



# Waste Management **Framework for Radioactive Waste Management and Decommissioning in Canada**

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REGDOC-2.11, Version 2

March 2021



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Regulatory document REGDOC-2.11, Version 2

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Cat. No. CC172-204/2021E-PDF

ISBN 978-0-660-37606-6

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*Également publié en français sous le titre : Cadre de gestion des déchets radioactifs et du déclassé au Canada, version 2*

## **Document availability**

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## **Publishing history**

December 2018      Version 1

Mars 2021            Version 2

## Preface

This regulatory document is part of the CNSC's waste management series of regulatory documents, which covers the management of radioactive waste, including uranium mine waste rock, uranium mine and mill tailings, and decommissioning. The full list of regulatory document series is included at the end of this document and can also be found on the [CNSC's website](#).

Regulatory document REGDOC-2.11, *Framework for Radioactive Waste Management and Decommissioning in Canada*, provides overview information on the governance and regulatory framework for radioactive waste management and decommissioning in Canada. This overview provides the basis for the other documents in the waste management series:

- REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste*
- REGDOC-2.11.1, *Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings*
- REGDOC-2.11.1, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste*
- REGDOC-2.11.2, *Decommissioning*

For information on the implementation of regulatory documents and on the graded approach, see [REGDOC-3.5.3, Regulatory Fundamentals](#).

The words “shall” and “must” are used to express requirements to be satisfied by the licensee or licence applicant. “Should” is used to express guidance or that which is advised. “May” is used to express an option or that which is advised or permissible within the limits of this regulatory document. “Can” is used to express possibility or capability.

Nothing contained in this document is to be construed as relieving any licensee from any other pertinent requirements. It is the licensee's responsibility to identify and comply with all applicable regulations and licence conditions.

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## Framework for Waste Management and Decommissioning in Canada

### 1. Introduction

Radioactive waste in Canada is defined as any material (liquid, gaseous or solid) that contains a radioactive nuclear substance, as defined in section 2 of the [Nuclear Safety and Control Act](#) (NSCA), for which no further use is foreseen. In addition to containing nuclear substances, radioactive waste may also contain hazardous substances that are not radioactive, as defined in section 1 of the [General Nuclear Safety and Control Regulations](#).

Under Canada's national framework for radioactive waste management (described in section 2), waste owners are required to manage this waste in a safe and secure manner, and to arrange for its long-term management.

This regulatory document also provides an overview of the framework for the planning, preparation, execution and completion of decommissioning in Canada. The CNSC defines decommissioning as the administrative and technical actions taken to allow the removal of some or all of the regulatory controls from a facility, location or site where nuclear substances are managed, used, possessed or stored. Decommissioning actions are the procedures, processes and work activities (such as storage with surveillance, decontamination, dismantling or cleanup) that are taken to retire a facility, location or site from service with due regard for the health and safety of people and the environment.

#### 1.1 Purpose

This document provides information on the framework for radioactive waste management and decommissioning in Canada. It describes the philosophy underlying the CNSC's approach to regulating the management of radioactive waste and the decommissioning of facilities, locations or sites, and explains the principles taken into account in CNSC regulatory decisions. This document also details the CNSC's regulatory policy that:

- requires the implementation of measures to manage radioactive waste to:
  - protect the health and safety of persons and the environment
  - provide for the maintenance of national security
  - achieve conformity with measures of control and international obligations to which Canada has agreed
- promotes consistent national and international standards and practices for decommissioning and the management and control of radioactive waste

#### 1.2 Scope

This regulatory document is relevant to all radioactive waste management, including the generation, handling, processing, storage, transport and disposal of radioactive waste, and all phases of decommissioning, including planning, preparation, execution and completion, in Canada.

#### 1.3 Relevant legislation

In addition to the NSCA and its regulations, the following federal legislation is relevant to the regulation and management of radioactive waste and decommissioning in Canada:

- [Nuclear Fuel Waste Act](#)
- [Nuclear Liability and Compensation Act](#)
- [Nuclear Energy Act](#)
- [Impact Assessment Act](#)
- [Canadian Environmental Protection Act, 1999](#)
- [Fisheries Act](#)

Several Government of Canada departments and agencies are involved in administering these legislative instruments. Where multiple regulators are involved, the CNSC may coordinate activities in order to optimize regulatory efforts.

In addition, the nuclear industry is subject to the provincial acts and regulations in force within the individual provinces and territories where nuclear-related activities are carried out. Where jurisdictions and responsibilities overlap, the CNSC leads efforts to harmonize regulatory activities, including joint regulatory groups that involve provincial and territorial regulators.

