

RECOMMENDATION 2.3: SEISMIC

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information request for the following purposes:

- To gather information with respect to Near Term Task Force (NTTF) Recommendation 2.3, as amended by Staff Requirements Memoranda (SRM) associated with SECY-11-0124 and SECY-11-0137
- To develop a methodology and acceptance criteria for seismic walkdowns to be endorsed by the staff following interactions with external stakeholders
- To perform seismic walkdowns using the endorsed walkdown methodology
- To identify and address plant-specific vulnerabilities¹ through the corrective action program
- To verify the adequacy of monitoring and maintenance procedures.

Pursuant to 10 CFR 50.54(f), addressees are required to submit a written response to this information request.

BACKGROUND

Structures, systems, and components (SSCs) important to safety in operating nuclear power plants are designed either in accordance with, or have been modified to meet the intent of, Appendix A to CFR Part 100 and Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2. GDC 2 states that SSCs important to safety at nuclear power plants must be designed to withstand the effects of natural phenomena such as earthquakes, tornados, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their intended safety functions. The design bases for these SSCs are to reflect appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area. The design bases are also to reflect sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

In response to the accident at the Fukushima Daiichi Nuclear Power Plant caused by the March 2011, Magnitude (M) 9 Tohoku earthquake and subsequent tsunami, the Commission established the Near-Term Task Force (NTTF) to conduct a systematic review of NRC processes and regulations and to make recommendations to the Commission for its policy direction. The NTTF developed a set of recommendations that are intended to clarify and strengthen the regulatory framework for protection against natural phenomena. The purpose of this letter is to gather information with respect to NTTF Recommendation 2.3. Recommendation 2.3, as amended by the SRMs associated with SECY-11-0124 and SECY-11-0137, instructs the NRC staff to issue requests for information to licensees pursuant to 10 CFR 50.54(f). This information request is for licensees to develop a methodology and acceptance criteria for

¹ A definition of vulnerability in the context of this enclosure is as follows: Plant-specific vulnerabilities are those features that when subject to the existing design basis hazard are unable to perform their intended functions, which may also lead to compromising the overall ability to provide protection or mitigation.

seismic walkdowns to be endorsed by the staff following interaction with external stakeholders. Licensees should perform the seismic walkdowns to identify and address plant-specific vulnerabilities (through the corrective action program) and verify the adequacies of monitoring and maintenance procedures.

In developing Recommendation 2.3, the NTF recognized the need to verify the adequacy of features that play an integral role in the defense-in-depth approach for protection from natural phenomena. NTF Recommendation 2.3, as amended by SECY-11-0124 and SECY-11-0137, states that recent plant inspections have been conducted by NRC staff and industry in response to the Fukushima Daiichi accident and that these activities should be used to inform the implementation of this recommendation. Ongoing inspections of the Fukushima Daiichi and Daini Nuclear Power Stations may also provide insights useful for this recommendation. Furthermore, recent lessons learned from the earthquake near the North Anna Power Station should also be utilized in development of the walkdown procedure(s).

APPLICABLE REGULATORY REQUIREMENTS

- Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, GDC 2, "Design Bases for Protection against Natural Phenomena"
- 10 CFR 50.54, "Conditions of Licenses"
- 10 CFR 50.34(a)(1), (a)(3), (a)(4), (b)(1), (b)(2), and (b)(4)
- Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," to 10 CFR Part 100, "Reactor Site Criteria"

The seismic design bases for currently operating nuclear power plants were either developed in accordance with, or have been modified to meet the intent of GDC 2 and 10 CFR Part 100, Appendix A. Appendix A requires that safety related SSCs remain functional if the Safe Shutdown Earthquake (SSE) occurs.

DISCUSSION

The NTF recommended that the Commission direct several actions to ensure adequate protection from natural phenomena. The actions should be taken to prevent fuel damage and to ensure containment and spent fuel integrity. In particular, NTF recommendation 2.3 states that the Commission should "Order licensees to perform seismic and flood protection walkdowns to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for protection features such as water tight barriers and seals in the interim period until longer term actions are completed to update the design basis for external events".

