



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

July 17, 2014

Mr. Michael J. Pacilio  
Senior Vice President  
Exelon Generation Company, LLC  
President and Chief Nuclear Officer (CNO)  
Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – 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 NOS. MF0223 AND MF0224)

Dear Mr. Pacilio:

On March 12, 2012,<sup>1</sup> the U.S. Nuclear Regulatory Commission (NRC) issued a letter requesting information pursuant to Title 10 of the *Code of Federal Regulations*, Paragraph 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," 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 process, verify the adequacy of monitoring and maintenance procedures, and report the results to the NRC.

By letter dated November 27, 2012,<sup>2</sup> Exelon Generation Company, LLC (Exelon) submitted a flooding walkdown report as requested in Enclosure 4, "Recommendation 2.3: Flooding," of the 50.54(f) letter for Dresden Nuclear Power Station, Units 2 and 3. By letter dated January 31, 2014,<sup>3</sup> Exelon provided a response to the NRC request for additional information for the NRC staff to complete its assessments.

In accordance with NRC Temporary Instruction (TI) 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," dated June 27, 2012,<sup>4</sup> NRC inspectors and technical staff observed the licensee's August 13–16, 2012, walkdowns and independently performed walkdowns of a sample of flood protection features. By letter dated November 1, 2012,<sup>5</sup> the NRC informed the licensee of the observations and concerns that were identified as

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

<sup>2</sup> ADAMS Accession No. ML12332A305.

<sup>3</sup> ADAMS Accession No. ML14031A443.

<sup>4</sup> ADAMS Accession No. ML12129A108.

<sup>5</sup> ADAMS Accession No. ML12306A393.

M. Pacilio

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part of the TI activities. The licensee provided supplemental information to the NRC in response to these observations by letters dated December 1, 2012, and January 31, 2013.<sup>6</sup>

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.

If you have any questions, please contact me at (301) 415-2020 or by e-mail at [Brenda.Mozafari@nrc.gov](mailto:Brenda.Mozafari@nrc.gov).

Sincerely,



Brenda Mozafari, Senior Project Manager  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosures:  
Staff Assessment of Flooding Walkdown Report

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<sup>6</sup> ADAMS Accession Nos. ML12348A012 and ML13037A045, respectively.

STAFF ASSESSMENT OF FLOODING WALKDOWN REPORT  
NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO  
THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT  
EXELON GENERATION COMPANY, LLC  
DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3  
DOCKET NOS. 50-237 AND 50-249

1.0 INTRODUCTION

On March 12, 2012,<sup>1</sup> the U.S. Nuclear Regulatory Commission (NRC) issued a letter requesting information pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 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," 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.

Enclosure 4 to the 50.54(f) letter requested licensees to submit a final report which includes the following (Requested Information Item 2):

- 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.

- 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 NRC 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 CAP.
- g. Document any cliff-edge effects identified and the associated basis. Indicate those that were entered into the CAP. 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>2</sup> the Nuclear Energy Institute (NEI) submitted NEI 12-07, Revision 0, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" (walkdown guidance), to the NRC staff to consider for endorsement. By letter dated May 31, 2012,<sup>3</sup> the staff endorsed the walkdown guidance.

By letter dated November 27, 2012,<sup>4</sup> Exelon Generation Company, LLC (Exelon, the licensee) submitted a flooding walkdown report as requested in Enclosure 4, "Recommendation 2.3: Flooding," of the 50.54(f) letter for Dresden Nuclear Power Station (DNPS), Units 2 and 3. NRC staff issued a request for additional information to the licensee regarding the available physical margin (APM) by letter dated December 23, 2013.<sup>5</sup> The licensee responded by letter dated January 31, 2014.<sup>6</sup>

The NRC staff evaluated the licensee's submittals to determine if the information provided in the flooding 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 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. GDC 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>2</sup> ADAMS Package Accession No. ML121440522.

<sup>3</sup> ADAMS Accession No. ML12144A142.

<sup>4</sup> ADAMS Accession No. ML12332A305.

<sup>5</sup> ADAMS Accession No. ML13325A891.

<sup>6</sup> ADAMS Accession No. ML14031A443.

