

NRC INSPECTION MANUAL

IRIB

TEMPORARY INSTRUCTION 2515/188

INSPECTION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 SEISMIC WALKDOWNS

CORNERSTONE: INITIATING EVENTS AND MITIGATING SYSTEMS

APPLICABILITY: This temporary instruction (TI) applies to all holders of operating licenses for nuclear power reactors, except plants that have permanently ceased operations.

2515/188-01 OBJECTIVES

The objective of this TI is to independently verify that the licensee's seismic walkdown activities were conducted using walkdown methodology endorsed by the U.S. Nuclear Regulatory Commission (NRC). These seismic walkdowns are being performed at all sites in response to a letter from the NRC to licensees, entitled "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML12053A340](#)). Enclosure 3 of the March 12, 2012, letter requested licensees to perform seismic walkdowns using an NRC-endorsed walkdown methodology.

2515/188-02 BACKGROUND

Following the accident at the Fukushima Dai-ichi nuclear power plant resulting from the March 11, 2011, Great Tohoku Earthquake and subsequent tsunami, the NRC established the Near-Term Task Force (NTTF) in response to Commission direction. The NTTF Charter, dated March 30, 2011, tasked the NTTF with conducting a systematic and methodical review of NRC processes and regulations and determining if the agency should make additional improvements to its regulatory system. Ultimately, a comprehensive set of recommendations contained in a report to the Commission (dated July 12, 2011, SECY-11-0093 (ADAMS Accession No. [ML111861807](#))) was developed using a decision rationale built around the defense-in-depth concept in which each level of defense-in-depth (namely prevention, mitigation, and emergency preparedness (EP)) is critically evaluated for its completeness and effectiveness in performing its safety function.

On August 19, 2011, following issuance of the NTTF report, the Commission directed the NRC staff in its staff requirements memorandum (SRM) for SECY-11-0093 (ADAMS Accession No. [ML112310021](#)), to determine which of the NTTF recommendations could and should be implemented without unnecessary delay.

On September 9, 2011, the NRC staff provided SECY-11-0124 to the Commission (ADAMS Accession No. [ML11245A158](#)). The document identified those actions from the NTTF report that should be taken without unnecessary delay. As part of the October 18, 2011, SRM for SECY-11-0124 (ADAMS Accession No. [ML112911571](#)), the Commission approved the staff's proposed actions, including the development of three information requests under Title 10 of the Code of Federal Regulations (10 CFR) 50.54(f). The information collected would be used to support the NRC staff's evaluation of whether further regulatory action was needed in the areas of seismic and flooding design, and EP.

As part of this 10 CFR 50.54(f) information request, licensees will be required to perform walkdowns using NRC-endorsed walkdown methodology to verify that plant features credited in the current licensing basis for seismic events are available, functional, and properly maintained. Electric Power Research Institute (EPRI) document 1025286 titled, "Seismic Walkdown Guidance," (ADAMS Accession No. [ML12188A031](#)) provides NRC-endorsed walkdown guidance to be used for performing seismic walkdowns. The purpose of this TI is to verify that the licensee's seismic walkdown activities were conducted using the EPRI 1025286 guidance document.

With regard to seismic hazards, available seismic data and models show increased seismic hazard estimates for some operating nuclear power plant sites. The state of knowledge of seismic hazards within the United States has evolved to the point that it would be appropriate for licensees to re-evaluate the designs of existing nuclear power reactors to ensure that structures, systems and components (SSCs) important to safety will withstand a seismic event without loss of capability to perform their intended safety function. As seismic knowledge continues to evolve, new seismic hazard data and models have been produced. These updated models are being used as part of the new assessment of seismic hazard and risk being conducted as part of NTTF Recommendation 2.1. The seismic walkdowns being conducted for Recommendation 2.3 are focused on assuring compliance with the current licensing basis and will provide input to the subsequent Recommendation 2.1 analyses.

In enclosure 3 (seismic walkdowns) to the 50.54(f) letter, the NRC requested information for the following purposes:

- to gather information with respect to NTTF Recommendation 2.3, as amended by SRM associated with SECY-11-0124 and SECY-11-0137.
- to request licensees to develop a methodology and acceptance criteria for seismic walkdowns to be endorsed by the NRC staff.
- to request licensees to perform seismic walkdowns using the NRC-endorsed seismic walkdown methodology.
- to identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program.
- to verify the adequacy of licensee monitoring and maintenance procedures.