Staff's assessment of NTF Recommendation 2.3 is discussed in SECY-11-0124. Staff agreed with the NTF findings and noted that guidance for seismic protection walkdowns exists and that recent plant inspections by staff in accordance with Temporary Instruction (TI) 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event," and licensees' plant

inspections in response to the Fukushima Daiichi accidents should help inform the implementation of this recommendation. Results of staff's evaluation of the recent earthquake near North Anna Power Station may also provide insights.

In the SRM to SECY-0124, the Commission approved the staff's proposed actions to implement without delay the Near-Term Task Force recommendations as described in the SECY. With regard to Recommendation 2.3, the staff's approved actions are to develop and issue a request for information to licensees pursuant to 10 CFR 50.54(f) to develop a methodology and acceptance criteria for seismic walkdowns to be endorsed by the staff following interactions with external stakeholders, perform seismic walkdowns to identify and address plant-specific vulnerabilities (through the corrective action program) and verify the adequacy of monitoring and maintenance for protection features, and inform the NRC staff of the results of the walkdowns and corrective actions taken or planned. The SRM to SECY-11-0124 also directed the staff to inform the Commission, either through an Information Paper or briefing of the Commissioners' Assistants, when it has developed the technical bases and acceptance criteria for implementing Recommendation 2.3.

TI 2515/183 was issued by the NRC on March 23, 2011. Inspection activities were completed by April 29, 2011 and NRC Inspection Reports were issued by May 13, 2011. The NRC developed a Summary of Observations report to encapsulate the performance of TI 2515/183 (see <http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/follow-up-rpts.html>). The Summary report states that while individually, none of the observations posed a significant safety issue, they indicate a potential industry trend of failure to maintain equipment and strategies required to mitigate some design basis events. Regarding the licensees' capability to mitigate large fires or flooding coincident with seismic activity, the report notes that some equipment used to mitigate fires or station blackout (SBO) was stored in areas that were not seismically qualified or could be flooded.

As outlined in the SECY-11-0124, the staff intends to work with the industry and other stakeholders to endorse a procedure(s) to develop acceptance criteria, conduct walkdowns, and identify vulnerabilities. It is anticipated that the walkdown procedure will be developed by modifying various existing NRC and industry processes, including the recent inspections described above in accordance with TI 2515/183. Other guidance for seismic protection walkdowns include Electric Power Research Institute (EPRI) report NP-6041-SL Revision 1, "A Methodology for Assessment of Nuclear Power Plant Seismic Margin," Seismic Qualification Utility Group (SQUG) procedure, "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Power Plant Equipment," and International Atomic Energy Agency (IAEA) NS-G-2.13, "Evaluation of Seismic Safety for Existing Nuclear Installations." Additional details of attributes of a walkdown procedure are described in the Requested Action below.

The technical approach and methods used to develop the required information should be integrated such that it accounts for design, physical barriers, procedures, temporary measures, and planned or installed mitigation measures to deal with potential scenarios. This type of an integrated approach will allow the NRC and industry to assess the significance of any new information related to the hazard in a systematic manner (Recommendation 2.2 of the NTTF specifies periodic evaluation of new and significant information). The NRC staff will work with licensees to identify efficiencies and strategies to assure that the developed walkdown

methodology and acceptance criteria are reviewed such that the walkdowns can be completed in a timely fashion in order to support the Commission guidance on the overall schedule.

REQUESTED ACTIONS

In response to NTTF Recommendation 2.3, the Commission requires all licensees to perform seismic walkdowns in order to identify and address plant specific vulnerabilities and verify the adequacy of monitoring and maintenance programs such that the nuclear power plant can respond to external events. The walkdown will verify current plant configuration with the existing licensing basis, verify current maintenance plans, and identify vulnerabilities. The walkdown procedure should be developed and submitted to the NRC. The procedure may incorporate current plant procedures, if appropriate. Prior to the walkdown, licensees should develop acceptance criteria, collect appropriate data, and assemble a team with relevant technical skills. Improvements made as part of the licensees' response to the Individual Plant Examination of External Events (IPEEE) program for seismic issues should be reported.

