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

June 27, 2014

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT UNITS 1, 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. MF0200, MF0201, AND MF0202)

Dear Mr. Shea:

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) (the 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, resultant tsunami, and subsequent accident at the Fukushima Dai-ichi nuclear power plant. 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 27, 2012, the Tennessee Valley Authority (TVA) submitted a flooding walkdown report as requested in Enclosure 4 of the 50.54(f) letter for the Browns Ferry Nuclear Plant, Units 1, 2, and 3, as supplemented by letter dated June 6, 2013. By letter dated February 7, 2014, TVA provided a response to the NRC request for additional information for the staff to complete its assessments.

The NRC staff acknowledges that the licensee will complete the delayed walkdown items no later than the spring of 2014 consistent with the regulatory commitment. The NRC staff reviewed the information provided and, as documented in the enclosed staff assessment, determined 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) 415-1447 or by email at Farideh.Saba@nrc.gov.

Sincerely,

Farideh E. Saba

Farideh E. Saba, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260,
and 50-296

Enclosure:
Staff Assessment of Flooding Walkdown Report

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STAFF ASSESSMENT OF FLOODING WALKDOWN REPORT

NEAR-TERM TASK FORCE RECOMMENDATION 2.3 RELATED TO

THE FUKUSHIMA DAI-ICHI NUCLEAR POWER PLANT ACCIDENT

TENNESSEE VALLEY AUTHORITY (TVA)

BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3

DOCKET NO. 50-259, 50-260, 50-296

1.0 INTRODUCTION

On March 12, 2012,[1] the U.S. Nuclear Regulatory Commission (NRC) issued a request for information per Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f) (the 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,"[2] 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 include 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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[1] Agencywide Documents Access and Management System (ADAMS) Accession No. ML12053A340.
[2] 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 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,[3] 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,[4] the NRC staff endorsed the walkdown guidance.

By letter dated November 27, 2012,[5] the Tennessee Valley Authority (TVA), provided a response to Enclosure 4 of the 50.54(f) letter Required Response Item 2, for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. The licensee submitted a supplemental report dated June 6, 2013,[6] in addition to the letter dated November 27, 2012. The purpose of the supplemental report was to include the results of subsequent walkdowns that occurred during the spring of 2013. The NRC staff issued a request for additional information (RAI) to the licensee regarding the available physical margin (APM) dated December 23, 2013.[7] The licensee responded by letter dated February 7, 2014.[8]

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 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 for Nuclear Plant," Criterion 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

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[3] ADAMS Package Accession No. ML121440522.
[4] ADAMS Accession No. ML12144A142.
[5] ADAMS Accession No. ML12335A340.
[6] ADAMS Accession No. ML13161A351.
[7] ADAMS Accession No. ML13325A891.
[8] ADAMS Accession No. ML14042A393.

withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions.

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 (CLB) is the set of NRC requirements applicable to a specific plant, and the 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 BFN, Units 1, 2 and 3

The licensee stated that the design basis flood (DBF) hazard for the BFN site is the probable maximum flood (PMF) resulting from the probable maximum precipitation (PMP) in the Tennessee River watershed upstream of the site, plus the wind wave runup resulting from a 45-miles per hour (mph) wind. The current DBF is 578.0 feet (ft) relative to mean sea level (MSL), which is equal to a 572.5 ft MSL still water PMF elevation on Wheeler Reservoir plus 5.5 ft of wind wave runup on a vertical wall. The wind wave runup estimate is from a 45-mph wind blowing from the southeast. TVA noted that the hydrologic analysis for BFN was being revised to use updated information and U.S. Army Corps of Engineers hydrologic modeling and river analysis methods, consistent with the revised hydrologic analyses for the Sequoyah and Watts Bar Nuclear Plants. The PMP PMF elevation resulting from the revised analysis for BFN was lower than the current DBF; therefore, the current design and licensing basis elevation will remain at 572.5 ft MSL plus wind wave runup to 578.0 ft MSL. The NRC staff will review the revised analysis as part of the Recommendation 2.1 review. The BFN flooding walkdown report states that the plant grade is 565.0 ft MSL.