For initial licensing, each licensee was required to develop and maintain design bases that, as defined by 10 CFR 50.2, "Definitions," 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 (CLB) 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.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Design Basis Flooding Hazard

The walkdown report indicates that the design basis flood hazard for the DNPS site is riverine flooding from the Kankakee and Illinois Rivers. The site is located at the confluence of these two major rivers, in addition to a secondary river, the Des Plaines River. Based on flood hydrographs, the licensee stated that the probable maximum flood (PMF) is estimated to reach a peak stillwater elevation of 524.5 feet (ft) mean sea level (MSL). The walkdown report states that the coincident wind-generated waves and wave runup would increase the maximum water surface elevation to about 528 ft MSL. The walkdown report states that the crib house has the lowest subgrade floor elevation (509 ft MSL) containing equipment important to safety, while non-watertight openings in safety-related structures are at an elevation of 517.5 ft MSL.

The walkdown report states that since the site will be inundated during the design-basis PMF event, the flooding strategy relies on implementation of flood emergency procedures to mitigate the effects of the flood and prevent damage to the reactor cores. The flooding walkdown report states: "Based on the critical-time hydrograph, 33 hours will be available from the onset of the limiting rainfall event until the Illinois River reaches elevation 517.5 ft MSL and begins flooding the safety-related equipment in the main reactor building." The walkdown report states that based on the PMF hydrograph, only 7 hours are available to complete flood mitigation activities before the flood level rises from 509 to 517.5 ft MSL. The licensee stated that the plant would be inundated for 57 hours, it would take another 23 hours for the flood levels to fall below 509 ft MSL, and then it would take 12 hours to reinstall the service water pump motors.

The walkdown report states that the CLB also considered the effects of a local intense precipitation event on the site drainage. The walkdown reports states that an analysis of local intense precipitation showed a peak flood depth of 0.45 ft, which is approximately 0.05 ft below where safety-related equipment is affected.

The licensee provided a description of the design basis flood hazard level in response to Enclosure 4 of the 50.54(f) letter. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

## 3.2 Flood Protection and Mitigation

### 3.2.1 Flood Protection and Mitigation Description

The walkdown report states that the external flood mitigation strategy is to prevent the loss of safe plant control that could be caused by the PMF through the implementation of a flood emergency procedure, which is credited in CLB documents. The licensee states that this procedure makes use of onsite equipment to achieve a safe shutdown of the reactors and requires opening all doors to permit the free flow of flood water through the plant. As part of this procedure, reactor cooling systems are used to discharge decay heat throughout the duration of the PMF.

The walkdown report states that the flood emergency is initiated based on predicted rainfall exceeding 2 inches in 6 hours or actual water level exceeding 506 ft MSL. However, the licensee stated that the flood protection procedures also accounts for the situation where flood levels reach 509 ft MSL without sufficient warning to allow normal reactor shutdown. In this case, the licensee stated that shutdown would follow the standard operating procedure for a reactor scram and the majority of the flood procedure steps could be accomplished within 7 hours (time for the river to rise from 509 to 517.5 ft MSL). However, the walkdown report states that the construction of the sandbag berm at the isolation condenser makeup pumphouse would require more time and could potentially affect the implementation of the procedure.

The licensee noted that adverse weather conditions (e.g., high winds, localized flooding, and freezing temperatures) can be expected during the execution of the flood emergency procedure. The flooding walkdown report discussed the impact that adverse weather conditions may have on procedural steps performed outdoors.

### 3.2.2 Incorporated and Exterior Barriers

The walkdown report states that DNPS does not have any incorporated, exterior, or temporary features credited in the CLB documents for providing flood protection. However, the licensee states that below-grade walls and floors of the Units 2 and 3 reactor and turbine buildings were designed to withstand hydrostatic loads associated with extreme ground water conditions. Penetrations and seals were treated as observations included for the wall or slab feature as part of the walkdowns. The licensee stated that degraded and nonconforming conditions identified during the walkdowns were entered into the CAP for disposition.

### 3.2.3 Temporary Barriers and Other Manual Actions

The walkdown report describes the use of temporary barriers and manual actions for flood mitigation, include the following:

- Enter a plant flood emergency procedure when river levels are predicted to exceed elevation 509 feet MSL within 72 hours. This prediction is determined from monitoring the National Weather Service forecasts, U.S. Army Corps of Engineers forecasts at nearby dams, or Exelon's own weather monitoring systems.
- When flood levels are predicted to exceed 509 ft MSL within 3 days, the units are shutdown, and vessel slow fill procedures are initiated.

