

70-687

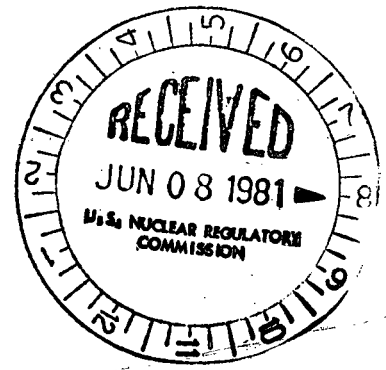
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Docket No. 70-687  
Materials License No. SNM-639  
Amendment No. 6

Distribution:  
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TSchultze) ss-396

Union Carbide Corporation  
Medical Products Division  
ATTN: Mr. Marcus H. Voth  
Manager, Nuclear Operation  
P. O. Box 324  
Tuxedo, New York 10987

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NKetzlach  
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WTing  
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Gentlemen:

Pursuant to Title 10, Code of Federal Regulations, Part 70, Special Nuclear Material License No. SNM-639 is hereby amended to authorize the use of the surface contamination limits for alpha radiation in controlled areas as presented in your letter, dated December 5, 1980 (page 4). Accordingly, those sections of your letter dated April 28, 1969 and November 5, 1970, pertaining to alpha contamination are superseded and Item 9 of License No. SNM-639 is modified to read as follows:

"9. The special nuclear material is for use in accordance with the statements, representations and conditions specified in the licensee's applications dated April 28 and May 21, 1969; November 5, 1970; February 8, June 13, June 29, and August 13, 1973; May 28, 1974; February 11, 1975; August 12, 1976; May 3, October 13, and November 17, 1978; June 2, November 26, and December 5, 1980, excepting that part of the December 5, 1980 letter requesting an exemption from 10 CFR Section 70.24."

All other conditions of this license shall remain the same.

With respect to your request for exemption from 10 CFR Section 70.24(a) for dry oxide or assay samples, we do not believe that you have provided adequate basis for the exemption and, therefore, this request is denied. Exemptions from the criticality alarm requirements normally are based on physical factors that preclude the credibility of a criticality accident, under normal or accident conditions, such as geometry or the physical form of the material; or, in the case of your exemption for special nuclear material in the hot cells, that

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the event could occur only in heavily shielded circumstances thus providing adequate protection of personnel. (In the latter case, other means must be in place to provide information that an accidental criticality has occurred.) Your present request appears to be based on administrative controls designed to limit the accumulation of dry oxide at any one location. We agree that accidental criticality is unlikely and that two independent contingencies must occur before such an event is possible, i.e., failure of administrative controls over the accumulation of material in one location and introduction of moderation. However, in the latter instance, you appear to have considered only flooding and have not considered other possible sources of water, such as fire fighting, broken water pipes, etc. There is no evidence that the quantities of material or the geometry of the containers would preclude accidental criticality in the event of introduction of moderation.

Enclosed are copies of Regulatory Guides 8.5 and 8.12. Installation of criticality accident alarm systems should be in accordance with the guides, each of which references national ANSI standards; if you choose to use different methods to meet regulatory requirements for criticality accident alarm systems, please provide a description of the system and justification for its adequacy.

FOR THE NUCLEAR REGULATORY COMMISSION

*Original signed by  
Leland C. Rouse*

Leland C. Rouse, Chief  
Advanced Fuel and Spent Fuel  
Licensing Branch  
Division of Fuel Cycle and  
Material Safety

Enclosures:  
Regulatory Guides 8.5 and 8.12

SEE ATTACHED CONCURRENCE COPY FOR PRIOR CONCURRENCES

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SURNAME ▶	ATClark:flb	NKetzlach	LCRouse				
DATE ▶	74205 1/9/81*	1/12/81	6/4/81				



U.S. NUCLEAR REGULATORY COMMISSION

Revision 1\*  
March 1981

# REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 8.5

## CRITICALITY AND OTHER INTERIOR EVACUATION SIGNALS

### A. INTRODUCTION

Section 70.24, "Criticality Accident Requirements," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," requires criticality detection and alarm systems in any area containing special nuclear material when the licensee is authorized to possess such special nuclear material in excess of certain specified amounts. This guide defines the characteristics of an audible signal acceptable to the NRC staff for use where prompt, complete evacuation is required to prevent serious injury from radiation exposure.

