



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,"¹ 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.

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

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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.

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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.

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