

Statement by Nuclear Waste Watch's Radioactive Waste Review Group

An Alternative Policy for Canada on Radioactive Waste Management and Decommissioning

March 2022

This policy statement has been prepared by Nuclear Waste Watch's Radioactive Waste Review Group in response to the draft policy issued by Natural Resources Canada on February 1, 2022. This alternative policy statement mirrors the NRCAN draft in order and content areas but integrates important changes to bring the policy in line with fundamental principles of transparency, safety and the public good.

BACKGROUND

Nuclear research and development, and the use of nuclear technologies, produce radioactive waste. Radioactive waste consists of gases, liquids, sludges or solids that contain a nuclear substance and are by-products of nuclear fuel production and nuclear reactor operation. It also includes materials that have become contaminated with radioactivity by contact with other radioactive wastes.

Radioactive waste is generated during the normal operation of uranium mines, mills, fuel fabrication facilities, reactors and other nuclear facilities; including during decommissioning activities. It also may be produced as a result of nuclear or radiological emergencies.

Radioactive waste emits ionizing radiation, including alpha particles, beta particles, gamma rays and neutrons. These projectiles damage cells and genetic material. Higher levels of exposure to ionizing radiation cause prompt observable tissue damage; lower levels can lead to cancer, genetic damage, cardiovascular disease and immune system disorders many years after exposure.

Recognizing that radioactive waste can remain hazardous for very long periods of time, waste producers, owners and operators of facilities must manage radioactive waste in a manner that protects health, safety, security and the environment over the long-term, bearing in mind that future generations will have to assume responsibility in case of containment failure.

Classes of radioactive waste

For any given sample of radioactive waste, information about its physical, mechanical, chemical, radiological and biological properties is essential for proper classification. Particular attention must be paid to the mobility and bioavailability of each radionuclide in the natural environment. Radioactive waste must be characterized and classified according to a national standard. Provision must be made for careful retention of records, knowledge and memory of radioactive waste. Future risks associated with waste storage, handling, packaging, transport and long-term management must be kept to a minimum.

In Canada, four classes of radioactive waste are recognized:

- High-level radioactive waste is mainly the used nuclear fuel from commercial power reactors and from research reactors. It constitutes a smaller percentage of total radioactive waste volume than low and intermediate level wastes, but presents the highest hazard level owing to its intense radiation, the significant heat that it releases, and the long period of time during which it remains a hazard. High-level radioactive waste requires shielding, remote handling, long-term isolation and monitoring for hundreds of thousands of years.
- Intermediate-level radioactive waste is also high-hazard waste. It requires long-term isolation and monitoring, and may require remote handling and shielding, but it does not produce the same level of heat as high-level radioactive waste. It includes large pieces of equipment weighing hundreds of tons that are highly radioactive, as well as other parts of the reactor cores and cooling systems that have been in close proximity to nuclear fuel. Waste that contains radionuclides with long half-lives and remains a hazard for thousands of years or more is included in the intermediate-level waste class.

Waste that contains radionuclides with short half-lives but has high levels of radioactivity, such as certain disused radioactive sources, is also classified as intermediate level.

- Low-level radioactive waste constitutes the largest volume of radioactive waste apart from uranium mine and mill tailings. It releases low levels of radiation and may be handled with protective equipment. It poses significant health risks if component radionuclides are dispersed in the environment and subsequently inhaled or ingested. This class of waste can include building materials, clothing, tools, soils, and vegetation contaminated by past management practices.
- Uranium mine and mill tailings, resulting from mining and processing of uranium to produce nuclear fuel and other nuclear products, represent a very large volume of long-lived radioactive waste in Canada. Much of this waste remains in the local environment and has not yet been dealt with in a satisfactory manner for the long term. Uranium is both a radioactive substance and a chemical hazard. Uranium mill tailings often contain toxic heavy metals that are a source of surface and groundwater contamination.

