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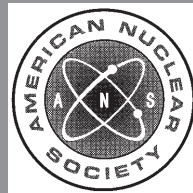
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nuclear plant response to an earthquake

an American National Standard

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**American National Standard
for Nuclear Plant Response
to an Earthquake**

Secretariat
American Nuclear Society

Prepared by the
**American Nuclear Society
Standards Committee
Working Group ANS-2.23**

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American National Standard

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Foreword

(This Foreword is not part of American National Standard Nuclear Plant Response to an Earthquake, ANSI/ANS-2.23-2002.)

This standard describes actions a utility should take following an earthquake felt at a nuclear power plant site to determine the need to shut down and, if shutdown is required, actions to determine the plant's readiness to restart based on exceedance of the Operating Basis Earthquake (OBE) ground motion or damage found during post-earthquake inspections. The utility makes the decision to shut down the nuclear power plant. In some cases shutdown is part of the licensing basis (e.g., condition of license, FSAR commitment, or Technical Specification). The criteria which define OBE exceedance are given in American National Standard Criteria for the Handling and Initial Evaluation of Records from Nuclear Power Plant Seismic Instrumentation, ANSI/ANS-2.10-2003. Requirements for seismic instrumentation are given in American National Standard Earthquake Instrumentation Criteria for Nuclear Power Plants, ANSI/ANS-2.2-2002.

This standard addresses the required sequences of response to an earthquake. It defines immediate actions, as well as post-shutdown and long-term actions. The findings at each stage indicate the need for, and the level of, any additional effort. The standard specifies that plant personnel perform initial inspections, gather seismic recordings, and reach decisions on the need for plant shutdown and on plant readiness for shutdown. If the plant is shut down, the standard defines procedures for near-term actions by plant operators to determine the earthquake effects, with engineers performing focused inspections and tests to determine if structures have sustained significant damage or if operating systems are in any way impaired. The standard then defines actions necessary to establish the readiness of the plant to restart. Finally, the standard provides for long-term, confirmatory evaluations which, in most cases, can be performed after plant restart.

Specifically, the standard specifies actions in four main areas:

Pre-Earthquake Preparatory Actions. These actions include preparation of plant procedures, selection of equipment to be examined following an earthquake, and base-line inspection of this equipment.

Post-Earthquake Short-Term Actions. These actions determine the physical condition of the plant immediately following an earthquake and assess the severity of the earthquake effects on the plant in order to determine whether shutdown is warranted.

Post-Shutdown Inspections and Tests. These actions examine the detailed condition of the nuclear power plant and its readiness to resume operation after it has been shut down. These inspections and tests are designed to provide a graded response commensurate with the type and severity of any damage found.

Long-Term Evaluations. These evaluations assess the potential for hidden damage that might have occurred to safety-related equipment and structures. Except for earthquakes which cause significant damage, long-term evaluations can be performed after plant restart.

The combination of the preparatory, short-term, post-shutdown, and long-term actions provides a rational approach for determining the real damage potential of a felt earthquake, a systematic methodology for assessing plant readiness for restart, and realistic criteria for ensuring the long-term integrity of the plant.

The technical basis for this standard is EPRI report NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake," which serves as the commentary for this standard.

Many of the requirements involving the degree of damage and necessary levels of inspection are based on experience gained from investigations of the performance of equipment and structures at power and industrial facilities which have undergone actual earthquakes. The Electric Power Research Institute, United States Department of Energy, and the Earthquake Engineering Research Institute are among the organizations which have published reports on these investigations.

This standard was prepared by Working Group ANS-2.23, which had the following membership:

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Contents	Section	Page
	1. Scope	1
	2. Purpose	1
	3. Definitions	1
	4. Overview of Nuclear Plant Response	2
	5. Pre-Earthquake Preparatory Actions	2
	5.1 Plant Procedures	3
	5.2 Selection of Equipment and Structures for Inspection	3
	5.3 Base-Line Inspections	3
	6. Post-Earthquake Short-Term Actions	3
	6.1 Immediate Operator Actions	3
	6.2 Operator Walkdown Inspections	4
	6.3 Evaluation of Ground Motion Records	5
	6.4 Determination of Need for Plant Shutdown	5
	6.5 Pre-Shutdown Inspections	5
	7. Post-Shutdown Inspection and Tests	7
	7.1 Initial Focused Inspections and Tests	7
	7.2 Expanded Inspections and Tests	11
	7.3 Surveillance Tests	12
	7.4 Inspection Criteria	13
	7.5 Inspection Personnel	13
	7.6 Documentation	13
	7.7 Readiness for Restart	13
	8. Long-Term Evaluations	13
	8.1 Calculation of Seismic Loads	14
	8.2 Comparison of Actual and Design Seismic Loads	15
	8.3 Seismic Reevaluations	15
	8.4 Acceptance Standards	15
	9. References	17
 Appendices		
	Appendix A Outline of Plant-Specific Earthquake Response Procedure	18
	Appendix B Scope of Focused Inspections	20
	Appendix C Recommended Operator Inspections for Earthquake-Related Damage	22
	Appendix D Visual Inspection of Equipment and Structures After an Earthquake	23
	Appendix E Expanded Inspections	28

Figures		
Figure 6-1	Flow Diagram of Short-Term Actions	4
Figure 7-1	Flow Diagram of Post-Shutdown Inspections and Tests	10
Figure 8-1	Flow Diagram of Long-Term Evaluations and Acceptance Criteria	14
Table		
Table 7-1	Earthquake Damage Intensity Scale (EDIS) for Nuclear Power Plant Facilities (Matrix Form)	8