



# REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

## REGULATORY GUIDE 1.101, REVISION 4

(Draft was issued as DG-1075)

### EMERGENCY PLANNING AND PREPAREDNESS FOR NUCLEAR POWER REACTORS

#### A. INTRODUCTION

In § 50.47, "Emergency Plans," of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," paragraph (a)(1) states that no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. For operating power reactors, 10 CFR 50.54(s)(2)(ii) requires that "If . . . the NRC finds that the state of emergency preparedness does not provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency . . . the Commission will determine whether the reactor shall be shut down until such deficiencies are remedied or whether other enforcement action is appropriate." In both cases, the NRC will base its finding on a review of the Federal Emergency Management Agency (FEMA) findings and determinations as to whether State and local emergency plans are adequate and capable of being implemented, in addition to the NRC assessment as to whether the licensee's emergency plans are adequate and capable of being implemented.

Onsite and offsite emergency response plans must meet the standards that are listed in 10 CFR 50.47 in order for the staff to make a positive finding that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency. One of these standards, 10 CFR 50.47(b)(4), pertains to the development of emergency action levels (EALs). Section IV, "Content of Emergency Plans," of Appendix E to 10 CFR Part 50 also contains requirements for the development and review of EALs.

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Regulatory guides are issued to describe and make available to the public such information as methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques used by the staff in evaluating specific problems or postulated accidents, and data needed by the NRC staff in its review of applications for permits and licenses. 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 Directives Branch, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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This regulatory guide provides guidance to licensees and applicants on methods acceptable to the NRC staff for complying with the NRC's regulations for emergency response plans and preparedness at nuclear power reactors. Licensees and applicants may propose means other than those specified by the provisions of the Regulatory Position of this guide for meeting applicable regulations. No new positions or requirements are being imposed by this regulatory guide. Implementation of the Nuclear Energy Institute's (NEI's) guidance by licensees will be on a strictly voluntary basis.

The information collections contained in this regulatory guide are covered by the requirements of 10 CFR Part 50, which were approved by the Office of Management and Budget (OMB), approval number 3150-3011. 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**

Revision 1 to NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,"<sup>1</sup> was published in November 1980 to provide specific acceptance criteria for complying with the standards set forth in 10 CFR 50.47. FEMA, NRC, and other involved Federal agencies intend to use the guidance contained in Revision 1 of NUREG-0654/FEMA-REP-1 in their individual and joint reviews of the radiological emergency response plans and preparedness of State and local governments and the plans and preparedness of applicants for and holders of a license to operate a nuclear power reactor. Revisions 2 and 3 of Regulatory Guide 1.101 endorsed Revision 1 of NUREG-0654/FEMA-REP-1.

In January 1992, the Nuclear Utilities Management and Resource Council (NUMARC) issued Revision 2 of NUMARC/NESP-007, "Methodology for Development for Emergency Action Levels,"<sup>2</sup> which contained guidance on EAL development that accounted for lessons learned from ten years of using the NUREG-0654 guidance. The NRC stated in Revision 3 of Regulatory Guide 1.101 (August 1992), that Revision 2 of NUMARC/NESP-007 was considered to be an acceptable alternative to the guidance provided in NUREG-0654 for development of EALs to comply with 10 CFR 50.47 and Appendix E to 10 CFR Part 50. In addition, the NRC stated in Revision 3 of Regulatory Guide 1.101 that there is a likelihood that the results of ongoing risk studies related to shutdown may necessitate revision of both the NRC EAL guidance (NUREG-0654) and the NUMARC EAL guidance (NUMARC/NESP-007). Appendix E to 10

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<sup>1</sup>Copies are available at current rates from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328 (telephone (202)512-1800); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, VA 22161; (telephone (703)487-4650; <<http://www.ntis.gov/ordernow>>. Copies are available for inspection or copying for a fee from the NRC Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852; the PDR's mailing address is US NRC Public Document Room, Washington, DC 20555; telephone (301)415-4737 or (800)397-4209; fax (301)415-3548; email is PDR@NRC.GOV.

<sup>2</sup>Copies are available for inspection or copying for a fee from the NRC Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, MD 20852; the PDR's mailing address is US NRC Public Document Room, Washington, DC 20555; telephone (301)415-4737 or (800)397-4209; fax (301)415-3548; email is PDR@NRC.GOV.