- If flood levels reach 509 ft MSL without sufficient warning, the reactor scram procedure is initiated.
- When flood levels reach 509 ft MSL the following steps are initiated:
  - two Unit 2 service water pump motors are removed and relocated to above 530 ft MSL for post-flood service;
  - the emergency make-up pump is setup in the center of the Unit 2 reactor building equipment hatch, which includes building scaffolding, lifting the pump with a crane, and staging additional diesel fuel; and
  - valves in the fire protection system are configured to connect the pump to the system.
- A sandbag berm will be constructed around the building for the isolation condenser make-up pumps when flood levels reached 509 ft MSL.
- At flood levels of 513 ft MSL, procedures are initiated to secure service water pumps, transfer reactor cooling to the isolation condenser, and initiate plans to address loss of fuel pool cooling.
- At flood levels of 517 ft MSL, all transformers and electrical equipment will be de-energized and reactor doors will be opened to permit uninhibited flood water flow through the plant.
- Before flood levels reach 517 ft MSL, vents on below-ground diesel tanks are sealed, below-ground water storage tanks are filled with water, and motor boats for transportation are secured.
- The diesel emergency make-up pump is started when flood levels reach 518 ft MSL to provide make-up water to the isolation condenser. The pump is raised and lowered from the crane as flood waters rise and recede.

#### 3.2.4 Reasonable Simulation and Results

The licensee stated that it performed reasonable simulations to verify that flood protection procedures or activities can be executed as specified, including completion within the credited time. The licensee performed 19 reasonable simulations related to the implementation of the flood emergency procedure. Four categories of reasonable simulations were performed: (1) simple simulations of short period walkthroughs that had been previously performed and documented; (2) complex simulations or long period walkthroughs that had been previously performed and documented; (3) drills or exercises that have not been performed before; and (4) record or desktop evaluations of procedures that are considered standard operating procedure.

For the reasonable simulations, the licensee considered conditions which may impact completion of the activities, such as rising flood waters and adverse weather (e.g., high winds, localized flooding, and freezing temperatures).

The licensee concluded that based on the reasonable simulations and desktop evaluations of the procedures that reactor shutdown and alternative cooling would be implemented with sufficient time margin to allow core cooling in a safe shutdown mode.

### 3.2.5 Conclusion

The licensee provided a description of the protection and mitigation features in response to Enclosure 4 of the 50.54(f) letter. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

### 3.3 Warning Systems

The walkdown report states that warning systems in rooms important to safety are not credited in the external flooding licensing basis for DNPS. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

### 3.4 Effectiveness of Flood Protection Features

The exterior below-grade walls and basement slabs of the reactor and turbine building were included on the licensee's walkdown list as incorporated passive barriers for flood protection. Based on visual inspections, the licensee considered the condition of below-grade walls to be acceptable. The walkdown report states that some degraded and nonconforming conditions associated with these walls and penetrations were identified and entered into the CAP. However, the licensee stated that these conditions would not affect the walls' ability to withstand hydrostatic loads and keep below-grade areas dry. The licensee did not identify any issues with the basement slabs.

The licensee provided a description of the effectiveness of flood protection features in response to Enclosure 4 of the 50.54(f) letter. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

### 3.5 Walkdown Methodology

By letter dated June 11, 2012,<sup>7</sup> the licensee stated that it would use the NRC-endorsed walkdown guidelines contained in NEI 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features." The licensee's walkdown report 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.

The licensee provided a description of the implementation of the walkdown process in response to Enclosure 4 of the 50.54(f) letter. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

### 3.6 Walkdown Results

#### 3.6.1 Walkdown Scope

The DNPS flood emergency procedure and associated standard operating procedures were the focus of the licensee's walkdown. In addition, the licensee inspected below-grade walls, slabs, and associated penetrations and seals. As discussed above, the licensee performed reasonable simulations to assess the flood emergency procedure.

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<sup>7</sup> ADAMS Accession No. ML12164A569.

### 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. The licensee found that below-grade walls, slabs, and associated penetrations were acceptable and able to perform their intended function. Any degraded and nonconforming conditions were entered into the CAP for disposition. The licensee reviewed the 1982 Systematic Evaluation Program (SEP) study, and noted that it did not discuss the specific site topography used for the local intense precipitation analysis. Since the topography and non-watertight openings in safety-related structures have not changed since the SEP analysis, the licensee determined that the local intense precipitation analysis should still be consistent.

