



U.S. NUCLEAR REGULATORY COMMISSION

REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

(This guide reissued
February 1978)

REGULATORY GUIDE 3.4

NUCLEAR CRITICALITY SAFETY IN OPERATIONS WITH FISSIONABLE MATERIALS OUTSIDE REACTORS

A. INTRODUCTION

Section 70.22, "Contents of applications," of 10 CFR Part 70, "Special Nuclear Material," requires that applications for a license to receive title to, own, acquire, deliver, receive, possess, use, or transfer special nuclear material contain proposed procedures to avoid accidental conditions of criticality. This regulatory guide provides guidance for complying with this portion of the Commission's regulations by describing acceptable procedures for the prevention of criticality accidents in the handling, storing, processing, and transporting of fissionable materials outside of nuclear reactors.

B. DISCUSSION

ANSI N16.1-1975¹ is a revision of ANSI N16.1-1969 and was prepared by Subcommittee 8, Fissionable Materials Outside Reactors, of the Standards Committee of the American Nuclear Society. ANSI N16.1-1975 was approved by the American National Standards Committee N16, Nuclear Criticality Safety, in early 1975 and subsequently by the American National Standards Institute (ANSI) on April 14, 1975.

ANSI N16.1-1975 applies to handling, storing, processing, and transporting U-233, U-235, Pu-239, and other fissionable materials outside nuclear reactors. The standard presents generalized basic criteria

ANSI N16.1-1975, "American National Standard for Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," may be obtained from the American Nuclear Society, 555 North Kensington Avenue, La Grange Park, Illinois 60525.

and specific limits for some simple single fissionable units but not for multi-unit arrays. Further, the subcritical limits specified in the standard allow for uncertainties in the calculations and experimental data used in their derivation but not for contingencies such as double batching or failure of analytical techniques to yield accurate values. This standard does not apply to the assembly of fissionable materials under controlled conditions, such as in critical experiments. Nor does the standard include the details of administrative controls, the design of processes or equipment, the description of instrumentation for process control, or detailed criteria to be met in transporting multi-unit arrays of fissionable materials.

C. REGULATORY POSITION

The nuclear criticality safety practices, the single-parameter limits for fissile nuclides, and the guidance for multiparameter control contained in ANSI N16.1-1975 provide generally acceptable procedures for the prevention of criticality accidents in the handling, storing, processing, and transporting of special nuclear materials outside of nuclear reactors subject to the following:

1. Use of ANSI N16.1-1975 is not a substitute for detailed nuclear criticality safety analyses for specific operations.
2. Sections 7 and 8 of ANSI N16.1-1975 list additional documents referred to in the standard. The specific applicability or acceptability of these listed documents will be covered separately in other regulatory guides, where appropriate.

USNRC REGULATORY GUIDES

Regulatory Guides are issued to describe and make available to the public methods acceptable to the NRC staff of implementing specific parts of the Commission's regulations, to delineate techniques used by the staff in evaluating specific problems or postulated accidents, or to provide guidance to applicants. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. However, the staff's consideration of comments received during the initial public comment period for this guide has resulted in the determination that there is no need for a revision at this time.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

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D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plans for using this regulatory guide.

This guide reflects current NRC staff practice. Therefore, except in those cases in which the appli-

cant or licensee proposes an acceptable alternative method, the staff will use the method described herein in evaluating an applicant's or licensee's capability for and performance in complying with specified portions of the Commission's regulations until this guide is revised as a result of suggestions from the public or additional staff review.

This guide is being reissued with the words "For Comment" deleted. The staff's consideration of comments received during the initial public comment period has resulted in the determination that there is no need for a revision at this time. Consequently, no changes have been made in the text of the guide.



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