American Nuclear Society

criteria for modeling and calculating atmospheric dispersion of routine radiological releases from nuclear facilities

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American National Standard
Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities

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Foreword

(This Foreword is not a part of American National Standard "Criteria for Modeling and Calculating Atmospheric Dispersion of Routine Radiological Releases from Nuclear Facilities," ANSI/ANS-2.15-2013.)

Atmospheric dispersion modeling is the mathematical simulation of atmospheric processes involving the release, transport, diffusion, and fate of airborne pollutants. Computer programs and systems that implement atmospheric dispersion modeling have been in widespread use for decades. As a result, there are many common practices among model users. However, a national standard does not exist that provides criteria for model selection and use for different types of modeling applications (e.g., assessment of annual releases, accidental release events) or for different types of modeling domains (e.g., flat terrain, mountain/valley areas, water/land environments). Instead, atmospheric dispersion modeling practices are often based on a diverse set of regulatory guidance and other documents that date from the 1970s and 1980s.

Since the publication of these guidance documents, considerable advances have occurred in our understanding of the atmospheric processes that govern the transport, diffusion, and deposition of atmospheric pollutants. Dramatic improvements in computer technologies have resulted in the significant increase in computational processing speeds and information sharing capabilities of available models. Also, technological advances have occurred in the areas of meteorological monitoring, data collection, and data sharing that can greatly expand the capabilities of atmospheric dispersion models. As a result of these changes, atmospheric dispersion modeling selection and usage practices need to be updated to incorporate the scientific and technological enhancements, improve modeling results, and support greater consistency among model users.

Subject matter experts from the Nuclear Utilities Meteorological Data User's Group, the U.S. Department of Energy's Meteorological Coordinating Council, and other organizations began working together in 2004 to define and standardize practices that can be used to address the atmospheric dispersion modeling of radiological releases from nuclear facilities. The working group decided that several standards were needed, based on end-use considerations:

- ANS-2.15, addressing atmospheric dispersion modeling of routine releases;
- ANS-2.16, addressing atmospheric dispersion modeling of design-basis accidents;
- ANS-3.8.10, addressing atmospheric dispersion modeling of accidental releases for emergency response.

This document, on the modeling of routine releases, is the first of these dispersion modeling standards. The working group decided to create all three standards in sequence to take advantage of their similarities, to achieve consistency among the standards, and to incorporate the lessons learned from one in preparing the next.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the references section that provides guidance on the use of references.

This standard does not incorporate the concepts of generating risk-informed insights, performance-based requirements, or a graded approach to quality assurance. The user is advised that one or more of these techniques could enhance the application of this standard.

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