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CSA N292.0:19

General principles for the management of radioactive waste and irradiated fuel



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Preface

This is the second edition of CSA N292.0, *General principles for the management of radioactive waste and irradiated fuel*. It supersedes the previous edition, published in 2014.

Changes to this edition include the following:

- a) The scope of this Standard has been expanded to include the management of other radioactive materials.
- b) Guidance has been provided on the re-characterization of radioactive materials, optimization for disposal, and safety assessments.
- c) Further guidance and requirements for containment systems, waste packages, and storage sites have been provided.
- d) Further guidance for waste management facilities has been provided for design, site selection, site characterization, non-routine activities, flood management, periodic monitoring, technological obsolescence, knowledge retention, and external collaboration.
- e) Terminology and requirements have been updated for harmonization with the CSA N292 series of Standards.

This Standard is part of a series of Standards on radioactive waste management. It specifies common requirements for the management of radioactive waste and irradiated fuel, and is used in concert with all CSA Standards that apply to the management of radioactive waste and irradiated fuel (e.g., CSA N292.1, CSA N292.2, CSA N292.3, CSA N292.5, CSA N292.6, and CSA N294).

Users of this Standard are reminded that the site selection, design, manufacture, construction, installation, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the *Nuclear Safety and Control Act* and its Regulations. The Canadian Nuclear Safety Commission might impose additional requirements to those specified in this Standard.

The CSA N-Series Standards provide an interlinked set of requirements for the management of nuclear facilities and activities. CSA N286 provides overall direction to management to develop and implement sound management practices and controls, while the other CSA nuclear Standards provide technical requirements and guidance that support the management system. This Standard works in harmony with CSA N286 and does not duplicate the generic requirements of CSA N286; however, it may provide more specific direction for those requirements.

This Standard was prepared by the Subcommittee on Management of Low- and Intermediate-Level Radioactive Waste, under the jurisdiction of the Technical Committee on Radioactive Waste Management and the Strategic Steering Committee on Nuclear Standards, and has been formally approved by the Technical Committee.

Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- 3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

- 4) To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include "Request for interpretation" in the subject line:
- define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
 - provide an explanation of circumstances surrounding the actual field condition; and
 - where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.

- 5) This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line:
- Standard designation (number);
 - relevant clause, table, and/or figure number;
 - wording of the proposed change; and
 - rationale for the change.

CSA N292.0:19

General principles for the management of radioactive waste and irradiated fuel

0 Introduction

0.1 Overview

Radioactive waste and irradiated fuel (also referred to as “radioactive material” in this Standard) are generated in the nuclear fuel cycle and from the use of radioisotopes in medicine, industry, institutions, and research. Approaches for managing radioactive waste and irradiated fuel vary depending on characteristics of the material involved. Consideration of all steps during the management of radioactive material in the early phases of waste management provides additional possible exit paths. Management activities include, but are not limited to, handling, packaging, transportation, processing and storage, care-taking/monitoring, and long-term management of radioactive waste.