This TI may be completed all at once or in phases as the licensee completes the actions associated with the NRC's 50.54(f) letter of March 12, 2012. The inspector(s) should coordinate the inspection effort with the licensee in accordance with the licensee's schedule.

03.01 General Guidance

Inspectors should accompany the licensee during their walkdowns and, in addition, conduct their own independent plant walkdowns to verify that the licensee adhered to its walkdown procedure. It is expected that most licensees will adhere to the EPRI walkdown guidance document. Licensees that intend to use other procedures must notify the NRC prior to the walkdowns. Contact Reactor Inspection Branch (IRIB), Division of Inspection and Regional Support (DIRS), NRR if the licensee is not using the EPRI walkdown guidance document.

Licensees will develop a seismic walkdown equipment list (SWEL) that contains a list of SSCs to walkdown using criteria described in Section 3: "Selection of SSCs," of the EPRI seismic walkdown guidance document. Licensees will develop two types of lists referred to as SWEL 1 and SWEL 2. SWEL 1 and SWEL 2 are combined to form the overall SWEL used for the walkdowns. SWEL 1 contains a representative sample of the complete set of SSCs needed to safely shut down the reactor and maintain containment integrity. SWEL 2 contains a representative sample of seismic category 1 components associated with the integrity of the spent fuel pool, as well as a list of all items that could lead to rapid drain down of the spent fuel pool. The SWELs from these two groups are combined into a single SWEL for use during the seismic walkdowns and area walk-bys. Walk-by is defined as a visual examination that considers the overall condition of areas that contain items on the Seismic Walkdown Equipment List. Additional information can be found in Section 4: "Seismic Walkdowns and Area Walk-Bys," of the EPRI seismic walkdown guidance document.

SSCs that undergo regular periodic inspections or that are assessed principally through analysis will normally not be selected for walkdown. These excluded SSCs include seismic category I structures, containment penetrations and seismic class I piping systems. All three of these types of SSCs are typically confirmed to meet their seismic licensing bases through analyses. Additionally, periodic inspections are also performed on these SSCs. The exclusion of equipment occurs during development of the SWEL and is not part of the walkdown activities (See the discussion of Screen #2 on page 3-2 of the EPRI guidance document for more information).

Development of the SWEL occurs prior to the walkdowns. Inspectors are not expected to review the SWEL for adequacy or report on the SWEL as part of this TI. However, clear deficiencies as it relates to the sample considerations used in development of the SWEL (Screen #4 of SWEL 1 discussed on page 3-5 and Screen #3 of SWEL 2 on page 3-8) may be noted.

The guidance discusses two types of assessments to be conducted for each item on the SWEL. Seismic Walkdowns (also called equipment walkdowns) are intensive assessments focused on each of the individual items on the SWEL. Area walk-bys are assessments of the rooms or areas in which the each of the SWEL items is located. Checklists for each of these activities are found in Appendix C of the EPRI guidance document.

Seismic walkdowns focus on the seismic adequacy of the items on the SWEL. The seismic walkdowns should also evaluate the potential for nearby SSCs to cause adverse seismic interactions with the SWEL items. The seismic walkdowns focus on the following adverse seismic conditions associated with the subject SWEL item:

- adverse anchorage conditions
- adverse seismic spatial interactions
- other adverse seismic conditions

In particular, the walkdowns should confirm that potentially adverse anchorage conditions, including the following, are not present:

- bent, broken, missing, or loose hardware
- corrosion that is more than mild surface oxidation
- visible cracks in the concrete near the anchors
- other potentially adverse seismic conditions

Additionally, the configuration of the anchorage should be verified to be consistent with existing plant documentation for 50% of the items on the SWEL that have anchorages.

Each equipment walkdown also includes an assessment of the potential for adverse seismic spatial interaction between the SWEL item and a nearby SSC caused by relative motion between the two items during an earthquake. An inspection should be performed in the area immediately adjacent to and surrounding the SWEL item to identify any seismic interaction conditions that could adversely affect the capability of that SWEL item to perform its intended safety-related functions.