## 2. Canada's National Framework for the Management of Radioactive Waste

[Natural Resources Canada](#) (NRCan) is the lead government department responsible for developing and implementing federal nuclear energy policy across the nuclear supply chain – from uranium mining to the final disposition of waste. NRCan's functions include administering the [Nuclear Fuel Waste Act](#) (NFWA), the [Nuclear Liability and Compensation Act](#) (NLCA) and the [Radioactive Waste Policy Framework](#) [1].

### ***Radioactive Waste Policy Framework***

The Government of Canada's [Radioactive Waste Policy Framework](#) [1], established through NRCan, specifies that:

- the Government of Canada will ensure that radioactive waste disposal is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner
- the Government of Canada is responsible for developing policy, and regulating and overseeing radioactive waste producers and owners to ensure that they comply with legal requirements and meet their funding and operational responsibilities in accordance with approved waste management plans
- waste owners are responsible, in accordance with the “polluter pays” principle, for the funding, organization, management and operation of the facilities, locations or sites required to safely manage their wastes over the short and long terms. The framework recognizes that arrangements may be different for the four general classes of radioactive waste in Canada:
  - low-level radioactive waste
  - intermediate-level radioactive waste
  - high-level radioactive waste
  - uranium mine and mill waste

For more information on the classification and characterization of radioactive waste, consult the following CNSC infographics: [What is Radioactive Waste?](#) [2] and [Radioactive Waste Characterization](#) [3].

### ***Nuclear Fuel Waste Act***

In 2002, Parliament passed the NFWA, which required nuclear energy corporations to establish a waste management organization as a separate legal entity to manage the full range of activities for the long-term management of used nuclear fuel. The NFWA also required that this waste management organization prepare and submit a study to the Government of Canada on proposed approaches for the long-term management of the used fuel. Under this Act, the Government of Canada was designated responsible for:

- reviewing the waste management organization’s study on proposed approaches for the long-term management of spent fuel
- selecting a long-term management option from those proposed and outlined in the study
- providing oversight during the implementation of the selected option

In accordance with the NFWA’s requirement to establish a waste management organization as outlined above, Canada’s nuclear electricity producers established the [Nuclear Waste Management Organization](#) (NWMO) in 2002. The NWMO was given the responsibility for designing and implementing Canada’s plan for the safe, long-term management of used nuclear fuel. After a comprehensive three-year study and extensive public engagement, the NWMO presented the study, including its preferred approach, to the Government of Canada. In 2007, the NWMO’s recommendation of [Adaptive Phased Management \(APM\)](#) [4] was selected as the preferred approach for the safe and secure long-term management of Canada’s used nuclear fuel. APM – which involves the containment and isolation of Canada’s used fuel at a new repository site – comprises six phases, starting with site selection to post-closure monitoring of the site. The NWMO is now responsible for implementing APM, subject to all necessary regulatory approvals.

### **3. The CNSC’s Regulatory Framework and Oversight of Waste Management and Decommissioning**

The CNSC has developed a comprehensive regulatory framework that guides its regulation of Canada’s nuclear industry. A complete overview of the CNSC’s regulatory framework can be found in section 3 of REGDOC-3.5.3, *Regulatory Fundamentals* [5].

With respect to radioactive waste management and decommissioning, this framework comprises:

- the NSCA and its associated regulations
- licences and their accompanying licence conditions handbooks
- the regulatory documents related to waste management and decommissioning:
  - REGDOC-1.2.1, *Guidance on Deep Geological Repository Site Characterization* [6]
  - REGDOC-2.11.1, *Waste Management, Volume I: Management of Radioactive Waste* [7]
  - REGDOC-2.11.1, *Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings* [8]
  - REGDOC-2.11.1, *Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste* [9]
  - REGDOC-2.11.2, *Decommissioning* [10]
  - REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities* [11]
- guidance, which is used to inform applicants or licensees on how to meet requirements, to elaborate further on requirements, or to provide best practices

In developing the documents and guidance that fall under its regulatory framework, the CNSC draws upon recommendations of the International Atomic Energy Agency (IAEA), as well as information on best practices from the international and national community. This information includes [CSA Group standards](#), which complement CNSC regulatory documents.

