



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

June 18, 2014

Mr. Joseph H. Plona  
Senior Vice President and Chief Nuclear Officer  
DTE Electric Company  
Fermi 2 - 210 NOC  
6400 North Dixie Highway  
Newport, MI 48166

SUBJECT: FERMI NUCLEAR PLANT, UNIT 2 - STAFF ASSESSMENT OF THE FLOODING WALKDOWN REPORT SUPPORTING IMPLEMENTATION OF NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT (TAC NO. MF0228)

Dear Mr. Plona:

On March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information letter per Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (50.54(f) letter). The 50.54(f) letter was issued to power reactor licensees and holders of construction permits requesting addressees to provide further information to support the NRC staff's evaluation of regulatory actions that may be taken in response to lessons learned from Japan's March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami. The request addressed the methods and procedures for nuclear power plant licensees to conduct seismic and flooding hazard walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions through the corrective action program, and to verify the adequacy of the monitoring and maintenance procedures.

By letter dated November 26, 2012, DTE Electric Company (DTE), formerly Detroit Edison, submitted a Flooding Walkdown Report as requested in Enclosure 4 of the 50.54(f) letter for the Fermi Nuclear Plant, Unit 2 site. By letter dated January 30, 2014, DTE provided a response to the NRC request for additional information for the staff to complete its assessments.

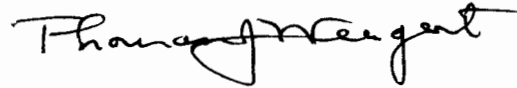
The staff acknowledges that a supplemental letter will be provided addressing the walkdown results for the remaining restricted access feature consistent with the regulatory commitment within 90 days of the RF16 refueling outage completion, currently scheduled for the first quarter of 2014. The NRC staff reviewed the information provided and, as documented in the enclosed staff assessment, determined that sufficient information was provided to be responsive to Enclosure 4 of the 50.54(f) letter.

J. Plona

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If you have any questions, please contact me at (301) 415-4037.

Sincerely,

A handwritten signature in black ink that reads "Thomas J. Wengert". The signature is written in a cursive style with a long horizontal line extending from the end of the name.

Thomas J. Wengert, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:  
Staff Assessment of Flooding Walkdown Report

cc w/encl: Distribution via Listserv

STAFF ASSESSMENT OF FLOODING WALKDOWN REPORT  
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO  
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
DTE ELECTRIC COMPANY  
FERMI NUCLEAR PLANT, UNIT 2  
DOCKET NO. 50-341

1.0 INTRODUCTION

On March 12, 2012,<sup>1</sup> the U.S. Nuclear Regulatory Commission (NRC) issued a request for information per Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (50.54(f) letter) to all power reactor licensees and holders of construction permits in active or deferred status. The request was part of the implementation of lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 4, "Recommendation 2.3: Flooding,"<sup>2</sup> to the 50.54(f) letter requested licensees to conduct flooding walkdowns to identify and address degraded, nonconforming, or unanalyzed conditions using the corrective action program (CAP), verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

The 50.54(f) letter requested licensees to provide the following:

- a. Describe the design basis flood hazard level(s) for all flood-causing mechanisms, including groundwater ingress.
- b. Describe protection and migration features that are considered in the licensing basis evaluation to protect against external ingress of water into structures, systems, and components (SSCs) important to safety.
- c. Describe any warning systems to detect the presence of water in rooms important to safety.
- d. Discuss the effectiveness of flood protection systems and exterior, incorporated, and temporary flood barriers. Discuss how these systems and barriers were evaluated using the acceptance criteria developed as part of Requested Information item 1.h.
- e. Present information related to the implementation of the walkdown process (e.g., details of selection of the walkdown team and procedures) using the documentation template discussed in Requested Information item 1.j, including actions taken in response to the peer review.

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<sup>1</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.

<sup>2</sup> ADAMS Accession No. ML12056A050.

- f. Results of the walkdown including key findings and identified degraded, nonconforming, or unanalyzed conditions. Include a detailed description of the actions taken or planned to address these conditions using guidance in Regulatory Issues Summary 2005-20, Revision 1, Revision to the NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety," including entering the condition in the corrective action program.
- g. Document any cliff-edge effects identified and the associated basis. Indicate those that were entered into the corrective action program. Also include a detailed description of the actions taken or planned to address these effects.
- h. Describe any other planned or newly installed flood protection systems or flood mitigation measures including flood barriers that further enhance the flood protection. Identify results and any subsequent actions taken in response to the peer review.

