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Written submission from Catherine Vakil

Exposé oral

Mémoire de Catherine Vakil

In the Matter of the

Ontario Power Generation Inc.

Application for a licence to construct one BWRX-300 reactor at the Darlington New Nuclear Project Site (DNNP)

Commission Public Hearing
Part-2

January 8, 2024

À l'égard d'

Ontario Power Generation Inc.

Demande visant à construire 1 réacteur BWRX-300 sur le site du projet de nouvelle centrale nucléaire de Darlington (PNCND)

Audience publique de la Commission
Partie-2

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Canada

Nov. 4, 2024 – submitted by Catherine Vakil MD

CNSC submission for hearings regarding a licence to construct the first of four boiling water reactors (BWRX-300 design) at the Darlington New Nuclear Project (DNNP)

Ontario Power Generation (OPG) is requesting a licence from the CNSC to build the first of four BWRX-300 nuclear reactors at the Darlington site outside Toronto. I will outline in this intervention the reasons why the CNSC should not grant a licence to construct this nuclear reactor.

1) **Lack of an environmental assessment** - The CNSC was negligent in allowing the exemption of the BWRX-300 reactor from a new environmental assessment (EA), claiming that its design is not fundamentally different from the four pressurized water reactor designs for which the EA was created in 2009, and therefore that this previous EA can apply to the BWRX-300. As described in many interventions in the Nov. 20, 2023 hearings, it is obvious that the BWRX-300 reactor is most definitely fundamentally different than any of the proposed reactors described in the 2009 EA, and clearly the CNSC should have demanded a new EA at that time.

   I would like to remind the CNSC that the EA from 2009 was written before the Fukushima catastrophe of 2011. The spectacular loss of coolant and subsequent meltdown at Fukushima was a direct result of an unforeseen sequence of events beginning with an earthquake and tsunami. The ensuing loss of coolant, build up of hydrogen, fire and explosion caused a massive release of radionuclides, and the consequences continue to this day and will continue far into the future due to the longevity of the radionuclides, some of which have half lives measured in millions of years. Despite the immediate known cause – an earthquake and tsunami - the Commission of

Investigation of Japan eventually concluded that the disaster was in fact ultimately human-made, and the regulatory bodies governing nuclear safety were at fault, with sloppy and inadequate safety measures taken, on the assumption that such a catastrophic series of events was “unlikely”.

Lessons to be learned by the CNSC from the tragic events at Fukushima should be first and foremost in the minds of Commissioners - that extremely unlikely unforeseen events do occur, and the potentially catastrophic consequences must be addressed and not just dismissed as “unlikely”. There is peril in pushing through nuclear projects without the due diligence that Canadians deserve. Not only are Canadians paying huge amounts of tax dollars for these projects, but they are, in the case of the BWRX-300 reactor, guinea pigs regarding the ultimate safety and risks involved, because this reactor at the DNNP is first of its kind. Any unforeseen problems will be tested there, with potentially extremely serious consequences for people living locally and downwind and downstream from this site. These people deserve the most detailed and scrutinized analysis of the risks of this project as is possible.

2) **Novel design and safety** - The BWRX-300 is the most recent in a decades-long attempt by the nuclear industry to build a “small” “modular” nuclear reactor (shortened to SMR, though these are not small, and the first of its kind of anything is never modular). It does not exist yet anywhere in the world, nor does a single functioning SMR, all of which have failed since their inception in the 1950s. Thus, the BMRX-300 is an experiment. It is not Canadian and is of a completely different design which is not at all comparable to CANDU reactors. The CNSC is only familiar with CANDUs, and for these reasons the CNSC should conduct an independent critique by experts on these novel reactors. These experts should be, importantly, completely free of industry bias.

During the October hearings it was clear that the design of this reactor is not yet complete, with concerning safety issues such as questions about emergency safety shut-off systems that remain unanswered, about which

the public and the CNSC should be very concerned. There were many examples of missing information in the OPG's application document because the design is incomplete. The CNSC's response was not to challenge OPG to provide a complete design for their reactor, but a proposal to halt construction at different points until OPG came up with sufficient information each time to allow continuation. Surely it would make more sense, cost far less money, and be far safer for Canadians for the CNSC to insist that OPG present the complete design, and answer key safety questions before granting a 10 year licence to construct. How can it possibly consider a licence before OPG describes in detail the complete design of the proposed reactor, especially when it is first of a kind worldwide?

The CNSC must recognize the need for extremely detailed scrutiny of the health and safety implications of this reactor, with a very high bar for acceptability and safety. It is the role of the CNSC to analyze with the utmost thoroughness the safety features, potential for any type of leak or accident, large or small, and to err on the side of caution. For this reason the CNSC should not grant a licence to construct.

