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OFFICE OF NUCLEAR REGULATORY RESEARCH  
**REGULATORY GUIDE**

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## REGULATORY GUIDE 2.6

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# EMERGENCY PLANNING FOR RESEARCH AND TEST REACTORS AND OTHER NON-POWER PRODUCTION AND UTILIZATION FACILITIES

## A. INTRODUCTION

### Purpose

This regulatory guide (RG) provides licensees and applicants with a method that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable for use in complying with the regulations on the content of emergency plans for research and test reactors and other non-power production and utilization facilities licensed under Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, “Domestic Licensing of Production and Utilization Facilities” (10 CFR Part 50) (Ref. 1).

### Applicability

This RG applies to all applicants and holders of licenses for research and test reactors and other non-power production and utilization facilities under 10 CFR 50.21, “Class 104 Licenses; for medical therapy and research and development facilities,” and 10 CFR 50.22, “Class 103 Licenses; for commercial and industrial facilities.”

### Applicable Regulations

- 10 CFR 50.34(a)(10) requires that each application for a construction permit include a discussion of the facility’s preliminary plans for coping with emergencies as part of a preliminary safety analysis report. The items which shall be included in the preliminary plan are set forth in Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” to 10 CFR Part 50.
- 10 CFR 50.34(b)(6)(v) requires that each application for a Part 50 license to operate a facility include a final safety analysis report that contains, along with other information, the applicant’s plans for coping with emergencies, including the items specified in Appendix E to 10 CFR Part 50.

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Electronic copies of this RG, previous versions of this guide, and other recently issued guides are available through the NRC’s public Web site under the Regulatory Guides document collection of the NRC Library at <http://www.nrc.gov/reading-rm/doc-collections/>. The RG is also available through the NRC’s Agencywide Documents Access and Management System (ADAMS) at <http://www.nrc.gov/reading-rm/adams.html>, under ADAMS Accession No. ML17137A096. The regulatory analysis may be found in ADAMS under Accession No. ML16035A477 and the staff responses to the public comments on DG-2004 may be found under ADAMS Accession No. ML17137A099.

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- 10 CFR 50.54(q) requires Part 50 licensees to follow and maintain the effectiveness of emergency plans that meet the requirements of Appendix E to 10 CFR Part 50.
- 10 CFR Part 50, Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities” identifies the minimum requirements for the emergency plans to be included with the safety analysis report submitted as part of the construction permit or license application. It also indicates that because operation of facilities other than power reactors involve distinct considerations, the size of the emergency preparedness zone (EPZ) and degree of compliance with requirements in Appendix E, sections I through V, as necessary, will be determined on a case-by-case basis using this regulatory guide for research and test reactor, and other non-power production and utilization facility emergency response plans.

### **Related Guidance**

- NUREG-1537, Parts 1 and 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors” (Ref. 2), provides guidance for applicants preparing license applications for non-power reactor licenses and the NRC staff in its review of these license applications.
- Final Interim Staff Guidance (ISG) Augmenting NUREG-1537, Parts 1 and 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors” (Ref. 3) provides guidance for applicants preparing license applications for radioisotope production facilities and aqueous homogeneous reactors and the NRC staff in its review of these license applications.
- NUREG-0849, “Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors,” provides guidance for the NRC staff in its review of emergency plans for research and test reactors (Ref. 4).
- Regulatory Information Summary (RIS) 2005-02, Revision 1, “Clarifying the Process for Making Emergency Plan Changes” (Ref. 5), provides specific information with regard to processing changes to emergency plans. The RIS includes information to determine whether a “decrease in effectiveness” resulted from the proposed emergency plan change.
- National Fire Protection Association (NFPA) 801, “Standard for Fire Protection for Facilities Handling Radioactive Materials” (Ref. 6), may be useful to licensees developing and implementing fire protection programs. However, the NRC has not approved this standard.

### **Applicable Information Notices**

- Information Notice (IN) 92-79, “Non-Power Reactor Emergency Event Response” (Ref. 7), describes an event that required interface with the public and highlights the need for licensees to quickly apprise the NRC of the circumstances of an emergency classification.
- IN 97-34, “Deficiencies in Licensee Submittals Regarding Terminology for Radiological Emergency Action Levels in Accordance with the New Part 20” (Ref. 8), updates Appendix I of NUREG-0849 to reflect revised 10 CFR Part 20 regulations in the radiological emergency action levels (EALs).

- IN 2009-31, “Non-Power Reactor Licensee Notifications to the NRC during an Incident” (Ref. 9), describes lessons learned from an emergency declaration at a non-power reactor regarding the appropriate NRC office to contact and the types of information that the NRC may request from licensees at that time.

