



# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 8.12

(Task CE 801-5)

## 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.

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

Section 70.24 requires, in part, a monitoring system capable of detecting 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. Criticality accident alarm systems are also discussed in American National Standard ANSI/ANS-8.3-1986, "Criticality Accident Alarm System,"<sup>1</sup> which has the same detection criterion.

### C. REGULATORY POSITION

The guidance on criticality accident alarm systems contained in ANSI/ANS-8.3-1986, "Criticality Accident

Alarm System," is generally acceptable to the NRC staff, subject to the following limitations:

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 must 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, whereas paragraph 4.5.1 of the standard permits coverage by a reliable single detector.

### D. IMPLEMENTATION

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

Except in those cases in which an applicant proposes an acceptable alternative method for complying with § 70.24 of 10 CFR Part 70, the method described in this guide will be used in the evaluation of designs of criticality accident alarm systems.

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

#### 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                 | 6. Products                       |
| 2. Research and Test Reactors     | 7. Transportation                 |
| 3. Fuels and Materials Facilities | 8. Occupational Health            |
| 4. Environmental and Siting       | 9. Antitrust and Financial Review |
| 5. Materials and Plant Protection | 10. General                       |

Copies of issued guides may be purchased from the Government Printing Office at the current GPO price. Information on current GPO prices may be obtained by contacting the Superintendent of Documents, U.S. Government Printing Office, Post Office Box 37082, Washington, DC 20013-7082, telephone (202)275-2060 or (202)275-2171.

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.

8907270106 881031  
PDR REGG  
08 012 R PDR

#### VALUE/IMPACT STATEMENT

A draft value/impact statement was published with the proposed Revision 2 to Regulatory Guide 8.12 (Task CE 801-5) when the draft guide was published for public comment in May 1988. No changes were necessary, so a separate value/impact statement for the final guide has not been prepared. A copy of the draft value/impact statement is available for inspection and copying for a fee at the Commission's Public Document Room at 2120 L Street NW., Washington, DC, under Task CE 801-5.

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

FIRST CLASS MAIL  
POSTAGE & FEES PAID  
NRC  
PERMIT No. G-67