



**Written submission from
Frank R. Greening**

**Mémoire de
Frank R. Greening**

In the Matter of

À l'égard de

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

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

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

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

Commission Public Hearing – Part 2

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

June 2018

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From: Frank Greening
Sent: Friday, May 04, 2018 4:14 PM
To: Interventions (CNSC/CCSN)
Cc: Levert, Louise (CNSC/CCSN); Lojk, Robert (CNSC/CCSN); gerry.frappier@canad.ca; Rinker, Michael (CNSC/CCSN); Elder, Peter (CNSC/CCSN); Sauvé, Kiza (CNSC/CCSN); Torrie, Brian (CNSC/CCSN); Mendoza, Melissa (CNSC/CCSN); Media relations / Relations avec les médias (CNSC/CCSN)
Subject: Pickering Intervention: Submission for 2018-H-03

To: The Senior Tribunal Officer
Secretariat of the Canadian Nuclear Safety Commission (CNSC)
280 Slater Street, P.O. Box 1046, Station B Ottawa, ON K1P 5S9

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Email: Interventions@cnsccsn.gc.ca

Re: Submission to the CNSC Public Hearing to consider Ontario Power Generation's (OPG's) application to renew its Nuclear Power Operating Licence for the Pickering Nuclear Generating Stations, A and B, for a period of 10 years, Hearing Number Ref. 2018-H-03

Dear Commissioners:

Over the past 15 years, I have intervened at many Public Hearings on the licensing of nuclear facilities at Bruce, Pickering, Darlington and Chalk River. In most of these interventions I have asked technical questions and requested technical information and data on specific items such as pressure tubes, feeder pipes, radio nuclide emissions, etc. Invariably, I have not been given answers to my questions, nor have I been provided with any of the data I requested. This is unacceptable and makes a mockery of the claims of openness and transparency we routinely hear from the CNSC about its nuclear regulatory activities.

Nevertheless, with regard to the present relicensing of Pickering, I am once again participating in a CNSC licensing hearing, but in order to do this in a meaningful way, *I must first have access to the following information:*

1. All available fitness-for-service inspection data, (as required by CSA N285.4 and N285.8), for pressure tubes at Pickering A and Pickering B over the past 5 years (2013 – 2017). This should, as a minimum, include:
 - (i) Hydrogen/Deuterium data derived from concentration measurements of scrapes taken at different axial locations and after different Effective Full Power Hours (EFPH) or Hot Hours (HH) of Unit Operation.

(ii) All available pressure tube oxide thickness data measured on removed pressure tubes from Pickering A and Pickering B.

(iii) Hydrogen pickup data at the rolled joints of Pickering pressure tubes.

2. Data on the wall thickness of at-risk outlet feeder pipes.

In OPG's April 2005 submission to the CNSC entitled: Pickering GS B Outlet Feeders Required Wall Thickness Values, (Document No. NK30-CALC-33126-00021 R000), and Component Disposition Form NK30-EVAL-33160-00003-R00, Pickering B outlet feeder operational lifetimes were estimated. The data submitted by OPG to the CNSC shows there are many feeders for which the required thickness limit would be reached before 2020. Examples of these pipes are:

- Unit 5: B11E, B13E, C08E, C15W, D06W, F09E
- Unit 6: C06E, K02W, N02E, O21E, Q03E
- Unit 7: O02W, U06W
- Unit 8: C17W, E04E, F20W, H02W, J02E, K02W, K21E, N02E, P21W, Q03E

What are the current wall thicknesses of these feeders?

3. Airborne radionuclide emissions data (*on a weekly basis*) for all contaminated and non-contaminated stacks at Pickering A and Pickering B. This should include data for tritium (HTO), Carbon – 14, Noble Gases, Radioiodine, Gamma/Beta- emitting particulate and alpha-emitting particulate for the period 2013-2017.

N.B. Monthly or annual averaged data are *not* acceptable for the calculation of doses to critical groups since the airborne emissions from CANDU reactors are spiked, not continuous, and should be evaluated under CSA N288.2, (*not CSA N288.1*). CSA N288.2 deals with *short-term* emissions which are well represented by weekly data.

