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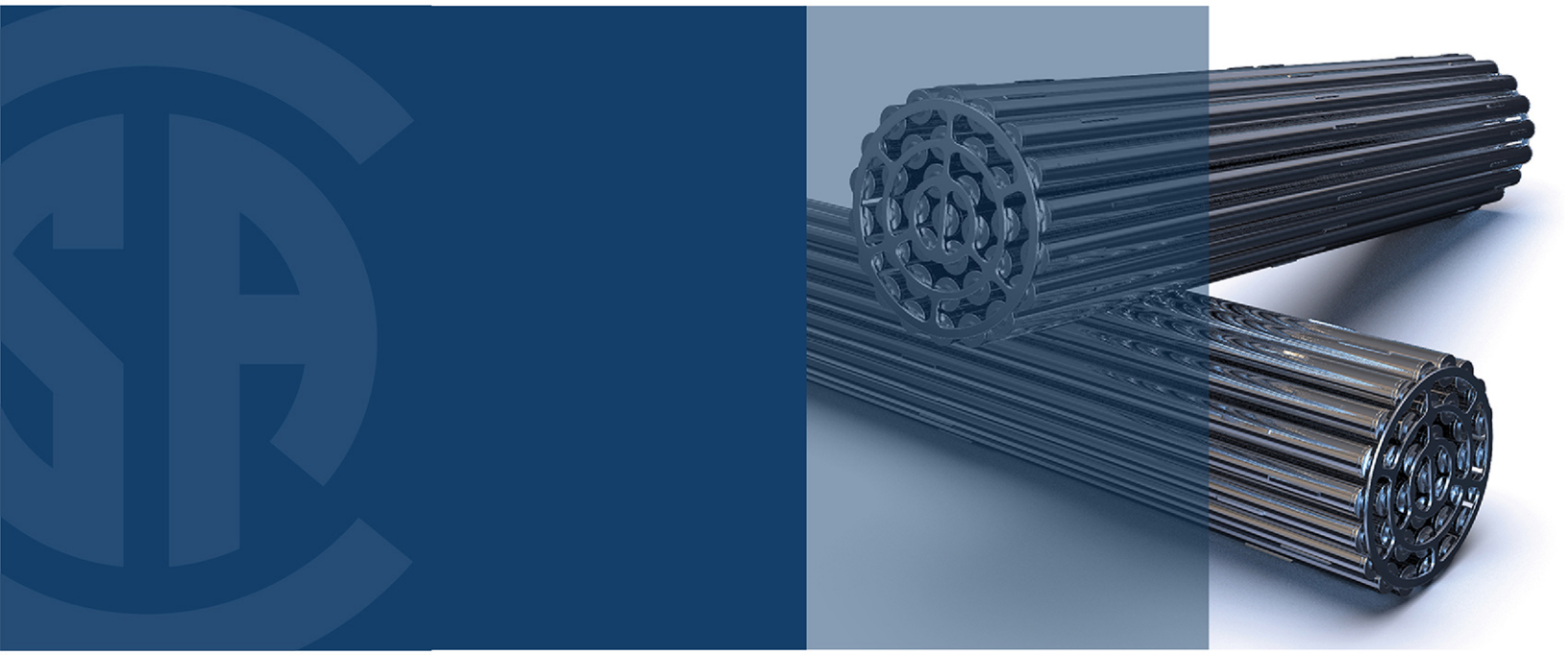
CSA N285.4:19

Periodic inspection of CANDU nuclear power plant components



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Preface

This is the seventh edition of CSA N285.4, *Periodic inspection of CANDU nuclear power plant components*. It supersedes the previous editions, published in 2014, 2009, 2005, 1994, 1983, and 1978. It is one of the CSA N285 series of Standards on CANDU® nuclear power plant components.

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This Standard provides uniform rules for the periodic inspection of pressure-retaining systems and components in CANDU nuclear power plants. It has been revised and updated to account for new knowledge and experience gained from CANDU research and operations, advances in technology, and changes to the regulatory framework in Canada.

The seventh edition of CSA N285.4 includes the following major changes:

a) an update to definitions, specifically definition related to “inspection” and “examination”, affecting most clauses;
b) new reporting requirements for measurement of pressure tube to calandria tube gap at fuel channel annulus spacers and displacement of annulus spacers;
c) requirements for measurement of hydrogen isotope concentration measurement in rolled joint region of pressure tube;
d) modifications to fuel channel annulus spacer material surveillance to provide further clarity on sample size and spacer testing methods to be used;
e) new requirements specified for pressure tube fracture protection assessment and leak before break assessment using in-service pressure tube material properties and operating conditions;
f) updated susceptibility criteria, acceptance standards, and inspection sample size for periodic inspections to address wall thinning and environmentally assisted cracking;
g) provided clarity on which supplementary periodic inspections require qualification of the inspection method/procedure, as per Clause 4.3; and
h) updated acceptance standards and disposition process for visual inspection of components and hangers, including provision of criteria for minor condition disposition.

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 cautioned that, due to restructuring, a clause in this edition might not be directly comparable to the clause with the corresponding number in the previous edition of this Standard. Users are also reminded that the design, manufacture, construction, commissioning, operation, examination, maintenance, and decommissioning of nuclear facilities in Canada are subject to the provisions of the *Nuclear Safety and Control Act* and Regulations as well as other regulatory documents of the Canadian Nuclear Safety Commission (CNSC). The CNSC might impose additional requirements to those specified in this Standard.

In order to facilitate adoption by the authority having jurisdiction, this Standard includes some regulatory provisions.

This Standard was prepared by the Technical Committee on Periodic Inspection of Nuclear Power Plant Components, under the jurisdiction of 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 five years from the date of publication, and 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 <list type="unordered"> number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

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Periodic inspection of CANDU nuclear power plant components

1 Scope

1.1

This Standard defines requirements for the periodic inspection of pressure retaining systems, components, and supports that form part of a CANDU nuclear power plant.

Periodic inspection (see Annex A for additional guidance) is considered to include the fluid boundary portions of components and piping, including their supports that comprise

a) systems containing fluid that directly transports heat from nuclear fuel and other systems whose failure can result in a significant release of radioactive substance;
b) systems essential for the safe shutdown of the reactor or the safe cooling of the fuel, or both, in the event of a process system failure; and
c) other systems or components whose failure could jeopardize the integrity of the systems described in Item a) or b), or both.

In addition, for components exposed to conditions beyond the known experience base, and where such components constitute part of a vital system, the components may be considered suitable for inclusion in the periodic inspection program, as supplementary periodic inspections.

1.2

This Standard addresses

a) failure aspects;
b) classification of areas subject to periodic inspection;
c) provision for access;
d) examination methods and procedures;
e) personnel qualifications;
f) frequency of periodic inspection;
g) responsibilities;
h) documentation;
i) records;
j) evaluation of periodic inspection results;
k) dispositioning; and
l) repair, replacement, and modification requirements.

1.3

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.

