

Background briefer on nuclear waste in Canada

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Nuclear Fuel Waste

In 2021, Canadian and US nuclear reactors generated around 90 and 780 Terawatt-hours of electricity, respectively, yet produced roughly equal amounts of fuel waste (roughly 2000 tonnes). Despite these large amounts of waste per unit electricity generated from CANDU reactors, Canada has no publicly acceptable disposal plan. In 1998, the Seaborn Panel concluded that the Atomic Energy of Canada Limited (AECL) concept of deep geological disposal of fuel waste might be technically feasible but was inadequate from a social perspective. The Panel recommended creating a Nuclear Fuel Waste Management Agency “at arm's length from the utilities and AECL.” Instead, electrical utilities established the Nuclear Waste Management Organization (NWMO) under the 2002 *Nuclear Fuel Waste Act*. NWMO lacks “multiple oversight mechanisms” as recommended by the Panel. Its efforts to site a Deep Geological Repository (DGR) for fuel waste, either near South Bruce in southern Ontario or Ignace in northwestern Ontario, have not secured support from the public or Indigenous communities.

Other Reactor Waste

As with nuclear fuel, metal and concrete reactor components become increasingly radioactive during bombardment by neutrons from splitting of uranium atoms. Canada has no plan for dealing with reactor decommissioning waste. No Canadian power reactor has ever been fully decommissioned, including four shut down AECL “prototype” reactors in Quebec, Ontario and Manitoba. Under a Conservative government in 2015, AECL contracted a consortium of multinational corporations to deal with its own “nuclear liability” as cheaply as possible. The consortium’s proposal to fill two AECL reactors with grout and abandon them beside the Ottawa and Winnipeg Rivers does not conform to international decommissioning standards. The consortium’s proposal to dispose of other AECL waste in a giant mound at the Chalk River Laboratories (the NSDF project) has also raised technical concerns and fierce public opposition. Nonetheless, the Canadian Nuclear Safety Commission (CNSC) has signaled its intent to approve this project after a final June 27th hearing. Participation is limited to two Quebec First Nations on whose unceded territory the NSDF would be located.

Uranium Mine Waste

Canada’s first uranium mine (at Port Radium on Great Bear Lake) was expropriated by the federal government during World War II to enable US nuclear weapons production. Many Sahtu Dene men who were hired to transport yellowcake from this mine died of radiation poisoning. Canada now has around 220 million tonnes of uranium mine

tailings. They contain about 85 per cent of the radioactivity in mined uranium ore, including highly toxic radium, radon gas, thorium, and polonium. Mines in northern Saskatchewan in the Athabasca Basin have the world's highest uranium levels. Indigenous communities in the region are concerned that the radioactive tailings from these mines are adversely affecting their health. They oppose efforts of mining companies such as Cameco to obtain CNSC licenses of infinite duration.

Small Modular Reactor (SMR) Waste

If built and operated, SMRs would generate far more waste (of all types) per unit electricity generated than current reactor types. Fuel waste from SMRs such as molten salt reactors would require technically challenging and expensive processing prior to long-term storage or disposal. Reprocessing fuel waste to extract plutonium for SMR fuel would be expensive and dangerous, create weapons proliferation risks, and ignore a history of serious accidents and widespread environmental contamination from handling the large quantities of liquid high-level waste generated by reprocessing.

Canada's Policy for Radioactive Waste Management and Decommissioning

On March 31, 2023, Natural Resources Canada (NRCan) released a new radioactive waste policy that "modernizes" a previous 1996 framework policy. A 2019 International Atomic Energy Agency (IAEA) mission recommended that Canada "enhance the existing policy and establish the associated strategy to give effect to the principles" in the framework. The framework stated that "waste producers and owners are responsible, in accordance with the principle of "polluter pays", for the funding, organization, management and operation of disposal and other facilities required for their wastes." The new policy does not include the polluter pays principle. It makes no provision for public oversight of nuclear waste management, ignoring hundreds of requests from civil society groups for a new waste agency independent of utilities and government bodies that promote nuclear power. Civil society groups are also highly critical of the government's decision to assign the task of developing a national strategy to the NWMO, an industry-run organization.