### **Purpose of Regulatory Guides**

The NRC issues RGs to describe to the public methods that the staff considers acceptable for use in implementing specific parts of the agency’s regulations, to explain techniques that the staff uses in evaluating specific problems or postulated events, and to provide guidance to applicants. RGs are not substitutes for regulations, and compliance with them is not required. Methods and solutions that differ from those set forth in RGs will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.

### **Paperwork Reduction Act**

This RG contains information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget (OMB), approval number 3150-0011.

### **Public Protection Notification**

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

## B. DISCUSSION

### Reason for Revision

This revision of the guide (Revision 2) addresses new issues identified since the guide was last revised in March 1983 (Revision 1). This revision endorses the latest version of the consensus standard, American National Standards Institute (ANSI)/American Nuclear Society (ANS) standard ANSI/ANS-15.16-2015, “Emergency Planning for Research Reactors” (Ref. 10) (ANSI/ANS-15.16 or the standard). The scope of RG 2.6 was expanded to address non-power 10 CFR Part 50 facilities other than research and test reactors. Other changes to RG 2.6 include editorial changes, and the current program guidance for RGs.

Revising this RG to endorse the use of, in whole or in part, a consensus standard is consistent with the NRC policy of evaluating the latest versions of national consensus standards to determine their suitability for endorsement by RGs. This approach also complies with the NRC’s management directive (MD) 6.5, “NRC Participation in the Development and Use of Consensus Standards” (Ref. 11) and is in accordance with Public Law 104-113, *National Technology Transfer and Advancement Act of 1995* (Ref. 12).

### Background

The Commission’s interest in emergency planning is focused primarily on situations that may cause or threaten to cause radiological hazards that could affect public health and safety. Emergency plans should be directed toward mitigating the consequences of emergencies and should provide reasonable assurance that appropriate measures can and will be taken to protect public health and safety in the event of an emergency. Although developing a completely detailed plan encompassing every conceivable type of emergency situation is not practical, advanced planning and provisions for ensuring the availability of necessary equipment, supplies, and services can create a high order of preparedness and ensure an orderly and timely decision making process at the time of an emergency. The plans should express the overall concept of operation that describes how the elements of advanced planning have been considered and the provisions that have been made to cope with emergency situations.

From its review of safety analysis reports for research and test reactors and other non-power production and utilization facilities, and based on the radionuclide inventory and postulated radioactive releases at these facilities, the NRC staff determined that the potential radiological hazards to the public associated with the operation of these facilities are less than those associated with the operation of commercial nuclear power plants. However, the types and potential consequences of emergencies vary from facility to facility. As such, the NRC staff expects that the emergency plans and procedures developed by or for each facility should realistically reflect the hazards and consequences of each facility.

The ANSI and the ANS issued ANSI/ANS-15.16, which is generally consistent with current regulatory requirements. Originally developed in 1982, and updated in 2008 and 2015, the current standard provides specific acceptance criteria for research and test reactors and other non-power production and utilization facilities to comply with the applicable requirements set forth in 10 CFR 50.34, “Contents of Applications; Technical Information,” 10 CFR 50.54, “Conditions of Licenses,” and Appendix E to 10 CFR Part 50. These criteria provide a basis for licensees and applicants to develop acceptable emergency response plans and improve emergency preparedness at their facilities.

The NRC staff issued NUREG-0849 in 1983 as a standard review plan for evaluating emergency plans submitted by research and test reactor licensees<sup>1</sup>. Consistent with ANSI/ANS-15.16, NUREG-0849 provides areas of review, planning standards, and evaluation items for NRC staff to evaluate a licensee's or applicant's compliance with the applicable emergency planning requirements described above. Both NUREG-0849 and ANSI/ANS-15.16 were incorporated by reference into NUREG-1537, Section 12.7, "Emergency Planning," and the ISG augmenting NUREG-1537. This guidance forms the basis for all construction permit and operating license application reviews of research and test reactors and other non-power production and utilization facilities. Relevant non-reactor emergency planning guidance contained in the ISG augmenting NUREG-1537 is based on NUREG-1520, Revision 1, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," published in May 2010 (Ref. 13).<sup>2</sup>

### **Harmonization with International Standards**

The International Atomic Energy Agency (IAEA) has established a series of safety standards constituting a high level of safety for protecting people and the environment. Safety standards present international good practices and increasingly reflect best practices to help users striving to achieve high levels of safety. Relative to this RG, IAEA Safety Requirements NS-R-4, "Safety of Research Reactors" (Ref. 15), addresses emergency planning in Sections 7.72 through 7.78. While the NRC has an interest in facilitating the harmonization of standards used domestically and internationally, the agency does not specifically endorse or approve the use of NS-R-4 and is only acknowledging that it may be a useful reference for general information. The NRC could consider the use of the international standard in a licensing action following adequate justification by a licensee or applicant and technical review by the NRC.

