

Decommissioning and Environmental Remediation: International and Canadian Requirements

NRCan Joint Engagement Table
May 13, 2021

Ole Hendrickson, Ph.D.
Concerned Citizens of Renfrew County and Area

I will compare IAEA and CNSC decommissioning requirements.

<p>IAEA Safety Standards for protecting people and the environment</p>	<p>IAEA Safety Standards for protecting people and the environment</p>
<p>Decommissioning of Facilities</p>	<p>Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities</p>
<p><u>General Safety Requirements Part 6</u> No. GSR Part 6</p>	<p><u>Specific Safety Guide</u> No. SSG-47</p>
<p> IAEA International Atomic Energy Agency</p>	<p> IAEA International Atomic Energy Agency</p>

GSR Part 6 establishes internationally agreed requirements for decommissioning. SSG-47 provides additional guidance.

IAEA Safety Requirements GSR Part 6 Decommissioning of Facilities

Introduction

1.9. Strategies for decommissioning that have been adopted or are being considered by States include immediate dismantling and deferred dismantling...

1.10. A combination of these two strategies may be considered practicable... **Entombment, in which all or part of the facility is encased in a structurally long lived material, is not considered a decommissioning strategy and is not an option in the case of planned permanent shutdown.** It may be considered a solution only under exceptional circumstances (e.g. following a severe accident).

GSR Part 6 recognizes two acceptable decommissioning strategies – immediate and deferred dismantling.

Entombment, or *in-situ* decommissioning, is unacceptable...

Canada's Nuclear Regulator

Waste Management
Decommissioning

REGDOC-2.11.2

CNSC's recommended decommissioning strategies:

- a) immediate (prompt) decommissioning – to decontaminate, dismantle and/or clean up without any planned delays
- b) deferred decommissioning – to place the facility, location or site in a period of storage with surveillance
- c) **in situ decommissioning**

Canadian Nuclear Safety Commission / Commission canadienne de sûreté nucléaire

Canada

...but CNSC REGDOC-2-11-2 recommends *in situ* decommissioning, so as to enable on-site disposal of federal legacy reactors and SMRs if their removal is not “practicable.”

Requirement 4: Responsibilities of the government for decommissioning

The government shall establish and maintain a governmental, legal and regulatory framework within which all aspects of decommissioning... can be planned and carried out safely.

3.2 The responsibilities of the government shall include:

Establishing a national policy for the management of radioactive waste, **including radioactive waste generated during decommissioning.**

Canada's Radioactive Waste Policy Framework does not address decommissioning waste.

Requirement 7: Integrated management system for decommissioning

SSG-47 notes that “Specialized expertise might be necessary in areas such as: **Radiological characterization**; Radiation protection; Safety assessment; **Cost estimation**; **Environmental protection**; Industrial safety; **Nuclear security** and accounting for and control of nuclear material; **Emergency preparedness**; Regulatory and/or licensing expertise; Decontamination, dismantling and demolition; Robotics and remote handling; Predisposal **management of waste** (e.g. processing, storage and transport of waste); **Site remediation** and landscaping.”

Waste characterization, cost estimation, emergency preparedness, waste management, and site remediation all require specialized expertise.

Requirement 8: Selecting a decommissioning strategy

The licensee shall select a decommissioning strategy that will form the basis for the planning for decommissioning. The strategy shall be consistent with the national policy on the management of radioactive waste.

5.1. The preferred decommissioning strategy shall be immediate dismantling. However, there may be situations in which immediate dismantling is not a practicable strategy when all relevant factors are considered.

5.2. **The selection of a decommissioning strategy shall be justified by the licensee.**

CNSC (draft language) – “The licensee shall justify the selected strategy and should conduct a comparison of alternative decommissioning strategies.”

IAEA requires that the decommissioning strategy be justified, but CNSC removed language on justification from REGDOC-2.11.2.

Selecting a decommissioning strategy (Guidance from SSG-47)

5.2. In principle, two possible decommissioning strategies are applicable: immediate dismantling and deferred dismantling.

- Generally, **immediate dismantling** is the preferred strategy, as it **avoids transferring the burden of decommissioning to future generations**.
- **Release from regulatory control without restrictions should be the preferred end state** and ultimate objective of decommissioning.
- No action... and entombment... are not acceptable decommissioning strategies.

Immediate dismantling avoids burdening future generations.
Unrestricted use is the preferred end state.

Waste management considerations (Guidance from SSG-47)

5.40 ...when storage or disposal capacities are not available, the preferred decommissioning strategy could include a period of safe enclosure until the necessary waste management infrastructure is available.