3) **Siting** - It is unfathomable that anyone, let alone our nuclear safety regulator, would even consider that locating an experimental reactor in the middle of the exclusion zone of 4 operating reactors, could possibly be considered safe. In addition to the danger presented by multiple reactors within a short distance of each other (one of which is an experimental reactor, partly underground, that has never been built anywhere in the world), there is highly radioactive spent fuel in dry storage within metres of the proposed new reactor. That Canada would even contemplate approving this, in the most populated region of the country and on the banks of the largest source of fresh water in the world that provides drinking water for 40 million people, is incomprehensible.

   Nevertheless, the CNSC granted OPG the licence to prepare the site after previous hearings. Now is the opportunity for the CNSC to examine all aspects of this novel reactor and demand that OPG present, in detail, the

completed design, with attention to all safety issues that were brought forward by the CNSC, and remain unanswered, in the Oct. 2, 2024 hearings.

4) **Plan to deal with high-level nuclear waste from SMRs** - SMRs produce a variety of radioactive waste products that will require different types of short- and long-term management than the waste from CANDU reactors due to their more difficult to manage properties. The Deep Geological Repository planned for Ontario is not designed for SMR waste, so waste from these theoretical reactors will have to be managed differently. A recently published scientific study done at Stanford University concluded that proposed SMR designs would actually increase the amount of nuclear waste produced by a factor between 2 and 30 times more than the existing types of nuclear reactors (Nuclear Waste from Small Modular Reactors. Krall L.M., MacFarlane A.M. and R.C. Ewing. Proceedings of the National Academy of Sciences. 2022 Vol. 119 No. 23 e2111833119).

   The fuel rods from the BWXT-300 are bigger than those of the CANDU reactors and the spent fuel upon discharge from the reactor is hotter and more radioactive than the waste from CANDUs. Special containers and detailed plans for this novel waste must be researched and developed, and the cost of this should be included in the financial projections. No reactor should be approved until a firm plan for its waste is presented in detail. Clearly there is and has never been a solid plan for any type nuclear waste since its inception in the 1940s, and the BWXR-300 is no exception.

   Absurdly, the OPG claims that they are not required to address radioactive waste at the License to Construct stage because they will not be generating any nuclear waste during construction. According to the CNSC's own rules (p. 49, REGDOC-1.1.2, Licence Application Guide: Licence to Construct a Reactor Facility) the OPG must provide a plan addressing nuclear waste. The CNSC should deny a licence until OPG can clearly describe a plan for safe perpetual storage of its novel SMR waste streams.

5) **Decommissioning** – On page 143 (out of 1126 pages) of the OPG's Application for a Licence to Construct a BWRX-300 reactor at the Darlington New Nuclear Project Site (DNNP), CMD 24-H2, dated Oct. 2, 2024 it says "The submission of an 'end of life' PDP (*Preliminary Decommissioning Plan)* is not required for an application for a licence to construct; however, will be required for any subsequent licensing phase, should the project proceed." It does not make sense and is unacceptable that a licence to construct a reactor of a completely unique design could be granted without requiring a detailed decommissioning plan, especially for a reactor built right next to the Great Lakes. In addition, I could not find in any of the myriad of documents on the CNSC website, nor in the documents related to the Jan. 8, 2025 hearings, in zip files, some over 1000 pages long, the actual PDP that OPG presented to the CNSC and they approved in Nov. 2021. The BWRX-300 is unique in that it extends 38 metres underground, which would be a decommissioning challenge never experienced by OPG or the CNSC. Before licensing, the CNSC and OPG should provide a detailed plan for decommissioning such a novel reactor type and this should be easily accessible to the public who is commenting on the licence to construct this reactor.

Conclusion

The CNSC is widely regarded in many circles as a mouthpiece of the nuclear industry. If the CNSC wants to show Canadians that lessons were learned from Fukushima, and if it wants to earn the confidence of Canadians and counter the distrust that many Canadians have in it, it should refuse to grant a licence to OPG for the construction of the BWRX-300 reactor until certain criteria are met.

The CNSC should demand from OPG, in the least, a complete design description of the BWRX-300 reactor. It should also require detailed answers to all questions posed at the Oct. 2, 2024 hearings, especially those relating to safety. It should not grant a licence to construct and then plan on instituting "holds" while OPG scrambles to come up with answers to questions that should be answered now.

The CNSC should demand a comprehensive report from OPG on decommissioning plans. It should insist that OPG provide full details of their plan for dealing with

the novel SMR spent fuel. The cost to research, develop and build facilities for this should be included now in the financial projection for this project.

Until all these criteria are addressed the CNSC should not grant a licence to construct the BWRX-300 reactor at the Darlington site.