In particular, the following seismic spatial interaction aspects should be considered:

- proximity of SWEL items to nearby SSCs
- potential for failure or falling of SSCs near the SWEL item
- flexibility and length of attached lines and cables (see Appendix D of the EPRI seismic walkdown guidance)

Detailed guidance for evaluating each of these types of seismic spatial interactions is described in Appendix D: "Seismic Spatial Interaction," of the EPRI seismic walkdown guidance.

The walkdowns should confirm that other potentially adverse seismic conditions, including the following, are not present:

- degraded conditions
- loose or missing fasteners that secure internal or external components to equipment
- large, heavy components mounted on a cabinet that are not typically included by the original equipment manufacturer
- cabinet doors or panels that are not latched or fastened
- other adverse conditions

An area walk-by will also be performed in the vicinity of each item on the SWEL. The purpose of the area walk-bys is to identify potentially adverse seismic conditions associated with other

SSCs located in the vicinity of the SWEL items. For efficiency, the walk-bys will typically immediately follow the walkdown of the related SWEL item. An exception may be if one room houses more than one piece of SWEL equipment. In this case only one area walk-by is conducted and only one checklist will be produced.

Vicinity is generally defined as the room containing the SWEL item. If the room is very large (e.g., turbine hall), then the vicinity should be identified based on judgment, e.g., on the order of about 35 feet in each direction from the SWEL item. This vicinity should be described on the Area Walk-By Checklist (AWC), shown in Appendix C of the EPRI seismic walkdown guidance document.

The key examination factors that should be considered during area walk-bys include the following:

- anchorage conditions (if visible without opening equipment)
- significantly degraded equipment in the area
- visual assessment (from an observer on the floor) of cable/conduit raceways and HVAC ducting (e.g., condition of supports or fill conditions of cable trays)
- potentially adverse seismic interactions including those that could cause flooding, spray, and fires in the area
- other housekeeping items that could cause adverse seismic interaction (including temporary installations and equipment storage)

The area walk-bys are intended to identify adverse seismic conditions that are readily identified by visual inspection, without necessarily stopping to open cabinets or taking an extended look. Therefore, it is expected that the area walk-by will take significantly less time than it takes to conduct the equipment walkdowns described above for a SWEL item, unless a potential issue is identified during the walk-by.

Any potential adverse conditions identified in the walkdowns and walk-bys will be subjected to a licensing basis evaluation, as discussed in Section 5 of the EPRI guidance document. If the potential condition cannot be easily and rapidly dispositioned, it should be submitted into the CAP for further review.

If any condition identified during the seismic walkdown activities represents a degraded, nonconforming, or unanalyzed condition (i.e., noncompliance with the current licensing basis) for an SSC, the licensee should address the condition using the guidance in Regulatory Issue Summary 2005-20, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, 'Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety,'" dated April 16, 2008, including entering the condition into the corrective action program. Reporting requirements under 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," also should be considered.

03.02 Inspection Requirement and Guidance

Inspectors should select two to four items from SWEL to walk down with the licensee. Additionally, inspectors should independently walk down one to three items from the SWEL. If possible, combinations of walkdowns with the licensee and the independent walkdowns should

sample each of the following attributes described in Section 3 of the EPRI seismic walkdown guidance:

- a variety of types of systems
- major new and replacement equipment
- a variety of types of equipment
- a variety of environments
- equipment enhanced because of vulnerabilities identified during the individual plant examination of external events program

Additionally, inspectors should verify whether or not the licensee identified items that could allow the spent fuel pool to drain down rapidly (see Section 3 and pages 3-7 to 3-8 of the EPRI seismic walkdown guidance document for additional guidance) and if so, if the items were added to the SWEL and walked down.

