



**Supplementary Information
Oral Presentation**

**Renseignements supplémentaires
Exposé oral**

**Revised written submission from the
Canadian Association of
Physicians for the Environment**

**Mémoire révisé de
l'Association Canadienne des
Médecins pour l'Environnement**

In the Matter of the

À l'égard de

**BWXT Nuclear Energy Canada Inc.,
Toronto and Peterborough Facilities**

**BWXT Nuclear Energy Canada Inc.,
installations de Toronto et Peterborough**

Application for the renewal of the licence for
Toronto and Peterborough facilities

Demande de renouvellement du permis pour les
installations de Toronto et Peterborough

Commission Public Hearing

Audience publique de la Commission

March 2 to 6, 2020

Du 2 au 6 mars 2020

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CNSC hearings March 4-5, 2020

Subject – BWXT Nuclear Energy Canada Inc. Application to renew licence for the Toronto and Peterborough Facilities.

Thank you for the opportunity to participate in these hearings.

I am a family physician in Kingston, Ontario, and Assistant Professor in the Department of Family Medicine at Queen’s University. I am also a board member of the Canadian Association of Physicians for the Environment (CAPE) and I am their specialist in the area of nuclear energy and health. I would like to express concerns about the recommendation of the Canadian Nuclear Safety Commission (CNSC) staff to recommend extension of the licence of BWXT Nuclear Energy Canada Inc. for ten more years for their nuclear facilities in Toronto and Peterborough, as well as their decision to include uranium pellet production at the Peterborough site. I have not received any funding for my participation in these hearings.

My presentation today will centre on four issues:

- 1) the health effects of beryllium and uranium on children
- 2) the lack of appropriate monitoring of beryllium in the Peterborough neighbourhood surrounding the BWXT facility, and of uranium in the neighbourhood surrounding the BWXT facility in Toronto
- 3) the CNSC staff recommendation for the CNSC to approve the ten-year re-licencing of BWXT in Toronto and in Peterborough, with the addition of processing uranium pelleting in Peterborough, despite the obvious lack of appropriate monitoring at both sites
- 4) that ten years is too long for BWXT to continue operations without any public oversight or involvement

The Peterborough Public Health Unit claims that uranium is “relatively safe” and that it is not a carcinogen. Uranium is an alpha emitter and all alpha emitters are

carcinogens. Therefore uranium is a Group 1 carcinogen, according to the IARC (International Agency for Research on Cancer, World Health Organization, Monograph 2012). Various world radiation organizations have not listed it as a carcinogen because of the lack of epidemiological studies showing clear causal relationships with cancer. Most of these studies look at cancer rates of uranium miners and millers, some finding increases in some types of cancer, some not. There are serious methodological issues in some of these studies making it difficult to show up increases in illnesses, some of which are:

- 1) small numbers, so the studies are not powered enough to show statistically significant increases in rare illnesses
- 2) uranium workers are exposed to other toxins other than uranium, making any increase in illness impossible to attribute to the uranium exposure alone
- 3) many of the workers smoke or have other risk factors, confounding the results
- 4) exposure is impossible to measure
- 5) the latency of some cancers is long, causing loss to follow-up and under-estimation of disease
- 6) the “healthy worker effect”, which reduces the ability to show an increase in illness rates

A lack of relationship between uranium exposure and disease does not mean that uranium is safe. This is just a result of the difficulty in studying it. Also, studies that show non-significant increases in illness should not be dismissed as negative studies. Most importantly, there are no studies on the health effects of uranium in children.

Uranium also has toxic effects as a heavy metal, most importantly deleterious effects on the kidney. These effects again have not been studied in children.

Beryllium is also of concern regarding children’s exposure to BWXT’s emissions in Peterborough. Like uranium, it has not been studied in children. Chronic exposure, which is usually occupational, causes Chronic Beryllium Disease (CBD), a serious disabling lung disease that requires ongoing medical treatment, is often fatal and can declare itself many decades after exposure ceases. Beryllium is also toxic to the kidneys, liver, heart and nervous system, and is a Group 1 carcinogen

according to the IARC. Community-acquired CBD has been described in some studies, in residents living within five miles of a beryllium facility, and in family members of workers at beryllium facilities. This is important when considering the presence of a beryllium facility such as BWXT in the middle of a neighbourhood as is the case in Peterborough.

I will now address my concerns:

1) The health effects of beryllium and uranium on children

There are no studies on the health effects of uranium or beryllium or a combination of exposure to uranium and beryllium, in children. We cannot assume that children are at the same risk as adult males (in whom almost all the studies are done) due to physiological and behavioural differences. With all other toxic exposures children are more sensitive than adults (ie. there is more harm to children at the same dose per kilogram of body weight than to adults). In the case of radioactivity, it is known that children are far more radiosensitive than adults, and that females are as much as twice as radiosensitive as males. It is also known that embryos and fetuses are exquisitely sensitive to radiation, causing diseases including childhood leukemia. Some of these diseases are incompatible with life, and manifest as early miscarriage, and are therefore unacknowledged and unmeasured. Our understanding of all of this is incomplete, making it all the more important to be extremely cautious about children's toxic and radionuclide exposures, and to not make assumptions about safety just because there is an absence of "proof" of harm.

