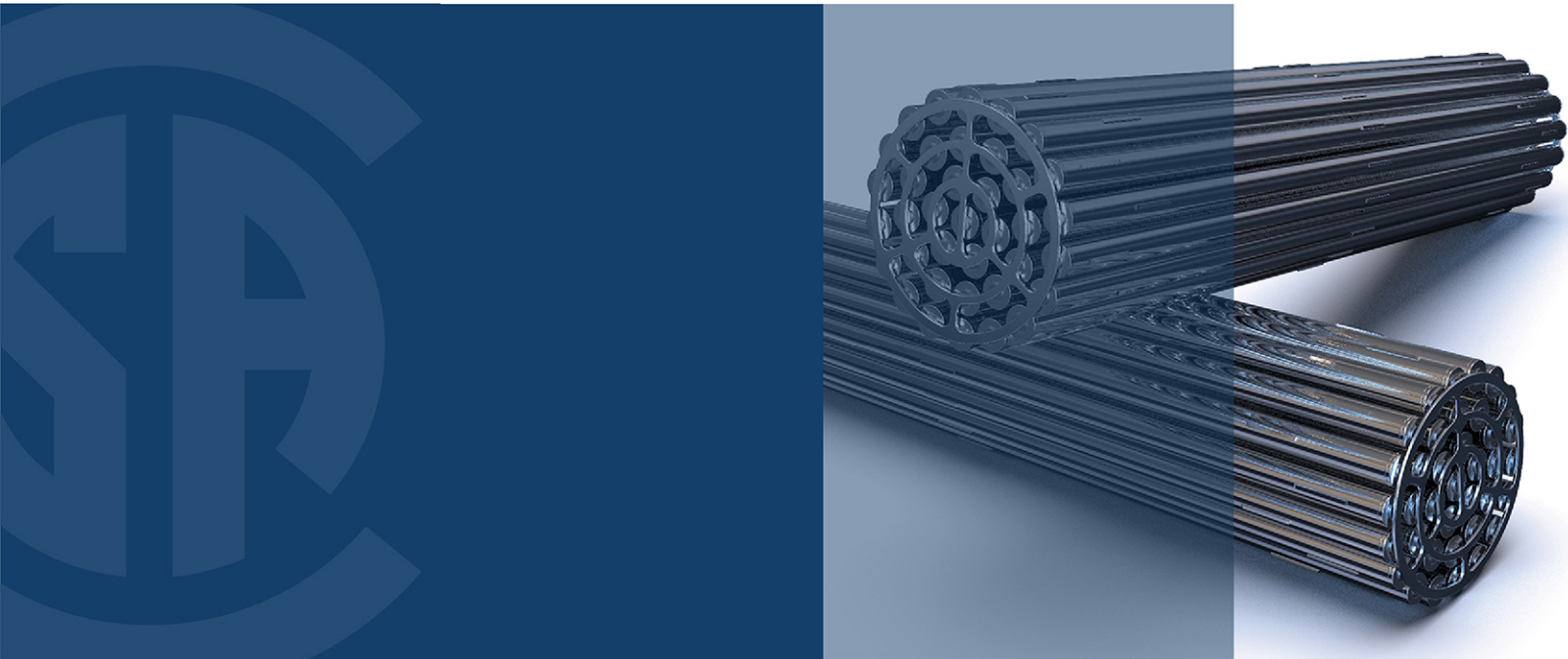




CSA N299.3:19

Quality assurance program requirements for the supply of items and services for nuclear power plants, Category 3



Legal Notice for Standards

Canadian Standards Association (operating as "CSA Group") develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document's fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party's intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group's and/or others' intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.



Standards Update Service

CSA N299.3:19 December 2019

Title: *Quality assurance program requirements for the supply of items and services for nuclear power plants, Category 3*

To register for e-mail notification about any updates to this publication

- go to store.csagroup.org
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2427479**.

If you require assistance, please e-mail techsupport@csagroup.org or call 416-747-2233.

Visit CSA Group's policy on privacy at www.csagroup.org/legal to find out how we protect your personal information.