### **Documents Discussed in Staff Regulatory Guidance**

This RG endorses, in part, the use of one or more codes or standards developed by external organizations, and other third party guidance documents. These codes, standards and third party guidance documents may contain references to other codes, standards or third party guidance documents ("secondary references"). If a secondary reference has itself been incorporated by reference into NRC regulations as a requirement, then licensees and applicants must comply with that standard as set forth in the regulation. If the secondary reference has been endorsed in an RG as an acceptable approach for meeting an NRC requirement, then the standard constitutes a method acceptable to the NRC staff for meeting that regulatory requirement as described in the specific RG. If the secondary reference has neither been incorporated by reference into NRC regulations nor endorsed in an RG, then the secondary reference is neither a legally-binding requirement nor a "generic" NRC approved acceptable approach for meeting an NRC requirement. However, licensees and applicants may consider and use the information in the secondary reference, if appropriately justified, consistent with current regulatory practice, and consistent with applicable NRC requirements.

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1 Appendix I of NUREG-0849 was updated in April 1997 to reflect revisions to 10 CFR Part 20 requirements in radiological EALs. The NRC staff issued IN 97-34 (Ref. 8) in June 1997 to inform licensees of this revision to the NUREG.

2 Since the publication of the ISG augmenting NUREG-1537, the NRC published Revision 2 to NUREG-1520 in June 2015 (Ref. 14). Licensees and applicants should refer to the most recent revisions of NRC guidance documents when developing license applications and implementing NRC requirements.

## **C. STAFF REGULATORY GUIDANCE**

The NRC staff endorses the guidance in ANSI/ANS-15.16-2015 for use as a means for research and test reactor and other non-power production and utilization facility licensees and applicants to comply with the requirements in 10 CFR 50.34(a)(10), 10 CFR 50.34(b)(6)(v), 10 CFR 50.54(q), and 10 CFR Part 50, Appendix E. The following clarifications are added:

### **1. Radiation Dose Levels for Emergency Action Levels**

The radiation dose levels of the emergency action levels established in ANSI/ANS-15.16 for the various emergency classes differ from those specified for power reactors. However, in the judgment of the NRC staff, the radiation dose levels specified in Table I of the standard are adequate for the credible accidents associated with the operation of research and test reactors and other non-power production and utilization facilities and the specified action levels provide reasonable assurance that protective measures associated with the action levels specified in Table I can and will be taken, provided that the licensee also gives appropriate emphasis to developing emergency action levels that relate directly to facility parameters (e.g., pool water levels and area radiation monitors).

### **2. NRC Notification**

The licensee should notify the NRC headquarters operations center of events classified under Table I of the standard.

### **3. Implementing Procedures**

The licensee should establish and maintain procedures for implementing the requirements of the emergency plan. The implementing procedures should be readily accessible for use by the staff of the implementing organization (e.g., operators, facility management, etc.). The emergency implementing procedures should be maintained and made available at the facility for inspection and review at any time by an NRC representative.

### **4. Procedure Review and Revision**

The procedural system that the licensee uses for the review and approval of emergency implementing procedures should contain instructions governing the writing, revising, and updating of implementing procedures. The instructions should specify the methods that the licensee will use to ensure that procedures, revisions, and changes are reviewed for adequacy, approved for use, and distributed to user organizations and individuals responsible for implementing the procedures.

### **5. Plan Details Subject to Routine Change**

The plan should not incorporate details that may routinely change (e.g., names and telephone numbers, specific items of equipment and supplies, inventory lists, and step-by-step procedures or checklists that may be altered as a result of experience or test exercises). These details are useful, but are better maintained in the facility's implementing emergency procedures.

## **D. IMPLEMENTATION**

The purpose of this section is to provide information to applicants and licensees regarding the NRC's plans for using this RG. The regulatory position held in this guidance demonstrates the method that the NRC staff finds acceptable for an applicant or licensee to meet the requirements of the underlying NRC regulations. Methods or solutions that differ from those described in this RG may be deemed acceptable if they provide sufficient basis and information for the NRC staff to verify that the proposed alternative demonstrates compliance with the appropriate NRC regulations. Current licensees may continue to use guidance the NRC found acceptable for complying with the identified regulations as long as their current licensing basis remains unchanged.

The guidance in this RG is not a backfit, as that term is defined in 10 CFR 50.109, "Backfitting," because non-power facilities licensed under 10 CFR Part 50 are not included within the scope of entities protected by 10 CFR 50.109.

