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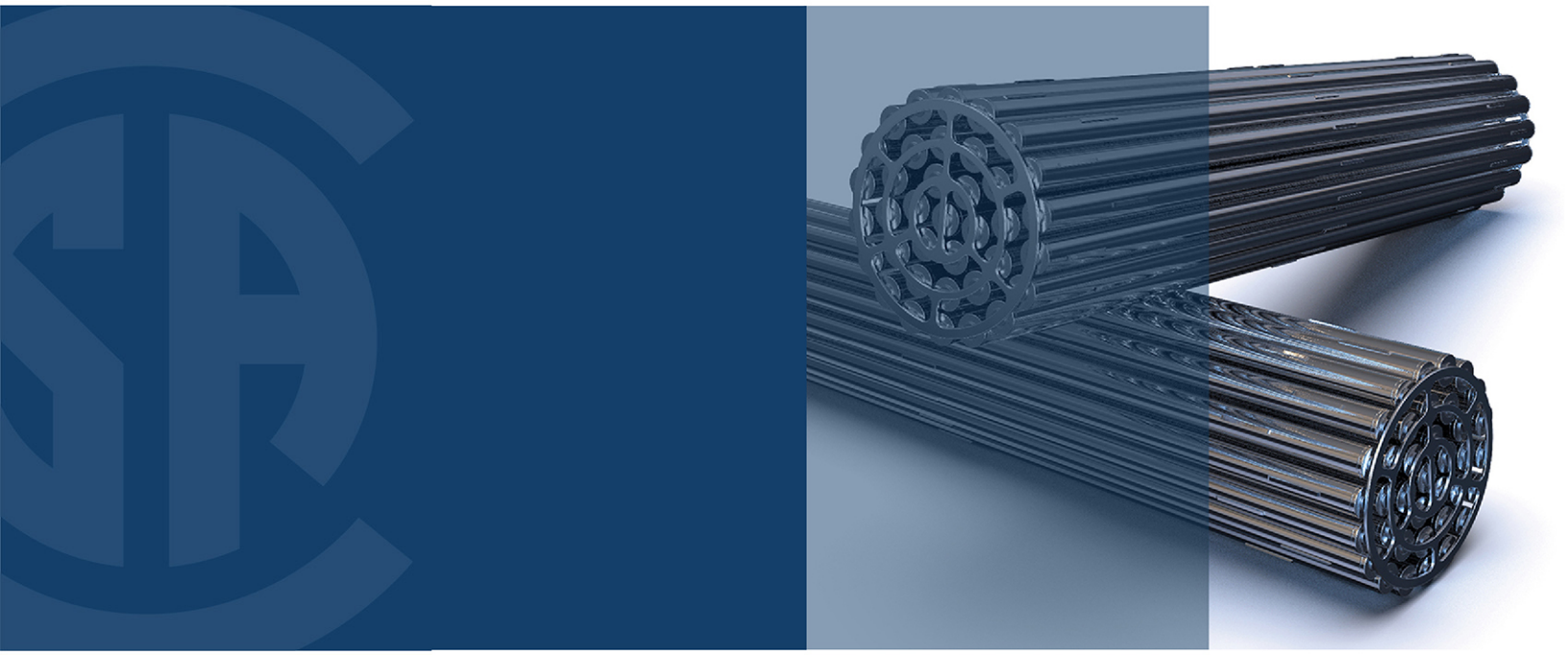
CSA N290.9:19

Reliability and maintenance programs for nuclear power plants



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Preface

This is the first edition of CSA N290.9, *Reliability and maintenance programs for nuclear power plants.*

This Standard provides requirements and guidance regarding reliability and maintenance programs, as well as the interactions between these programs, at nuclear power plants. It reflects Canadian regulatory requirements, operating experience of the Canadian nuclear industry, and international good practices, including those of the International Atomic Energy Agency.