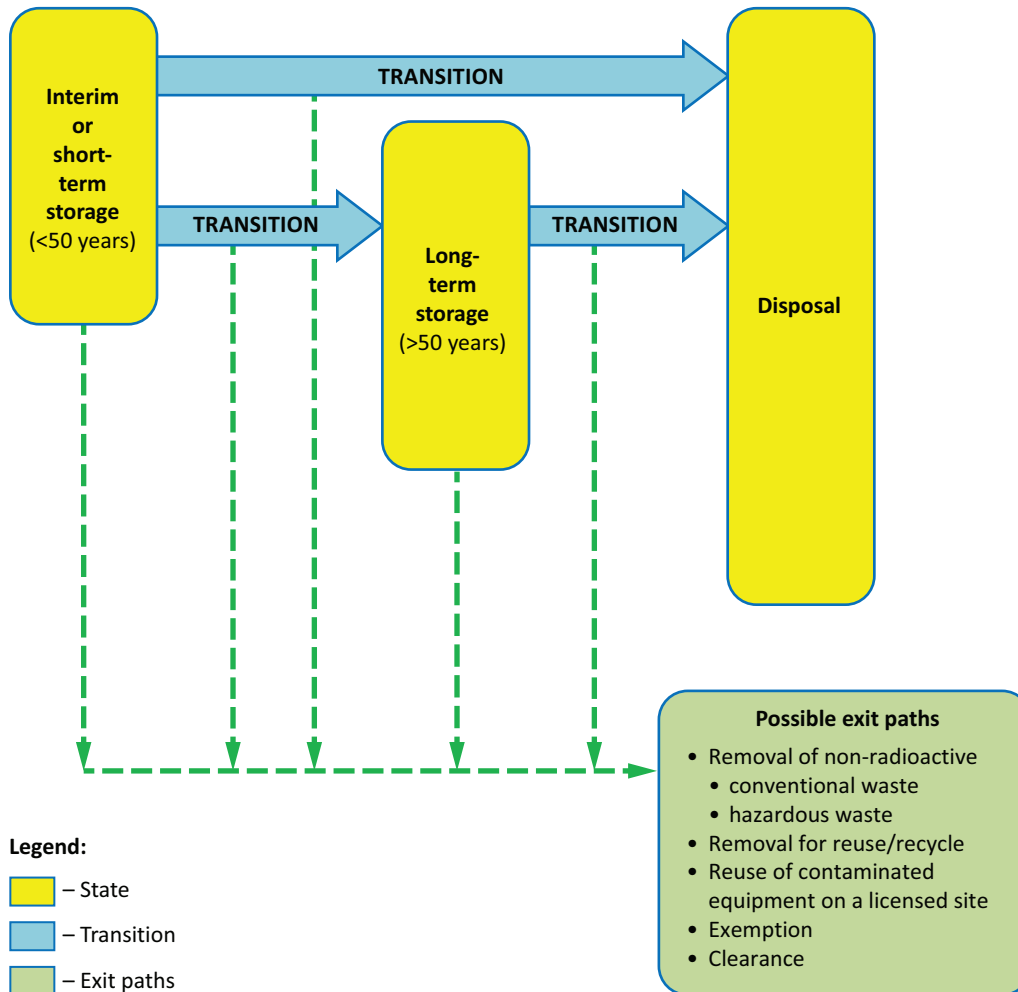
After radioactive waste and irradiated fuel are generated and packaged, the radioactive material can be moved between various safe, contained, and isolated states (i.e., conditions). It can be

- a) transferred or transported directly to storage or disposal states;
- b) in transition between storage and disposal states; or
- c) released from radioactive waste management through an exit path.

Interim steps for the management of radioactive material are selected to optimize options for final radioactive waste disposal later. If interim steps, such as preparation and storage, are not carefully planned, they could impact future exit opportunities. Optimization of safety, dose, cost, etc., should also be considered when selecting strategies to avoid or minimize repeated handling or reworking of waste at future steps.

Note: For the purposes of this Standard, Figure 1 illustrates the states, transitions, and potential exit paths involved in managing radioactive waste and irradiated fuel.

Figure 1
Diagram of states, transitions, and exit paths
 (See Clauses 0.1 and 3.1.)



Notes:

- 1) Transition might or might not involve physical movement of the radioactive material, and as such, two or more of the states might occur at the same site.
- 2) Some sites might consider irradiated fuel a radioactive waste (specifically high-level radioactive waste).

0.2 Users

This Standard is intended to be used by individuals and organizations that are associated with

- a) the generation, handling, characterization, processing, transportation, or other management of radioactive waste and irradiated fuel; and
- b) the siting, design, construction, commissioning, operation, and decommissioning of storage or disposal facilities for radioactive waste and irradiated fuel.

Note: Radioactive waste and irradiated fuel are collectively referred to in this Standard as “radioactive materials”.

1 Scope

1.1

This Standard specifies common requirements for the management of radioactive waste and irradiated fuel from generation to storage or disposal.

Note: *This includes management of mixed waste, which can have other management requirements.*

1.2

This Standard is used in concert with all CSA standards that apply to the management of radioactive waste and irradiated fuel.

Note: *For example, CSA N292.1, CSA N292.2, CSA N292.3, CSA N292.5, CSA N292.6, and CSA N294.*

1.3

This Standard applies to waste organizations or facilities of all sizes that generate, possess, manage, process, transport, and dispose radioactive waste and irradiated fuel, including nuclear power reactors, research institutes, medical facilities, manufacturing facilities, laboratories, and industrial facilities.

Note: *Waste organizations can refer to waste generators, waste brokers, waste receivers, waste processors, and waste management facility operators.*

1.4

The following types of radioactive waste are not addressed in this Standard:

- a) naturally occurring radioactive material (NORM) and technologically enhanced, naturally occurring radioactive material (TENORM); and
- b) uranium mine and mill tailings.

Note: *While this Standard is not applicable to the management of mine and mill tailings, the principles in this Standard can be useful for their management.*

1.5

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the Standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the editions listed below, including all amendments published thereto.

Note: *For additional references that might be useful to the user, see Annex C.*