5.41. If the waste management infrastructure is **not available**... efforts should be made to **synchronize the timing of the development of the waste management infrastructure with the anticipated timing of decommissioning**.

Synchronized development of waste management infrastructure avoids prolonged deferral of decommissioning,

Requirement 9: Financing of decommissioning

Responsibilities in respect of **financial provisions for decommissioning shall be set out in national legislation**. These provisions shall include establishing a mechanism to provide adequate financial resources and to ensure that they are available when necessary, for ensuring safe decommissioning.

6.1. It shall be ensured that adequate financial resources to cover the costs associated with safe decommissioning, including management of the resulting waste, are available when necessary.

The federal government's only financial provision for decommissioning is a letter from a past natural resources minister. This does not constitute a mechanism to provide adequate resources.

Requirement 10: Planning for decommissioning

The licensee shall prepare a decommissioning plan and shall maintain it throughout the lifetime of the facility, in accordance with the requirements of the regulatory body, in order to show that decommissioning can be accomplished safely to meet the defined end state.

7.16. Interested parties shall be provided with an opportunity to examine the final decommissioning plan and, as appropriate and subject to national regulations, supporting documents, and to provide comments prior to its approval.

IAEA requires the public be allowed to comment on the final decommissioning plan. CNSC only requires “a summary report of any public and Indigenous consultations.”

Planning for decommissioning (Guidance from SSG-47)

Public Involvement

7.45. Experience has shown that interested parties mainly focus their attention on the selected decommissioning **strategy and its justification**, the nature and extent of planned dismantling actions, the management and **long term storage of radioactive waste** on the site, the facility's **end state**, especially in the case of restricted reuse, the financial management of the **decommissioning fund** and the **socioeconomic impacts** of the decommissioning.

IAEA says the public is interested in the strategy, its justification, waste management, end state, financing, and socioeconomic impacts.

Requirement 14: Radioactive waste management in decommissioning

Radioactive waste shall be managed for all waste streams in decommissioning.

8.9. The licensee shall ensure traceability for all waste generated during decommissioning. The licensee shall maintain up to date records of the waste generated, stored in the facility, or transferred to another authorized facility, specifying its quantities, characteristics, treatment methods and destination.

Proper waste management requires traceability, as well as up-to-date records of quantities, characteristics, treatment methods, and destination.

CNSC lacks these requirements. But it requires licensees to “segregate as much material as possible for reuse and recycling.” This is problematic. Reuse could mean using radioactively contaminated concrete for road construction, landscaping, or landfill. Recycled radioactive metals can contaminate metal recycling facilities. Reprocessing of used fuel to extract plutonium, sometimes referred to as “recycling”, creates risks of nuclear weapons proliferation and should be forbidden.

IAEA Safety Standards

for protecting people and the environment

Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards

Jointly sponsored by
EC, FAO, IAEA, ILO, OECD/NEA, PAHO, UNEP, WHO



General Safety Requirements Part 3

No. GSR Part 3



GSR Part 3 deals with remediation of areas contaminated by past activities such as Port Hope or Chalk River.

Responsibilities for remediation of areas with residual radioactive material

- **A remedial action plan**, supported by a safety assessment, is prepared and is submitted to the regulatory body or other relevant authority for approval.
- An appropriate system for **maintaining, retrieval and amendment of records** that cover the nature and the extent of contamination; the decisions made before, during and after remediation; and information on verification of the results of remedial actions, including the results of all monitoring programmes after completion of the remedial actions
- **The government shall ensure that a strategy for radioactive waste management is put in place** to deal with any waste arising from the remedial actions
- **A mechanism for public information is in place and interested parties are involved in the planning, implementation and verification of the remedial actions**, including any monitoring following remediation.

GSR-3 requirements for contaminated areas include a remedial action plan, record keeping, a waste management strategy, and public involvement.

Summary points

- Decommissioning strategies justified and in conformity with IAEA guidance and requirements
- Public comment opportunities on strategies, end states, waste transport, financing and waste management
- Detailed radiological survey and radionuclide inventory prior to approval of decommissioning plans
- No transport without justification, traceability of wastes
- No reuse or recycling without justification
- Transmission/retention of records
- Decommissioning plans for all SMR license applications
- Financial provisions for decommissioning federal sites
- Long-term management infrastructure for federal wastes
- Federal remedial action plan for Chalk River

I would be pleased to share this presentation and discuss these points. Thank you.