CSA N299.3:19

***Quality assurance program
requirements for the supply of items
and services for nuclear power
plants, Category 3***



®A trademark of the Canadian Standards Association, operating as "CSA Group"

*Published in December 2019 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at store.csagroup.org
or call toll-free 1-800-463-6727 or 416-747-4044.*

ISBN 978-1-4883-2397-3

*© 2019 Canadian Standards Association
All rights reserved. No part of this publication may be reproduced in any form whatsoever
without the prior permission of the publisher.*

Contents

Technical Committee on Management Systems for Nuclear Facilities 4

Subcommittee on Quality Assurance Program Requirements for Supply of Items and Services for Nuclear Power Plants 6

Preface 8

0 Introduction 9

0.1 Background 9

0.2 Category series 9

1 Scope 12

2 Reference publications 13

3 Definitions 15

4 General requirements 19

4.1 General 19

4.2 Customer's responsibilities 20

4.3 Management responsibilities 20

4.3.1 Top management 20

4.3.2 Management representative 21

4.4 Independent verification 21

4.5 Software 21

4.5.1 Software employed in work methods or tools 21

4.5.2 Embedded software 21

4.5.3 Design analysis software 21

4.6 Safety culture 22

4.7 Use of experience 22

4.8 Counterfeit, fraudulent, and suspect items (CFSIs) 22

5 QA manual 23

5.1 General 23

5.2 QA manual contents 23

6 QA program descriptions 23

7 QA program elements 24

7.1 Management review 24

7.2 Indoctrination, training, and qualification 24

7.2.1 Indoctrination 24

7.2.2 Training 24

7.2.3 Qualification 24

7.3 Tender and contract review 25

7.3.1 Review of tendering requirements 25

7.3.2 Review of contractual requirements 25

7.4	Design	25
7.4.1	Application	26
7.4.2	Design planning	26
7.4.3	Work assignment	26
7.4.4	Interfaces	26
7.4.5	Design inputs	26
7.4.6	Preliminary design	26
7.4.7	Design analysis software	26
7.4.8	Detailed design	26
7.4.9	Design output	26
7.4.10	Design verification	26
7.4.11	Design changes	27
7.5	Documentation	27
7.6	Procurement	28
7.6.1	Selection	28
7.6.2	Use of customer's approved suppliers	29
7.6.3	Subcontract requirements	29
7.6.4	Reviews	30
7.6.5	Inspection, surveillance, and audit of sub-suppliers	30
7.6.6	Amendments to subcontracts	30
7.7	Verification planning	30
7.8	Verification activities	32
7.9	Verification status	33
7.9.1	Verification status for items	33
7.9.2	Verification status for services	33
7.10	Measuring and testing equipment (M&TE)	34
7.11	Identification and traceability	35
7.11.1	Identification	35
7.11.2	Traceability	35
7.12	Handling and storage	35
7.13	Production	35
7.13.1	Planning	35
7.13.2	Process descriptions	36
7.13.3	Process verification	36
7.13.4	Work control	36
7.14	Special processes	36
7.15	Packaging and shipping	36
7.16	Records	37
7.16.1	General requirements	37
7.16.2	Generation of records	37
7.16.3	Authentication of records	37
7.16.4	Maintenance and storage of records	37
7.16.5	Record retention periods	38
7.17	Nonconformances	38
7.17.1	General nonconformance requirements	38
7.17.2	Specific nonconformance requirements for items and services	39
7.18	Corrective action	39
7.19	Customer-supplied items and services	40
7.20	Statistical techniques	40

7.21	Quality audits	40
7.21.1	Internal quality audits	40
7.21.2	External quality audits	41
8	CSA N299 dedication requirements	41
8.1	Application	42
8.2	Dedication eligibility	43
8.3	Planning	43
8.4	Work assignment	43
8.5	Identification and maintaining traceability	43
8.6	Design evaluation	43
8.7	Acceptance	44
8.7.1	Acceptance criteria and control areas	44
8.7.2	Control Area 1: QA program augmentation	45
8.7.3	Control Area 2: Verification activities	45
8.7.4	Control Area 3: Supplier performance	47
8.8	Conduct acceptance activities	47
8.9	Dedication outputs	48
8.10	Dedication changes	48