In the regulation of radioactive waste management and decommissioning, the CNSC makes appropriate use of industry standards created by independent, third-party standard-setting organizations, such as the CSA Group. The following [CSA Group standards](#) are relevant to waste management and decommissioning:

- CSA N292.0, *General principles for the management of radioactive waste and irradiated fuel* [12]
- CSA N292.1, *Wet storage of irradiated fuel and other radioactive materials* [13]
- CSA N292.2, *Interim dry storage of irradiated fuel* [14]
- CSA N292.3, *Management of low- and intermediate-level radioactive waste* [15]
- CSA N292.5, *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances* [16]
- CSA N292.6, *Long-term management of radioactive waste and irradiated fuel* [17]
- CSA N294, *Decommissioning of facilities containing nuclear substances* [18]

Under the CNSC's performance-based approach to regulation, the licence applicant proposes a waste management or decommissioning approach supported by scientifically defensible benchmarks. The CNSC then assesses the proposal against existing regulatory requirements to ensure the health, safety, and security of the public and the protection of the environment.

### **Oversight of radioactive waste management**

The CNSC is responsible for licensing the management of radioactive waste, including, as applicable, its generation, handling, processing, transport, storage and disposal. Since all nuclear substances associated with licensed activities will eventually become radioactive waste, the safe management of all radioactive waste is considered during the licensing review process for any CNSC-licensed facility or activity.

When making regulatory decisions about the management of radioactive waste, the CNSC considers the extent to which the owners of the waste have addressed the following six principles:

- generation of radioactive waste is minimized to the extent practicable by the implementation of design measures, operating procedures and decommissioning practices
- management of radioactive waste is commensurate with the waste's radiological, chemical and biological hazard to the health and safety of persons, to the environment and to national security
- assessment of future impacts of radioactive waste on the health and safety of persons and the environment encompasses the period of time during which the maximum impact is predicted to occur
- predicted impacts on the health and safety of persons and the environment from the management of radioactive waste are no greater than the impacts that are permissible in Canada at the time of the regulatory decision
- measures needed to prevent unreasonable risk to present and future generations from the hazards of radioactive waste are developed, funded and implemented as soon as reasonably practicable



- trans-border effects on the health and safety of persons and the environment that could result from the management of radioactive waste in Canada are not greater than the effects experienced in Canada

The CNSC is committed to optimizing regulatory efforts, and to consulting and cooperating with provincial, national and international agencies to:

- promote harmonized regulation and consistent national and international standards for the management of radioactive waste
- achieve conformity with the measures of control and international obligations to which Canada has agreed concerning radioactive waste

### **Decommissioning**

In accordance with CNSC regulatory document REGDOC-2.11.2, *Decommissioning* [10], licensees have up-to-date decommissioning plans that are maintained throughout the lifecycle of a licensed facility. In addition, the CNSC requires all licensees to implement financial guarantees to cover the cost of decommissioning work resulting from the licensed activities. Decommissioning plans that assume the need for post-closure licensing, monitoring, surveillance and maintenance of the decommissioned activities include financial provisions for these actions. For more information on financial guaranties, see regulatory document REGDOC-3.3.1, *Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities* [11].

Licensees prepare a preliminary decommissioning plan (PDP) and a detailed decommissioning plan (DDP). The PDP is filed with the CNSC as early as possible in the lifecycle of the facility and is reviewed and updated periodically. The DDP is filed with the CNSC prior to decommissioning and is required for appropriate licensing action (i.e., a licence to authorize decommissioning activities). Proponents propose their preferred strategy as part of their PDP. Before any proposed decommissioning strategy is executed, it must be supported by a safety assessment that the CNSC evaluates against regulatory requirements to ensure the protection of the health, safety, and security of the public and the protection of the environment.

## **4. International Obligations**

Canada is a signatory to the [Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management](#) (Joint Convention) [19], an international agreement governing all aspects of the management of spent fuel and radioactive waste. The Joint Convention is a legally binding treaty that aims to ensure worldwide safe management of radioactive waste. It represents the participating countries' commitment to achieving and maintaining a consistent high level of safety in the management of spent fuel and radioactive waste as part of the global safety regime for ensuring the protection of people and the environment. The Joint Convention allows for the international peer review of a country's radioactive waste management programs. Prior to the peer review, Canada submits a national report demonstrating the measures taken to implement the agreement's obligations. [Canada's national reports to the Joint Convention](#) are published every three years.

## Glossary

For definitions of the terms used in this document, see [REGDOC-3.6, \*Glossary of CNSC Terminology\*](#), which includes terms and definitions used in the [Nuclear Safety and Control Act](#) and the regulations made under it, and in CNSC regulatory documents and other publications. REGDOC-3.6 is provided for reference and information.

