



**Supplementary Information
Oral Presentation**

**Renseignements supplémentaires
Exposé oral**

**Presentation from
Adam Prinsen, Laura Anderson,
Wei Wei Han and Brenna Steeles**

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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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laissée en blanc*

Presentation on behalf of:

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Can inhaled uranium cause lung cancer?

Pulmonary adenomas and adenocarcinomas were found in Beagle dogs after they were intentionally exposed to inhaled uranium. The incidence of tumors was 50-100 times higher than the expected rate of spontaneous tumors. (2)

Rats exposed to uranium ore dust had significantly higher rates of malignant and non-malignant lung tumors. (2)

“We aimed to quantify dose-response relationships between lung dose from alpha-emitters and lung cancer in nuclear workers”

“We found strong evidence for associations between low doses from alpha emitters and lung cancer risk. Risk estimates were similar to those estimated previously in uranium miners exposed to radon and its progeny”

“We found strong evidence that internal exposure to alpha-emitters in the lung increases lung cancer risk even at the low doses experienced by nuclear workers.” (13)

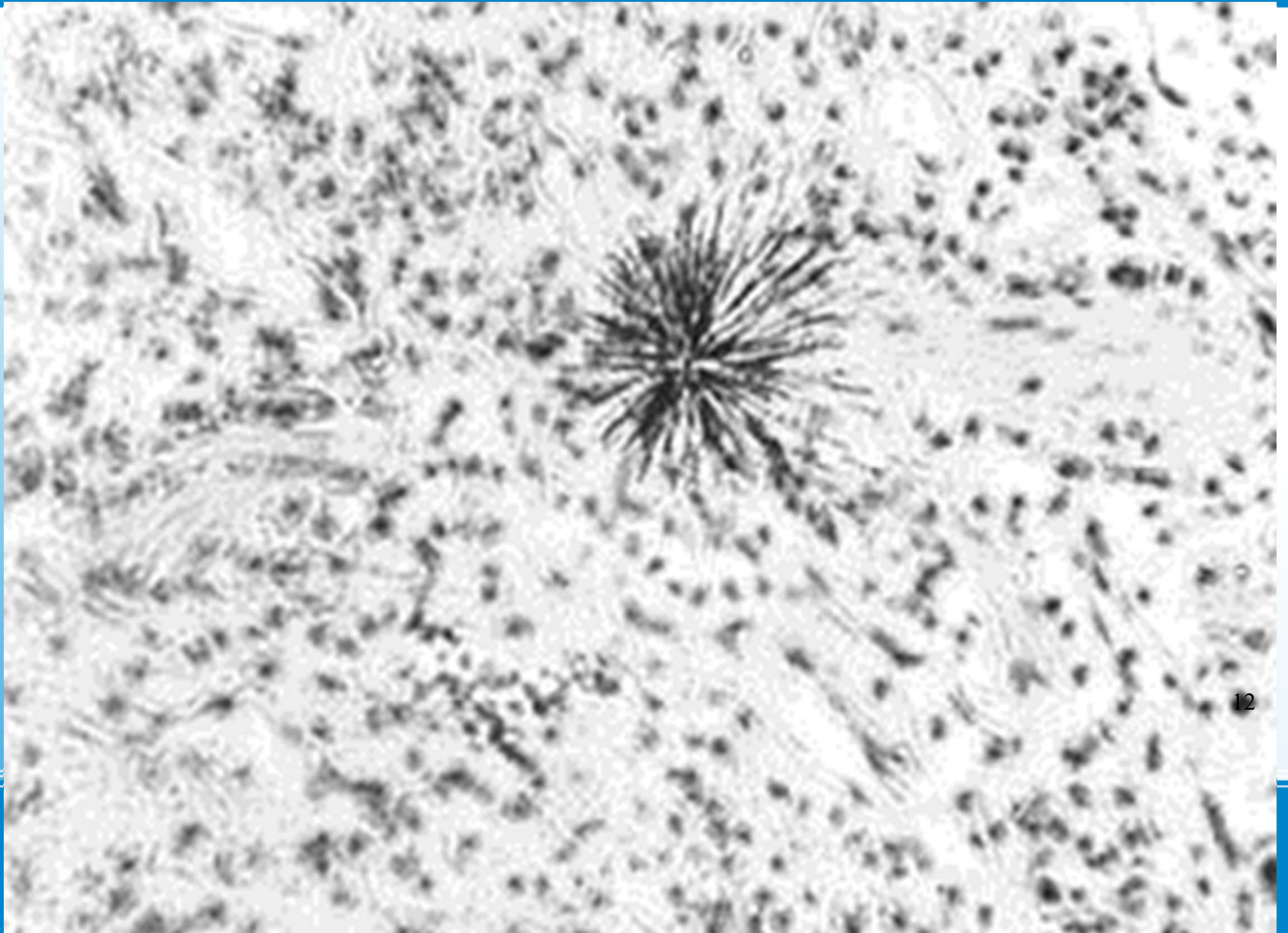
“Carcinogenic risks of internal exposures to alpha-emitters (except radon) are poorly understood. Since exposure to alpha particles—particularly through inhalation—occurs in a range of settings, understanding consequent risks is a public health priority.” (13)

So can inhaled uranium cause lung cancer?

YES we have evidence that it can.

- All** radionuclides that emit α -particles and that have been adequately studied, including radon-222 and its decay products, have been shown to cause cancer in humans and in experimental animals.
- α -Particles emitted by radionuclides, **irrespective** of their source, have been shown to cause chromosomal aberrations in circulating lymphocytes and gene mutations in humans in vivo. The evidence from studies in humans and experimental animals suggests that similar doses to the same tissues — for example lung cells or bone surfaces — from α -particles emitted during the decay of different radionuclides produce the same types of non-neoplastic effects and cancers”

Uranium is an alpha emitting radionuclide. Uranium dioxide particles are insoluble and can remain in the lungs for years after they are inhaled.



An average sized, inhaled, 2.5 micron fragment of uranium delivers 340 REM of radiation per year to the tissue surrounding it. Using the International Commission on Radiation Protection standard RBE factor of 20 for Alpha particles, one 2.5 micron diameter uranium oxide fragment inhaled into the body emits 68 times the permitted annual dose for radiation workers and a dose 200 times higher than the legal dose limit for the Canadian population (19).

Alpha radiation and its effects on localized areas of lung tissue is not being accounted for in BWXT's risk assessments.

“Health Canada’s method of calculating radiation dose is to average the radiation over the body weight of the town’s residents. Health Canada’s method ignores ionization effects and the energy transfer at the organ tissue and cellular level.”

“The potential for adverse health effects related to releases of radionuclides is directly related to the population density near the mine or processing facility.” (10)

“There has been insufficient analysis of Port Hope’s unusual patterns of coronary disease and cancers and their possible association with the daily emissions and chronic internal exposure to insoluble radiogenic toxins into the town’s breathing zone.”

**Do CNSC decisions and “safe levels”
determined by the CNSC protect the
public?**

Accidents?

Hydrogen tank plus 700,000kg of uranium?

Next to an elementary school?

Insurance?

Don't most countries put these facilities at a distance from residential areas and children?

Summary:

Alpha radiation in individuals has not been accounted for.

Accidents would be devastating in the city.

Children are playing nearby and are more radiologically sensitive.

We don't feel confident that you are making safe decisions

Please deny BWXT this pelleting license