

# NRC INSPECTION MANUAL

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## TEMPORARY INSTRUCTION 2515/187

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### INSPECTION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 FLOODING 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.

#### 2515/187-01 OBJECTIVES

The objective of this TI is to independently verify that the licensee's external flood protection walkdown activities were conducted using walkdown methodology endorsed by the U.S. Nuclear Regulatory Commission (NRC). These flooding 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 4 of the March 12, 2012, letter requested licensees to perform external flooding walkdowns using an NRC-endorsed walkdown methodology (ADAMS Accession No. [ML12056A050](#)).

#### 2515/187-02 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 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 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 (CLB) for protection and mitigation from external flood events are available, functional, and properly maintained. Nuclear Energy Industry (NEI) document 12-07 titled, "Guidelines for Performing Verification Walkdowns of Plant Protection Features," (ADAMS Accession No. [ML12173A215](#)) provides NRC-endorsed walkdown guidance to be used for assessing external flood protection and mitigation capabilities. The purpose of this TI is to verify that the licensee's external flood protection walkdown activities were conducted using NEI 12-07 guidance document.

The NTTF observed that, "some plants have an overreliance on operator actions and temporary flood mitigation measures such as using sandbags, temporary flood walls and barriers, and portable equipment to perform safety functions." The NTTF report also states that, "the Task Force has concluded that flooding risks are of concern due to a 'cliff-edge' effect, in that the safely consequences of a flooding event may increase sharply with a small increase in the flooding level. Therefore, it would be very beneficial to safety for all licensees to confirm that structures, systems, and components (SSCs) important to safely are adequately protected from floods."

Specifically, the NRC requested information for the following purposes:

- To gather information on NTTF Recommendation 2.3, as amended by staff requirements memorandum (SRM) associated with Commission papers, SECY-11-0124, "Recommended Actions To Be Taken without Delay from the Near-Term Task Force Report," dated September 9, 2011, and SECY-11-0137, "Prioritization of Recommended Actions To Be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011.
- To request licensees to develop a methodology and acceptance criteria for flooding walkdowns to be endorsed by the NRC staff.
- To request licensees to perform flooding walkdowns using an NRC-endorsed walkdown methodology, as defined herein.
- To identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program.

- To identify and address cliff-edge effects through the corrective action program.
- To verify the adequacy of licensee monitoring and maintenance procedures.

## 2515/187-03 INSPECTION REQUIREMENTS AND GUIDANCE

This TI may be completed all at once or in phases as the licensee completes the actions associated with the NRC's letter of March 12, 2012, related to Title 10 of the Code of Federal Regulations (10 CFR) 50.54(f). 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 one of their walkdowns and, in addition, conduct their own independent plant walkdown to verify that the licensee adhered to its walkdown procedure. It is expected that most licensees will adhere to the NEI 12-07 (Revision 0-A). The walkdowns should identify plant-specific degraded, nonconforming, or unanalyzed conditions and verify the adequacy of monitoring and maintenance for protection features such as watertight barriers and seals. Walkdown should also include comparison of plant configuration and procedures to the flood protection features designed to protect the spent fuel pool. A general understanding of the NEI walkdown guidance would be useful to inspectors in performing this TI.

The NRC requested that the licensees walkdown procedure verify that flood protection systems for the plant are available, functional, and able to be implemented under a variety of site conditions. In particular, the walkdowns should confirm that:

- cable and piping trenches and other penetrations to SSCs important to safety, including underground rooms, are not pathways for external ingress of water,
- adequate water detection and warning systems are available, if credited in the current licensing basis,
- the effects of elevated water levels and severe weather conditions would not impair support functions or would not impede performing necessary actions given the weather conditions, and
- other factors at multi-unit sites (e.g., equipment availability and staffing) would not prevent implementation of flood protection measures.
- The procedure or activity can be executed as specified/written.

If any condition identified during the 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.

Section 6.0 of the NEI walkdown guidance document provides additional discussion of the acceptance criteria including conditions adverse to quality.

