



CSA Group Input to Canada's Draft Policy for Radioactive Waste Management and Decommissioning

Overview of CSA Group and CSA Nuclear Program

Canadian Standards Association, operating as CSA Group (CSA), is a not-for-profit, membership-based organization with a mission to enhance the lives of Canadians through the advancement of standards in the public and private sectors. We serve industry, government, and consumers in Canada and around the world. Since our founding in 1919, CSA has grown to become one of the largest Standards Development Organizations (SDOs) in Canada. CSA is accredited by Standards Council of Canada (SCC) and American National Standards Institute (ANSI), allowing CSA to develop accredited national standards for Canada and the United States, as well as binational standards. CSA also participates in international standards development through ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission).

The CSA Nuclear Program was established over 45 years ago in response to the needs of the Canadian nuclear sector to develop standards and support the safe and reliable operation of the industry. Today, over 600 volunteer expert members serve on over 65 committees that develop requirements and guidance on various subject areas addressing the life cycle of nuclear facilities, including design, construction, operations and maintenance, and decommissioning. With over 65 standards published to date and more in development, the nuclear portfolio represents a pool of knowledge and expertise for the nuclear industry, offering robust technical standards and best practice guidelines.

Input to Natural Resources Canada's Draft Policy for Public Comment

We are pleased to provide the following feedback on Natural Resources Canada's draft *Policy on Radioactive Waste Management and Decommissioning*, specifically with respect to the complementary aspects addressed by the CSA Nuclear Program, standards development process, and CSA nuclear standards.

Policy Commitment 1: Health, safety, security and environmental protection are the federal government's top priorities with respect to 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.

- CSA standards help to improve safety, health, the environment, and economic efficiency in Canada and beyond, and are widely referenced in regulations to support public policy initiatives. Standards developed by the CSA Nuclear Program represent the technical requirements for compliance with Canadian regulations when they are referenced by the Canadian Nuclear Safety Commission (CNSC) to regulate nuclear facilities and activities, including radioactive waste management and decommissioning, across Canada. Currently, over 90% of CSA nuclear standards are referenced in the CNSC licensing or regulatory documents.
- The suite of CSA N292 standards for radioactive waste management and the CSA N294 standard for decommissioning, described in [Appendix A](#), establish relevant technical requirements and guidance to support and complement Canada's regulatory and policy framework.
- Specific ways that CSA standards support and align with the draft policy principles include the

following:

1.6: Waste producers and owners will ensure optimal protection of human health, safety, security and the environment for present and future generations in their radioactive waste management and decommissioning activities, including transportation

- CSA N292.0 requires that management of radioactive waste and irradiated fuel provide for protection of the environment and the health and safety of workers and the public (Clause 4.10.1.1, Safety).
- CSA N294 requires that a safety assessment be performed to identify potential hazards to workers, the public, and the environment, from both routine decommissioning activities and credible accidents during decommissioning and that the methods for mitigating such hazards be identified (Clause 7.6.4, Safety assessment of the facilities undergoing decommissioning).

1.8: Waste producers and owners will prevent and minimize, as far as practicable, the production of radioactive waste in their operations, and in the decommissioning and, as applicable, closure of their facilities and sites

- CSA N292.0 requires that the waste management program consider the waste hierarchy (Clause 4.5.2, Scope of the radioactive waste management program) and that a waste management program include strategies to minimize production of waste and reduce the overall volume of waste requiring long-term management (Clause 4.5.6, Minimization of waste).
- CSA N294 requires that the waste management program consider waste minimization (Clause 7.6.5.2, Waste management plan).

1.9: Waste producers and owners will characterize, classify and document their radioactive waste in order to define and implement waste management and decommissioning solutions that are commensurate with their risks in both the short and long term

- CSA N292.0 requires the implementation of a radioactive waste classification system based on the safety case (Clause 4.8.3, Waste classification) and that waste characterization be performed (Clause 4.8.4, Waste characterization). CSA N292.8 provides further details regarding the development and implementation of a waste characterization strategy, program, and plan.
- CSA N292.0 requires that records be maintained in accordance with the quality management system of the operating organization, and that records related to the waste's origin, history, and characteristics be provided to subsequent organizations when waste is transferred (Clause 4.7).
- CSA N294 requires that all radioactive waste generated be characterized in accordance with the CSA N292 series of standards (Clause 5.4.3, Waste characterization) and that the waste management program consider waste characterization and classification (Clause 7.6.5.2, Waste management plan).