CFR Part 50 specifies that EALs are to be used as criteria for determining the need for taking emergency response actions (e.g., notification of emergency response organizations). The need for emergency response actions depends on the degree of degradation of plant safety during an event. The shutdown risk studies have demonstrated that events warranting emergency classification and response (although very unlikely) can occur in the shutdown and refueling mode of plant operation.

In January 2003, the Nuclear Energy Institute submitted guidance (NEI 99-01, Revision 4, January 2003, "Methodology for Development of Emergency Action Levels")<sup>3</sup> for developing EALs applicable in the shutdown and refueling modes of plant operations. NEI 99-01 also provided new guidance for developing EALs for permanently shutdown reactors and dry cask spent fuel storage at nuclear power plants. In addition, improvements to the NUMARC/NESP-007 EAL guidance were incorporated into NEI 99-01; these improvements were first developed (and the rationale behind the revision discussed) in NEI 97-03, Draft Final Revision 3, "Methodology for Development of Emergency Action Levels" (December 1998). NEI 97-03 was not endorsed by the NRC because the NRC applied its resources to the review of NEI 99-01, which incorporates the guidance in NEI 97-03.

In Revision 3 to Regulatory Guide 1.101, the NRC stated that "Licensees may use either NUREG 0654/FEMA-REP-1 or NUMARC/NESP-007 in developing their EAL scheme but may not use portions of both methodologies." The staff stated in EPPOS No. 1, "Emergency Preparedness Position (EPPOS) on Acceptable Deviations from Appendix 1 of NUREG-0654 Based Upon the Staff's Regulatory Analysis of NUMARC/NESP-007, 'Methodology for Development of Emergency Action Levels,'" that it recognizes that licensees who continue to use EALs based upon NUREG-0654 could benefit from the technical basis for EALs provided in NUMARC/NESP-007. However, the staff also recognized that the classification scheme must remain internally consistent. Likewise, licensees can benefit from guidance provided in NEI 99-01 without revising their entire EAL scheme. This is particularly so in regard to adopting guidance on EALs for cold shutdown and refueling modes of operations or for Independent Fuel Storage Facilities. However, the licensee needs to ensure that its EAL scheme remains internally consistent (i.e., the EALs making up the scheme are integrated so as to cover the spectrum of conditions that may warrant classification in a logical manner).

### **C. REGULATORY POSITION**

The criteria and recommendations in Revision 1 of NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (November 1980), are methods acceptable to the NRC staff for complying with the standards in 10 CFR 50.47 that must be met in onsite and offsite emergency

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<sup>3</sup>Electronic copies (Accession Number ML030300486) are available in NRC's Public Electronic Reading Room, which can be accessed through the NRC's web site, <WWW.NRC.GOV> .

<sup>4</sup>Electronic copies (Accession Number ML022970165) are available in NRC's Public Electronic Reading Room, which can be accessed through the NRC's web site, <WWW.NRC.GOV> .

response plans. These criteria provide a basis for NRC licensees and State and local governments to develop acceptable radiological emergency plans and improve emergency preparedness.

The guidance in NUMARC/NESP-007 (Revision 2, January 1992), "Methodology for Development of Emergency Action Levels," is acceptable to the NRC staff as an alternative method to that described in Appendix 1 to NUREG-0654/FEMA-REP-1 for developing EALs required in Section IV.B of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4). In addition, the guidance contained in NEI 99-01 (Revision 4, January 2003), "Methodology for Development of Emergency Action Levels,"<sup>3</sup> is acceptable to the NRC staff as an alternative method to that described in Appendix 1 to NUREG-0654/FEMA-REP-1 and NUMARC/NESP-007 for developing EALs required in Section IV of Appendix E to 10 CFR Part 50 and 10 CFR 50.47(b)(4).

#### **D. IMPLEMENTATION**

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

Except when an applicant or licensee proposes an acceptable alternative method for complying with specified portions of the NRC's regulations, the methods described in this guide will be used in the evaluation of emergency plans and preparedness for nuclear power reactors.

## **REGULATORY ANALYSIS**

A separate Regulatory Analysis was prepared for the proposed Revision 4 to Regulatory Guide 1.101 (Draft Regulatory Guide DG-1075), "Regulatory Analysis for Proposed Revision 4 of Regulatory Guide 1.101 To Accept the Guidance in NEI 99-01 as an Alternative Methodology for the Development of Emergency Action Levels." Electronic copies of the Regulatory Analysis are available in NRC's Public Electronic Reading Room, which may be accessed through the NRC's web site at <[WWW.NRC.GOV](http://WWW.NRC.GOV)>, under Accession Number ML031250542.