

# “Alpha particle” Uranium Contamination in Port Hope, Ontario

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Region: [Canada](#)

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*Port Hope, Ontario, 100 km from Toronto*

The following text pertaining to “alpha particle” ionizing radiation in Port Hope, Ontario was submitted by the Uranium Medical Research Center to Canada’s Minister of Health

Uranium Medical Research Centre  
March 1, 2008

Hon. Tony Clement  
Minister of Health  
Government of Canada

House of Commons  
Ottawa, Ontario, K1A 0A6

Topic: Uranium contamination, Port Hope, Ontario

Dear Mr. Clement:

November 13, 2007, Uranium Medical Research Centre, Inc released laboratory results of assays of uranium measured in the 24-hour urine specimens of nine (9) representative residents and former nuclear workers in Port Hope, Ontario [1].

The Port Hope findings were peer reviewed at the European Association of Nuclear Medicine’s Annual Congress, August 2007 [2]. The lab study was conducted at a world leading radioisotope laboratory, Institute of Petrology and Geochemistry, Johannes Goethe University of Frankfurt, Germany [3].

The urine analysis of the nine Port Hope residents and former nuclear workers revealed all study subjects’ bodies to be contaminated by unnatural species of uranium. Neither Health Canada, nor the other responsible monitoring and regulating agencies (Canadian Nuclear

Safety Commission, Natural Resources Canada, Ontario Public Health, and the Provincial or Federal Departments of Environment) list these uranium species as present in Port Hope. Nor do they identify them as potential contaminants to the residents and workers there. We can find no environmental, biological or radiological study identifying these species of uranium in any jurisdiction in Canada [4].

### **What the Port Hope radiobiology study found**

- Three former nuclear workers' urines contain the artificial uranium isotope,  $^{236}\text{U}$ . This isotope of uranium is a manmade component of recycled nuclear reactor, spent fuel. For example, measurable quantities of  $^{236}\text{U}$  were found in the urine of one worker 23 years since industry exposure.
- One worker's urine contains Depleted Uranium (DU), the "tails" of the uranium enrichment process. Canada does not enrich uranium although the record shows the Defense Research Establishment (DRE-DND), the Royal Military College (DND) and Cameco have imported DU for US/NATO weapons R&D and to produce components for US anti-amour DU munitions, respectively [5].
- All nine subject's (i.e. former workers, both male and female adults, and one child) urines contain elevated abundances of the uranium isotope,  $^{234}\text{U}$ . Elevated  $^{234}\text{U}$  is a forensic signature of "down-blended" or recycled, enriched uranium [7]. Dirty uranium is not identified in Natural Resources Canada's (NRCan) public documents associated with radioactive waste in Port Hope nor is it mentioned in CNSC's regulatory documents. Neither are there references to it in the NRCan/AECL Port Hope Environmental Assessments (EA) or the Municipality's Peer Review reports [8]. This constitutes serious omissions in the licensing reviews, the dose modeling, the EA's and the Peer Reviews.
- The findings demonstrate that emissions from the nuclear plants contain isotopes that are different in chemistry, form, radioactivity and biological effects than the species of uranium licensed for import and processing by Cameco and Zircotec.
- The contaminants found are substantially different from the species of uranium Health Canada and CNSC base the calculations of the allowable radiation doses in Port Hope. For example, the elevated uranium isotope  $^{234}\text{U}$  is 18,500 times more radioactive than primary isotope processed in Port Hope,  $^{238}\text{U}$  [9].

UMRC's laboratory mass spectrometry findings have been acknowledged in public forums by Cameco, Health Canada and the Canadian Nuclear Safety Commission. None have denied the accuracy of the laboratory results. At CNSC's Public Hearing, January 9, 2008, in Oshawa, Ontario, and at a Cameco public meeting in February 2008, Port Hope, CNSC staff and Cameco's Andrew Oliver, Vice President, Fuel Services Division, acknowledged the materials UMRC found in the biological samples have been processed in Port Hope [10].

