



REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 3.58
(Task CE 407-4)

CRITICALITY SAFETY FOR HANDLING, STORING, AND TRANSPORTING LWR FUEL AT FUELS AND MATERIALS FACILITIES

A. INTRODUCTION

Section 70.22, "Contents of Applications," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," requires that applications for a specific license to own, acquire, deliver, receive, possess, use, or initially 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 procedures acceptable to the NRC staff for preventing criticality accidents in operations involving handling, storing, and transporting light water reactor (LWR) fuel at fuels and materials facilities, i.e., fuel cycle facilities other than nuclear reactors.

Any information collection activities mentioned in this regulatory guide are contained as requirements in 10 CFR Part 70, which provides the regulatory basis for this guide. The information collection requirements in 10 CFR Part 70 have been cleared under OMB Clearance No. 3150-0009.

B. DISCUSSION

ANSI/ANS-8.17-1984, "Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors,"¹ was prepared by Subcommittee 8, Fissionable Materials Outside Reactors, of the Standards Committee of the American Nuclear Society. ANSI/ANS-8.17-1984 was approved by the American National Standards Committee N16, Nuclear Criticality Safety, in 1983 and by the American National Standards Institute (ANSI) on January 13, 1984.

¹Copies may be obtained from the American Nuclear Society, 555 North Kensington Avenue, La Grange Park, Illinois 60525.

ANSI/ANS-8.17-1984 provides guidance for preventing criticality accidents in operations involving handling, storing, and transporting LWR fuel rods and units in any phase of the fuel cycle outside reactor cores. This guidance includes general safety criteria and criteria to establish subcriticality.

C. REGULATORY POSITION

The general safety criteria and criteria to establish subcriticality contained in ANSI/ANS-8.17-1984 provide procedures acceptable to the NRC staff for preventing accidental conditions of criticality in handling, storing, and transporting LWR fuel at fuels and materials facilities. The only exception is that credit for fuel burnup may be taken only when the amount of burnup is confirmed by reactivity measurements that are appropriate for each type of fuel assembly in the environment in which it is to be stored. Use of ANSI/ANS-8.17-1984, however, is not a substitute for detailed nuclear criticality safety analyses for specific operations.

Section 6 of ANSI/ANS-8.17-1984 lists additional documents referred to in the standard. The specific applicability or acceptability of two of these listed documents has been addressed in the latest version of the regulatory guides identified below:

| Standard | Regulatory Guide |
|--------------------------------|---|
| ANSI/ANS-8.1-1983 ¹ | 3.4 - Nuclear Criticality Safety in Operations with Fissionable Materials at Fuels and Materials Facilities |
| ANSI/ANS-8.3-1979 ¹ | 8.12 - Criticality Accident Alarm Systems |

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.

This guide was issued after consideration of comments received from the public. 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.

Written comments may be submitted to the Rules and Procedures Branch, DRR, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The guides are issued in the following ten broad divisions:

1. Power Reactors
2. Research and Test Reactors
3. Fuels and Materials Facilities
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Issued guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161.

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.

The methods described in this guide were applied to a number of specific cases during reviews and selected licensing actions. These methods reflect the latest general

NRC approach to criticality safety in operations with LWR fuel at fuels and materials facilities. Therefore, except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the methods described herein will be used after the issuance of this guide in the evaluation of submittals in connection with license applications submitted under 10 CFR Part 70.

VALUE/IMPACT STATEMENT

The NRC staff performed a value/impact assessment to determine the proper procedural approach for providing guidance on criticality safety for handling, storing, and transporting LWR fuel at fuels and materials facilities. The NRC staff has been involved in the development, review, and approval of ANSI/ANS-8.17-1984, "Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors," which was approved by the American National Standards Institute on January 13, 1984. The assessment resulted in a decision to develop a regulatory guide that would endorse, with possible supplemental provisions, ANSI/ANS-8.17-1984. The results of this value/impact

assessment were included in a draft regulatory guide on this subject, CE 407-4, entitled "Criticality Safety for Handling, Storing, and Transporting LWR Fuel Outside Reactors," that was issued for public comment in July 1985. The title of the guide was changed subsequently to clarify its applicability.

The value/impact statement published with the proposed guide is still applicable. A copy of the draft regulatory guide (identified by its task number, CE 407-4) and its associated value/impact statement is available for inspection and copying for a fee at the NRC Public Document Room at 1717 H Street NW., Washington, DC.

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