMT is downstream and downwind of the Pickering NGS in Lake Ontario. Many TMT community members fish in the Bay of Quinte, and thus their livelihood and well-being depends on the quality of the fish and other freshwater aquatic life in Lake Ontario and in the Bay of Quinte, in particular. Elevated gamma radiation levels have the potential to negatively impact freshwater aquatic life. Therefore, it is important, from the MBQ's perspective that OPG follow through with its efforts to minimize exceedances of any radiological action levels as much as possible.

### 6.4 Environmental Spills

The most significant spills and unintended releases into the environment due to operation at Pickering NGS were reviewed between years 2013 to 2017 with the purpose of ensuring that the extent of these spills was controlled and that the land surrounding Pickering NGS has not been contaminated for future generations.

As noted in the CNSC CMD, OPG's spill categories align with Ontario Ministry of the Environment and Climate Change (MOECC) regulatory requirements for the classification of contraventions as follows:

- Category 'A' spills are considered very serious due to the scale of injury or damage, health effects, or safety impairment.

- Category 'B' spills are considered serious due to localized injury or impacts to property.
- Category 'C' spills are all other reportable spills that are less serious than Category A and B spills.

OPG's CMD indicates that there were no Category A or B spills during this period. Below is a summary of 12 Category 'C' spills that have occurred in recent years, as documented in the Application for License Renewal:

- A Category 'C' spill occurred on June 13, 2017, that was described as a release of 125 litres of lubrication oil that was accidentally spilled to the floor. It was noted that 75 litres was recovered from the floor and an estimated 50 litres of the product entered floor drains which lead to the Condenser Cooling Water Discharge Duct with a lake outfall.
- The following 11 Category 'C' spills were identified with short descriptions only in the OPG CMD:
  - In 2016, 8 litres of oil from a compressor;
  - In 2015, 100 litres and 50 litres of sewage - overflow;
  - In 2014, 30 litres of hydraulic fluid from pump, 200 litres of sewage - overflow, 19 litres of fire resistant fluid from the turbine governor system, 10 litres of oil from a transformer temporary dike and 100 litres of sewage from a leak in a line; and
  - In 2013, 4 litres of ethylene glycol from an air conditioning unit, 50 litres of sodium hypochlorite solution from an underground pipe, 536 of generator seal oil from a heat exchanger.

OPG identified numerous spill mitigation initiatives and planned improvements for completion in late 2017. OPG noted that the number of spills has been decreasing since 2004.

Although the above spills would not be expected to have caused any impacts affecting the MBQ, the periodic occurrence of spills is nevertheless a concern. OPG should follow through with the implementation of these plans as quickly as possible. Furthermore, in the event of an unplanned release that could potentially affect the TMT, either in the long term or the short term, OPG should provide immediate notification to the MBQ.

### *6.5 Water Cooling / Fish Impingement*

As described in the CNSC EAR, a thermal plume exists from current operations and has an estimated area of 1.5 to 8 square kilometres. OPG has an Environmental Compliance Approval (ECA) discharge limit for different operating conditions. Based on the CNSC EAR, OPG has implemented mitigation measures to reduce the thermal effect on fish. However, one station in 2011-2012 was noted to be above the 10% level (the threshold for no-effect on Round Whitefish embryo survival) and it was noted that this station represented only 1% of suitable spawning habitat and the survival loss threshold was only exceeded on this one occasion. As such, CNSC staff concluded that the thermal plume is not likely to have adverse effects. However, OPG has committed to conducting two additional years of thermal assessment during the licensing period (2018-2019 and 2019-2020). XCG agrees that further thermal assessment is warranted.

Although no significant changes are contemplated for the cold water intake, the following chemicals were identified as being used on a regular basis:

- Sodium hypochlorite is used as a biocide for mitigating zebra and quagga mussel infestations in the pump wells and pump houses.
- Hydrazine, ammonia and morpholine are used to provide pH control and corrosion protection in the boiler feedwater systems.

It could not be determined through XCG's review if the use of these chemicals has increased over the years. It is understood that the Pickering NGS cold water intake is similar to the Darlington NGS that has reported increased chemical usage due to zebra mussel infestations.

OPG met with representatives of the MBQ and other Indigenous communities representatives in the spring 2017 regarding OPG's mitigation and off-set measures for fish impingement and entrainment. MBQ was provided a tour by boat of the Pickering NGS fish dispersion system (FDS). MBQ was surprised by the quantities of fish able to penetrate the various barriers resulting in the significant biomass reported quantities. Review of the biomass (kilogram) of fish impinged shows that while improvements since 2003-2004 are evident, the 2017 preliminary values are the highest ever recorded. The explanation is that the fish barrier had been removed for the winter. This is of great concern given the significant loss of fish that equates to an amount greater than last five recorded years' combined losses.

A Department of Fisheries and Oceans (DFO) authorization was issued on January 11, 2018, to December 21, 2028. The authorization includes the monitoring and maintenance of the existing FDS and for the offsetting measures related to the Big Island Wetland complex, the Simcoe Point Wetland restoration and the Bring Back the Salmon Program.