Policy Commitment 2: The federal government is committed to openness, transparency and inclusive engagement with Indigenous peoples, provinces, territories, interested communities, scientific experts, waste producers and owners, and other interested persons in Canada to encourage the timely development of the necessary infrastructure to effectively manage all of Canada's radioactive waste and decommissioning activities.

- CSA's accredited and transparent standards development process brings stakeholders together in a collaborative and consensus-building process – in a way that is balanced, open, and subject to public review. Interested persons can participate in CSA standards development in various ways, including by requesting membership on a committee, providing input during public review of draft standards, requesting interpretation of provisions in a published standard, or proposing changes to a standard.



- The CSA N292 and N294 Technical Committees (TCs) collaborate with one another with the aim of developing consistent requirements within the CSA N294 and N292 suite of Standards, and will continue to seek opportunities to further strengthen their collaboration.
- Specific ways that CSA standards support and align with the draft policy principles include the following:

2.4: Waste producers and owners will plan radioactive waste management and decommissioning projects in an open and transparent manner, with early input from Indigenous peoples, provinces, territories, interested communities, scientific experts and other interested persons in Canada

- CSA N292.7 requires that when considering the development of a deep geological disposal facility, programs for engagement with Indigenous groups, members of the public, and stakeholders be established as early as possible (Clause 5.1, Engagement programs).
- CSA N294 recommends that in the planning for decommissioning, consideration be given to developing and implementing public engagement and Indigenous engagement programs (Clause 5.3.1, Public and Indigenous communication and engagement).

2.5: Waste producers and owners will 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 and monitoring of radioactive waste management and decommissioning projects; inclusion of Indigenous Knowledge and advice

- CSA N292.7 requires that site characterization address gathering of Indigenous perspectives on site characteristics (Clause 6.2.3.2, Purpose of site characterization). The standard also recommends that site characterization be informed by both Indigenous and Western science knowledge systems (Clause 6.2.3.4.1, Level of detail of site characteristics). Table 1 (Parameters to be addressed by the site characterization program) of the standard is inclusive of Indigenous Information and Knowledge.
- CSA N294 includes Indigenous Knowledge as a source of information that may be used to assess the state of the site and/or the facility after shutdown (Clause 7.5.2, Investigation and assessment of the state of the facility after shutdown).

2.8: Waste producers and owners will 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

- CSA's standards development process leverages the in-kind contributions of key stakeholders, reducing duplication of effort, and providing a forum for collaboration and sharing of operational experience.
- CSA standards are living documents, which are updated and revised based on periodic review. Standards are maintained and updated based on experience gained during their application, in consideration of user feedback, to reflect technological advances, and to address the evolving needs of the sector.

Policy Commitment 3: The federal government is committed to global excellence in the fields of radioactive waste management and decommissioning through international collaboration on effective technology, approaches and policies, by honouring its international commitments and respecting international guidance, and by providing international expertise as appropriate.

- The CSA standards development process involves benchmarking and harmonization with internationally accepted requirements and practices. Many CSA standards are derived from international standards and customized for the unique needs of Canada. For example: the CSA N292 suite of Standards, and CSA N294 were developed with consideration of the International Atomic



Energy Agency's Standards.

- CSA committees also represent a deep pool of subject matter expertise and can provide input on international standards development to reflect Canada's national interest. CSA standards can also be used as the basis for development of international standards.

Summary

As a leader in standards development for over 100 years, CSA has the experience to provide comprehensive standards solutions to unique challenges faced by Canada. CSA proactively and continuously engages with diverse stakeholders to develop and maintain standards that support the safety and reliability of nuclear facilities throughout their lifecycles, and the management of radioactive waste. These stakeholders represent a broad network that can be leveraged to provide technical expertise, liaise with international standards organizations, and collaborate on standards development.

We hope that as *Canada's Policy on Radioactive Waste Management and Decommissioning* is finalized, standards will continue to be recognized as key supporting elements for Canada's policy and regulatory framework. We would be pleased to provide further details and answer any questions regarding the CSA Nuclear Program and its standards work.



Appendix A: CSA Standards for Radioactive Waste Management and Decommissioning

Specific to the topics of Canada's Radioactive Waste Policy Review, ten (10) CSA nuclear standards that are pertinent, that are either published or in development, are described below. Instructions on accessing view access of published CSA nuclear standards are available at <https://www.csagroup.org/standards/areas-of-focus/nuclear/view-nuclear-standards/>.