### **Health Canada states an unambiguous falsehood to the people of Port Hope and Members of Parliament**

Upon request from the Port Hope Town Council and members of Parliament for a reaction,

Jack Cornett (Director, Radiation Protection Branch, Health Canada) made statements dismissing the medical significance of the Port Hope findings. By doing so, Jack Cornett and Health Canada stated an unambiguous medical and scientific falsehood. His December 20, 2007 statement to the Port Hope Town Council and local press claims the industrial commercial uranium contaminants found by UMRC in the bodies of Port Hope's former nuclear workers and residents are "typical for Canadians" [11].

On January 21, 2008, correspondence under the Minister of Health's letter to the Mayor of Port Hope, repeats the same falsehood: "all the [uranium] levels are low and typical of the range in normal background values in individual Canadians"; and, "regardless of whether the uranium was natural or included artificial materials", the "highest reported uranium value ... is only a fraction of the public dose limit [12]."

Director Cornett also misinformed the Municipality of Port Hope in writing by stating Health Canada contacted UMRC for detailed study information. No such contact was received. At the CNSC January 9, 2008 hearing, Chris Clement, Director of Radiation Protection Division, admitted to anonymously co-authoring with Jack Cornett, Health Canada's December 20, 2007 statement to the Port Hope Town Council and local press.

### **Health Canada, CNSC and Dr Finkelstein are in error**

Your department, in cooperation with the CNSC, and recently joined by Port Hope's "peer reviewer", Dr. Murray Finkelstein, an Occupational Health consultant with the Ontario Ministry of Labour, proclaim a position which is scientifically and medically insupportable: you are on public record as telling Port Hope and members of Parliament the contaminants found in the bodies of the nine Port Hope subjects are not a health concern.

Dr Finkelstein's critique is based on his stated conclusion that the contaminants UMRC found in the lab are "soluble" uranium [13]. From this point forward, Dr Finkelstein's analysis is incorrect as he erroneously categorized the contaminants' physical-chemical form, its metabolic pathway through the body and likens the contamination to exposure to natural uranium. By misunderstanding the solubility class, Dr Finkelstein then bases his critique on inaccurate biological and radiological assumptions; discussing an entirely different form of uranium with a different biological half-life (i.e. residency time in the body) than the contaminants UMRC found in the bodies of the Port Hope subjects. A revealing point is Dr. Finkelstein's misuse of the word "species" to refer to "isotopes" of uranium, indicating he is not familiar with the basic vocabulary of radiation physics and uranium chemistry.

Health Canada, like Dr Finkelstein, also misunderstands the species (i.e. the physical-chemical form) of the contaminant found in Port Hope. This is revealed by Health Canada's statements about radiation dose. Apparently the Health Canada staff (Director Cornett) have led you, the Minister, to believe radiation dose can be calculated from the quantity of the uranium in the urine. This is a fundamental error.

Insoluble uranium, inhaled and incorporated into the body's tissues, bones and organs, takes years to decades to be released from tissues and is never fully cleared from the body. The quantities of the industrial contaminants measured in the Port Hope subjects are "tracers" of the presence of insoluble uranium; revealing much larger quantities of these materials remaining in the study subjects' bodies [14]. The study information released publicly by UMRC did not contain the information needed by Health Canada to calculate the

study subjects' radiation doses. Health Canada's statements about the doses cannot therefore be based on correct dose reconstruction methods [15].

Health Canada's statements to the Port Hope Council, the press and members of Parliament reveal the department does not understand the findings and their significance. Health Canada's conclusion that the Port Hope contaminants are typical, the dose is below the public dose limit, and that the findings are not medically significant is erroneous and irresponsible. You have ignored important radiological data about human contamination in Port Hope for which the only responsible position would be to undertake further study.