As noted in Section 3.2, many TMT community members fish in the Bay of Quinte, and their livelihood and well-being depends on the quality of the fish and other freshwater aquatic life in the lake. Therefore, any impact to the fishery could result in environmental, health, social, and economic impacts on the MBQ. Therefore, it is essential for OPG to ensure that thermal and chemical impacts on the lake are minimized, and that an expanded long-term monitoring program be conducted to assess the effects of thermal and chemical impacts on not only the Round Whitefish population, but on other fish species and invertebrate populations in the lake.

### *6.6 Seismic Events, Floods, High Winds*

To demonstrate the adequacy of the facility design to withstand external and internal hazards, internal floods, internal fires, seismic events and high winds, OPG assesses the hazards either through a periodic safety review (PSR), probabilistic safety assessment (PSAs) or through a specific situation analysis. Specific details on the capabilities of the Pickering NGS withstanding these hazards were not found within the commission member documents. XCG recommends that this information be made available. Additionally, an estimation of the risk of a large release following seismic events and extreme weather events should be made public.

Recent earthquakes that affected Ontario in 2010 and 2012 measured 5.0 and 5.2 on the Richter scale, respectively. Recent EF-2 tornadoes that occurred in southwestern Ontario in August 2015 demonstrate the potential for extreme weather events to occur in the vicinity of the Pickering NGS. Therefore, it is imperative that the whole facility be brought up to the highest

design standard to withstand tornadoes, earthquakes and any other natural disasters that have the potential to occur.

## 7. SUMMARY OF KEY FINDINGS

The following summarizes the key findings of this environmental review:

1. Given the age of the units at the Pickering NGS, it is concerning that the reviewed documentation does not mention examples of this type of CANDU reactor having previously been extended beyond the original effective full power hours or beyond a prescribed number of operating years. It is concerning for MBQ that this proposed extension beyond the originally intended operating limit appears to be the first for this type of CANDU reactor. Further clarification on this should be provide to MBQ.
2. In the event that a future nuclear waste or radioactive product shipment or shipments will be passing by the TMT on a public highway, rail line, or via marine shipment, the MBQ should be notified well in advance of the planned shipment date. Along with the notification, OPG should provide details regarding precautions to be taken to prevent a containment breach during transport.
3. Further clarification is required as to the cause of the 2016 effluent radiological liquid release for gross-beta radiation levels that had the potential to negatively impact freshwater aquatic life, which in turn could have a negative impact on MBQ's livelihood and well-being. It is important from the MBQ's perspective that OPG follow through with its efforts to minimize exceedances of any radiological action levels as much as possible.
4. The discharge of cooling water at two outlet points is described as presenting "localized thermal effects." However, due to the proximity of the Pickering NGS to Lake Ontario, there is the potential to negatively impact freshwater aquatic life. Furthermore, one thermal exceedance was observed during the current license period. Therefore, it is essential for OPG to ensure that thermal impacts to Lake Ontario are minimized, and that an expanded long-term monitoring program be conducted to assess thermal and chemical impacts on various fish species and invertebrate populations.
5. Due to the significant preliminary 2017 biomass fish impinged reported quantities, the fish diversion system may not be operating as effectively as planned and/or the timing of deployment and retrieval of the netting may need to be revisited with DFO consultation.
6. According to the information reviewed, the unplanned releases, spills and action level exceedances that have occurred at the Pickering NGS would not be expected to have caused any impacts affecting the MBQ. Nevertheless, the periodic occurrence of unplanned releases, spills and action level exceedances is a concern. OPG has implemented corrective actions in order to reduce the number of these events, and OPG should continually implement these plans. Furthermore, in the event of an unplanned release that could potentially affect the TMT, either in the long term or the short term, OPG and/or CNSC should provide immediate notification to the MBQ.
7. An assessment of the risk of releases following a seismic event and extreme weather events was absent from both the CNSC CMD and the OPG CMD. XCG recommends that this assessment be made available, or performed if it has not yet been done.

8. It is imperative that the whole facility be brought up to the highest design standard to withstand tornadoes, earthquakes and any other natural disasters that have the potential to occur.

## 8. LIMITATIONS

This review relied on information provided in documents produced by others. In conducting this peer review, XCG assumed that the information presented in these documents is accurate. XCG did not conduct investigations or inquiries in order to independently verify the information provided in the documents. Therefore, XCG does not accept responsibility for any inaccuracies in the available information.

The scope of this letter report is limited to the matters expressly covered. This report was prepared for the sole benefit of the client to whom the report is addressed, and may not be relied upon by any other person or entity without the written authorization of XCG Consulting Limited. As such, the scope of services performed in the execution of this investigation may not be appropriate to satisfy the needs of other users. If others use or reuse this document or the findings, conclusions, or recommendations represented herein it is at the sole risk of said users.

## 9. CLOSURE

If you have any questions regarding the above, or require anything further, please do not hesitate to contact me.

Yours very truly,

XCG CONSULTING LIMITED

Gregory G Mallette, C.E.T.
Project Specialist

Kevin Shipley, M.A.Sc., P.Eng., EP(CEA), EP, $QP_{RA}$
Partner

cc: Nicole Storms, Email: nicoles@mbq-tmt.org