The PMP PMF is the controlling flood hazard; however, in its flooding walkdown report, TVA stated that the design basis includes local intense precipitation. Flood water elevations from local intense precipitation could reach 566.6 ft MSL, exceeding plant grade by 1.6 ft. TVA stated that local intense precipitation flooding could reach this elevation between the office building and service building. According to the flooding walkdown report, the peak local intense precipitation floodwater elevations in the vicinity of the Reactor, Diesel Generator, and Radioactive Waste Buildings would not exceed plant grade of 565.0 ft MSL.

TVA states that it would take approximately 4.5 days from initiating the Abnormal Operating Instruction (AOI) for flood waters to reach 565.0 ft MSL. TVA stated that the water level would remain above plant grade for at least 4 days, but did not provide an estimated total duration.

Based on the NRC staff's review, the licensee appears to have described the design basis flood hazard level(s) 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 reported that the current licensing basis flood protection elevation is the DBF of 572.5 ft MSL plus wind wave heights where applicable. The flood protection and mitigation features were designed using the following assumptions and inputs:

- Safety-related structures would remain watertight to the DBF plus wind wave runup (generally 578.0 ft)
- High winds and wave forces could occur with floods
- All flood protection would be in place before the water level reaches 565.0 ft (plant grade)

The licensee states that the Updated Final Safety Analysis Report (UFSAR) for BFN does not describe required actions in the event of an impending PMF, but that flood events above 558 ft MSL are governed by an AOI that includes flood-preparation steps. The AOI would be implemented when the Wheeler Reservoir water level reached 558.0 ft MSL or if precipitation caused water to appear in a certain plant location.

The Reactor Building for BFN Units 1, 2, and 3 is protected by watertight doors for personnel and equipment access locks that seal the openings and are designed to remain sealed against static water pressure to 572.5 ft MSL. In addition, a flood gate is located outside the equipment access lock that is designed to withstand static forces to an elevation 578.0 ft, wave and surge forces for lower floods (556.0 to 568.0 ft MSL) with 85-mph winds, or the PMF (572.5 ft MSL) with 45 mph winds. The Diesel Generator Buildings for BFN Units 1, 2, and 3 are designed to remain dry to 578.0 ft MSL. Exterior doors are normally closed, latched, and locked; rubber seals are in place any time the doors are closed. If an exterior door on a Diesel Generator Building was found to be inoperable or otherwise not able to seal, a portable bulkhead would be installed to seal off the interior doorway of the affected diesel generator room. The Radioactive Waste Building is designed to remain dry to 578.0 ft MSL. All doors and other penetrations below the PMF would be sealed to exclude water and withstand water pressure. Exterior doors are designed to withstand high winds and the PMF including wave runup. The Radwaste Evaporator Building is sealed to 578.0 ft MSL. The Offgas Treatment Building for BFN Units 1, 2, and 3 is sealed to 568.0 ft.

The BFN condenser cooling water (CCW) pumping station structure is designed to protect service-water pumps from the PMF including wave runup of 578.0 ft MSL, including water pressure from below the pump deck. The CCW pumping station exterior personnel access doors located at plant grade are normally closed and latched to provide protection up to 578.0 ft MSL.

3.2.2 Incorporated and Exterior Barriers

In its flooding walkdown report, TVA described incorporated and exterior flood-protection barriers that are credited in the CLB for BFN Units 1, 2, and 3. The design features described in Section 3.2.1 are credited with maintaining all safety-related SSCs from floods up to the PMF, including wind wave runup. The Reactor, Radioactive Waste, Radwaste Evaporator, and Diesel Generator Buildings are watertight to 578.0 ft MSL. The walls of the CCW pumping station facing Wheeler Reservoir and the bottom of the CCW pump deck are designed to withstand the PMF and maximum wind wave runup, as well as upward pressure from below the pump deck.

3.2.3 Temporary Barriers and Other Manual Actions

The licensee reported that the BFN site has several temporary barriers and other manual actions that require operator action:

- The exterior doors to the Diesel Generator Buildings for BFN Units 1, 2, and 3 are normally closed and latched in the watertight position. However, if one of the exterior doors cannot perform its flood-protection function, a portable bulkhead is available to seal an interior doorway between the affected room and the rest of the Diesel Generator rooms. The interior door must be removed and the portable bulkhead bolted over the doorway.