During the walkdown inspectors may want to be aware of the following information:

- Integrated combined effects of flooding along with other adverse conditions (e.g., high winds, hail, ice, lightning, extreme hot and humid conditions or extreme cold conditions, icing and frozen ground conditions) which reasonably could be expected to simultaneously occur. For example, this would include steps in a flooding procedure that require manipulation of systems and components in outside areas of the plant site that could not be safely accessed because of storm conditions.
- Pre-walkdown actions, such as the collection of current site topography including any changes since the original licensing (e.g., security improvements and temporary structures), sets of as-built drawings, review of the existing design basis flood level(s), review of any flood protection and pertinent flood mitigation features, such as exterior barriers, incorporated barriers, and temporary flood barriers.
- Flood protection features which are available, functional, and able to be implemented under a variety of site conditions, such as:
  - operator availability, operator training, timeliness of response, equipment maintenance and operability, back-up availability, operator access under adverse site conditions
  - methods and acceptance criteria to evaluate exterior barriers
  - methods and acceptance criteria to evaluate incorporated barriers
  - methods and acceptance criteria to evaluate temporary flood barriers
  - preparations in advance of adverse weather conditions
- Licensee programs which are in place that periodically verify the status and adequacy of flood mitigation strategies and equipment.
- NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," provides criteria and associated technical bases for evaluating the feasibility and reliability of post-fire operator manual actions implemented in nuclear power plants. Although the guidance on operator manual actions the licensee should follow is contained in the NEI Flooding Walkdown Guidance document, some useful information with respect to feasibility and reliability of operator manual actions may also be found in NUREG-1852.
- Licensee's responses to questions 10, 11, 15, 16, 19, 23, and 27 in the walkdown record form (Appendix B of NEI Flooding Walkdown Guidance document).

Inspectors should also verify that noncompliances with the current licensing basis have been entered into the licensee's CAP. In addition, verify that issues identified in accordance with Item 2.g in Enclosure 4 of 50.54(f) letters have also been entered into the CAP.

### 03.02 Inspection Requirement/Guidance

Inspectors should select two areas that require flood protection to conduct the walkdown. Additionally, inspectors should review one to three flood walkdown packages to ensure that they

contain the required information. The inspectors should accompany the licensee during the walkdown of one area and perform an independent walkdown of the second area. If possible, the inspection with the licensee should include 1) an area that is normally not accessible; or 2) walkdown a barrier which was determined to have a small available physical margin (APM) as indicated by question 27 of the walkdown record form; or 3) review licensee's procedure walk-through which incorporates complex manual actions as demonstrated through reasonable simulation (see paragraph 5.5.6 of NEI Flooding Walkdown Guidance document).

Independent inspector walkdowns should consider a barrier which was determined to have a small APM (selection criteria number 2 above). Inspection of area that is not normally accessible or licensee's simulation of complex manual actions do not need to be selection criteria when performing independent walkdowns because assistance from the licensee would be required to inspect these aspects of licensee flood protection. Walkdowns previously performed (in response to Institute of Nuclear Power Operations (INPO) IER 11-1 or other comprehensive walkdowns conducted to validate flood protection features in 2011) and credited by the licensee (see NEI 12-07 Section 5.5) may be excellent candidates for an independent NRC walkdown.

The term APM describes the flood margin available for applicable flood protection features at a site (not all flood protection features have APMs). The APM for each applicable flood protection feature is the difference between licensing basis flood height and the flood height at which water could affect an SSC important to safety. Additional discussion of cliff-edge effect and APM are provided in the NEI Flooding Walkdown Guidance document.

a. Walkdown Inspection with the Licensee

1. Review and verify that the walkdown packages (sample size of one to three) contain the following:

- pre-job brief
- walkdown guidance and acceptance criteria
- walkdown record form
- design drawings, if needed
- general arrangements drawings, if needed
- flood protection strategy implementation procedures

2. Accompany the licensee during their walkdowns performed to verify flood protection features at its facility. In addition, ensure the facility has a viable communications protocol in place to obtain applicable flood warning. Inspectors may want to bring a copy of the walkdown record form (Appendix B of NEI walkdown guidance document) along as a tool to ensure that the licensee is completing and documenting the applicable portions of their walkdowns.