Radioactive Waste Management

CSA N292.0:19, *General principles for the management of radioactive waste and irradiated fuel*

This standard specifies common requirements for the management of radioactive waste and irradiated fuel from generation to storage or disposal. Management activities include, but are not limited to, handling, packaging, transportation, processing and storage, care-taking/monitoring, and long-term management of radioactive waste. Management requirements addressed in CSA N292.0 include minimizing the generation of radioactive waste, as well as the characterization, segregation, and classification of radioactive waste. This standard requires the implementation of a waste management program that address all waste streams associated with or potentially contaminated by nuclear substances, and considers the waste hierarchy. This standard also addresses the safety assessment and additional requirements for waste management facilities.

This standard is used in concert with all CSA standards that apply to the management of radioactive waste and irradiated fuel, including those within the CSA N292 suite of standards and CSA N294.

CSA N292.1-16, *Wet storage of irradiated fuel and other radioactive materials*

This standard specifies requirements for the wet storage of irradiated fuel and other radioactive materials requiring shielding or decay heat dissipation. The standard also addresses the design, construction and commissioning, operation, and management of the wet storage system.

CSA N292.2-13, *Interim dry storage of irradiated fuel*

This standard specifies requirements specific to interim dry storage systems for irradiated fuel, including damaged or defective fuel. It also specifies requirements for the site selection, design, construction, commissioning, operation, and planning for decommissioning of dry storage systems.

CSA N292.3-14, *Management of low- and intermediate-level radioactive waste*

This standard specifies requirements specific to the management of low- and intermediate-level radioactive waste. Management activities include, but are not limited to, handling, packaging, transportation, processing and storage, monitoring, and long-term management of radioactive waste. The standard also includes considerations for waste minimization.

[In development] CSA N292.4, *Storage of radioactive waste and irradiated fuel*

This standard will specify requirements specific to the storage of radioactive waste and irradiated fuel, including requirements for transfer of radioactive materials from wet storage to dry storage, and within a storage system. The standard will specify requirements for the lifecycle of a storage system, and will address activities including Indigenous and public engagement, site evaluation, design, monitoring and surveillance, safety assessment, site preparation, construction, commissioning, operation, and decommissioning.

Note: As part of restructuring the CSA N292 suite of Standards (in progress), this standard is being developed based on the existing requirements of CSA N292.0, CSA N292.1, CSA N292.2, CSA N292.3, and CSA N292.6.



CSA N292.5-11, *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances*

This guideline provides direction for the application of exemption quantity and clearance level criteria for the release of materials containing, or potentially containing, radioactive nuclear substances, and the activities necessary to demonstrate compliance with these criteria.

CSA N292.6-18, *Long-term management of radioactive waste and irradiated fuel*

This standard addresses the management of radioactive waste and irradiated fuel associated with long-term storage and transitions. Long-term storage is defined as storage beyond 50 years, but generally not exceeding 100 years. (These timeframes are consistent with the use of the term “long- term storage” by the International Atomic Energy Agency (IAEA)). Management activities include, but are not limited to, handling, packaging, transportation, processing and storage/emplacement, and monitoring. Consistent with the waste hierarchy, the standard includes requirements intended to ensure that the amount of waste that will require disposal is minimized.

CSA N292.7:22, *Deep geological disposal of radioactive waste and irradiated fuel*

This standard specifies requirements for the lifecycle of a deep geological disposal facility, and addresses activities including Indigenous and public engagement, site evaluation, design, monitoring and surveillance, safety assessment, site preparation, construction, commissioning, operation, closure, and institutional controls.

CSA N292.8:21, *Characterization of radioactive waste and irradiated fuel*

This standard pertains to the characterization of radioactive waste and irradiated fuel. This standard specifies the overall requirements for establishing and implementing a waste characterization strategy, program, and plan, as well as methodologies for the sampling and characterization of radioactive waste and irradiated fuel. The standard also provides guidance for the timing of waste characterization planning and execution, waste characterization during nuclear decommissioning and site remediation, and reporting of waste characterization results. This standard applies to waste characterization during all steps in the management of radioactive waste and irradiated fuel, including generation, handling, processing, transport, storage, and disposal.

Decommissioning of Nuclear Facilities

CSA N294:19, *Decommissioning of facilities containing nuclear substances*

This standard applies to the decommissioning of nuclear facilities and other locations where nuclear substances are managed, possessed, or stored. The standard includes requirements regarding responsibilities for decommissioning, general requirements regarding decommissioning, as well as requirements specific to the four phases of decommissioning (planning, preparation, execution, and completion of decommissioning), and requirements specific to institutional controls following decommissioning. This standard also provides requirements specific to end-state verification, with an informative Annex addressing defining end-state objectives for decommissioning.