- The Reactor Building has a flood gate located outside the equipment access lock that would be lowered into place in the event of a flood.

- The doors between the Radioactive Waste Building and the Service Building and between the Radioactive Waste Building and the Turbine Building are manually operated; the doors are normally closed, but must be manually latched to be watertight.

- Other manual actions for flood protection include operating or securing drain plugs, valves, equipment hatches, and manhole covers.

3.2.4 Reasonable Simulation and Results

TVA performed reasonable simulations of its BFN flood-response AOI. The flood-response AOI is a collection of procedures to ensure that plant shutdown begins when an above-grade flood is predicted, and that all flood protection is in place before the flood water elevation reaches 565.0 ft MSL. TVA's simulation was primarily a step-through of the procedures by a licensed Senior Reactor Operator with assistance from a team of key staff from affected plant organizations (e.g., operations, licensing, maintenance, project management) to determine the time and resources required at each step. Actual field performances of two necessary flood-protection activities were conducted: the installation of the portable bulkhead door to a diesel generator room, and operation of the Reactor Building equipment access lock floodgate. TVA stated that its initial assumption was that the three units were operating at full power at the time of the simulation, but that the AOI actions would be applicable to all modes of operation.

TVA concluded the following from its reasonable simulation of the flood-response AOI:

- Flood-mode preparation could be accomplished within the 4.5-day period between the time river water elevation reaches 558.0 ft and the time the water level reaches 565.0 ft.

- Flood-response AOI procedures were adequate, but could be improved to reduce the response time by providing more specific direction and sequenced steps, and grouping actions by location for more efficient performance.

- The Reactor Building equipment access lock floodgate rail seals did not effectively seal the rail pocket below the gate.

The flooding walkdown report did not indicate whether any concurrent conditions (e.g., intense rainfall and high winds) were considered when performing the simulation.

3.2.5 Conclusion for Flood Protection and Mitigation

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

In its flooding walkdown report, the licensee stated that unlike upstream plants, which rely on the TVA's Tennessee River Operations system for an initial flood warning, the flooding walkdown report states that Tennessee River Operations is contacted by BFN staff when Wheeler Reservoir surface elevation reaches 558.0 ft MSL. At that point, BFN's flood response depends upon the Tennessee River Operations forecast system for communicating an estimated time for flood water elevation to reach the BFN plant grade, which TVA states is approximately 4.5 days.

Floor and equipment drain sump water-level monitors can be found in the Turbine Building and Reactor Building; water-level detectors are located in the core spray/reactor core isolation cooling pump and residual heat-removal pump rooms. These internal warning systems are not credited for protection from external flooding events in the CLB.

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

3.4 Effectiveness of Flood Protection Features

TVA's evaluation of flood-protection effectiveness included inspection of flood-protection features for safety-related SSCs, review of site topography and drainage plans, review and simulation of flood-response procedures, and review of maintenance procedures.

TVA's inspection of the Reactor Building revealed that the rail seals for the equipment access lock floodgate were not shaped properly and could not effectively seal the rail pocket below the floodgate. Six penetration seals in the Reactor Building were identified as potentially degraded. One of the watertight doors on the Radioactive Waste Building had missing seal material.

At the CCW pumping station, TVA identified five penetration seals as potential deficiencies, and identified seven seals on manholes and hatches protecting the residual heat removal service water (RHRSW) pump rooms as being at the end of their service life. These items were identified as deficiencies and entered into the CAP. Additional deficiencies were noted during the subsequent walkdowns that were performed on the steam vault floodwall. Prior to and independent of the flooding walkdown, the RHRSW pump room flooddoors had been listed as degraded and nonconforming; this condition had been entered into the CAP and the doors had been scheduled for replacement. A cracked weld was identified in the south access portal door by personnel not involved in the flooding walkdown.

TVA did not discuss specific flooding walkdown findings with respect to the effectiveness of site grading and drainage systems to direct water away from safety-related structures.

From its reasonable simulation of its flood-response AOI, TVA found that flood preparation for BFN could be completed within the 4.5 days available between the time Wheeler Reservoir water level reaches 558.0 ft MSL and the time the water level is predicted to reach 565.0 ft MSL. TVA identified a number of procedural improvements that would shorten the response time and documented these improvements in its CAP. In addition, TVA identified a number of improvements to maintenance procedures that would ensure that flood-response equipment, components, and tools would be accessible and would function reliably. Many of these issues are being addressed in a fleetwide Flood Mode Operation Improvement Strategy, discussed further in Section 3.6.2.

