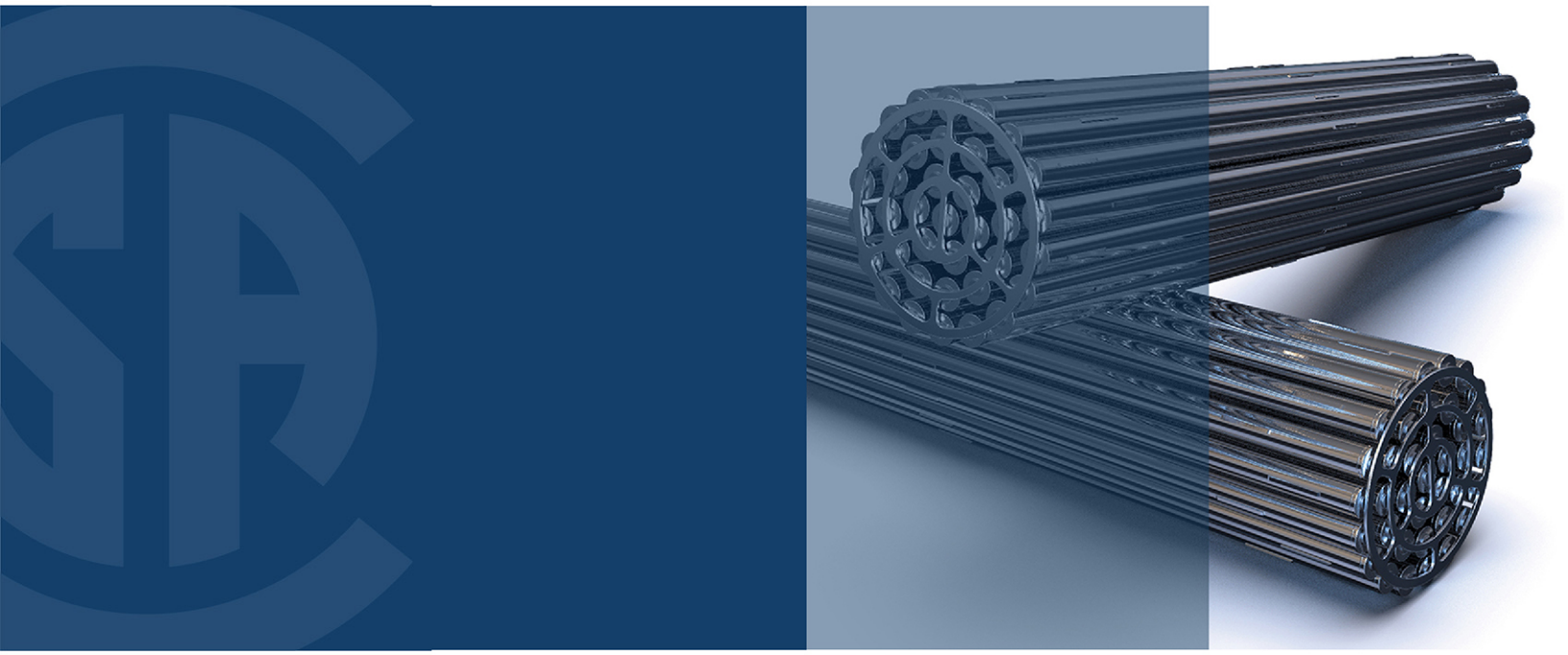
CSA N288.2:19

Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents



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Contents

Preface

This is the third edition of CSA N288.2, *Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents*. It supersedes the previous editions published in 2014 and 1991 under the title *Guidelines for calculating radiation doses to the public from a release of airborne radioactive material under hypothetical accident conditions in nuclear reactors.*

This Standard is part of a series of Standards on environmental management for nuclear facilities. This Standard describes acceptable methods for modelling the consequences of accidents at nuclear reactors for safety assessment and real-time emergency response. This Standard also identifies acceptable data sources and acceptable methodologies to account for specific effects, and recommends standardized end points for the calculations.

This edition has been updated to reflect current industry practice and new research and analysis methods. Major changes to this edition include the following:

a) The definitions have been updated for consistency with the CSA N288 series of Standards.
b) Administrative provisions (e.g., the term “Class 1”) were removed.
c) Additional clarification in areas identified by users was added.
d) The definitions for “beyond design basis accidents (BDBA)” and “severe accident” were aligned with the definitions provided in CSA N290.16-16.

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 Guidelines for Calculating the Radiological Consequences to the Public of a Release of Airborne Radioactive Material for Nuclear Reactor Accidents, under the jurisdiction of the Technical Committee on Environmental Management 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 guide lines 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 figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

CSA N288.2:19
Guidelines for calculating the radiological consequences to the public of a release of airborne radioactive material for nuclear reactor accidents

0 Introduction

This Standard describes acceptable methods that can be used to calculate the radiological consequences of a release of airborne radioactive material for nuclear reactor accidents. This Standard does not mandate a single approach or code, or provide detailed equations to construct a code. This Standard also identifies acceptable data sources and acceptable methodologies to account for specific effects, and recommends standardized end points for the calculations. Once the user has chosen a specific code, the user should obtain the equations and parameter values required to calculate doses and other end points from the code documentation to confirm the selected code aligns with the methodologies specified in this Standard.

The previous edition of the Standard described equations and parameters that were to be used to calculate the doses to an individual. The selected equations and parameters were closely associated with an implementation of the Standard in the code PEAR (Public Exposures from Accidental Releases).

The clauses of this Standard start with the treatment of meteorology, including the statistical sampling of meteorological parameters (Clause 4). Source characterization is discussed in Clause 5 and modelling dispersion in the atmosphere in Clause 6. The calculation of consequences such as ground contamination and dose assessment for stochastic and deterministic health effects is addressed in Clause 7. Uncertainty assessment is covered in Clause 8. Informative guidance is provided in the Annexes.

1 Scope

1.1 Type of consequence assessments

This Standard proposes methods for modelling the consequences of accidents at nuclear reactors for safety assessment and real-time emergency response.

Notes:

1) *Models used to assess the consequences of a postulated accident for safety assessment purposes have much in common with those used for a real-time nuclear accident for emergency response purposes, including the calculation of dispersion and air concentrations. However, the two types of models differ in their treatment of source terms and end points.*
2) *Safety assessment is a prospective activity that includes*
   a) *deterministic and probabilistic calculations carried out for Authority Having Jurisdiction (AHJ) requirements;*
   b) *probabilistic risk assessment for cost-benefit analyses; and*
   c) *deterministic and probabilistic calculations carried out for emergency planning purposes.*