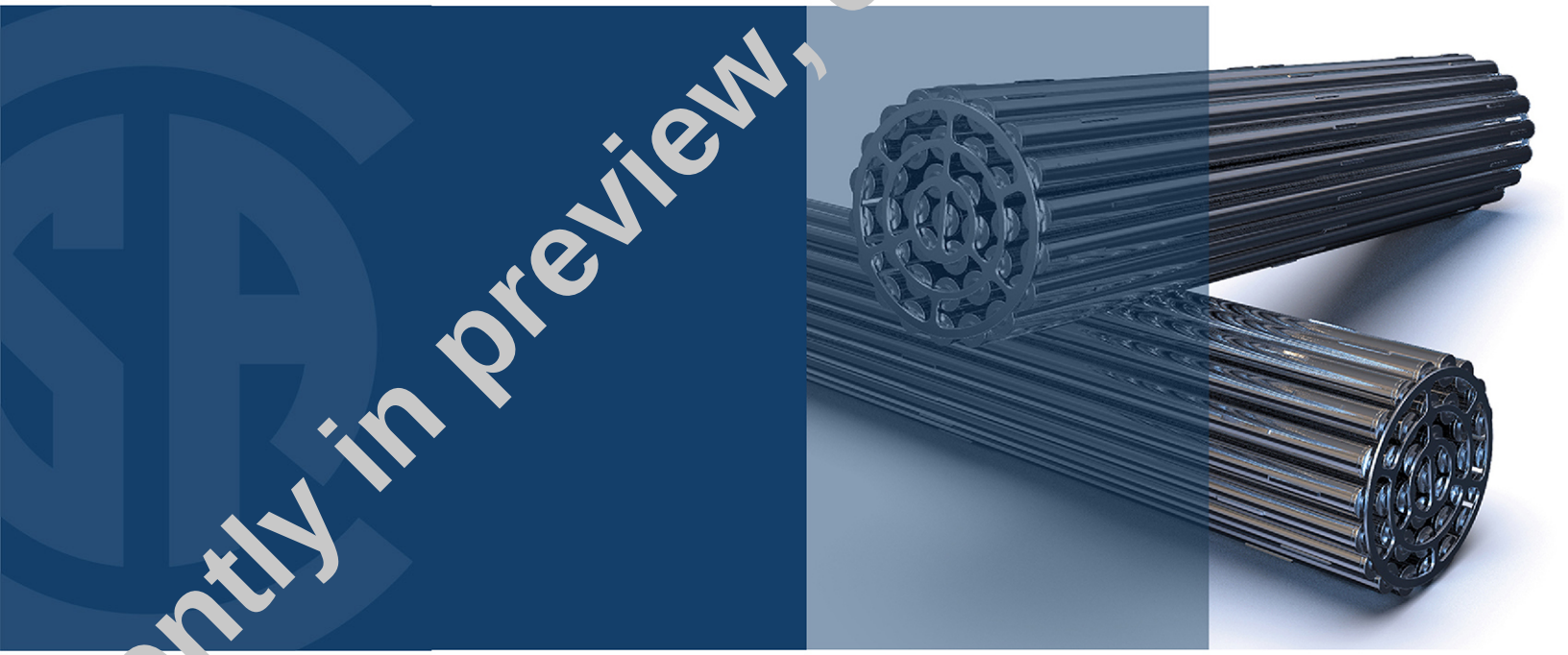
CSA N285.7:21

# Periodic inspection of CANDU nuclear power plant balance of plant systems and components



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# *CSA N285.7:21*

# ***Periodic inspection of CANDU nuclear power plant balance of plant systems and components***



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# *Contents*

# *Preface*

This is the second edition of CSA N285.7, *Periodic inspection of CANDU nuclear power plant balance of plant systems and components*. It supersedes the previous edition published in 2015.

This Standard is one of a series of Standards intended to provide uniform requirements for CANDU® nuclear power plants.

**Note:** *CANDU (CANada Deuterium Uranium) is a registered trademark of Atomic Energy of Canada Limited (AECL).*

This Standard provides requirements for the periodic inspection of balance of plant systems and components.