2) The lack of appropriate monitoring of beryllium in the Peterborough neighbourhood surrounding the BWXT facility, and of uranium in the neighbourhood surrounding the BWXT facility in Toronto

BWXT does not measure beryllium levels in the soil in the surrounding neighbourhood in Peterborough. The only levels taken in the past five years are a few measurements done by the Independent Environmental Monitoring Program (IEMP) by the CNSC in 2014, 2018 and 2019. Though the levels measured have

been under the action level, some of the measurements show a concerning increase in soil concentration, particularly the measurement in the Price of Wales Public School (POWPS) schoolyard. Levels increased from 1.0 mg/kg dry weight to 2.34 mg/kg dry weight between 2014 and 2019, representing more than doubling of the concentration. If this trend were to continue, levels would be over the “safe” limit in a few years, making ongoing monitoring extremely important. Importantly, the CNSC staff, who conducted the monitoring, did not feel it necessary to address this increase in soil levels and has recommended approval of the re-licencing despite these unexplained and unacceptable increases from their own monitoring program.

Uranium levels are measured at the BWXT plant in Toronto, and in the neighbourhood surrounding it. According to BWXT’s Annual Compliance Monitoring Reports, in Toronto soil levels are measured annually, in “locations ie. residential”, but the reports do not identify where these are or how many are measured at actual residences and schools nearby. This is of concern, as there was a total of only 14 of these measurements done, once annually, in locations that are not identified. It is very possible that this method of measurement could miss a large reading somewhere in the residential area which could cause an increase in health risk to local residents.

The report shows that a total of 46.2 grams of uranium was emitted into the air from 2014 to 2018. This represent an extremely large number of uranium atoms, all of which are alpha emitters. Even one DNA breakage from an alpha particle emitted by a uranium atom in the lung can precipitate cancer. The legal mandate of the CNSC is to protect human health first and foremost. One of the basic principles of radiation protection is that all unnecessary exposures to ionizing radiation should be eliminated unless there is clear justification. The residents surrounding the BWXT facilities in Toronto and Peterborough are being forced to accept increased health risks, with no benefit to them at all, which clearly contradicts basic principles of radiation protection.

- 3) The CNSC staff has recommended approval of the relicensing of BWXT in Toronto and in Peterborough, with the addition of processing uranium

pelleting in Peterborough, despite the lack of appropriate monitoring, especially with respect to POWPS

Despite the above described flaws and gaps in monitoring and safety, the CNSC staff has recommended that the CNSC approve the ten-year licence renewal for BWXT at both sites, as well as the addition of the uranium pelleting process in Peterborough. As I have described above, there is a lack of appropriate monitoring of these toxins in both Toronto and Peterborough neighbourhoods surrounding the BWXT facilities, especially with respect to children playing and going to school nearby. CNSC staff should not be recommending approval in these circumstances.

- 4) Ten years is too long for BWXT to continue operations without any public oversight or involvement

Clearly the public needs and deserves to have input into BWXT activities and monitoring on an ongoing basis. A ten-year licence would mean that there would be no public participation for ten years in decisions that involve their own health.

Recommendations:

The CNSC should deny BWXT a licence until it presents a reasonable plan for regular frequent monitoring of beryllium soil levels in the neighbourhood surrounding the facility at the Peterborough site, especially on POWPS grounds.

The CNSC should deny BWXT a licence at the Peterborough site until it presents an explanation for the increased soil levels of beryllium on POWPS playground found by the CNSC IEMP, and reveals a plan to remediate the cause of this increase in soil levels.

The CNSC should deny BWXT a licence until it presents a reasonable plan for regular frequent monitoring of uranium in the neighbourhood surrounding the facility at the Toronto site, especially at playgrounds and schools in the vicinity, and similarly at the Peterborough site, if uranium pelleting should occur there.

The CNSC should require their staff to only recommend approval of licences for nuclear facilities that show appropriate monitoring of any emissions that could potentially increase health risks to the public. Decisions about licencing should be made keeping in mind the legal mandate of the CNSC, which is to protect human health first and foremost, and that one of the basic principles of radiation protection is that all unnecessary exposures to ionizing radiation should be eliminated unless there is clear justification.

The CNSC should consider moving all nuclear operations including uranium pelleting and fuel bundle assembly to sites far away from where people live, similar to what is done in other countries, instead of in the middle of cities close to residential neighbourhoods and schools.

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