

General requirements for safety systems of nuclear power plants



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Preface

This is the first edition of CSA N290.0, *General requirements for safety systems of nuclear power plants*. This Standard is one of a series of standards on reactor control systems, safety systems, and instrumentation for nuclear power plants.

The CSA N-Series of 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 reflects the operating experience of the Canadian nuclear power industry.

Users of this Standard are reminded that the design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the provisions of the *Nuclear Safety and Control Act* and its supporting Regulations.

This Standard was prepared by the Subcommittee on Emergency Core Cooling Systems of Nuclear Power Plants, under the jurisdiction of the Technical Committee on Reactor Control Systems, Safety Systems, and Instrumentation of Nuclear Power Plants, and the Strategic Steering Committee on Nuclear Standards.

October 2011

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N290.0-11

General requirements for safety systems of nuclear power plants

1 Scope

1.1

This Standard covers the design, qualification, installation, operation, maintenance, inspection, and documentation of the safety systems for a water-cooled nuclear power plant.

1.2

This Standard provides the general requirements for the safety systems. This Standard is a companion document of CSA N290.2 and N290.3, which outline specific requirements.

1.3

In CSA standards, “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 (nonmandatory) 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 edition listed below.

CSA (Canadian Standards Association)

N285.0-08/N285.6 Series 8

General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants

N285.4-09

Periodic inspection of CANDU nuclear power plant components

N285.5-09

Periodic inspection of CANDU nuclear power plant containment components

N290-05 (R2010)

Management system requirements for nuclear power plants



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N290.1-13

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***Requirements for the shutdown
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Preface

This is the second edition of CSA N290.1, *Requirements for the shutdown systems of nuclear power plants*. It supersedes the first edition published in 1980.

This Standard has been written as a general standard for reactor shutdown systems of nuclear power plants. It establishes the design, procurement, installation, commissioning, operation, testing, and maintenance requirements of the shutdown system(s) to terminate the fission chain reaction in the event of an accident.

This Standard is one of a series of standards on reactor control systems, safety systems, and instrumentation for nuclear power plants.

This Standard incorporates the relevant requirements of the Canadian Nuclear Safety Commission regulatory documents R-8 *Requirements for Shutdown Systems for CANDU Nuclear Power Plants*, February 21, 1991, and R-10 *The Use of Two Shutdown Systems in Reactors*, January 11, 1977.

The CSA N-Series of Standards provides 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.

Users of this Standard are reminded that the design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities in Canada are subject to the provisions of the *Nuclear Safety and Control Act* and its supporting Regulations.

This Standard was prepared by the Subcommittee on Nuclear Reactor Shutdown Systems under the jurisdiction of the Technical Committee on Reactor Control Systems, Safety Systems, and Instrumentation of Nuclear Power Plants and the Strategic Steering Committee on Nuclear Standards, and has been formally approved by the Technical Committee.

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N290.1-13

Requirements for the shutdown systems of nuclear power plants

1 Scope

1.1

This Standard applies to the design, procurement, installation, commissioning, operation, testing, and maintenance requirements of reactor shutdown systems (SDSs) for existing and new water-cooled nuclear power plants (NPPs), both CANDU and non-CANDU.

Notes:

- 1) *“Existing nuclear power plants” refers to those licensed for operation prior to 2013.*
- 2) *The requirements for new plants and existing plants might differ. Where requirements differ for new plants and existing plants, the differences are explicitly stated.*
- 3) *This Standard does not apply to NPPs smaller than 200 MW thermal power.*

1.2

This Standard is written as a companion document to CSA N290.0, which provides general requirements for the NPP safety systems, including the reactor SDS. This Standard and its companion CSA N290.0 provide the requirements for the reactor SDS.

1.3

This Standard is written to be “technology neutral”. This Standard uses the term “reactor shutdown system” (SDS), which includes the following functions: detection, actuation, and means of shutdown (MSD).

Note: *In non-CANDU plants, the “protection system” perform detection and actuation (see 10-CFR-50 Appendix A Criterion 20).*

1.4

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.

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