

May 17, 2021

Jim Delaney
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Re: Canada's Radioactive Waste Policy Framework Modernization - Small Modular Reactor Deployment

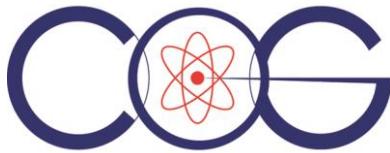
Dear Mr. Delaney,

In reviewing Canada's policies, regulations and actions to ensure the continued safe and environmentally responsible interim storage and long-term disposal of waste from Canada's nuclear power industry, it is important to consider not just the incredible legacy of Canada's CANDU reactor technology, but to also anticipate future reactor technologies. Canada will eventually deploy new-to-Canada reactor technologies, such as Small Modular Reactors (SMRs), and other advanced reactor technologies that do not use natural uranium and heavy water technologies.

The design and operation of these future reactor technologies will be highly regulated, and the resulting waste will be rigorously managed, as has been the case for CANDU reactor technology since the beginning of nuclear power generation in Canada. That will include the careful design and safe transportation and storage of low-, intermediate- and high-level radioactive waste, or used nuclear fuel, all of which is fully funded, and will continue to be fully funded, by Canada's nuclear reactor owners and waste producers.

The purpose of this letter is to highlight a few of the issues with the potential to affect SMR deployment in Canada, as the federal government works to modernize its Radioactive Waste Policy Framework. Notably, more than a dozen different vendors have entered into the Canadian Nuclear Safety Commission's (CNSC's) Pre-licensing Vendor Design Review process - the precursor to the licensing of SMRs in Canada. Any changes to the Radioactive Waste Policy Framework must therefore be technology neutral and flexible enough to provide guidance for a wide variety of nuclear power technologies and applications.

Generally speaking, Canada's Radioactive Waste Policy Framework is appropriate, effective and rigorously applied through the independent oversight of the CNSC, Canada's independent nuclear regulator, and a number of other agencies and organizations (e.g., the International Atomic Energy Agency and the Nuclear Waste Management Organization (NWMO)). Nevertheless, the Policy Framework would benefit from greater flexibility around technology, as well as utilization of the very low-level radioactive waste category.



Canada's SMR Roadmap and new Action Plan call out many of the issues which Canada's Radioactive Waste Policy Framework must consider with respect to SMRs, and key stakeholders (e.g., the NWMO) have made commitments to address many of these issues.

Waste Minimization

To maximize the displacement of greenhouse gas (GHG) emitting power generation technologies, SMRs are being considered for deployment in existing nuclear jurisdictions but are also being considered in new-to-nuclear Provinces and Territories, for both on- and off-grid applications. This includes the numerous remote communities and mine sites that currently rely on high GHG emitting diesel generating technologies. As such, the deployment of SMRs has the potential to increase the number of fuel waste owners and producers across the country.

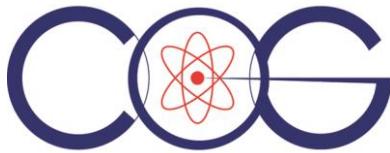
Additionally, new business models may be applied to SMR deployment. Notably, the waste producers may be different from the waste owners, assuming different roles and responsibilities with respect to waste storage and disposal. Regardless, as good corporate citizens, producers are expected to focus on waste minimization practices, including waste reduction, reuse and recycling. There are also opportunities for innovation and technology development to further minimize waste volumes while deriving economic benefits for Canadians. The Policy Framework must be flexible enough to realize these opportunities.

Waste Storage Facilities

SMRs will produce relatively small volumes of low- and intermediate-level radioactive waste that is similar to that of Canada's existing nuclear fleet but produced in much smaller volumes. The resulting radioactive waste could be, and is currently, safely stored for prolonged periods of time. However, ultimately, it would be appropriate for Canada to develop permanent disposal facilities for longer-lived low- and intermediate-level radioactive waste. The very low-level radioactive waste category should be utilized more as it is already recognized in CNSC REGDOC 2.11.1¹.

High-level radioactive waste, or fuel waste, will also be produced in relatively small volumes by SMRs. The discussion on used fuel storage needs to be broadened (made less specific) because not all of the SMR designs will require the same storage features as CANDU reactors. In some cases, the fuel waste will be sent directly to dry storage, as there is no need for conventional fuel bays, or wet storage (e.g., in some cases they do not use water for cooling). In other cases, the waste owner will remove the fuel waste during refuelling, or refuel on an infrequent basis (e.g., every 20 years), having limited need for onsite storage. With respect to yet other designs, there may be requirements for extended periods of interim onsite storage for reprocessing purposes.

¹ Very-low level radioactive waste could be effectively managed through onsite decay, further reducing low-level radioactive waste volumes. This would be particularly useful for dismantling activities which require the disposal of large volumes of items, such as concrete.



Decommissioning

The relatively small size, and modular assembly, of SMRs will provide for greater portability and ease of decommissioning in comparison to traditional reactor designs. In the case of the especially portable micro reactor designs, the assembled, fueled, modules will be removed from site prior to closure, facilitating a greater number of potential end use options. The policy and regulatory requirements that govern the selection of decommissioning strategies requires stakeholder involvement in defining the targeted end use. End use objectives should continue to be developed in consultation with potentially affected stakeholders as required by regulatory processes under the *Nuclear Safety and Control Act* and the *Impact Assessment Act*.

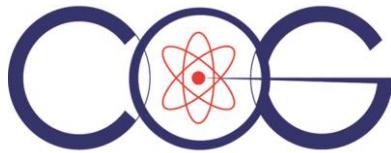
Waste Disposal

While there is nothing in the current Radioactive Waste Policy Framework that would prohibit or preclude waste owners from collaborating on a permanent low- and intermediate-level radioactive waste disposal project, there would be significant social licence benefits to such collaboration. However, a collaborative approach may require SMR waste that originates in one province to reach a future disposal facility in another province. The Policy Framework would therefore benefit from language that would encourage waste owners to collaborate, and that would provide a policy lever to support a project proponent in successfully siting a combined disposal facility.

SMR fuel waste falls within the NWMO's mandate, which allows a fee for service approach to the determination of long-term waste management requirements for emerging technologies. Nevertheless, the NWMO will need to develop a funding formula to account for the volumes of fuel waste that arise from SMR deployment. The NWMO will also need to review its design and safety case to ensure that the different SMR fuel wastes meet its acceptance criteria. Some SMR fuel designs will require further processing to meet the waste acceptance criteria, for example. These considerations are captured in the *Nuclear Fuel Waste Act* and the NWMO has begun working with vendors on what provisions will be required for SMR fuel waste, in the Deep Geological Repository.

Overall, Canada's existing legislative and policy frameworks for radioactive waste management are sound. However, a few changes to Canada's policies and plans for interim storage and long-term disposal of radioactive waste will need to be made, to be both robust and flexible enough to imagine and enable nuclear reactor technologies that are new to Canada, so that these technologies, so important to fighting climate change, do not face unnecessary policy and regulatory obstacles to their deployment.

CANDU Owners Group Inc.



"Excellence Through Collaboration"

Yours truly,



Robin Manley,

Vice President, New Nuclear Development, OPG, &

Chair, CANDU Owners Group SMR Technology Forum (SMRTF)

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