Annex A (normative)	— Category selection	49
Annex B (informative)	— Guidance on QA program descriptions	58
Annex C (informative)	— Guidance on design	61
Annex D (informative)	— Guidance on measuring and test equipment	63
Annex E (informative)	— Counterfeit, fraudulent, and suspect items (CFSIs)	66
Annex F (informative)	— Risk evaluation	68
Annex G (informative)	— Records	69

Technical Committee on Management Systems for Nuclear Facilities

J. Brown	BWXT Nuclear Energy Canada Inc., Peterborough, Ontario, Canada <i>Category: Supplier/Fabricator/Contractor</i>	<i>Chair</i>
A. Coulas	Canadian Nuclear Laboratories Limited (CNL), Chalk River, Ontario, Canada <i>Category: Owner/Operator/Producer</i>	<i>Vice-Chair</i>
S. D. Harris	Ontario Power Generation, Oshawa, Ontario, Canada <i>Category: Owner/Operator/Producer</i>	<i>Vice-Chair</i>
R. W. Barnes	ANRIC Enterprises Inc., Toronto, Ontario, Canada <i>Category: Service Industry</i>	
E. Clavel	Clavel Quality Consulting, Mississauga, Ontario, Canada <i>Category: Service Industry</i>	
D. Constantinescu	Bruce Power, Tiverton, Ontario, Canada <i>Category: Owner/Operator/Producer</i>	
C. M. Daniel	AECOM, Richmond Hill, Ontario, Canada <i>Category: Service Industry</i>	
R. Grismer	Cameco Corporation, Saskatoon, Saskatchewan, Canada <i>Category: Owner/Operator/Producer</i>	
B. Johnston	McMaster University, Hamilton, Ontario, Canada <i>Category: General Interest</i>	
P. Jones	TRIUMF, Vancouver, British Columbia, Canada <i>Category: General Interest</i>	

J. Krane	Stuart Olson, Port Elgin, Ontario, Canada <i>Category: Supplier/Fabricator/Contractor</i>	
P. Lahaie	Canadian Nuclear Safety Commission (CNSC), Ottawa, Ontario, Canada <i>Category: Government and/or Regulatory Authority</i>	
G. Lamarre	Canadian Nuclear Safety Commission (CNSC), Ottawa, Ontario, Canada	<i>Non-voting</i>
V. Raees	Technical Standards and Safety Authority, Ajax, Ontario, Canada <i>Category: Government and/or Regulatory Authority</i>	
R. Schewaga	Orano Canada, Saskatoon, Saskatchewan, Canada <i>Category: Supplier/Fabricator/Contractor</i>	
M. Schnell	Canadian Light Source Inc., Saskatoon, Saskatchewan, Canada <i>Category: General Interest</i>	
P. Schultz	Canadian Nuclear Safety Commission, Ottawa, Ontario, Canada	<i>Non-voting</i>
C. Sellers	Campbellcroft, Ontario, Canada	<i>Non-voting</i>
P. L. Wiggins	NB Power Corporation, Lepreau, New Brunswick, Canada <i>Category: Owner/Operator/Producer</i>	
P. Young	Scarborough, Ontario, Canada <i>Category: General Interest</i>	
M. Khan	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

Subcommittee on Quality Assurance Program Requirements for Supply of Items and Services for Nuclear Power Plants

C. Sellers	Campbellcroft, Ontario, Canada	<i>Chair</i>
N. Boraso	CANDU Owners Group Inc., Toronto, Ontario, Canada	
J. Brown	BWXT Nuclear Energy Canada Inc., Peterborough, Ontario, Canada	
R. Burns	Kinectrics Inc., Toronto, Ontario, Canada	
M. Cagnetta	Framatome, Kincardine, Ontario, Canada	
S. Ciobanu	Framatome, Pickering, Ontario, Canada	
E. Clavel	Clavel Quality Consulting, Mississauga, Ontario, Canada	
S. Demeter	Kinectrics Inc., Toronto, Ontario, Canada	
S. Gujral	Tetra Tech, Pickering, Ontario, Canada	
S. D. Harris	Ontario Power Generation, Oshawa, Ontario, Canada	
P. Karsten	Karsten Nuclear Quality Services Inc., Kincardine, Ontario, Canada	
J. Lopez	Bruce Power LP, Tiverton, Ontario, Canada	
T. Mason	Black & McDonald Ltd., Pickering, Ontario, Canada	

