

Opinion

Radioactive waste: a big problem for New Brunswick's proposed new nuclear reactors

The nuclear waste problem is not going away.



Gordon Edwards & Susan O'Donnell

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On June 26, federal Climate Change and Environment Minister Jonathan Wilkinson ended the environmental assessment of a proposed radioactive waste storage facility beside Lake Huron, after the Ontario Power Generation (OPG) withdrew its proposal to build it. OPG decided to terminate the project after the Saugeen Ojibway Nation, on whose unceded territory the facility would be located, voted on Jan. 31 not to support the project, which had been under consideration for 15 years.

What to do with radioactive waste remains a significant challenge for all nuclear reactor operators, including the two proposed nuclear projects supported by the New Brunswick government and its public utility NB Power. Recently, more than 100 groups across Canada, including nine in New Brunswick, signed a letter to federal Minister of Natural Resources Seamus O'Regan asking to suspend decisions about radioactive waste disposal until Canada has a sufficient radioactive waste policy in place.

In November 2019, a special mission of experts from the International Atomic Energy Agency (IAEA) recommended that Canada's radioactive waste policy needed to be enhanced and that a national strategy on dealing with radioactive waste needed to be formulated. Canada has agreed to act on the IAEA recommendation.

Nuclear energy produces dangerous irradiated nuclear fuel and a host of other radioactive waste materials requiring safe storage for hundreds of thousands of years. Globally, no facility for permanent safe storage of irradiated fuel has been licensed to operate, and several facilities for storing non-fuel radioactive wastes have experienced setbacks costing billions of dollars to rectify.

In Canada, only New Brunswick and Ontario have operational nuclear power reactors. Of the 10 proposed new reactor projects currently in pre-licensing review by the Canadian Nuclear Safety Commission, two are in New Brunswick. Both, to be sited at NB Power's Point Lepreau Nuclear Generating Station, are so-called "small modular nuclear reactors" or SMNRs. Both will create irradiated fuel that is more intensely radioactive per kilogram than waste currently stored at the Lepreau CANDU reactor. In addition, the non-fuel radioactive wastes will remain the responsibility of the Government of New Brunswick, likely requiring the siting of a permanent radioactive waste repository somewhere in the province.

The two New Brunswick prototypes are both designed to re-use spent CANDU fuel bundles. At Point Lepreau, solid, highly radioactive used fuel bundles are stored in hundreds of silos on a site about a kilometre away from the CANDU reactor.

Interestingly, promoters of both new nuclear projects in New Brunswick—the ARC-100 reactor and the Moltex "Stable Salt Reactor"—claim their reactors will "burn up" these radioactive waste fuel bundles. They have even suggested that their prototype reactors offer a "solution" to the Lepreau reactor's existing nuclear fuel waste problem. The radioactive left-over used fuel from the new reactors will still require safe storage for hundreds of thousands of years.

The only way to re-use the existing used fuel at Lepreau is to access the unused "fissile material," mainly plutonium, contained in the irradiated fuel bundles.

The basic problem is that you cannot access the materials inside the spent fuel from Lepreau except by opening up the solid bundles and converting them into a molten or liquid form. The spent fuel contains hundreds of human-made radioactive poisons that were created inside the Lepreau nuclear reactor. Some of these poisons are gases or vapours, making it extremely difficult to keep all dangerous materials in check and accounted for. In prior operations of this kind, radioactive pollutants have invariably escaped into the environment.

Until now, every effort to recycle and "burn up" used reactor fuel—in France (La Hague), the U.K. (Sellafield), Russia (Mayak) and the U.S. (Hanford)—has resulted in countless incidents of radioactive contamination of the local environment. In addition, none of these projects eliminated the need for permanent storage of the left-over long-lived radioactive byproducts, many of which cannot be "burned up."

When recycled plutonium and enriched uranium are used as fuels in a Moltex SSR or ARC-100 reactor, an even greater concentration of intensely radioactive fission products will be produced—more so than already exists from the Lepreau reactor, which uses unenriched uranium as fuel. If the two new reactors are built, for the first 500 to 1,000 years after they go into operation, the used fuel from them will be much more radioactive per kilogram than the used fuel from Lepreau.

The nuclear waste problem is not going away. The recent letter from more than 100 groups across Canada, the cancellation last week of the proposed nuclear waste dump in Ontario, and the formation in May of a new coalition in New Brunswick to oppose the new nuclear projects demonstrate that significant opposition to new nuclear energy generation exists. Producing nuclear energy always means producing nuclear waste as well.

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