OBJECTIVES AND COMMITMENTS

The Government of Canada's objectives for radioactive waste management and decommissioning are as follows:

- Radioactive waste will be prevented or minimized, taking into account both waste volume and levels of radioactivity;
- Detailed plans for decommissioning and disposal of waste will be prepared at project inception;
- Radioactive waste will be properly characterized and classified, with priority given to distinguishing low-level waste from intermediate-level waste, so that shielding and long term storage requirements for the latter can be properly addressed;
- Radioactive waste will be contained and monitored to ensure it remains isolated from the accessible biosphere for the time frame relevant to the category of waste;
- The "polluter pays" principle will be implemented by requiring polluters to provide secure and adequate financing for decommissioning and waste management expenses, including a contingency fund for future remediation efforts, while following strict management practices that prevent damage to human health or the environment;
- All radioactive waste and decommissioning activities and all radioactive waste management facilities and sites will be safely managed by waste producers, owners and facility operators, and regulated by the nuclear regulator to protect human health, safety, security and the environment over the long term;
- Radioactive waste producers, owners, facility operators, governments, Indigenous peoples, scientific experts, civil society groups and other interested Canadians and communities will regularly collaborate on and contribute, in an open and transparent manner, to the planning, development,

review and implementation of an integrated strategy for radioactive waste management and decommissioning for Canada; and

- Recognizing that radioactive waste may remain hazardous for very long periods of time, waste producers and owners will manage and dispose of radioactive waste in a manner that protects human health, safety, security and the environment over the long-term.

These objectives advance three key federal government priorities:

(i) Protecting the health, safety and security of people and the environment. This is the federal government's top priority when it comes to nuclear energy and radioactive waste. To this end, the federal government is committed to continuous improvement with respect to managing radioactive waste and decommissioning for generations to come.

(ii) Openness, transparency and inclusive engagement to encourage the timely development of the necessary infrastructure for effectively dealing with all of Canada's radioactive waste and decommissioning activities.

(iii) Global excellence in the fields of radioactive waste management and decommissioning.

Canada's Policy on Radioactive Waste Management and Decommissioning, which is set out below, comprises a series of policy commitments for radioactive waste management and decommissioning.

CANADA'S POLICY ON RADIOACTIVE WASTE MANAGEMENT AND DECOMMISSIONING

The government is committed to ensuring that responsibilities are clearly delineated, and that the necessary policy and legislative framework are in place to establish requirements, guidance, licensing and compliance in these priority areas. This applies to waste arising both from normal operations and decommissioning, and from nuclear or radiological emergencies.

Need for a publicly-owned agency independent of the nuclear industry

A publicly-owned agency independent of the nuclear industry and government agencies that promote nuclear power will be created to oversee the management of radioactive pollutants and decommissioning of nuclear facilities. The agency will ensure that waste management target schedules are respected and reports on progress according to money spent are made available to the public. The agency's goal will be to avoid short- and long-term social costs and risks, and to ensure that no undue burden is imposed on future generations. Scientific, technical, civil society and social advisory groups, including representation by Indigenous peoples, will be created to support this agency.

THE FEDERAL GOVERNMENT SHALL:

Legislation and regulations

- 1.1. Ensure that legislation --particularly the *Nuclear Safety and Control Act*, the *Impact Assessment Act* and the *Nuclear Fuel Waste Act* as well as other Acts, associated regulations and other policy tools -- will further support the implementation of this Policy;
- 1.2. Regularly review and update relevant legislation and policy to ensure that they remain relevant and effective. Likewise, the federal government will regularly review this *Policy for Radioactive Waste Management and Decommissioning* to ensure that it aligns with International Atomic Energy Agency guidance;
- 1.3. Implement the *United Nations Declaration on the Rights of Indigenous Peoples Act* and the related Action Plan with regard to radioactive waste management and decommissioning;
- 1.4. Amend the *Physical Activities Regulations* under the *Impact Assessment Act* to include construction and operation of new nuclear reactors, decommissioning of nuclear reactors, and all phases in the development, operation and closure of long-term waste management facilities;
- 1.5. Maintain and update its legislative and regulatory regime, centered on an independent radioactive waste management and decommissioning agency and an independent nuclear regulator, to oversee and regulate radioactive waste management and decommissioning, including funding and operational requirements of approved waste management and decommissioning plans;

