

# Low-level radioactive waste

The following is part six of an eight part written debate regarding nuclear power generation  
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## The Debaters

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  - Former Chair, [Canadian Nuclear Society](#) Environment and Waste Management Division
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**Pat McNamara** has been an anti-nuclear activist since he discovered the elementary school his daughters attended was built on radioactive waste, with radon levels 125 higher than the allowable limit. He is currently finishing his second book on nuclear regulatory corruption and the incestuous relationship between the nuclear industry and the Canadian Nuclear Safety Commission. He resides in Weberville.

## Michael Stephens opening statement

Activities using nuclear substances generate radioactive by-products. Most of these are much less radioactive than used reactor fuel, and are called low-level wastes, or intermediate-level wastes (ILW) if they contain more radioactivity. The federal Low-Level Radioactive Waste Management Office periodically publishes an [inventory](#) of all the current and projected future radioactive waste in Canada.

LLW and ILW consist of workers' used protective plastic suits and gloves, cleaning mops and rags, filters from reactor ventilation systems, ion exchange resins used to clean the water in used fuel storage bays, surplus reactor equipment, oil from reactor coolant pumps, used laboratory and processing equipment, building demolition waste, soil, surplus radioactive sources, and tailings from uranium mines and mills.

Materials are reused or recycled where possible to minimize the amount that will become waste. Some wastes are incinerated to reduce their volume; others are compacted into steel boxes. The LLW and ILW from Canadian reactors and other nuclear activities are now safely stored in concrete bunkers or buildings. The wastes will eventually be moved to repositories for long-term management. Several countries already operate repositories for this purpose. Ontario Power Generation (OPG) and the Municipality of Kincardine have a project to construct a [Deep Geologic Repository](#) for the LLW and ILW from OPG's 20 reactors.

The large volumes of waste tailings from uranium mines and mills are [managed](#) in nearby monitored near-surface engineered ponds or mined-out pits designed to minimize contact between ground water and the tailings.

Radium and uranium refining in Port Hope, Ontario from the 1930s to the 1960s led to LLW being distributed in various locations in and around Port Hope. The federally-funded [Port Hope Area Initiative](#) is cleaning up and creating new facilities for safe local long-term management of the waste.

## Pat McNamara opening statement

Low Level Radioactive Waste (LLRW) includes all radioactive waste except spent reactor fuel and waste from mining, milling and mine tailings. LLRW can be as radioactive as high-level waste.

Atomic Energy Canada Limited (AECL) is responsible for Canada's LLRW. AECL has been as incompetent managing waste as they have been designing reactors. After 34 years, Port Hope is still waiting for the promised cleanup. After 30 years, the Serpent River still carries radioactive material from ten dead lakes to Lake Huron.

The mine tailings are not considered LLRW. However, the poisons they release to air and water contaminate large areas which become radioactive waste, as is the case with the Serpent River watershed and Lake Athabaska's shoreline.

Most people aren't aware that 14,000 tonnes of fertilizer containing uranium waste (UO<sub>2</sub> & UO<sub>3</sub>) are spread on Canadian fields each year. The 10 PPM concentrations are 700% higher than background levels in Canadian soil. Our food is grown in LLRW.

Most Albertans are surprised to learn there's a mound with 42,500 cubic metres of LLRW in Fort McMurray. This contamination occurred when Fort Mac was on the uranium transportation route from Deline to Port Hope.

There are 1.5 million nuclear medicine procedures in Canada each year, mostly diagnostics using technetium-99m. Patients are told it has a short half-life of 6 hours and decays rapidly. They're not told that when it decays, it changes into technetium 99 with a half-life of 212,000 years. This decay and deposition takes place inside your body. This is LLRW.

All Canadian reactors have contaminated their sites with tritium. These soils are now LLRW and the poisons keep spreading. The 200,000 cubic metres of LLRW contaminating Port Hope in 1966 migrated and grew to 3.5 million cubic metres within forty years. How much will our kids have to cleanup?

### **Michael Stephens first rebuttal**

Any organization that generates radioactive waste is legally responsible for managing it. AECL accepts LLRW from Canadian hospitals, educational institutions and industry as a national service.

Management of mine tailings has improved greatly since World War 2 (WW2). The problems with any tailings relate to chemistry (e.g., acid generation from sulphates). The nuclear industry must meet standards a hundred times more demanding than those applied to fertilizer.

The federal Low-Level Radioactive Waste Management Office ([LLRWMO](#)) is cleaning up the uranium transportation route from Port Radium to Fort McMurray and other "historic" sites (e.g., WW2 radium dial painting workshops). When I had a diagnostic treatment with Tc-99m I set off the radiation monitors at work for a couple of days. The small dose of radiation I received was well worth confirming that I do not have problems of poor blood circulation to my brain. Something with a long half-life (like Technetium 99) is not very radioactive at all.