In accordance with the 50.54(f) letter, Enclosure 4, Required Response Item 2, licensees were required to submit a response within 180 days of the NRC's endorsement of the flooding walkdown guidance. By letter dated May 21, 2012<sup>3</sup>, the Nuclear Energy Institute (NEI) staff submitted NEI 12-07, Revision 0, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" to the NRC staff to consider for endorsement. By letter dated May 31, 2012<sup>4</sup>, the NRC staff endorsed the walkdown guidance.

By letter dated November 26, 2012<sup>5</sup>, DTE Electric Company (DTE, the licensee), formerly Detroit Edison, provided a response to Enclosure 4 of the 50.54(f) letter Required Response Item 2, for the Fermi Nuclear Power Plant, Unit 2 (Fermi-2). The NRC staff issued a request for additional information (RAI) to the licensee regarding the available physical margin (APM) dated December 23, 2013<sup>6</sup>. The licensee responded to the RAI by letter dated January 30, 2014<sup>7</sup>.

The NRC staff evaluated the licensee's submittals to determine if the information provided in the walkdown report met the intent of the walkdown guidance and if the licensee responded appropriately to Enclosure 4 of the 50.54(f) letter.

## 2.0 REGULATORY EVALUATION

The structures, systems, and components (SSCs) important to safety in operating nuclear power plants are designed either in accordance with, or meet the intent of Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2: "Design Bases for Protection Against Natural Phenomena" and Appendix A "Seismic and Geological Criteria for Nuclear Plants," to 10 CFR Part 100. Criterion 2 states that SSCs important to safety at nuclear power plants shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

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<sup>3</sup> ADAMS Package Accession No. ML121440522.

<sup>4</sup> ADAMS Accession No. ML12144A142.

<sup>5</sup> ADAMS Accession No. ML12331A202.

<sup>6</sup> ADAMS Accession No. ML13325A891.

<sup>7</sup> ADAMS Accession No. ML14031A431.

For initial licensing, each licensee was required to develop and maintain design bases that, as defined by 10 CFR 50.2, identify the specific functions to be performed by an SSC, and the specific values or ranges of values chosen for controlling parameters as reference bounds for the design.

The design bases for the SSCs reflect appropriate consideration of the most severe natural phenomena that have been historically reported for the site and surrounding area. The design bases also reflect sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.

The current licensing basis is the set of NRC requirements applicable to a specific plant, and a licensee's written commitments for ensuring compliance with, and operation within, applicable NRC requirements and the plant-specific design basis that are in effect.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Design Basis Flooding Hazard for Fermi-2

The licensee provided information on the design basis flood (DBF) hazard for the Fermi-2 site, which is associated with a storm surge on Lake Erie. The licensee reported a wind tide of 11.6 feet (ft.) New York Mean Tide (NYMT)<sup>8</sup>. Assuming the storm surge coincides with the maximum monthly mean lake elevation of 575.3 ft., the resulting stillwater elevation is 586.9 ft., which is 3.9 ft. above Fermi nominal site grade. The licensee stated that no differences or contradictions in flood-hazard levels were found in the design or licensing basis documentation.

Based on the NRC staff's review, the licensee appears to have described the design basis flood hazard level as requested in the 50.54(f) letter and consistent with the walkdown guidance.

#### 3.2 Flood Protection and Mitigation

##### 3.2.1 Flood Protection and Mitigation Description

The licensee stated that the current licensing basis (CLB) for flood protection is a single elevation. The licensee reported that the resulting stillwater elevation is 586.9 ft. for stormwater from Lake Erie. The licensee further stated that the Reactor/Auxiliary Building and the Residual Heat Removal (RHR) Complex are designed to be watertight to elevations of 588.0 and 590.0 ft., respectively and that both values are above the design basis storm surge stillwater elevation of 586.9 ft. The licensee reported that the Reactor/Auxiliary Building has been designed to withstand wave action and that all doors and penetrations through outside walls are protected from water intrusion to 588.0 ft. Two large railroad airlock doors with inflatable seals protect two large openings on the south wall of the Reactor/Auxiliary Building. The licensee stated that major structures (e.g., the Turbine Building) are credited with preventing wave action from resulting in water reaching penetrations above 588.0 ft.

