

Regulating Radioactive Waste from Nuclear Power Plants in Canada

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What is radioactive waste?

Radioactive waste is defined as any material (liquid, gaseous or solid) that contains a radioactive nuclear substance for which there is no foreseen use. In Canada, nuclear facilities produce a range of radioactive waste, such as uranium mine waste and mill tailings, medical isotope waste, used nuclear fuel, decommissioning waste, industrial waste and cleaning material contaminated with low levels of nuclear substances.

In all CNSC-licensed activities in Canada, the waste producers are required to manage the waste in a safe and secure manner and to make arrangements for the long-term management of the waste.

In nuclear power reactors, there are three types of waste produced:

1. High-level radioactive waste: irradiated (used) nuclear fuel or other waste that generates significant heat and requires long-term isolation from workers and the environment.
2. Intermediate-level radioactive waste: material containing large amounts of radioactive material that requires some form of isolation
3. Low-level radioactive waste: the least hazardous material, which contains low levels of nuclear substance like cleaning materials used inside a nuclear facility. This waste requires little or no isolation.

Quick facts

- The three Rs apply to the management of radioactive waste: reduce, reuse and recycle.
- CNSC's policy on managing radioactive waste requires waste owners to put in place design measures, operating procedures and decommissioning practices to minimize radioactive waste.
- The Government of Canada and the nuclear industry are developing solutions for long-term radioactive waste management that protects the health, safety and security of persons and the environment.
- The CNSC ensures that proper security measures are in place for nuclear facilities and that nuclear sector workers' health is protected.



Figure 1.a. LLRW storage containers
Source: Ontario Power Generation



Figure 1.b. ILRW in ground storage structures
Source: Ontario Power Generation



Figure 1.c. Dry storage containers for used nuclear fuel (HLW)
Source: Ontario Power Generation

How does the CNSC regulate radioactive waste?

As Canada's nuclear regulator, the CNSC is responsible for licensing the management of radioactive waste, including its transport and storage. Since all nuclear substances associated with licensed activities will eventually become radioactive waste, the safe long-term management of that radioactive waste is considered during the review process for any licensed activity or facility.

The CNSC's regulatory approach for radioactive waste stems from the [Nuclear Safety and Control Act](#) (NSCA) and is articulated in CNSC documents [P-299, Regulatory Fundamentals](#), [P-290, Managing Radioactive Waste](#), and [G-320, Assessing the Long Term Safety of Radioactive Waste Management](#). In developing these documents, the CNSC draws upon recommendations of the International Atomic Energy Agency (IAEA) and best practices from the international and national community.

As an example, the CNSC has incorporated IAEA waste minimization practices into CNSC Regulatory Policy P-290, *Managing Radioactive Waste*, which recommends that the volume of radioactive waste be minimized to the extent practicable by way of design measures, operating procedures and decommissioning practices. In addition, CNSC Regulatory Guide [G-219, Decommissioning Planning for Licensed Activities](#) indicates that waste management plans should include specific plans for the reuse, recycling, storage or disposal of that waste.

In addition, the Canadian Standards Association (CSA) standard on the *Decommissioning of Facilities Containing Nuclear Substances*, which states that strategies for waste management must consider and prioritize the recycling or reuse of equipment and materials to reduce the volume of radioactive waste. Radioactive waste minimization is also a key principle in the CSA standard *Management of Low- and Intermediate-level Radioactive Waste* which specifically refers to the development of a waste management program to reduce the overall volume of radioactive waste requiring long-term management. The program may include features such as delay and decay as well as conditional and unconditional clearance.

This cohesive approach ensures that Canadian nuclear safety regulations are continuously reviewed and improved to protect the health and safety of the public and the environment.

Transport of radioactive waste

In Canada, the responsibility for ensuring safe transport of nuclear substances, including radioactive waste, is jointly shared between the CNSC and Transport Canada. The CNSC issues transport licences for nuclear substances only once it is convinced that the shipment will be completed safely, without posing risks to the health, safety and security of Canadians and the environment. To find out more about [regulating the transport and packaging of nuclear substances to ensure safety, read the CNSC fact sheet](#).

How can radioactive waste be reduced, reused and recycled?

One of the key principles of in the IAEA guidance and the CNSC Regulatory Policy P-290, *Managing Radioactive Waste*, is that the licensee must minimize the generation of radioactive waste as much as possible. This includes the development of a waste management program that helps to reduce the overall volume of radioactive waste requiring long-term management. Licensees are expected to investigate and implement new technologies and techniques as they become available to achieve this goal

Did you know?

- The CNSC supports the principle of good waste management practices in the nuclear industry to reduce the volume of radioactive waste requiring storage.
- The CNSC's commitment to international standards and best practices assures that the management of radioactive waste in Canada meets the highest standards for health, safety, security and environmental protection.
- The CNSC monitors and inspects nuclear waste sites and waste management facilities to ensure compliance with nuclear safety regulations.
- Canadian methods for managing radioactive waste are similar to those in other countries.

Some of the strategies and reduction methods to minimize the volume of radioactive waste include:

- reusing and recycling of materials by separating radioactive components from non-radioactive ones
- preventing the contamination of materials by limiting the amounts in radioactive areas
- assessing technology advances in waste minimization and implementing improvements to waste handling facilities that reduce the volumes of radioactive waste

Methods used to reduce, reuse and recycle radioactive waste must always ensure that the health and safety of persons and the environment are protected.

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