TVA reported that these inspections and the reasonable simulation were performed in accordance with NEI 12-07. As necessary, findings were entered into the CAP.
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 11, 2012,[9] the licensee responded to the 50.54(f) letter 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"[10] (NEI 2012). The licensee's walkdown submittal dated November 27, 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.

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[9] ADAMS Accession No. ML12164A674.
[10] ADAMS Accession No. ML12173A215.

3.6 Walkdown Results

3.6.1 Walkdown Scope

The licensee performed walkdowns of the BFN Units 1, 2, and 3 Reactor, Radioactive Waste, and Diesel Generator Buildings and the RHRSW pump rooms in the CCW pumping station. Flood-protection features were visually inspected, incorporated features verified, and flood-protection procedures reviewed. As noted in Section 3.2.4, TVA performed a reasonable simulation of its flood-response AOI, using a representative team of personnel to step through procedures, and conducted field performances of two operational procedures. According to the flooding walkdown report, TVA considered all three units in normal power operation mode during its simulation, but noted that the AOI procedures would apply to any mode of operation. The procedures performed in the field (equipment access lock floodgate operation and diesel generator room bulkhead installation) were selected because their performance had not been previously documented. TVA did not describe any concurrent environmental conditions that may have been assumed during its reasonable simulation.

From its inspection results, TVA appeared to have applied some criteria to identify degraded, nonconforming, or unanalyzed conditions. TVA did not describe specific acceptance criteria for visual or physical inspections of flood-protection features but stated that its flooding walkdown acceptance criteria were developed in accordance with NEI 12-07. For its reasonable simulation that evaluated the credited flood-response procedures, TVA evaluated its flood-response AOI against the 4.5-day timeframe projected for the reservoir water level to increase from 558.0 to 565.0 ft MSL.

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 using a combination of visual inspections of site features and flood-protection barriers, reviews of flood-protection procedures, and the reasonable simulation of its flood-response AOI. In the initial flooding wlakdown report, TVA identified 5 deficiencies and entered 20 items into its CAP to document observations as well as deficiencies. In its supplemental flooding walkdown report, TVA identified 6 deficiencies that were corrected under the CAP. The results of TVA's evaluation are summarized as follows:

Inspection of civil features: TVA stated that its flooding walkdown included review of site topography drawings and field observations of existing site topography and drainage including security barrier installations. TVA's flooding walkdown report did not present any walkdown findings with respect to site grading or drainage, or note any related deficiencies, or observations entered into the CAP.

Inspection of flood-protection barriers: TVA stated that its flooding walkdown included inspection of the CCW pumping station walls and penetrations, Reactor Building penetrations and flood barriers, Diesel Generator Building penetrations and flood barriers, and Radioactive Waste Building penetrations. The flooding walkdown report briefly discussed walkdown findings with respect to these inspections or the effectiveness of the barriers, and identified deficiencies that were entered into the CAP. 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." The licensee identified 11 deficiencies at BFN Units 1, 2, and 3 because of the flooding walkdowns:

- Improperly shaped rail seals for the Reactor Building equipment access lock floodgate could not effectively seal the rail pocket below the floodgate.
- Six penetration seals in the Reactor Building and five penetration seals at the CCW pumping station were identified as potentially deficient.
- A cracked weld was identified in the frame of the south access portal watertight door.
- Seal material was missing on a watertight door on the Radioactive Waste Building.
- Seven manhole or hatch seals in the RHRSW pump rooms were found to be at the end of their service life.
- A gap in sealant between the pipe and an embedded plate for the steam vault flood wall.
- Two cracked sealants in the steam vault flood wall.
- Three sealants appeared to be missing from the steam vault flood wall.

Further, the licensee noted that, unrelated to the flooding walkdowns, there were reliability issues with the RHRSW pump room flooddoors and listed them as degraded and nonconforming. The licensee previously added these to its CAP and scheduled work to correct the condition.