Infrastructure and process

- 1.6. Establish an independent, publicly-owned, radioactive waste management and decommissioning agency;
- 1.7. Ensure that waste producers, owners and facility operators use common national standards to document and report on their radioactive waste inventories on a regular basis in a transparent manner, with the object of communicating this information effectively to present and future generations;
- 1.8. Take responsibility for leading an open and transparent process of developing a comprehensive and integrated radioactive waste management and decommissioning strategy for Canada that addresses each of the four radioactive waste classes;
- 1.9. Commit to open, transparent and inclusive engagement with Indigenous peoples, provinces, territories, interested communities, scientific experts, waste producers and owners, facility operators, and other interested persons in Canada to encourage the timely development and provision of the necessary infrastructure to effectively manage all of Canada's radioactive waste management and decommissioning activities;
- 1.10. Prioritize the health, safety and security of people and the environment by requiring that radioactive wastes are kept contained and isolated from the biosphere;
- 1.11. Accept its responsibility and fulfill its obligations for the management of historic radioactive waste liabilities and decommissioning activities for which the producer no longer exists and the current owner

cannot reasonably be held responsible (such as legacy wastes that were generated by federal entities in the formative years of Canadian nuclear research and development);

1.12. Recognize the long time-scales associated with the management of radioactive waste and the associated obligations to ensure ongoing stewardship of radioactive waste disposal facilities and sites;

1.13. Accept the responsibility for maintaining institutional controls and preserving records, knowledge and memory of radioactive waste over the very long term;

1.14. Forbid the deployment of reprocessing technology in Canada, noting the considerable evidence that reprocessing spent nuclear fuel creates nuclear weapons proliferation risks and international relations concerns, and based on operating experience to date showing that reprocessing facilities are highly contaminating of the local environment;

1.15. Support scientific and technical research and sharing of operational experience in radioactive waste management and decommissioning in an open and transparent manner, including public input into the setting of research objectives and full public access to scientific and technical research outcomes;

Engagement with indigenous people

1.16. Acknowledge, respect and honour that First Nations, Inuit and Métis peoples have unique status and rights in Canada, as recognized and affirmed in the *Constitution Act, 1982*, and that the honour of the Crown guides the conduct of the Crown in all of its dealings, including consultation and engagement processes, and that the conduct of the Crown will be guided by any framework, measure or action plan developed by Canada for Indigenous reconciliation, consultation or engagement purposes and that is relevant to radioactive waste management and decommissioning, including any framework, measure or action plan developed as a result of the *United Nations Declaration on the Rights of Indigenous Peoples Act*;

1.17. Acknowledge and respect the five principles for radioactive waste management formulated by the Anishinabek/Iroquois Alliance: no abandonment; monitored and retrievable storage; better containment, more packaging; away from major water bodies; no imports or exports of radioactive wastes;

Transport of radioactive waste

1.18. Ensure that there is no transport of radioactive wastes unless there has been full public consultation and transparency about a destination for that waste, which should be a secure approved long term management facility;

1.19. Avoid transporting radioactive waste beyond the minimum distance to a site that provides appropriate conditions for secure long-term management;

1.20. Ensure there is a public registry for the transport and transfers of radioactive waste within Canada or between Canada and foreign countries. This registry shall identify all instances of export of wastes for processing and return of the processed or residual wastes, and shall also include any changes in waste ownership;

International leadership

1.21. Be committed to providing international leadership and to collaborating on practices, research, science and guidance related to radioactive waste management and decommissioning, as well as to sharing its experiences with and learning from the global community, and to benchmarking against international approaches;

1.22. Seek and provide international expertise, as appropriate, in the fields of radioactive waste management and decommissioning through international collaboration on effective technology, approaches and policies;

1.23. Honour its international obligations and commitments in the area of radioactive waste management and decommissioning;

1.24. Respect international guidance in the area of radioactive waste management and decommissioning and thus ban the *in situ* decommissioning (entombment) of reactors in respect of the directives of the International Atomic Energy Agency. This applies to both current reactors and new reactors of any size;