NEI 12-07 defines a deficiency as follows: "a deficiency exists when a flood protection feature is unable to perform its intended function when subject to a design basis flooding hazard." NEI 12-07 further states that observations made during the walkdowns which may be potential deficiencies should be entered into the licensee's CAP. The licensee identified observations that were entered into the CAP; however, no deficiencies were identified. The walkdown report listed the following observations which were awaiting final disposition in the CAP at the time the walkdown report was completed: evidence of spalling and concrete degradation of below-grade walls, penetration seals which showed signs of degradation, and issues with some of the steps in the flood emergency procedure.

### 3.6.3 Flood Protection and Mitigation Enhancements

The walkdown report states the licensee is considering the following enhancements for flood protection or mitigation: obtaining a floating dock for staging the emergency diesel make-up pump, floodproofing the isolation condenser make-up pumps building access doors to eliminate the need for the sandbag berm, floodproofing additional access doors to increase time of equipment availability and personnel safety, initiation of sandbag berm installation based on actual river levels, and develop method to provide make-up water once flood waters recede.

### 3.6.4 Planned or Newly-Installed Features

The licensee did not specifically identify any changes that are necessary due to the flood walkdowns. However, the licensee identified potential enhancements as discussed in Section 3.6.3 and other changes which are discussed in Section 3.6.5.

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

The walkdown report states that the licensee did not identify any deficiencies; however, the licensee made a number of observations during the walkdown which were not immediately judged to be acceptable. These observations were entered into the CAP for disposition. The licensee has implemented or planned procedure changes to address the following observations related to the flood emergency procedures identified in the walkdown report:

- An accurate prediction of the river levels at the Dresden intake is not available, although the licensee determined that the flooding conditions to enter the flood emergency procedure would be predicted well enough in advance.

- Removal of the two service water pump motors may not be initiated early enough to be successful. However, the removal of these motors is to ensure they are available to aid in recover after the flood recedes, but does not impact the safe shutdown and cooling of the reactors during the flood event.
- Construction of the sandbag berm may not be initiated early enough to be successful.
- The procedure identified insufficient diesel fuel to be staged in the reactor building for the duration needed.
- Opening of the plant doors may be made difficult by rising floodwaters.
- The procedure does not clearly state which electrical busses need to be deenergized.
- The procedure does not clearly state which above ground water storage tanks needed to be filled.

### 3.6.6 Staff Analysis of Walkdowns

The NRC staff reviewed the licensee walkdown report and observed licensee activities associated with the walkdown from August 13–16, 2012. As discussed in Section 3.7, the staff identified several issues during its onsite observations which were not identified by the licensee in its walkdown report. By letters dated December 1, 2012,<sup>8</sup> and January 31, 2013,<sup>9</sup> the licensee provided supplemental information regarding these self-identified issues.

As part of the CLB, DNPS will mitigate the effects of a flood by implementing procedures to prevent damage to the reactor core since the site is inundated during the design basis flooding event. Although the licensee identified no deficiencies, several procedural steps were changed and added to various flood emergency procedures as a result of the licensee's walkdown.

As part of the walkdown, reasonable simulations were performed for all activities for which a demonstration has never been done and existing documented procedures were reviewed. For standard operating procedures, such as plant shutdown, only those portions of the procedures that are applicable to flood response were validated. All simulations were evaluated for completion in the credited time.

As discussed in Section 3.7, NRC staff made several observations which were not identified by the licensee. These observations were associated with procedural and design weaknesses of the external flooding plan and issues with the external flooding design plan. The most significant observation was the failure of the flood emergency procedure to include steps to direct operators to add makeup water to the reactor vessel to maintain water level above the top of active fuel during a flooding event. This issue resulted in a White finding. In its supplemental letters, the licensee responded to these observations and identified a number of additional enhancements that have been made or were under consideration.

The licensee provided a description of the results of the flooding walkdown, including potential improvements, in its November 27, 2012, response to Enclosure 4 of the 50.54(f) letter. In addition, the NRC staff made a number of independent observations which the licensee responded to in its December 1, 2012, and January 31, 2013, supplemental letters.

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<sup>8</sup> ADAMS Accession No. ML12348A012

<sup>9</sup> ADAMS Accession No. ML13037A045

Based on the NRC staff's review, the information provided appears to be consistent with the intent of Enclosure 4 of the 50.54(f) letter with respect to the evaluation of the effectiveness of flood protection features and the identification of key findings, corrective actions, and potential enhancements.