Area walk-bys should also be conducted during both the walkdowns with the licensee and the inspector's independent walkdown. The area walk-bys are intended to identify adverse seismic conditions that are readily identified by visual inspection in the area of the SWEL equipment, without necessarily stopping to open cabinets or taking an extended look. Therefore, it is expected that the area walk-by will take significantly less time than it takes to conduct the seismic walkdowns described above for a SWEL item unless a potential issue is identified.

a. Walkdown Inspection with a Licensee

Accompany the licensee during their seismic walkdowns. Inspectors should bring a copy of the seismic walkdown and area walk-by record forms (These two documents can be found in Appendix C of the EPRI seismic walkdown guidance document) as a tool to ensure that the licensee is completing and documenting the applicable portions of the walkdown. Inspectors should verify the following attributes associated with SSCs were inspected:

1. Anchorage was free of bent, broken, missing or loose hardware.
2. Anchorage was free of corrosion that is more than mild surface oxidation.
3. Anchorage was free of visible cracks in the concrete near the anchors.
4. Anchorage configuration is consistent with plant documentation (only required for 50 percent of equipment with anchorages).
5. SSCs will not be damaged from impact by nearby equipment or structures.
6. Overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls are secure and not likely to collapse onto the equipment.
7. Attached lines have adequate flexibility to avoid damage.
8. No other seismic conditions that could adversely affect the safety functions of the equipment are apparent (e.g., degraded conditions, loose or missing fasteners that secure internal or external components to equipment, heavy components mounted on a cabinet that are not typically included by the original equipment manufacturer, or cabinet doors or panels that are not latched).

b. Area Walk-bys

Inspector should verify the following attributes were inspected by the licensee during their area walk-bys:

1. Anchorage of equipment in the area appears to be free of potentially adverse seismic conditions (if visible without opening cabinets).
2. Anchorage of equipment in the area appears to be free of significant degraded conditions.
3. Based on a visual inspection from the floor, cable/conduit raceways and HVAC ducting in the area appear to be free of potentially adverse seismic conditions (e.g., condition of supports is adequate and fill conditions of cable trays appear to be inside acceptable limits).
4. The area appears to be free of potentially adverse seismic spatial interactions with other equipment in the area (e.g., ceiling tiles and lighting).
5. The area appears to be free of potentially adverse seismic interactions that could cause flooding or spray in the area.
6. The area appears to be free of potentially adverse seismic interactions that could cause a fire in the area.
7. The area appears to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding)

c. Independent Inspection Walkdown

Perform an independent walkdown of the equipment on the SWEL which was not inspected during the walkdown with the licensee and verify that the licensee completed the inspections described in paragraph 03.02.a of this TI. Because the purpose of the TI is to confirm the licensee's compliance with the NRC-endorsed guidance, the independent inspection walkdowns can be conducted in two ways: either the inspector can perform the walkdown to review the walkdown record form (i.e., the checklists in Appendix C of EPRI the seismic walkdown guidance document) already completed by the licensee or the inspector can perform the walkdown and independently complete the walkdown record form and then compare it with the walkdown record form completed by the licensee. The first process may be more efficient and so walkdowns previously performed by the licensee may be excellent candidates for an independent NRC walkdown. Inspectors should bring along copy of the walkdown record form (either that completed by the licensee or a new copy for completion by the inspector).

2515/188-04 REPORTING AND DOCUMENTATION REQUIREMENTS

The inspection results of this TI should be included in the integrated quarterly report. NRC-identified or self-revealing findings should receive a four-part write-up in Section 4OA5 of the report. Violations and findings should be documented using the boilerplate information contained in Enclosure 1 of this TI and the following guidance:

Noncompliance should be screened, processed, and documented in accordance with IMC-0612, "Power Reactor Inspection Reports," IMC-0609, "Significance Determination Process,"

and associated appendices, as well as documented using the boilerplate in Enclosure 1 when associated with a more-than-minor violation.

The inspection report containing the results should be forwarded to NRR/JLD/PMB, Attention: Christopher Gratton, via e-mail at Christopher.Gratton@nrc.gov. Mr. Gratton can also be reached at (301) 415-1055. The inspection results from this TI will be used to evaluate the industry's readiness for a current licensing basis seismic event and to aid in determining if additional NRC regulatory actions are warranted. Inspectors should contact the Reactor Inspection Branch, NRR with any questions related to the scope of this TI or with questions related to other inspector concerns identified while implementing this TI.

