



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

REGDOC-2.11

December 2018



Framework for Radioactive Waste Management and Decommissioning in Canada

Regulatory document REGDOC-2.11

© Canadian Nuclear Safety Commission (CNSC) 2018

Cat. No. CC172-204/2018E-PDF

ISBN 978-0-660-28841-3

Extracts from this document may be reproduced for individual use without permission provided the source is fully acknowledged. However, reproduction in whole or in part for purposes of resale or redistribution requires prior written permission from the Canadian Nuclear Safety Commission.

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

Document availability

This document can be viewed on the [CNSC website](#). To request a copy of the document in English or French, please contact:

Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1046, Station B
Ottawa, ON K1P 5S9
CANADA

Tel.: 613-995-5894 or 1-800-668-5284 (in Canada only)

Fax: 613-995-5086

Email: cpsc.info.ccsn@canada.ca

Website: nuclearsafety.gc.ca

Facebook: facebook.com/CanadianNuclearSafetyCommission

YouTube: youtube.com/cpsc

Twitter: [@CNSC_CCSN](https://twitter.com/CNSC_CCSN)

LinkedIn: linkedin.com/company/cpsc-ccsn

Publishing history

December 2018 Version 1.0

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 the decommissioning of facilities containing nuclear substances. 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* (in development)
- [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: Assessing the Long-term Safety of Radioactive Waste Management*](#)
- [G-219, *Decommissioning Planning for Licensed Activities*](#)

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

The word “shall” is used to express a requirement 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.

Table of Contents

1.	Introduction.....	1
1.1	Purpose.....	1
1.2	Scope.....	1
1.3	Relevant legislation.....	1
2.	Canada’s National Framework for the Management of Radioactive Waste	2
3.	The CNSC’s Regulatory Framework and Oversight of Waste Management and Decommissioning.....	3
4.	International Obligations	5
	Glossary	6
	References	7

Framework for Waste Management and Decommissioning in Canada

1. Introduction

Radioactive waste 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), and which the owner has declared to be waste. In addition to containing nuclear substances, radioactive waste may also contain non-radioactive hazardous substances, as defined in section 1 of the [General Nuclear Safety and Control Regulations](#).

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

This regulatory document also provides an overview of the framework for decommissioning nuclear facilities in Canada. The CNSC defines decommissioning as the actions taken to retire a licensed facility permanently from service and render it to a predetermined end-state condition.

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, 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 decommissioning and waste management facilities and activities in Canada, including the generation, handling, processing, storage, transport and disposal of radioactive waste.

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 in Canada:

- [Nuclear Fuel Waste Act](#)
- [Nuclear Liability and Compensation Act](#)
- [Nuclear Energy Act](#)
- [Canadian Environmental Assessment Act, 2012](#)
- [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) and the [Radioactive Waste Policy Framework](#).

Radioactive Waste Policy Framework

The Government of Canada's [Radioactive Waste Policy Framework](#), established through NRCAN, sets the stage for institutional and financial arrangements to manage radioactive waste in a safe, comprehensive, environmentally sound, integrated and cost-effective manner. The framework specifies that:

- 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 long-term waste management plans
- waste owners are responsible, in accordance with the “polluter pays” principle, for the funding, organization, management and operation of the facilities required to safely manage their wastes over the short and long terms. The framework recognizes that arrangements may be different for the four broad categories of radioactive waste found 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 waste, consult the following CNSC infographics: [What is Radioactive Waste?](#) [1] and [Radioactive Waste Characterization](#) [2].

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 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 NWFA'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 \(APM\)](#) 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](#) [3].

With respect to radioactive waste management and the decommissioning of nuclear facilities, this framework comprises:

- the *Nuclear Safety and Control Act* and its associated regulations
- licences and their accompanying licence conditions handbooks
- the regulatory documents in the waste management series:
 - REGDOC-2.11.1, Waste Management, Volume I: *Management of Radioactive Waste* (in development)
 - [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: Assessing the Long-term Safety of Radioactive Waste Management](#)
 - [G-219, Decommissioning Planning for Licensed Activities](#)
- 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 the International Atomic Energy's recommendations as well as information on best practices from the international and national community. This information includes [CSA 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 CSA Group. The following [CSA standards](#) are relevant to waste management and decommissioning:

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

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 transport, storage and disposal. Since all nuclear substances associated with licensed activities will eventually become radioactive waste, the safe long-term 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:

- The generation of radioactive waste is minimized to the extent practicable by the implementation of design measures, operating procedures and decommissioning practices.
- The 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.
- The 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.
- The 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.
- The 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.
- The 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 guide [G-219, *Decommissioning Planning for Licensed Activities*](#) [4], 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 guide [G-206, *Financial Guarantees for the Decommissioning of Licensed Activities*](#) [5].

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) [6], 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 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. Canadian Nuclear Safety Commission (CNSC). [What is Radioactive Waste?](#)
2. CNSC. [Radioactive Waste Characterization](#).
3. CNSC. [REGDOC-3.5.3, Regulatory Fundamentals](#). Ottawa, 2018.
4. CNSC. [G-219, Decommissioning Planning for Licensed Activities](#). Ottawa, 2000.
5. CNSC. [G-206, Financial Guarantees for the Decommissioning of Licensed Activities](#). Ottawa, 2000.
6. CNSC. [Canadian National Report for the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management](#). Ottawa, 2017.

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. [REGDOC-2.11.1, Waste Regulatory Framework Volume II: Management of Uranium Mine and Waste Rock and Mill Tailings](#). Ottawa, 2018.
- CNSC. [REGDOC-2.11.1, Waste Regulatory Framework, Volume III: Assessing the Long-Term Safety of Radioactive Waste Management](#). Ottawa, 2018.
- CNSC. [Regulating Canada's Geological Repositories](#).
- CNSC. [Uranium Mining and Milling: The Facts on a Well-Regulated Industry](#).
- International Atomic Energy Agency (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 Canadian Nuclear Safety Commission (CNSC). In addition to the *Nuclear Safety and Control Act* and associated regulations, these facilities and activities may also be required to comply with other regulatory instruments such as regulatory documents or standards.

Effective April 2013, the CNSC's catalogue of existing and planned regulatory documents has been organized under three key categories and twenty-six series, as set out below. Regulatory documents produced by the CNSC fall under one of the following 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 Aboriginal 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. For the latest list of regulatory documents, visit the [CNSC's website](#).