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 Group 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 Reliability and Maintenance Programs for Nuclear Power Plants, under the jurisdiction of the Technical Committee on Reactor Safety and Risk 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:*
   a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *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:*
   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

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Reliability and maintenance programs for nuclear power plants

0 Objectives

0.1 General

Reliable safety-related structures, systems, and components (SSC) are necessary to ensure that the risk to members of the public from a nuclear incident at a nuclear power plant (NPP) is low. The purpose of this Standard is to define the requirements for a reliability program and the activities that integrate the reliability and maintenance programs for safety-related SSC at an NPP.

The activities necessary to manage the reliability of safety-related SSC include

a) identifying and classifying SSC;
b) defining the safety-related performance requirements of the SSC;
c) confirming the operability of SSC through surveillance;
d) categorizing components to prioritize maintenance;
e) sustaining the reliability of SSC through maintenance;
f) monitoring, assessing, and reporting the performance and condition of the SSC;
g) correcting performance deficiencies; and
h) monitoring the effectiveness of the reliability and maintenance programs.

Notes:

1) *The safety-related performance requirements of an SSC might be defined in one or more of the following:*
   a) *applicable codes and standards;*
   b) *deterministic safety analysis;*
   c) *probabilistic safety assessment; or*
   d) *design documentation.*
2) *This Standard does not repeat requirements from other CSA standards. Instead references are provided to other CSA standards where they address items in Clause 0.1.*

0.2 Reactor technology

The Canadian nuclear industry uses CANDU reactor technology. However, this Standard is written to be technology neutral, that is, to apply to all water-cooled power reactors.

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1 Scope

1.1 Reactors and other potential sources

This Standard provides the requirements and guidance for SSC at a water-cooled NPP. This Standard applies to SSC associated with

a) water-cooled power reactors; and

b) other potential sources of significant radioactive releases to the environment.

Notes:

1) *This Standard may be used to provide guidance for nuclear facilities other than water-cooled NPPs, e.g., research reactors.*
2) *"Other potential sources of significant radioactive releases to the environment" include wet storage bays and dry used fuel storage facilities.*

1.2 Public safety and other purposes

The requirements of this Standard apply only to safety-related SSC for which one or both of the following conditions apply:

a) the failure of the SSC results in a nuclear incident; or
b) the failure of the SSC impairs the ability to mitigate or monitor a nuclear incident.

Notes:

1) *In Canada, nuclear incidents have been classified as anticipated operational occurrences, design basis accidents, and beyond design basis accidents, including design extension conditions and severe accidents.*
2) *The requirements of this Standard do not apply, for example, to functions of SSC whose purpose is to*
   a) *protect workers from conventional or nuclear hazards;*
   b) *prevent, mitigate or monitor effluents resulting from the routine operation of water cooled NPPs;*
   c) *satisfy safeguards requirements; or*
   d) *prevent or mitigate malevolent acts.*

1.3 New and existing facilities

This Standard applies to both new and existing water-cooled NPPs.

Notes:

1) *"Existing NPPs" refers to NPPs initially licensed before 2019.*
2) *"New NPPs" refers to NPPs initially licensed after 2018.*
3) *This Standard notes where requirements might apply only to a new NPP or only to an existing NPP.*

1.4 Single and multi-reactor facilities

This Standard applies to NPPs with one or more water-cooled power reactors.

1.5 Pre-incident conditions

This Standard is limited to activities that are performed prior to the initiation of a nuclear incident.

Note: *This Standard does not address, for example, post-accident recovery actions or severe accident management guidance.*

1.6 Compliance with other standards

1.6.1

The requirements of this Standard do not supersede requirements in other CSA Standards.

Note: *For example, the requirements in Clause 6.5 of this Standard do not supersede the inspection and testing requirements in*

a) *CSA N285.0; and*
b) *CSA N293.*

1.6.2

The requirements of this Standard might augment the requirements of other CSA Standards.

Note: *For example, if a fire protection system is identified as a system important to safety (see Clause 5), then the requirements of this Standard might augment the requirements of CSA N293.*