The major changes to this edition include the following:

a) an update to the definitions, specifically the definitions related to "inspection" and "examination", affecting most clauses;
b) general harmonization with CSA N285.4-19 and N285.5-18;
c) revisions to Annexes B, C, and D for clarity of requirements based on application of risk informed rules to select locations for periodic inspection;
d) improved clarity of pre-screening requirements for raw water systems to account for in-service inspection programs, availability of back-up systems and independent trains, evaluation of external events, and internal flooding probabilistic safety assessments (IFSA);
e) clarified timeline for notifying the authority having jurisdiction (AHJ) and obtaining AHJ acceptance of dispositions (Clause 7.8);
f) clarified periodic inspection requirements for replaced components (Clause 8);
g) added reporting requirements for confirmatory inspections (Clause 10.3);
h) clarified requirements to defining a weld examination area that include a reasonable amount of base metal (Clause 13.1.2.3);
i) clarified examination requirements for mechanical couplings, including removal of requirement to examine threaded ligaments (Clause 13.4.2);
j) added guidance on approach to evaluation of examination results and use of acceptance standards (Clause A.2); and
k) added provisions for use of non-destructive examination personnel certified to other than CGSB standards (new Annex G).

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 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 might provide more specific direction for those requirements.

Users of this Standard are reminded that the operation of nuclear facilities in Canada is subject to the requirements of the *Nuclear Safety and Control Act* and Regulations. The Canadian Nuclear Safety Commission may impose additional requirements to those specified in this Standard.

Portions of this Standard have been developed using the Risk Informed In-service Inspection (RI-ISI) methodologies and definitions from ASME *BPVC* Section XI with 2011 Addenda, Code Case N-578-1, ASME RA-Sa-2009 and EPRI RI-ISI TR-112657 Rev B-A. Excerpts are reprinted with permission from The American Society of Mechanical Engineers, Electric Power Research Institute, Inc., and International Atomic Energy Agency.

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 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.*

# CSA N285.7:21
# Periodic inspection of CANDU nuclear power plant balance of plant systems and components

## 1 Scope

### 1.1

This Standard defines requirements for the periodic inspection of balance of plant pressure-retaining systems, components, and supports that form part of a CANDU nuclear power plant using a risk informed in-service inspection (RI-ISI) methodology. Periodic inspection (see Annex A for additional guidance) is considered to include the fluid boundary portions of balance of plant systems, components, and piping, including their supports that comprise a complete nuclear power plant, excluding the following systems or portions thereof:

a) Systems, and systems connected thereto, containing the fluid that, under normal conditions, directly transports heat from nuclear fuel, and other systems whose failure can result in a significant release of radioactive substances.

   **Note:** *These systems or portions of systems are subject to periodic inspection in accordance with Clause 3.3.1 a) in CSA N285.4.*

b) Systems essential for the safe shutdown of the reactor and/or the safe cooling of the nuclear fuel in the event of a process system failure.

   **Note:** *These systems or portions of systems are subject to periodic inspection in accordance with Clause 3.3.1 b) in CSA N285.4.*

Compressors, turbines, generators, engines, internal components of vessels and heat exchangers, and hydraulic or pneumatic cylinders are exempt from the periodic inspection requirements of this Standard. This includes piping internal to equipment or mounted upon equipment that carries fluid from one chamber to another on the same foundation.

**Note:** *To arrive at a periodic inspection program, the user should consider the examinations and tests performed by other programs such as pipe wall thinning, vessel examinations, equipment reliability, and maintenance programs in addition to RI-ISI. Examinations performed as part of supporting programs are not expected to be repeated in this periodic inspection program, but should be credited to this periodic inspection program to provide assurance that the program satisfies the intended purpose as described in Annex A.*

### 1.2

This Standard addresses the following requirements:

a) failure aspects;
b) classification of areas subject to periodic inspection;
c) provision for access;
d) examination techniques and procedures;
e) personnel qualifications;
f) frequency of periodic inspection;
g) responsibilities;
h) documentation;