## REFERENCES<sup>3</sup>

1. *U.S. Code of Federal Regulations (CFR)*, “Domestic Licensing of Production and Utilization Facilities,” Part 50, Chapter 1, Title 10, “Energy,” U.S. Nuclear Regulatory Commission, Washington, DC.
2. U.S. Nuclear Regulatory Commission (NRC), NUREG-1537, Parts 1 and 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors,” Washington, DC, February 1996. ADAMS Accession Nos. ML042430055 and ML042430048.
3. NRC, Interim Staff Guidance (ISG) augmenting NUREG-1537, Parts 1 and 2, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, for Licensing Radioisotope Production Facilities and Aqueous Homogeneous Reactors,” Washington, DC, October 2012. ADAMS Accession Nos. ML12156A069 and ML12156A075.
4. NRC, NUREG-0849, “Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors,” Washington, DC, October 1983. ADAMS Accession No. ML062190191.
5. NRC, Regulatory Information Summary (RIS), 2005-02, Revision 1, “Clarifying the Process for Making Emergency Plan Changes,” Washington, DC, April 19, 2011. ADAMS Accession No. ML100340545.
6. National Fire Protection Association (NFPA), 801, “Standard for Fire Protection for Facilities Handling Radioactive Materials,” 2008 Edition, National Fire Protection Association, Quincy, MA, 2008.<sup>4</sup>
7. NRC, Information Notice (IN), 92-79, “Non-Power Reactor Emergency Event Response,” Washington, DC, December 1, 1992. ADAMS Accession No. ML031190745.
8. NRC, IN 97-34, “Deficiencies in Licensee Submittals Regarding Terminology for Radiological Emergency Action Levels in Accordance with the New Part 20,” June 12, 1997. ADAMS Accession number ML031050574.
9. NRC, IN 2009-31, “Non-power Reactor Licensee Notifications to the NRC during an Incident,” Washington, DC, December 10, 2009. ADAMS Accession No. ML092680467.

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3 Publicly available NRC documents are available electronically through the NRC Library on the NRC’s public Web site at <http://www.nrc.gov/reading-rm/doc-collections/> and through the NRC’s Agencywide Documents Access and Management System (ADAMS) at <http://www.nrc.gov/reading-rm/adams.html>. The documents can also be viewed online or printed for a fee in the NRC’s Public Document Room (PDR) at 11555 Rockville Pike, Rockville, MD. For problems with ADAMS, contact the PDR staff at 301-415-4737 or (800) 397-4209; or e-mail [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

4 The National Fire Protection Association (NFPA) makes important safety codes and standards available for free online and documents are available at <http://www.nfpa.org/codes-and-standards/document-information-pages>. They may also be purchased by calling NFPA Customer Sales 800.344.3555 or writing NFPA 1 Batterymarch Park, Quincy, MA 02169-7471.

10. American National Standards Institute/American Nuclear Society standard (ANSI/ANS) 15.16-2015, "Emergency Planning for Research Reactors," American Nuclear Society, La Grange Park, IL, February 2015.<sup>5</sup>
11. NRC, Management Directive 6.5, "NRC Participation in the Development and Use of Consensus Standards," Washington, DC, December 2011. ADAMS Accession No. ML100600460.
12. *National Technology Transfer and Advancement Act of 1995*, Pub. L. No. 104-113 (1996).
13. NRC, NUREG-1520, Revision 1, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility – Final Report," Nuclear Regulatory Commission, Washington, DC, May 2010. ADAMS Accession No. ML101390110.
14. NRC, NUREG-1520, Revision 2, "Standard Review Plan for Fuel Cycle Facilities License Applications – Final Report," Nuclear Regulatory Commission, Washington, DC, June 2015. ADAMS Accession No. ML15098A115.
15. International Atomic Energy Agency (IAEA), Safety Requirements, NS-R-4, "Safety of Research Reactors," International Atomic Energy Agency, Vienna, Austria, 2005<sup>6</sup>.

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5 Copies of ANSI/ANS standards may be purchased from the American Nuclear Society (ANS) Web site (<http://www.new.ans.org/store/>); or by writing to: American Nuclear Society, 555 North Kensington Avenue, La Grange Park, Illinois 60526, U.S.A., Telephone 800-323-3044.

6 Copies of International Atomic Energy Agency (IAEA) documents may be obtained through their Web site: [WWW.IAEA.Org/](http://WWW.IAEA.Org/) or by writing the International Atomic Energy Agency P.O. Box 100 Wagramer Strasse 5, A-1400 Vienna, Austria. Telephone (+431) 2600-0, Fax (+431) 2600-7, or E-Mail at [Official.Mail@IAEA.Org](mailto:Official.Mail@IAEA.Org)