### B. DISCUSSION

ANSI/ANS N2.3-1979,<sup>1</sup> "Immediate Evacuation Signal for Use in Industrial Installations," which is a revision of USASI N2.3-1967, was approved by the American National Standards Institute (ANSI) on September 13, 1979. The standard defines the characteristics of an immediate evacuation signal system.

Whereas USASI N2.3-1967 specified the characteristics of a unique audible signal for evacuation of the area potentially affected by the consequences of a nuclear criticality accident, ANSI/ANS N2.3-1979 presents the recognized desirable characteristics of signal systems and good practices in their

\*The substantial number of changes in this revision has made it impractical to indicate them with lines in the margin.

<sup>1</sup>Copies may be obtained from the American Nuclear Society, 555 North Kensington Avenue, LaGrange Park, Illinois 60525.

conception, installation, and operation. A description of typical characteristics for an evacuation signal and the signal generator that were included as requirements in the body of USASI N2.3-1967 have been placed in Appendix B to ANSI/ANS N2.3-1979 simply as an example of compliance with the standard.

### C. REGULATORY POSITION

The characteristics of an immediate evacuation signal described in ANSI/ANS N2.3-1979, "Immediate Evacuation Signal for Use in Industrial Installations," are generally acceptable to the NRC staff for use wherever such a system may be needed or required except that the minimum duration of the signal should be sufficient to ensure evacuation and permit implementation of access control.

### D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees regarding the NRC staff's plan for using this regulatory guide. This guide reflects practices currently acceptable to the NRC staff. Except in those cases in which the applicant or licensee proposes acceptable alternative practices or methods for complying with specified portions of the Commission's regulations, the practices or methods described herein will be used as a basis for evaluating applications for licenses to possess special nuclear material in quantities subject to §70.24 of 10 CFR Part 70.

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#### 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. This guide was revised as a result of substantive comments received from the public and additional staff review.

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

The guides are issued in the following ten broad divisions:

1. Power Reactors
2. Research and Test Reactors
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Copies of issued guides may be purchased at the current Government Printing Office price. A subscription service for future guides in specific divisions is available through the Government Printing Office. Information on the subscription service and current GPO prices may be obtained by writing the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Publications Sales Manager.



U.S. NUCLEAR REGULATORY COMMISSION

# REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 8.12  
(Task OH 015-4)

## CRITICALITY ACCIDENT ALARM SYSTEMS

### A. INTRODUCTION

Section 70.24, "Criticality Accident Requirements," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," requires licensees who are authorized to possess special nuclear material in excess of certain amounts to maintain a criticality accident alarm system. This guide describes a system acceptable to the NRC staff for meeting the Commission's requirements for a criticality accident alarm system.

### B. DISCUSSION

Section 70.24 requires, in part, the detection of a criticality that produces an absorbed dose in soft tissue of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the reacting material within 1 minute. This sensitivity should be enough to detect any accidental criticality. Criticality accident alarm systems are also discussed in American National Standard ANSI/ANS 8.3-1979,<sup>1</sup> "Criticality Accident Alarm System," which has the same detection criterion.

Paragraph 4.1 of ANSI/ANS 8.3-1979 requires criticality accident alarms "wherever it is deemed that they will result in a reduction in total risk." The use of criticality alarms is not intended to produce a hazard for workers, but to reduce any hazard that may exist from working with materials that have a potential for criticality. Some situations exist in which the workplace could be evacuated as a result of a false alarm and a hazard could be posed by the evacuation. Such situations should be avoided. For example, where the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality, such as in some storage spaces for unirradiated nuclear power plant fuel, alarms are not needed. However, § 70.24 requires alarms whenever licensees are authorized to possess special nuclear material

\* The substantial number of changes in this revision has made it impractical to indicate the changes with lines in the margin.

