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Written submission from Cathy Vakil

Mémoire de Cathy Vakil

In the Matter of the

À l'égard d'

Ontario Power Generation Inc.

Ontario Power Generation Inc.

Applicability of the Darlington New Nuclear Project environmental assessment and plant parameter envelope to selected reactor technology

Applicabilité de l'évaluation environnementale et de l'enveloppe des paramètres de la centrale à la technologie de réacteur sélectionnée pour le projet de nouvelle centrale nucléaire de Darlington

Commission Public Hearing

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Canada

Written intervention to Canadian Nuclear Safety Commission (CNSC) regarding the requirement for an Environmental Assessment (EA) for the Darlington New Nuclear Project (DNNP) for four experimental boiling water reactors (BWRX-300)

Nov. 20, 2023

Dear Commissioners,

The purpose of this submission is to describe how the BWRX-300 is fundamentally different from the four pressurized water reactors that were assessed in the 2011 EA by the Joint Review Panel (JRP) and that therefore, by the Joint Review Panel's own recommendations, a new EA is required.

Ontario Power Generation (OPG) has concluded in their submission (CMD 24-H2.1) to the CNSC that a new EA is not required for the building of four BWRX-300 reactors on the site of the present Darlington CANDU reactors to replace the EA from 2009, claiming that the BWRX-300 reactor is not fundamentally different from the four pressurized water reactor designs for which that EA was created, which OPG claims obviates the need for a new updated EA.

Firstly I would like to make two crucial points.

1) 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 far into the future. 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) 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. The CNSC must recognize the need for extremely detailed scrutiny of the siting and health and safety implications of this reactor, with a very high bar for acceptability and very low threshold for proof of safety. It is the role of the CNSC to analyze with the utmost thoroughness the need for a new EA and to err on the side of caution. In other words, if there is any doubt whatsoever that the BWRX-300 is not fundamentally different than the four pressurized water reactors for which the EA was done in 2009 (pre-Fukushima), then the CNSC must demand a new EA.

Now I will describe the reasons that the BWRX-300 is fundamentally different from the pressurized water reactors to which the 2009 EA applies.

1) The PPE of 2009 used by the Joint Review Panel described 198 parameters that must now be applied to the BWRX-300. On page 13 of the OPG document (CMD 24-H2.1), it says that 60 of the 198 parameters do not apply to the BWRX-300 due to design differences, and 8 are outside the previous PPE. This illustrates that the BWRX-300 does not fit the pattern of the reactors that were previously considered by the JRP, and therefore the previous EA is not valid, and a new EA should be implemented.

2) Clearly the BWRX-300 is a very different design than the previously considered reactors as part of it is above ground and part of it is 38 metres underground. This has many implications that do not apply to reactors that are completely above ground such as the pressurized water reactors previously considered. Because this design feature is unprecedented, the unknown risks that it introduces indicate the need for a new EA. Some of these are:

- The fact that it may fill with water despite the "waterproof" foundation. Assumptions that this waterproofing will not fail would reflect an unlearned lesson from Fukushima. What would the hydrostatic pressure be on the walls? How reliable is the pumping capacity should it fill with water and how reliable is the backup electricity? How would a flood affect the functioning of the reactor? Will there be neutron leakage into the adjacent water and soil, posing a health risk to local people and those who drink Lake Ontario water, locally and downstream?

- A detailed description of effects on soil, rock, stormwater, air quality, blasting and other consequences of building a nuclear reactor 38 metres below ground level should be part of a new EA.

- The BWRX-300 is shorter above ground than the reactors for which the PPE was designed. It releases more radioactive gases than pressurized water reactors. Noble gases are heavier than air so there would be more exposure

at ground level to these gases than in a taller reactor. Is this addressed by OPG? This should prompt a new updated EA.

- What are the consequences of a loss of coolant, pressure build up and meltdown, in a reactor that is underground, near operating reactors and dry storage of spent fuel rods, and right next to Lake Ontario? This needs to be addressed in detail in a new EA.

3) The BWRX-300 spent fuel is much more radioactive (7 times the radioactivity) than CANDU fuel, creates more heat and is more prone to accidental criticality because it uses enriched uranium. The fuel rods are 9 times longer and 10 times heavier and will require new stronger heavier containers, affecting cost, transportation and eventual storage issues. (Of course, the low and intermediate level waste generated by ongoing operation and decommissioning should also be considered). There is still no long-term disposal or storage solution for the waste we already have (hence the 30 years' worth of spent fuel in dry storage within the exclusion zone), so this new high level radioactive waste from the BWRX-300, as well as its low and intermediate waste, present unprecedented issues. All of this represents a fundamental difference between the BWRX-300 and previous reactors designs, rendering the previous EA invalid.

4) There is no secondary coolant system in the BWRX-300 reactor, unlike the pressurized water reactors, which is a fundamental difference in design. This should prompt a new EA, according to the JRP's recommendations.

I must add here that 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.

It is the role of the CNSC to ensure the health and safety of Canadians. It is very clear from the points made above that the BWRX-300 is fundamentally different than the pressurized water reactors for which the PPE and EA were created, and according to the JRP, the EA from 2009 is not valid for this new reactor design and a new EA should be conducted.

The CNSC is widely regarded in some 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 demand, in the least, a new independently conducted EA for the BWTX-300 reactor.

Cathy Vakil MD