L. Payne	Énergie NB Power, Maces Bay, New Brunswick, Canada	
M. Pletosu	Ontario Power Generation Inc., Pickering, Ontario, Canada	
D. Sperling	Sperling Quality and Project Services, Burlington, Ontario, Canada	
A. Wagland	WAG QA Services Canada Inc., Waterloo, Ontario, Canada	
G. B. Waterhouse	Vermeer Engineering, Whitby, Ontario, Canada	
P. Wong	Canadian Nuclear Safety Commission (CNSC), Ottawa, Ontario, Canada	
M. Khan	CSA Group, Toronto, Ontario, Canada	<i>Project Manager</i>

Preface

This is the second edition of CSA N299.3, *Quality assurance program requirements for the supply of items and services for nuclear power plants, Category 3*. It supersedes the previous edition published in 2016.

The CSA N299 series of Standards defines quality assurance program requirements for the provision of items and services for nuclear power plants when specified in the contract between the customer and the supplier.

The most significant updates to this edition include

- a) the addition of requirements on dedication in Clause [8](#);
- b) the revision of Annex [E](#) to provide guidance on counterfeit, fraudulent, and suspect items (CFSIs);
- c) the addition of Annex [F](#) to provide guidance on risk evaluation; and
- d) the addition of Annex [G](#) to provide guidance on records.

This Standard has also been restructured and reordered for better readability.

Users of this Standard are reminded that civilian nuclear facilities in Canada are subject to the provisions of the *Nuclear Safety and Control Act* and its *Regulations*.

This Standard was prepared by the Subcommittee on Quality Assurance Program Requirements for Supply of Items and Services for Nuclear Power Plants, under the jurisdiction of the Technical Committee on Management Systems for Nuclear Facilities 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.*

CSA N299.3:19

Quality assurance program requirements for the supply of items and services for nuclear power plants, Category 3

0 Introduction

0.1 Background

The CSA Z299 series of Standards (referred to collectively as “CSA Z299”) was selected by Ontario Hydro and AECL in the 1970s as the quality assurance standard for the procurement of items and services for their nuclear facilities. As a result, the CSA Z299 Standards were embedded in the design bases of all nuclear power stations and some utility-owned nuclear facilities licensed in Canada, and continue to be used. These Standards were initially developed from Ontario Hydro quality standards and contained many of the requirements that were in force at that time. When the CSA N286 series of Standards were developed in the late 1970s, they referenced CSA Z299 as the recommended quality assurance standard for items and services. CSA Z299 was a commercial standard used broadly both nationally and internationally, and it was the pre-cursor to development of the ISO 9000 series of Standards. With the development of ISO 9001 in 1994, ISO 9001 became the commercial quality standard that was generally adopted by industry. CSA Z299 was no longer supported by the Technical Committee in charge of CSA Z299, and it was eventually withdrawn.

Internationally, there have been mixed approaches to creating industry-specific QA standards, such as augmenting ISO 9001 or creating completely new standards. CSA Z299 has not been issued since 1985 and needed to be updated to reflect current needs. To fulfill this need, nuclear utilities have developed, through a joint CANDU Owners Group (COG) project, a set of graded standards that align with the withdrawn CSA Z299 series so that the impact to the design basis and content transition to the new standards is minimized. These graded standards were used as the seed documents for the new CSA N299 series of Standards, which incorporates operating experience and current best practices and harmonizes, to the extent possible, with other standards (both national and international).

0.2 Category series

This is the third in a series of four Standards for the four quality assurance program categories (Category 1 to Category 4). See Figure [1](#) for a summary of this series of Standards and applicable elements.

This Standard was developed in response to industry’s need for a quality assurance standard for items and services supplied to nuclear power plants.