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in excess of certain amounts. Thus, Regulatory Position 1 discusses certain situations where an exemption from the criticality accident alarm system is appropriate.

### C. REGULATORY POSITION

The guidance on criticality accident alarm systems contained in ANSI/ANS 8.3-1979, "Criticality Accident Alarm System," is generally acceptable to the NRC staff, subject to the following:

1. Section 70.24 of 10 CFR Part 70 requires alarm coverage "in each area in which such licensed special nuclear material is handled, used, or stored..." whereas paragraph 4.2.1 of the standard states that the need for criticality alarms shall be evaluated for such areas. If such an evaluation does not determine that a potential for criticality exists, as for example where the quantities or form of special nuclear material make criticality practically impossible or where geometric spacing is used to preclude criticality, such as in some storage spaces for unirradiated nuclear power plant fuel, it is appropriate to request an exemption from § 70.24.

2. Paragraph 70.24(a)(1) of 10 CFR Part 70 requires that each area be covered by two detectors, in contrast to paragraph 4.5.1 of the standard, which allows coverage by a single detector.

3. The signal for evacuation should be sounded automatically upon detection of an accident.

4. A quick screening capability as required in paragraph 70.24(b) of 10 CFR Part 70 may be provided instead of the more extensive dosimetry requirements stated in paragraph 6.6 of the standard.

### 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. Except in those cases in which an applicant or licensee proposes an acceptable alternative

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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. This guide was revised as a result of substantive comments received from the public and additional staff review.

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method, the staff will use the methods described herein after March 1, 1981, in evaluating designs of criticality accident alarm systems to meet the requirements of § 70.24 of the Commission's regulations.

If an applicant or licensee wishes to use the method described in this regulatory guide before March 1, 1981, the applicant's alarm system design or the licensee's alarm system will be evaluated on the basis of this guide.

#### VALUE/IMPACT STATEMENT\*

This revision to Regulatory Guide 8.12, "Criticality Accident Alarm Systems," clarifies, in Regulatory Position 1, where criticality accident alarm systems are not appropriate and adds the position that in situations where alarm systems have been installed, the alarm should automatically sound when criticality is reached. These positions have been reached as a result of staff review of the draft guide and evaluation of public comments on it.

\* Draft Guide OH 015-4 and its associated value/impact statement dated May 1980 are available for inspection or copying for a fee at the NRC Public Document Room, 1717 H Street NW., Washington, D.C.

As indicated in Regulatory Position 1, a request for an exemption to the requirements of § 70.24, "Criticality Accident Requirements," of 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," is appropriate when there is no real possibility of a criticality, for example in situations where geometric spacing is used to preclude criticality, such as in storage spaces for unirradiated nuclear power plant fuel.

This revision to the guide describes a criticality accident alarm system acceptable to the NRC staff for meeting the Commission's regulations for such a system.

instantaneous warning to personnel in the unlikely event such an accident should occur. This is particularly applicable in this instance in which there is a dependence on administrative controls to prevent the accumulation of sufficient fissile material in one location.

A copy of Regulatory Guide 8.12, "Criticality Accident Alarm Systems" has been enclosed for your information.

If you have any questions regarding these matters, please let me know.

FOR THE NUCLEAR REGULATORY COMMISSION

Leland C. Rouse, Chief  
Advanced Fuel and Spent Fuel  
Licensing Branch  
Division of Fuel Cycle and  
Material Safety

Enclosure:  
As stated

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SURNAME ▶	ATClark:mib	NKetzlach	LCRouse				
DATE ▶	1/9/81	1/12/81	1/ /81				

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Union Carbide Corporation  
Medical Products Division  
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All other conditions of this license shall remain the same.

With respect to your request for exemption from 10 CFR Section 70.24(a) for the dry oxide, it is hereby denied. Criticality monitoring is required for any operation in which fissile material is in active use and sufficient material is permitted under a license to form a critical mass. The requirement does not consider the likelihood of the event, just its possibility. One cannot foresee how such an accident as an inadvertent criticality excursion will occur, else steps would be taken to prevent it. Therefore, it is considered prudent to provide an

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