4. Tritium monitoring data recorded over the past 10 years for sumps and wells on the Pickering site and also data pertaining to the site's foundation drainage.

Highly elevated levels of tritium in groundwater have been identified since 1997 at both PNGS A and B. Subsequent studies carried out between 2001 and 2006 have revealed the extent of this groundwater contamination:

Unit1 moderator purification room pit had tritium concentrations up to 1.04×10^{10} Bq/L
PNGS A & B foundation drain sumps had tritium concentrations up to 1.3×10^5 Bq/L
PNGS A reactor auxiliary bay sumps had tritium concentrations up to 1.9×10^8 Bq/L
PNGS B reactor auxiliary bay sumps had tritium concentrations up to 8.0×10^6 Bq/L
PNGS B irradiated fuel bay ground-tubes had tritium concentrations up to 4.0×10^6 Bq/L

It is reasonable to ask: what are the current levels of tritium at these locations?

In addition, I would ask OPG to explain how it intends to return the Pickering site to a "green field" condition *with these levels of tritium in the ground water*.

5. The most recent data available on measured concentrations of uranium and transuranic isotopes in Active Liquid Waste, (ALW), samples from Pickering NGS.

PNGS ALW sampled in Oct/Nov 2002 (as part of a COG project) detected U-235, U-238, Pu-239, Am-241 and Cm-244. (See: "Characterization of Radionuclide Species in CANDU Effluents – Final Report on Analysis of Samples Received in 2002" COG Report No: COG-03-3046, December 2003). The data show that gram quantities of uranium were being released from Pickering to Lake Ontario at that time.

6. OPG's Pickering B Environmental Assessment Report NK30-REP-07701-00002 issued in 2007, states that for the site study-area tritium wet deposition is "about 37,000 Bq/L". Could OPG please comment on, and update this assessment.
7. Specific details of all instances of the detection of failed or defective fuel bundles in Pickering Units over the past 10 years.
8. Annulus Gas System (AGS) purge frequencies for all operating Units at Pickering A and B over the past 10 years, as discussed in my 2017 publication in Volume 82, pages 1 – 15, of the journal Kerntechnik, for which the Abstract reads in part:

In the event of a pressure tube leak from a small through-wall crack during CANDU reactor operations, there is a regulatory requirement – referred to as Leak Before Break (LBB) – for the licensee to demonstrate that there will be sufficient time for the leak to be detected and the reactor shut down before the crack grows to the critical size for fast-uncontrolled rupture. In all currently operating CANDU reactors, worldwide, this LBB requirement is met via continuous dew point measurements of the CO₂ gas circulating in the reactor's Annulus Gas System (AGS).

Dear Commissioners, please recognize that no meaningful assessment of the safety and environmental impact of the continued operation of Pickering A and B Units is possible without access to the data I have requested above. I say this because data such as pressure tube H/D pickups, oxide thicknesses of pressure tubes, feeder pipe wall thicknesses, annulus gas purge frequencies, fuel failure rates, etc, are quantitative measures of the health and safety of an ageing CANDU Unit. Similarly, airborne and waterborne radionuclide emissions and tritium in precipitation and in on-site sumps and wells are measures of the potential environmental impact of the continued operation of Pickering NGS.

I believe most of this data is already in the possession of the CNSC. And I see no reason why it should not also be made available to the general public, and independent researchers such as myself, in order for everyone to have full disclosure into how Pickering NGS is performing at the present time, and how it is likely to perform in the near future. After all, what possible justification could there be to keep pressure tube and feeder pipe performance and environmental emissions data secret? Nevertheless, I suspect that OPG, and even some CNSC staff, will oppose the provision of such data to myself or members of the public; but Commissioners, should this happen, please consider whom you serve: the Canadian public, or the Canadian nuclear industry?

So, Commissioners, I am asking you to do the right thing: Please defend the public's right to have free and liberal access to information that impacts on its health and safety!

Thank you, Sincerely,

Dr. F. R. Greening, (OPG Senior Research Scientist, Retired)