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<sup>8</sup> All elevations refer to New York Mean Tide, 1935.

The walkdown report discusses external flood water backflowing into the Reactor/Auxiliary Building. Flooding in the basement of the Radwaste Building provides a pathway to the Reactor/Auxiliary Building via the collector tanks in the basement of the Radwaste Building. Redundant check valves and a manual isolation valve prevent flood water in the Radwaste Building from backflowing into the Reactor/Auxiliary Building.

The licensee indicated that all equipment in the RHR Complex that could be damaged by flood waters is located above the DBF elevation. Some wave run-up could exceed flood-protection heights, resulting in leakage into the complex. The NRC staff determined that RHR Complex equipment would not be splashed by this leakage. Therefore, the stillwater elevation would remain an appropriate design basis.

While the CLB does not refer to modes of operation, the licensee stated that watertight doors could be closed in time to prevent flooding regardless of mode of operation.

The licensee reported that the flood protection and mitigation features were designed using the following assumptions and inputs: (1) a stillwater DBF elevation of 586.9 ft. and (2) sufficient advance warning would be provided to allow time to properly close watertight doors.

### 3.2.2 Incorporated and Exterior Barriers

The licensee reported that the site has incorporated and exterior barriers that are permanently in place. The site has barriers that do not require operator manual actions, including waterproof walls and penetration seals. The site also has watertight doors that are permanently in place but require operators to seal them shut. The licensee did not state that site grading is a credited flood protection feature, however the NRC staff notes that the site grade does provide protection.

### 3.2.3 Temporary Barriers and Other Manual Actions

The licensee stated that the site has no credited temporary barriers.

### 3.2.4 Reasonable Simulation and Results

The licensee performed one reasonable simulation that demonstrated that all features are available, functional, and implementable. The reasonable simulation meets the intent of the walkdown guidance.

### 3.2.5 Conclusion

Based on the NRC staff's review, the licensee appears to have described protection and mitigation features as requested in the 50.54(f) letter and consistent with the walkdown guidance.

### 3.3 Warning Systems

The licensee reported that the current licensing basis at Fermi-2 does not credit any room water level flood warning systems for external flood protection.

Based on the NRC staff's review, the licensee appears to have provided information to describe any warning systems, as requested in the 50.54(f) letter and consistent with the walkdown guidance.

### 3.4 Effectiveness of Flood Protection Features

The licensee stated that the evaluation considerations for assessing effectiveness of flood-mitigation features were consistent with NEI 12-07 guidance related to performing verification walkdowns of plant flood-protection features. The licensee explicitly mentioned walkdowns of 60 penetrations, 5 watertight doors, and external floodwalls. Three deficiencies were identified by the licensee. The licensee determined that each deficiency could be mitigated in the event of an external flooding event and that no immediate safety concern was present.

Based on the NRC staff's review, the licensee appears to have discussed the effectiveness of flood protection features as requested in the 50.54(f) letter and consistent with the walkdown guidance.

### 3.5 Walkdown Methodology

By letter dated June 8, 2012<sup>9</sup>, the licensee responded to the 50.54(f) letter, stating that it intended to utilize the NRC-endorsed walkdown guidelines contained in NEI 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features." The licensee's walkdown submittal dated November 26, 2012, indicated that the licensee implemented the walkdowns consistent with the intent of the guidance provided in NEI 12-07. The licensee did not identify any exceptions from NEI 12-07.

Based on the NRC staff's review, the licensee appears to have presented information related to the implementation of the walkdown process as requested in the 50.54(f) letter and consistent with the walkdown guidance.

### 3.6 Walkdown Results

#### 3.6.1 Walkdown Scope

The licensee performed walkdowns of flood protection features including 60 penetrations, 5 watertight doors, and the external floodwalls. In addition, the licensee performed a reasonable simulation of manual actions and stated that all operator actions to install flood-mitigation features could be completed.

The licensee used acceptance criteria consistent with the intent of NEI 12-07.

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<sup>9</sup> ADAMS Accession No. ML12163A534.

### 3.6.2 Licensee Evaluation of Flood-Protection Effectiveness, Key Findings, and Identified Deficiencies

The licensee performed an evaluation of the overall effectiveness of the plant's flood-protection features. Three deficiencies were identified: two seals were not functioning properly and a conduit seal was missing. The licensee determined that each deficiency could be mitigated in the event of an external flooding event. The three deficiencies were entered into the licensee's corrective action program (CAP).

