



REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 1.167

(Draft was DG-1035)

RESTART OF A NUCLEAR POWER PLANT SHUT DOWN BY A SEISMIC EVENT

A. INTRODUCTION

Paragraph IV(a)(3) of Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires shutdown of the nuclear power plant if vibratory ground motion exceeding that of the operating basis earthquake ground motion (OBE) occurs or if significant plant damage occurs.¹ Prior to resuming operations, the licensee must demonstrate to the NRC that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public.

This guide provides guidance acceptable to the NRC staff for performing inspections and tests of nuclear power plant equipment and structures prior to restart of a plant that has been shut down by a seismic event.

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, approval number 3150-0011. The

¹Regulatory Guide 1.166, "Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Postearthquake Actions," provides criteria for plant shutdown.

NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

B. DISCUSSION

Data from seismic instrumentation² and a walkdown of the nuclear power plant¹ are used to make the initial determination of whether the plant must be shut down after an earthquake, if the plant has not already shut down from operational perturbations resulting from the seismic event.

The Electric Power Research Institute has developed guidelines that will enable licensees to quickly identify and assess earthquake effects on nuclear power plants in EPRI NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake," December 1989.³ This regulatory guide addresses sections of EPRI NP-6695 that relate to postshutdown inspection and tests, inspection criteria, inspection personnel, documentation, and long-term evaluations.

²Regulatory Guide 1.12, Revision 2, "Nuclear Power Plant Instrumentation for Earthquakes," describes seismic instrumentation acceptable to the NRC staff.

³EPRI reports may be obtained from the Electric Power Research Institute, EPRI Distribution Center, 207 Coggins Dr., P.O. Box 23205, Pleasant Hill, CA 94523.

USNRC REGULATORY GUIDES

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 Commission'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 Review and Directives Branch, DFIPS, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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EPRI NP-6695 has been supplemented to add inspections and tests as a basis for acceptance of stresses in excess of Service Level C and to recommend that engineering evaluations of components with calculated stresses in excess of service Level D focus on areas of high stress and include fatigue analyses.

C. REGULATORY POSITION

After a plant has been shut down by an earthquake, the guidelines for inspections and tests of nuclear power plant equipment and structures that are in EPRI NP-6695, depicted in Figure 3-2 and specified in Sections 5.3.2, 5.3.3, and 5.3.4; the documentation specified in Section 5.3.5 to be submitted to the NRC; and the long-term evaluations that are specified in Section 6.3, with the exceptions specified below, are acceptable to the NRC staff for satisfying the requirements in Paragraph IV(a)(3) of Appendix S to 10 CFR Part 50.

1. EXCEPTIONS TO SECTION 6.3.4.1 OF EPRI NP-6695

1.1 Item (1) should read:

If the calculated stresses from the actual seismic loading conditions are less than the allowables for emergency conditions (e.g., ASME Code Level C Service Limits or equivalent) or original design bases, the item is considered acceptable, provided the results of inspections and tests (Section 5.3.2) show no damage.

1.2 The second dashed statement of Item (3) should read:

—An engineering evaluation of the effects of the calculated stresses on the functionality of the item. This evaluation should address all lo-

cations where stresses exceed faulted allowables and should include fatigue analysis for ASME Code Class 1 components and systems.

2. LONG-TERM EVALUATIONS

Coincident with the long-term evaluations, the plant should be restored to its current licensing basis. Exceptions to this must be approved by the Director, Office of Nuclear Reactor Regulation.

D. IMPLEMENTATION

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

Except in those cases in which the applicant proposes an acceptable alternative method for complying with the specified portions of the Commission's regulations, the method described in this guide will be used in the evaluation of applications for construction permits, operating licenses, combined licenses, or design certification submitted after January 10, 1997. This guide will not be used in the evaluation of an application for an operating license submitted after January 10, 1997, if the construction permit was issued prior to that date.

Holders of an operating license or construction permit issued prior to January 10, 1997, may voluntarily implement the methods described in this guide in combination with the methods in Regulatory Guides 1.12, Revision 2, "Nuclear Power Plant Instrumentation for Earthquakes," and 1.166, "Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions." Other implementation strategies, such as voluntary implementation of portions of the cited regulatory guides, will be evaluated by the NRC staff on a case-by-case basis.

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this regulatory guide. The regulatory analysis, "Revision of 10 CFR Part 100 and 10 CFR Part 50," was prepared for these amendments, and it provides the regulatory basis for this guide and examines the costs and

benefits of the rule as implemented by the guide. A copy of the regulatory analysis is available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC, as Attachment 7 to SECY-96-118.



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