### 3.6.7 Available Physical Margin

The APM for each applicable flood protection feature is the difference between the licensing basis flood height and the flood height at which water could affect an SSC important to safety. In its walkdown report and January 31, 2014, letter, the licensee provided a description of the APM, as it relates to cliff-edge effects, in response to Enclosure 4 of the 50.54(f) letter. The licensee stated it has reviewed its APM determination process, and entered any unknown APMs into the CAP. Based on the NRC staff's review, this response appears to be consistent with the walkdown guidance.

### 3.7 Independent Verification

On June 27, 2012,<sup>10</sup> the NRC issued Temporary Instruction (TI) 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns." In accordance with the TI, NRC inspectors and technical staff observed the licensee's August 13–16, 2012, walkdowns and independently verified that the licensee implemented the flooding walkdowns consistent with the intent of the walkdown guidance. Additionally, the inspectors and staff independently performed walkdowns of a sample of flood protection features. The inspection reports dated October 19, 2012,<sup>11</sup> and January 23, 2013,<sup>12</sup> documented the performance of this inspection. However, the inspectors continued to engage the licensee regarding its response strategy for flooding events with additional questions and concerns after the walkdowns.

By letter dated November 1, 2012,<sup>13</sup> the NRC staff identified a number of observations and concerns made during the TI inspection and requested that the licensee provide a written response to these issues. By letter dated December 1, 2012, the licensee provided a response to this request. By letter dated January 3, 2013,<sup>14</sup> the NRC staff acknowledged receipt of the licensee's response and asked several questions. The licensee addressed these questions in a supplemental letter dated January 31, 2013.

On May 7, 2013,<sup>15</sup> the NRC issued Integrated Inspection Report 05000237/2013002, 05000249/2013002, including a preliminary White finding associated with the failure of the flood emergency procedure to include steps to direct operators to add makeup water to the reactor vessel to maintain water level above the top of active fuel during a flooding event. The NRC staff determined this finding was not an immediate safety concern. By letter dated July 31, 2013,<sup>16</sup> the NRC issued its final significance determination that this issue was a White finding.

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

<sup>11</sup> ADAMS Accession No. ML12293A352.

<sup>12</sup> ADAMS Accession No. ML13024A087.

<sup>13</sup> ADAMS Accession No. ML12306A393.

<sup>14</sup> ADAMS Accession No. ML13003A226.

<sup>15</sup> ADAMS Accession No. ML13128A056.

<sup>16</sup> ADAMS Accession No. ML13213A073.

The May 7, 2013, inspection report states that the licensee completed corrective actions associated with this issue by implementing a procedure for reactor vessel inventory make up with the diesel flood pump and revising the flood emergency procedure to require operator actions to reduce potential reactor coolant system leakage.

#### 4.0 SSCS NOT WALKDED DOWN

##### 4.1 Restricted Access Areas

The licensee stated there were no features in restricted access areas.

##### 4.2 Inaccessible Features

The walkdown report states that three penetrations were identified as inaccessible for visual inspection. However, the licensee reviewed available drawings and found no evidence of groundwater seepage below the penetrations. Based on this, the licensee determined it had reasonable assurance that the features were capable of performing their intended function.

Based on the above, the NRC staff determined that the licensee provided adequate justification for not inspecting the features it identified as inaccessible.

#### 5.0 CONCLUSION

The NRC staff reviewed the licensee's walkdown report and supplemental responses, observed parts of the licensee's walkdown, and independently performed walkdowns of a sample of flood protection features. Based on this, the staff concludes that the licensee 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 and supplemental responses, which were verified by the staff's inspection, identified no immediate safety concerns. The staff determined that sufficient information was provided in the walkdown report and supplemental responses to be responsive to Enclosure 4 of the 50.54(f) letter.

M. Pacilio

- 2 -

part of the TI activities. The licensee provided supplemental information to the NRC in response to these observations by letters dated December 1, 2012, and January 31, 2013.<sup>7</sup>

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.

If you have any questions, please contact me at (301) 415-2020 or by e-mail at [Brenda.Mozafari@nrc.gov](mailto:Brenda.Mozafari@nrc.gov).

Sincerely,

*/RA BPurnell for/*

Brenda Mozafari, Senior Project Manager  
Plant Licensing III-2 and  
Planning and Analysis Branch  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosures:  
Staff Assessment of Flooding Walkdown Report

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ADAMS Accession Number: ML14184B288

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<sup>7</sup> ADAMS Accession Nos. ML12348A012 and ML13037A045, respectively.