2515/188-05 COMPLETION REQUIREMENTS

This TI is to be initiated in accordance with the licensee's schedule for performing the walkdowns. The TI is considered closed when three to seven walkdowns (two to four walkdowns performed with the licensee and one to three walkdowns performed independently) have been completed. The TI should not remain open until the licensee has resolved any inspection findings.

2515/188-06 EXPIRATION

The TI will expire on December 31, 2013.

2515/188-07 CONTACT

Any technical questions about this TI should be addressed to Stephen Campbell at (301) 415-2256 or Stephen.Campbell@nrc.gov. Alternate point-of-contact is Tim Kobetz at (301) 415-1932 or Timothy.Kobetz@nrc.gov.

2515/188-08 STATISTICAL DATA REPORTING

All direct inspection effort expended on this TI is to be charged to 2515/188 with an IPE code of TI. All indirect inspection effort expended on this TI for preparation and documentation should be attributed to activity codes TIP and TID respectively.

2515/188-09 RESOURCE ESTIMATE

The estimated average time to complete the TI inspection requirements is 40 hours for each site. Inspectors can take credit, as appropriate, for baseline inspection program (e.g., partial walkdown sample associated with "Equipment Alignment" inspection procedure, IP 71111.04) for samples reviewed during this TI assessment.

2515/188-10 TRAINING

July 2012

2515/188-11 REFERENCES

Electric Power Research Institute (EPRI) document 1025286 titled, "Seismic Walkdown Guidance," May 2012, (ADAMS Accession No. [ML12164A181](#))

U.S. Nuclear Regulatory Commission, "Endorsement of Electric Power Research Institute (EPRI) document 1025286, "Seismic Walkdown Guidance," May 31, 2012," (ADAMS Accession No. [ML12145A529](#))

U.S. Nuclear Regulatory Commission, "Recommendations for Enhancing Reactor Safety in the 21st Century - The Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," July 12, 2011 (ADAMS Accession No. [ML112510271](#))

U.S. Nuclear Regulatory Commission, Regulatory Issue Summary 2005-20, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," April 16, 2008 (ADAMS Accession No. [ML0735313460](#))

END

Enclosure 1 – Documentation Template

Temporary Instruction 2515/188 – Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns

Completion of this TI is to be documented in a quarterly inspection report by including the following statements:

“The inspectors accompanied the licensee on their seismic walkdowns of (state which walkdown (list the date, location in the plant) inspectors accompanied the licensee) and verified that the licensee confirmed that the following seismic features associated with (state SWEL items inspected) were free of potential adverse seismic conditions (list the applicable seismic features which were verified):

- Anchorage was free of bent, broken, missing or loose hardware
- Anchorage was free of corrosion that is more than mild surface oxidation
- Anchorage was free of visible cracks in the concrete near the anchors
- Anchorage configuration was consistent with plant documentation.
- SSCs will not be damaged from impact by nearby equipment or structures.
- Overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls are secure and not likely to collapse onto the equipment.
- Attached lines have adequate flexibility to avoid damage.
- The area appears to be free of potentially adverse seismic interactions that could cause flooding or spray in the area.
- The area appears to be free of potentially adverse seismic interactions that could cause a fire in the area.
- The area appears to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding).

The inspectors independently performed their walkdown and verified that the following (Use bullets associated with SSCs inspected and seismic feature verified, as appropriate, list the date, location in the plant)

Observations made during the walkdown that could not be determined to be acceptable were entered into the licensee’s corrective action program for evaluation.

Additionally, inspectors verified that items that could allow the spent fuel pool to drain down rapidly were added to the SWEL and these items were walked down by the licensee.

“No NRC-identified or self-revealing findings were identified”

Or

Describe the findings in four-part format as required by IMC 0612.

Attachment 1 – Revision History for TI 2515/188
 Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns

| Commitment Tracking Number | Issue Date | Description of Change | Description of Training Required and Completion Date | Comment and Feedback Resolution Accession Number |
|----------------------------|--|---|--|--|
| N/A | ML12156A052 07/06/12 CN 12-013 | Researched commitments for 4 years and found none. This is a new document issued for inspections related to the industry response to the Fukushima Dai-ichi recommended NTTF actions associated with seismic walkdowns. | Yes July 2012 | ML12187A034 |
| | | | | |