The results of the walkdowns conducted in response to INPO Industry Event Report (IER) 11-1, "Fukushima Daiichi Nuclear Station Fuel Damage caused by Earthquake and Tsunami," or other comprehensive walkdowns conducted to validate flood protection features in 2011 may be used to satisfy the walkdown requirement for a flood protection feature if the previously performed walkdown performance and documentation meets the

expectations in the NEI 12-07 guidance (see Section 4, Scope of NEI 12-07) and any changes are addressed that may have affected the feature since the time of the previously performed walkdowns. See NEI 12-07 Section 5.5. Inspectors should verify the following attributes associated with the flood protection feature being inspected.

a) Incorporated or Exterior Passive Flood Protection Features

- 1) Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed.
- 2) Critical SSC dimensions were measured (see NEI 12-07 for additional guidance on critical SSC dimensions).
- 3) APM, where applicable, was determined. Note that each exterior passive flood protection feature may have its own APM value.
- 4) Flood protection feature functionality was determined using either visual observation or by review of other documents.

b) Incorporated or Exterior Active Flood Protection Features

- 1) Manual actions required to operate the flood protection features to ensure they can be performed within the required time considering the conditions expected during a design basis flood were assessed.
- 2) Adequate consumables exist to support the flood protection feature during the entire time its function is credited by the current license basis was verified.
- 3) Procedures used to operate credited equipment (e.g., dewatering equipment) were documented in the walkdown record form.

c) Temporary Passive Flood Protection Features

- 1) Equipment is properly staged and in a condition that would allow its use should it be needed for its intended purpose, or that sufficient time is available after a flood warning to move the equipment to an appropriate location was verified.
- 2) All connections necessary to hook up the temporary equipment to allow performance of its flood protection function will work in their intended application and that any supplies, seals, fasteners, etc., are of sufficient quantity, in good condition, properly staged, inventoried regularly, and subject to periodic condition assessment were confirmed.
- 3) Manual actions required to install the feature within the required time considering the conditions expected during a licensing basis flood (i.e., concurrent adverse weather conditions) were assessed. Reasonable simulations can be used to demonstrate adequacy of manual actions.

d) Reasonable Simulation

- 1) Walk-through of a procedure or activity to verify the procedure or activity can be executed as specified/written.

- 2) Any credited time dependent activities can be completed in the time required. Time-dependent activities include detection (some signal that the event will occur, has occurred, or is occurring), recognition (by someone who will notify the plant), communication (to the control room), and action (by plant staff).
- 3) Specified equipment/tools are properly staged and in good working condition, verification that connection/installation points are accessible.

b. Independent Inspection Walkdown

Perform an independent walkdown of the flood protection features that was not inspected during the walkdown with the licensee and verify that the licensee completed the actions associated with the flood protection feature specified in paragraph 03.02.a.2 of this TI. Inspectors may want to bring along copy of the walkdown record form (Appendix B of NEI walkdown guidance document) as a tool to ensure that the licensee is completing and documenting the applicable portions of their walkdowns.

c. Verification that issues identified during the Walkdowns have been entered into the Licensee Corrective Action Program (CAP)

1. Verify that noncompliances with the current licensing basis have been entered into the licensee's CAP.
2. Verify that issues identified in accordance with Item 2.g in Enclosure 4 of 50.54(f) letters have been entered into the CAP. Item 2.g requests licensees to identify instances of low APM that could have significant consequences during a beyond-design-basis event (cliff-edge effects); implement any appropriate compensatory measures to increase margin; place the issue in its CAP; and resolve the issue as part of its response to NTTF 2.1.

## 2515/187-04 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, titled "Other Activities" 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 of this TI when associated with a more-than-minor violation. Also, issues identified in accordance with Item 2.g in Enclosure 4 of 50.54(f) letters should be documented in accordance with Enclosure 1 of this TI.

The inspection report containing the results should be forwarded to NRR/JLD/PMB, Attention: Ed Miller, via e-mail at [Ed.Miller@nrc.gov](mailto:Ed.Miller@nrc.gov). Mr. Miller can also be reached at (301) 415-2481. The inspection results from this TI will be used to evaluate industry's readiness for a current licensing basis flooding event and to aid in determining if additional NRC regulatory actions are

warranted. Inspectors should contact 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.