### 3.6.3 Flood-Protection and Mitigation Enhancements

The licensee did not discuss any enhancements to existing flood protection and mitigation features.

### 3.6.4 Planned or Newly-Installed Features

The licensee is planning no new features.

### 3.6.5 Deficiencies Noted and Actions Taken or Planned to Address

The licensee stated that two of the identified deficiencies are related to torn or improperly functioning seals and that replacement seals have been ordered.

### 3.6.6 NRC Staff Analysis of Walkdowns

The NRC staff reviewed the licensee's walkdown report dated November 26, 2012.

As part of the walkdown effort, the licensee evaluated the capability of flood protection features by conducting a set of visual inspections. The features were confirmed to be in place and available and also to be capable of performing their intended flood protection or mitigation functions. No changes or enhancements to flood protection or mitigation features were identified as a result of the walkdowns.

During the walkdowns, items were identified as not immediately acceptable; however, corrective actions were identified and taken.

Based on the NRC staff's review, the licensee appears to have provided results of the walkdown and described any other planned or newly-installed flood protection systems or flood mitigation measures as requested in the 50.54(f) letter and consistent with the walkdown guidance. Based on the information provided in the licensee's submittals, the NRC staff concludes that the licensee's implementation of the walkdown process meets the intent of the walkdown guidance.

### 3.6.7 Available Physical Margin

By letter dated December 23, 2013, the NRC staff issued an RAI to the licensee concerning the available physical margin (APM). The licensee responded by letter dated January 30, 2014.



The licensee has reviewed its APM determination process and entered any unknown APMs into its corrective action program.

Based on the NRC staff's review, the licensee appears to have documented the information requested for any cliff-edge effects, as requested in the 50.54(f) letter and consistent with the walkdown guidance. Further, the NRC staff reviewed the response, and concludes that the licensee met the intent of the APM determination per NEI 12-07.

### 3.7 NRC Oversight

#### 3.7.1 Independent Verification by Resident Inspectors

On June 27, 2012, the NRC issued Temporary Instruction (TI) 2515/187<sup>10</sup> "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns." In accordance with the TI, NRC inspectors independently verified that the Fermi-2 licensee implemented the flooding walkdowns in accordance with the walkdown guidance. Additionally, the inspectors independently performed walkdowns of a sample of flood protection features. The inspection report dated January 28, 2013,<sup>11</sup> documents the results of this inspection. No findings of significance were identified.

### 4.0 SSCs TO BE WALKED DOWN AT A LATER DATE

#### 4.1 Restricted Access

The licensee identified one restricted access feature, a watertight door located behind a security barrier that can be accessed only when the plant is off-line. The licensee generated a work order to complete the inspection during the next scheduled outage, refueling outage 16, which the licensee stated is scheduled for the first quarter of 2014. In addition, in its November 26, 2012, letter the licensee identified the schedule for the conduct of this inspection and the submittal of the results as regulatory commitments.

#### 4.2 Inaccessible Features

The licensee identified no inaccessible features.

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<sup>10</sup> ADAMS Accession No. ML12129A108.

<sup>11</sup> ADAMS Accession No. ML13028A454.

## 5.0 CONCLUSION

The NRC staff concludes that the licensee's implementation of flooding walkdown methodology meets the intent of the walkdown guidance. The staff concludes that the licensee, through the implementation of the walkdown guidance activities and, in accordance with plant processes and procedures, verified the plant configuration with the current flooding licensing basis; addressed degraded, nonconforming, or unanalyzed flooding conditions; and verified the adequacy of monitoring and maintenance programs for protective features. Furthermore, the licensee's walkdown results, which were verified by the staff's inspection, identified no immediate safety concerns. The staff acknowledges that DTE will provide a supplemental letter that will address the walkdown results for the remaining restricted access feature, consistent with the regulatory commitment, within 90 days of the RF16 refueling outage completion, that was scheduled for the first quarter of 2014. The NRC staff reviewed the information submitted by the licensee and determined that sufficient information was provided to be responsive to Enclosure 4 of the 50.54(f) letter.

J. Plona

- 2 -

If you have any questions, please contact me at (301) 415-4037.

Sincerely,

*/RA/*

Thomas J. Wengert, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure:  
Staff Assessment of Flooding Walkdown Report

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