Non-radioactive material has an infinite half-life! Tritium decays quickly, and does not present a long-term health or safety issue.

A federal project is dealing with the [Port Hope LLRW](#). The Canadian Nuclear Safety Commission has reviewed the many health studies on Port Hope and concluded, "there is no evidence of health effects as a result of past and present activities of the radium and uranium refining processing industry in the region". Any new uranium refinery would not be allowed to disperse radioactive materials as happened at Port Hope decades ago.

### **Pat McNamara first rebuttal**

Contrary to Mr. Stephens' claim, the majority of uranium tailings have been dumped in pristine lakes, killing most of them. The tailings from twelve mines at Elliot Lake killed ten lakes in the Serpent River watershed. The tailings from Gunnar Mine created the Langley Bay Delta in Lake Athabaska. There were 8 radioactive spills at the Key Lake mine in its first six months of operation, including one of 100 million litres. There's been over 30 spills from the "engineered earthen-dams at Elliot Lake.

Cameco and the Canadian Government before them put LLRW in fertilizer to get rid of it. Fertilizer companies, some owned by Cameco, are not required to show the amount of uranium in their product.

Tritium and technetium both cause cancer and other health effects. Radioactive particles are hundreds of times more dangerous inside your body than outside. Tritium does not decay quickly; it takes about 120 years to decay completely.

The proposed cleanup of Port Hope is a [farce](#). AECL is only cleaning up one third of the identified LLRW and they are not testing for the full range of radioactive isotopes.

Bio-testing conducted by the Port [Hope Community Health Concerns Committee](#) showed U236 (reactor waste) inside people's bodies.

Health Canada and the CNSC are [corrupt](#) regarding their radiological protection of Port Hope residents.

"Health Canada's claim of "no problem" to area residents from 70 years of exposure is fraudulent and not supported by the data presented in the report". (Dr. Rosalie Bertell)

## **Michael Stephens second rebuttal**

Uranium mine and mill tailings [management](#) has improved greatly since WW2. They tend to have very advanced regulatory regimes and relatively strict regulatory requirements compared to other naturally-occurring radioactive materials.

Serpent River mines, mills and uranium tailings were [decommissioned](#) between 1985 and 2000 by the mine owners, Ontario government, Serpent River First Nation, local communities and interest groups.

A [Comprehensive Environmental Assessment](#) is being conducted of Saskatchewan Research Council's project to rehabilitate the Gunnar Mine site.

[Everything](#) we encounter in daily life contains radioactive material.

Tritium and technetium may cause health effects - in situations we know how to prevent. Tritium has a half life of 12.4 years; it decays much quicker than isotopes like uranium 235 and 238. Radioactive particles are hundreds of times less dangerous outside your body than inside, and precautions are taken to avoid people ingesting them.

[Cleanup](#) of contaminated sites in Port Hope will continue until there is no restriction on any future uses, including vegetable gardens, play areas, recreational uses and building a home.

No evidence is provided that LLRW was put in fertilizer to get rid of it. [Conventional industries](#) often add to natural environmental radioactivity. However, like the increases induced by the nuclear industry, few if any of the additions are significant to human health, on either local or global scale.

I also don't always necessarily agree with CNSC staff, but I have never seen evidence of corruption. No basis is provided for Dr Bertell's opinion.

## **Pat McNamara second rebuttal**

The "precautions" Mr. Stephens mentions did not prevent 217 Bruce Power employees from getting alpha-emitting particles inside their bodies recently.

Evidence of LLRW in fertilizer. (<http://www.wise-uranium.org/epcdnph.html>)

Dr. Bertell responded to Health Canada Health Studies in Port Hope (1998 & 2000) which found:

- 13% more deaths than expected
- 48% excess childhood leukemia
- 38% excess female deaths from colorectal cancer
- Double the expected female brain cancers
- Four times the expected brain cancers in children
- Nasal cancer in men five times higher than expected
- Esophageal cancer in men twice the expected rate
- 300 excess deaths from circulatory diseases

Health Canada stated none of these results are "significant" and would do no follow-up.

The CNSC hired epidemiologist Dr. Eric Mintz, to analyze the studies and he concluded: "The patterns of several cancer rates show cause for concern in that the patterns are consistent with environmental contamination and certainly the raised leukemia rates, which were even higher before remediation, are not reassuring. Along with the brain cancer, colon cancer and some of the rare cancer results, the available evidence points to there being problems in Port Hope". The CNSC refused to accept Dr. Mintz's analysis.

These excess illnesses and deaths were caused by LLRW distributed by the Canadian Government when they owned the Port Hope nuclear facility. Health Canada and the CNSC are covering up Federal liabilities in Port Hope by refusing to conduct comprehensive health studies they first promised in 1978. The CNSC and Health Canada are corrupt.