No importation of radioactive waste

1.25. Be committed to the principles whereby Canadian-generated radioactive waste is to be disposed of in Canada, and radioactive waste generated in other countries is not to be disposed of in Canada, while acknowledging that management of disused radioactive sources has become a serious global problem;

1.26. Assist countries that have purchased Canadian-made radioactive sources in managing them when they become radioactive waste as “disused sources”, including through provision on commercial terms of services and technologies to help isolate the disused sources in their own countries; and

1.27. Ban the importation of radioactive waste, acknowledging that this provides no benefit to Canadians.

THE REGULATOR SHALL:

1.1. Ensure the protection of the public and the environment from impacts of the mining, processing, utilization, and possession and storage of nuclear materials and the use of nuclear technologies, including the immediate and long-term hazards of radioactive waste;

1.2. Manage radiation exposures and risks associated with the transport of radioactive waste by ensuring compliance with international requirements for waste characterization, packaging, handling, and labelling;

1.3. Ensure public transparency and participation in regulatory and oversight activities, especially those relating to decommissioning and radioactive waste management;

1.4. Report to Parliament through the Minister of the Environment;

1.5. Follow this policy; and

1.6. Establish and enforce legally binding regulations for waste management facilities and decommissioning activities.

WASTE PRODUCERS AND OWNERS, AND FACILITY OPERATORS SHALL:

1.1 Prevent and minimize the production of radioactive waste in the operations of their facilities and sites;

1.2. Apply national standards for characterizing, classifying and documenting their radioactive waste in order to define and implement waste management and decommissioning solutions that are commensurate with the risks in both the short and long term;

1.3. Be responsible for the safety of their radioactive waste management and decommissioning facilities and activities, including transportation, that give rise to radiation exposures;

1.4. Fund, plan, develop and operate their radioactive waste management facilities and disposal sites, as well as the decommissioning, clean-up and closure of these facilities and sites;

1.5. Decommission facilities and sites within an appropriate timeframe to avoid transferring the responsibility to future generations, and justify their selection of a decommissioning strategy in terms of long-term as well as short-term radiation exposures;

1.6. Be responsible for implementing an overall strategy, developed by the federal government in collaboration with stakeholders, for the management of radioactive waste generated by their facilities;

1.7. Collaborate with one another to plan and develop waste management and decommissioning approaches that follow the national strategy;

1.8. Demonstrate a commitment to ongoing scientific, technical and safety learning, as well as collaboration, innovation and sharing of operational experience and research in radioactive waste management and decommissioning, including with the public, government and Indigenous entities;

1.9. As a demonstration of the open and transparent manner in which they operate, maintain and make public their waste inventories, including information on the longevity, mobility and toxicity of key radionuclides,

1.10. Maintain environmental monitoring programs for all nuclear sites and facilities, including waste management facilities, by monitoring soil, groundwater, surface water, air and vegetation on a regular and ongoing basis, and making results publicly available in a timely manner;

1.11. Plan radioactive waste management and decommissioning projects in an open and transparent manner, with early and ongoing input from Indigenous peoples, provinces, territories, interested communities, scientific experts and other interested persons in Canada;

1.12. Work in partnership with First Nations, Inuit and Métis communities to gain a greater understanding of their Indigenous Knowledge, approaches and advice in implementing the siting, construction, operation, transport and monitoring of radioactive waste management and decommissioning projects;

1.13. Engage with Indigenous peoples, provinces, territories, interested communities, scientific experts and other interested persons in Canada to develop and maintain the programs and practices of the waste producers, owners and facility operators; adhering to an integrated strategy for radioactive waste management and decommissioning activities set by the federal government that defines, reports on and sets out approaches for the long-term management of all of Canada's current and future radioactive wastes;

1.14. Collate and record information relevant to safety at all steps in the development and operation of a radioactive waste management facility;

1.15. Prepare and retain documentary evidence to illustrate that waste has been properly characterized and classified and that the necessary quality of data has been achieved; and

1.16. Ensure that radioactive waste packages and unpackaged radioactive waste comply with established requirements and criteria, are properly emplaced in a well-monitored storage or long-term management facility, and are in a form that can be retrieved should problems arise.

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