



Oral Presentation

Exposé oral

**Submission from
Michel Duguay**

**Mémoire de
Michel Duguay**

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**

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Arguments against the life extension of the Pickering B nuclear power plant

In December 2012 the Gentilly-2 CANDU nuclear reactor in Bécancour was shut down permanently. The 800 workers found new employment in Hydro-Québec and in other industries. A foremost value in our society is security. A shut down nuclear reactor is far more secure – though not perfectly so – than one in operation. On 22 April 2014 I submitted to the CNSC an article entitled “Pickering B life extension, coping with tubing rupture” in preparation for the CNSC public hearing that took place on 7 May 2014 in Ottawa. This article can be down-loaded from my web site www.canadaval.ca , or by putting its title in Google, or by using the CNSC web site searching engine.

From the history of accidents, many people know that tubing rupture is a major weakness in CANDU nuclear reactors. The CNSC has itself very well documented the problems with nuclear core pressure tubes and with cooling water feeder pipes. One big problem is the need to monitor the precise state of the approximately seven kilometers of tubing exposed to corrosion phenomena. My April 2014 put a lot of emphasis on the fact that due to the crowded feeder pipe geometry, a certain percentage of these tubes are in an unknown state of corrosion. Tubes under high pressure, especially when the pressure is cycled up and down for maintenance purposes, can develop micro-cracks that progressively grow until they can cause a sudden rupture. A sudden reduction of cooling water flow could trigger a fast temperature rise in the reactor core which could escalate to partial core meltdown.

This metal fatigue problem is well known in the commercial aviation industry. Since 1934 more than 300 airplane crashes have been caused by metal fatigue. This is one of the reasons that after a certain number of

flights, and/or flight hours, commercial airliners are systematically withdrawn from service. By asking permission to exceed the number of service years initially expected for the Pickering power plant, OPG is betting on some probability that no pressure tube will rupture, and that in the event of rupture OPG will have the means in place to prevent a severe nuclear accident from occurring. That failing, the early distribution of potassium iodide pills to the surrounding population will reduce the health damage due to radioactive iodide but it will not reduce the health damage due to cesium-137 and other radioactive elements in the fall-out from a major accident.

Another argument that I raised in my 2014 article stemmed from the experience with the Gentilly-2 reactor under the control of Hydro-Québec. Instead of refurbishing or shutting down Gentilly-2 some people were arguing for prolonging its service life beyond the 210 000 hours originally planned. In the following I quote my English translation of what Hydro-Québec's president Thierry Vandal said in a *Commission Parlementaire* held on 29 January 2013 in the Québec Parliament:

"This is an important issue and I would like to take the time to explain it well. While it is true that we have an operating license from the CNSC, the permit that we received for continued operation included an important condition: that there be a mandatory stop at the end of 2012, after which we would do one of two things: Either we would shut down the plant, which is what we have done, or we would begin the refurbishment."

"We asked ourselves, what should we do because we really wanted to have a close look before proceeding. We looked at this question in the context of, what for us, is the ultimate date, what I would call the extreme limit of operation, the 210 000 hours which is the design value for this power plant.

When we shut down the plant, we were almost there, within a few hours, having run the plant for 198 000 hours since the very beginning. These are the hours of operation at full power.

It is a measure of ageing, if you will, of the plant components. So for how many hours could we continue to operate from a safety point of view? I can tell you that Hydro Quebec's management in no way would have considered to go beyond 210 000 hours even if it was made possible. I would no more operate Gentilly-2 beyond 210 000 hours than I would climb onto an airplane that does not have its permits and that does not meet the standards. So it's out of question for us to put anyone,

i.e., us, the workers, the public and the company in a situation of risk in the nuclear domain.”

One final argument I present here for shutting down the Pickering B nuclear power plant is what I wrote in April 2014 about the article published by John Waddington in October 2009. I insert here the 24th paragraph of my April 2014 article:

“-24. Another argument against life extension of Pickering B is the paper that John Waddington published in October 2009 (ref. 13). Waddington worked for many years at Atomic Energy Canada Limited (AECL) and then as a director at the CNSC for ten years. Waddington joined the analysis made by several academic researchers that major accidents have a root cause that originates in major part in the prevailing safety culture. In the case of nuclear power, the Canadian nuclear industry works closely with the CNSC. John Waddington has expressed his view that the Canadian nuclear regulatory process needs to be changed if we are going to decrease the probability of a severe accident by a factor of ten, which is the current wish of the international nuclear power community. The fact that the CNSC lets OPG calculate the probability of nuclear accidents lowers the level of confidence that one can have in the results. Many flexible assumptions go into these probability calculations. The NTSB has shown examples where a part that was not supposed to fail in 80 000 years, failed after a few years. Many accidents are caused by unpredicted combinations of events. Probability calculations that OPG presents and that some CNSC staff members endorse carry a high level of uncertainty. The Canadian public is not well informed of this situation.”

In conclusion, I want to urge all parties involved in the Pickering B decision to think about the threat of damage that the life extension of the obsolete and degraded Pickering B power plant would present. Nowadays no new nuclear power plant would be allowed in the suburbs of a large city like

Toronto. The life extension of Pickering B would be prolonging a threat that the city of Toronto, the province of Ontario, and the nearby American states and Canadian provinces can do without. The Chernobyl and Fukushima nuclear catastrophes showed how far radioactive fall-out can travel.