## References

1. Natural Resources Canada. [\*Radioactive Waste Policy Framework\*](#).
2. CNSC. [\*What Is Radioactive Waste?\*](#)
3. CNSC. [\*Radioactive Waste Characterization\*](#).
4. Nuclear Waste Management Organization. [\*Adaptive Phased Management \(APM\)\*](#).
5. CNSC. [\*REGDOC-3.5.3, Regulatory Fundamentals\*](#). Ottawa, 2021.
6. CNSC. [\*REGDOC-1.2.1, Guidance on Deep Geological Repository Site Characterization\*](#). Ottawa, Ottawa, 2021.
7. CNSC. [\*REGDOC-2.11.1, Waste Management, Volume I: Management of Radioactive Waste\*](#). Ottawa, Ottawa, 2021.
8. CNSC. [\*REGDOC-2.11.1, Waste Management, Volume II: Management of Uranium Mine Waste Rock and Mill Tailings\*](#). Ottawa, 2018.
9. CNSC. [\*REGDOC-2.11.1, Waste Management, Volume III: Safety Case for the Disposal of Radioactive Waste\*](#). Ottawa, 2021.
10. CNSC. [\*REGDOC-2.11.2, Decommissioning\*](#). Ottawa, 2021.
11. CNSC. [\*REGDOC-3.3.1, Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities\*](#). Ottawa, 2021.
12. CSA Group. [\*CSA N292.0-14, General Principles For The Management Of Radioactive Waste and Irradiated Fuel\*](#). Toronto, 2014.
13. CSA Group. [\*CSA N292.1, Wet Storage of Irradiated Fuel and Other Radioactive Materials\*](#). Toronto, 2016.
14. CSA Group. [\*CSA N292.2, Interim Dry Storage of Irradiated Fuel\*](#). Toronto, 2013.
15. CSA Group. [\*CSA N292.3, Management of Low- and Intermediate-Level Radioactive Waste\*](#). Toronto, 2014.
16. CSA Group. [\*CSA N292.5, Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances\*](#). Toronto, 2011.
17. CSA Group. [\*CSA N292.6, Long-Term Management of Radioactive Waste and Irradiated Fuel\*](#). Toronto, 2018.
18. CSA Group. [\*CSA N294, Decommissioning of Facilities Containing Nuclear Substances\*](#). Toronto, 2009.
19. CNSC. [\*Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management\*](#). Ottawa, 2020.

## Additional Information

The following documents are not referenced in this regulatory document but contain information that may be useful to the reader:

- CNSC. [CNSC research on geologic repositories](#).
- CNSC. [Deep Geologic Repositories](#).
- CNSC. [Oversight of Canada's Framework for Radioactive Waste Management](#).
- CNSC. [Regulating Canada's Geological Repositories](#).
- CNSC. [Uranium Mining and Milling: The Facts on a Well-Regulated Industry](#).
- IAEA. [IAEA Safety Standards Series No. GSR Part 5, \*Predisposal Management of Radioactive Waste\*](#). Vienna, 2009.
- IAEA. [IAEA Safety Standards Series No. GSR Part 6, \*Decommissioning of Facilities\*](#). Vienna, 2014.
- IAEA. [IAEA Safety Standards Series No. SSR-5, \*Disposal of Radioactive Waste\*](#). Vienna, 2011.

## CNSC Regulatory Document Series

Facilities and activities within the nuclear sector in Canada are regulated by the CNSC. In addition to the NSCA and associated regulations, these facilities and activities may also be required to comply with other regulatory instruments such as regulatory documents or standards.

CNSC regulatory documents are classified under the following categories and series:

### 1.0 Regulated facilities and activities

Series	1.1	Reactor facilities
	1.2	Class IB facilities
	1.3	Uranium mines and mills
	1.4	Class II facilities
	1.5	Certification of prescribed equipment
	1.6	Nuclear substances and radiation devices

### 2.0 Safety and control areas

Series	2.1	Management system
	2.2	Human performance management
	2.3	Operating performance
	2.4	Safety analysis
	2.5	Physical design
	2.6	Fitness for service
	2.7	Radiation protection
	2.8	Conventional health and safety
	2.9	Environmental protection
	2.10	Emergency management and fire protection
	2.11	Waste management
	2.12	Security
	2.13	Safeguards and non-proliferation
	2.14	Packaging and transport

### 3.0 Other regulatory areas

Series	3.1	Reporting requirements
	3.2	Public and Indigenous engagement
	3.3	Financial guarantees
	3.4	Commission proceedings
	3.5	CNSC processes and practices
	3.6	Glossary of CNSC terminology

**Note:** The regulatory document series may be adjusted periodically by the CNSC. Each regulatory document series listed above may contain multiple regulatory documents. Visit the CNSC's website for the latest [list of regulatory documents](#).