### **200 times the legal dose for civilians**

Uranium is an "alpha particle" emitter. Alpha particles are the heaviest and most damaging of all forms of ionizing radiation. Uranium's radiation is 20 times more damaging (i.e. an RBE - "relative biological effectiveness" - of 20) than Gamma radiation [16]. Gamma is the only type of radiation monitored by Health Canada or any agency, in Port Hope. Alpha radiation, its public uptake and the human internal deposition of Alpha emitters is not monitored in Port Hope. 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.

Alpha radiation damages cellular function and can mutate the genetic code of the DNA. Alpha radiation damages the most vital of all repair and tissue building cells, the Stem cells [17]; and, it damages vital organ tissues in the heart, lungs, liver, lymphatic system, the kidneys and the central nervous system, all at a sub-microscopic scale. Alpha radiation is classified by the United Nation's International Agency for Research in Cancer, as a Group I, Carcinogenic to Humans compound [18].

When inhaled the microscopic fragments of uranium become deposited in internal organs and bones. Uranium is chemically referred to as a "bone seeker" for the reason that it has an affinity for bone tissue. The alpha radiation particles emitted by uranium travel very short distances and affect very small and discrete volumes of tissue. Each time a uranium atom decays, it delivers up to 4.9 MeV (million electron volts) of energy to surrounding cells and tissues.

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].

The life cycle of the species of contaminants UMRC identified in Port Hope bodies is years to decades. That means that the daily inhalational uptake of industrial fall-out of the most dangerous species of uranium in Port Hope accumulates in bodies faster than it can be eliminated. Health Canada's method of evaluating risks of the Alpha radiation does not account for this life cycle. 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.

UMRC rejects Health Canada's conclusions. Health Canada and the nuclear regulator, CNSC,

demonstrate they do not understand the findings and the implications for Port Hope. If Health Canada understood the Port Hope results, it would be seeking more information, not dismissing what they reveal: chronic internal contamination; and, Health Canada would be praising the study as a significant scientific and medical accomplishment: measuring contamination by industrial radiotoxins at femtogram quantities (i.e. parts per quadrillion), decades after exposure.

UMRC welcomes any opportunity to bring its experts to face Health Canada's, CNSC's and the Port Hope peer review team's experts. UMRC is confident a repeat of the Port Hope study (using the same parameters and an equivalent class of lab) will reveal exactly the same pattern of contamination on the same or a new study group. We encourage the Minister of Health to implement his Director of Radiation Protection, Jack Cornett's statement to the Municipality of Port Hope that there is a need to independently repeat the research.

Sincerely:

*Original signed by T Weyman*

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Cc Linda Thompson, Mayor, Municipality of Port Hope, Ontario

Michael Binder, President, Canada Nuclear Safety Commission

Hon Gary Lunn, Minister of Natural Resources Canada

For information: Hon. Sheila Frazer, Auditor General of Canada

## **NOTES**

1. Results of the Port Hope Biological Study Project Announced, 11/14/2007. [www.UMRC.net](http://www.UMRC.net)
2. The Quantitative Analysis of Uranium Isotopes in the Population of Port Hope, Ontario, Canada, A. Durakovic, A. Gerdes, I. Zimmerman<sup>1</sup>; Uranium Medical Research Centre, Toronto, On, Canada, and the Institute for Mineralogy, JW Goethe University, Frankfurt, Germany.

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- The total uranium (i.e. concentrations) in the study subjects varied; from within the range of the average of the study's Controls up to 2.2 times (220%) higher for a 14 year old boy and 6.5 times (650%) for a former nuclear worker who has not been directly exposed to a processing facility for 11 years.
- The profiles of the contaminants indicate that "dirty uranium" is being processed in Port Hope. Dirty uranium is characteristic of the recycled materials in the United States stockpiles [

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Prepared for: The Municipality of Port Hope; Hardy Stevenson and Associates Limited, 364 Davenport Road, Toronto, Ontario, M5R 1K6

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