REQUESTED INFORMATION

(1) The NRC requests that each addressee provide a walkdown procedure used for the evaluation of seismic hazards that meets the attributes described in the Requested Action, and includes the following:

- Determination of the seismic walkdown scope and any combined effects
- Pre-walkdown actions (e.g., data collection, review of drawings and procedures, identification of the plant licensing basis, identification of current seismic protection levels)
- Identification of SSCs requiring seismic protection and used in the mitigation for the reactor and spent fuel pool integrity including the Ultimate Heat Sink (UHS)
- Walkdown team composition and qualifications
- Details of the information to be collected during the walkdown including equipment access considerations
- Procedures used to evaluate the effectiveness of the monitoring and maintenance programs
- Procedures used to evaluate the passive protection systems
- Procedures used to evaluate active protection systems (operator availability, operator training, timeliness of response, equipment maintenance and operability, back-up availability, operator access under various site conditions)
- Procedures and acceptance criteria used for determining the viability of protection measures including mitigation strategies
- Maintenance and reliability of mitigation or protection systems including the UHS
- Documentation and peer review requirements

(2) Submit the final report which includes the following:

- Information on the plant-specific hazard licensing bases and a description of the protection and mitigation features considered in the licensing basis evaluation
- Information related to the implementation of the walkdown process
- A list of plant seismic vulnerabilities (including any seismic anomalies, outliers, or other findings) identified by the IPEEE and a description of the actions taken to eliminate or reduce them (including their completion dates)
- Results of the walkdown including key findings and identified vulnerabilities. Detailed description of the actions taken to address the vulnerabilities and an evaluation of the effectiveness of the protection and mitigation features
- Any planned or newly installed protection and mitigation features
- Results and any subsequent actions taken in response to the peer review

REQUIRED RESPONSE

In accordance with 10 CFR 50.54(f), an addressee must respond as described below. The submission of the required information is in stages to allow adequate time for further interactions with the stakeholders to provide clarifications, to develop implementation procedures and processes, and to develop the associated guidance as needed.

- Within XX (e.g. 90) days of the date of this information request, the addressee will submit to the NRC a process that will be used to conduct walkdowns and to develop needed information (item 1 of the requested information). As needed, this time period will allow sufficient time for interactions with the NRC staff and other stakeholders in development of the process.
- Within XXX (e.g. 180) days of the NRC endorsement of the walkdown process, each addressee will submit its final response for the requested information (item 2 of the Requested Information).

If an addressee cannot meet the requested response date, the addressee must provide a response within 90 days of the date of this information request and describe the alternative course of action that it proposes to take, including the basis of the acceptability of the proposed alternative course of action and estimated completion dates.

The required written response should be addressed to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, 11555 Rockville Pike, Rockville, MD 20852, under oath or affirmation under the provisions of Sections 161.c, 103.b, and 182.a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f). In addition, addressees should submit a copy of the response to the appropriate Regional Administrator.

Enclosure 4 Reference List

SECY 11-0124, "Recommended Actions to be taken without Delay from the Near-Term Task Force Report," ML11245A158, September 9, 2011.

SECY 11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," ML11272A111, October 3, 2011.

SRM SECY 11-0124, "Recommended Action to be taken without Delay from the Near-Term Task Force Report," ML112911571, dated October 18, 2011.

SRM SECY 11-0137, "Prioritization of Recommended Actions to Be Taken in Response to Fukushima Lessons Learned," ML113490055, dated December 15, 2011.

10 CFR 50.54 – "Conditions of Licenses"

Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, GDC 2, "Design Bases for Protection against Natural Phenomena"

10 CFR 50.34(a)(1), (a)(3), (a)(4), (b)(1), (b)(2), and (b)(4)

Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants," to 10 CFR Part 100, "Reactor Site Criteria"

Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

Summary of Observations report to encapsulate the performance of TI 2515/183 (<http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/follow-up-rpts.html>).

Electric Power Research Institute (EPRI) report NP-6041-SL Revision 1, "A Methodology for Assessment of Nuclear Power Plant Seismic Margin," August 1991.

Seismic Qualification Utility Group (SQUG) procedure: "Generic Implementation Procedure (GIP) for Seismic Verification of Nuclear Power Plant Equipment,"

International Atomic Energy Agency (IAEA) NS-G-2.13, "Evaluation of Seismic Safety for Existing Nuclear Installations."