#### 2515/187-05 COMPLETION SCHEDULE

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

#### 2515/187-06 EXPIRATION

The TI will expire on December 31, 2013.

#### 2515/187-07 CONTACT

Any technical questions regarding this TI should be addressed to Tim Kobetz at (301) 415-1932, Stephen Campbell at (301) 415-3353, or Jim Isom at (301) 415-1109. Questions can also be sent electronically to either [Timothy.Kobetz@nrc.gov](mailto:Timothy.Kobetz@nrc.gov), [Stephen.Campbell@nrc.gov](mailto:Stephen.Campbell@nrc.gov), or [James.Isom@nrc.gov](mailto:James.Isom@nrc.gov).

#### 2515/187-08 STATISTICAL DATA REPORTING

All direct inspection effort expended on this TI is to be charged to 2515/187 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.

#### 2515/187-09 RESOURCE ESTIMATE

The estimated average time to complete the TI inspection requirements is 40 hours per site. Inspectors can take credit, as appropriate, for baseline inspection program (e.g., Flooding sample associated with the "Adverse Weather Protection" inspection procedure, IP 71111.01 or partial walkdown sample associated with "Equipment Alignment" inspection procedure, IP 71111.04) for samples reviewed during this TI assessment.

#### 2515/187-10 TRAINING

June – July 2012

#### 2515/187-11 REFERENCES

Issue Date: 06/27/12  
Effective Date: 07/01/12



NEI 12-07 (Rev. 0-A), May 2012, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" (ADAMS Accession No. [ML12173A215](#))

U.S. Nuclear Regulatory Commission, "Endorsement of Nuclear Energy Institute (NEI) 12-07, Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features." (ADAMS Accession No. [ML12144A142](#))

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, "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," Enclosure 4, "Recommendation 2.3: Flooding (ADAMS Accession No. [ML12056A050](#))

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](#))

U.S. Nuclear Regulatory Commission, NUREG-1852, "Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire," October 2007 (ADAMS Accession No. [ML073020676](#))

END

## Enclosure 1 – Documentation Template

### Temporary Instruction 2515/187 – Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns

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

“Inspector(s) verified that licensee’s walkdown packages (provide walkdown package identifiers) contained the elements as specified in NEI 12-07 Walkdown Guidance document:

The inspectors accompanied the licensee on their walkdown of (state which walkdown inspectors accompanied the licensee) and verified that the licensee confirmed the following flood protection features: (use the following bullets or similar wording if incorporated or exterior passive flood protection features were verified. Use bullets associated with other flood protection features, as appropriate, if another flood protection feature was verified)

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed.
- Reasonable simulation, if applicable to the site
- Critical SSC dimensions were measured
- Available physical margin, where applicable, was determined.
- Flood protection feature functionality was determined using either visual observation or by review of other documents.

The inspectors independently performed their walkdown and verified that the following flood protection features were in place. (Use bullets associated with other flood protection features, as appropriate.)

The inspectors verified that noncompliances with current licensing requirements, and issues identified in accordance with the 10 CFR 50.54(f) letter, Item 2.g of Enclosure 4, were entered into the licensee's corrective action program. In addition, issues identified in response to Item 2.g that could challenge risk significant equipment and the licensee’s ability to mitigate the consequences will be subject to additional NRC evaluation.

“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 2515/187  
 Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns

| Commitment Tracking Number | Issue Date   | Description of Change  | Description of Training Required and Completion Date | Comment and Feedback Resolution Accession Number |
|----------------------------|--|--|--|--|
| N/A                        | <a href="#">ML12129A108</a><br>06/27/12<br><a href="#">CN 12-011</a> | Researched commitments for 4 years and found none. This is a new document issued for inspections related to the industry response to the Fukushima Near-Term Task Force (NTTF) recommended actions associated with flooding. | Webinar training to be held<br>06/28/2012            | ML12153A009                                      |
|                            |  |  |  |  |

Issue Date: 06/27/12  
 Effective Date: 07/01/12

Att1-1

2515/187