Review of maintenance procedures for flood-mode components: TVA entered observations into the CAP regarding permanently installed flood-response components that were not included in a preventive-maintenance program.

Reasonable simulation of flood-response AOI: As described in Section 3.2.4, TVA concluded that the flood-response AOI could be performed in the available timeframe. TVA also noted the response time could be improved by revising operation and maintenance procedures and by preventive maintenance of flood-response components. These items resulted in a number of CAP entries.

NEI 12-07 specifies that licensees identify observations and potential deficiencies in the CAP that were not yet dispositioned at the time the walkdown report was submitted. TVA did not identify specific observations awaiting disposition at the time the flooding walkdown report was submitted, but did identify general types of observations for which actions would be taken. Observations related to reducing the flood-preparation timeline by reviewing and modifying maintenance procedures and flood-preparation procedures, equipment, and tool availability are being addressed in a fleetwide Flood Mode Operation Improvement Strategy, which TVA expected to issue in early December 2012.

3.6.3 Flood-Protection and Mitigation Enhancements

In the flooding walkdown report, TVA states that, as a result of its flooding walkdown, it has implemented or planned a number of enhancements that improve or increase flood protection or mitigation throughout its operating reactor fleet, including BFN Units 1, 2, and 3. These include improvements to flood-response procedures, flood-mode equipment maintenance, and tool and equipment accessibility.

3.6.4 Planned or Newly Installed Features

The licensee determined that changes were necessary as a result of the flooding walkdowns. As noted in Section 3.6.3, TVA is implementing a fleetwide review of flood-response warning time definitions, flood-response and related procedure improvements, flood-mode equipment accessibility, and flood-mode equipment maintenance programs.

3.6.5 Deficiencies Noted and Actions Taken or Planned to Address

As described in Section 3.6.2, TVA identified 11 deficiencies at BFN Units 1, 2, and 3 during the initial and subsequent walkdowns. These deficiencies were entered into the CAP. TVA stated that the cracked weld on the south access portal door frame had been repaired, and that further inspections and repairs have been scheduled to address the other deficiencies. A timeline for completion of the scheduled actions was not provided in the flooding walkdown report.

3.6.6 Staff Analysis of Walkdowns

NRC staff reviewed the licensee walkdown report dated November 27, 2012, and supplemental report dated June 6. 2013. TVA appeared to implement its flooding walkdown process consistent with the intent of NEI 12-07. TVA reviewed its operating procedures, used a reasonable simulation of its flood-response AOI, and conducted field simulations of time-critical operation and maintenance activities.

Based on the NRC staff's review, the staff concludes that the licensee has provided results of the walkdown and described any other planned or newly installed flood protection systems or flood mitigation measures as indicated in Requested Information Items 2.f and 2.h of the 50.54(f) letter consistent 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

NRC staff issued an RAI to the licensee regarding the APM dated December 23, 2013.[11] The licensee responded with a letter dated February 7, 2014. The licensee has reviewed its APM determination process, and entered any unknown APMs into its CAP. The NRC staff reviewed the response, and concluded that the licensee met the intent of the APM determination per NEI 12-07.

[11] ADAMS Accession No. ML13325A891.

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 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 "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns." In accordance with the TI, NRC inspectors independently verified that the licensee implemented the flooding walkdowns consistent with the intent of the walkdown guidance. Additionally, the inspectors independently performed walkdowns of a sample of flood protection features. The results of these inspections were documented in the inspection reports dated February 8[12] and May 14, 2013.[13] No findings of significance were identified.

4.0 STRUCTURES, SYSTEMS AND COMPONENTS NOT WALKED DOWN

The licensee did not identify any inaccessible features, but did identify restricted access features.

4.1 Restricted Access Features

The licensee identified the main steam tunnel floodwalls as restricted access during its walkdown of BFN Units 2 and 3. In its supplement, dated June 6, 2013, the licensee presented its results for the delayed walkdowns of the Unit 2 main steam tunnel floodwalls. The licensee committed to complete walkdowns on the Unit 3 main steam tunnel floodwalls during the next refueling outage scheduled for the spring of 2014.

4.2 Inaccessible Features

The licensee did not identify any inaccessible features.

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 staff notes that no immediate safety concerns were identified. The staff acknowledges that the licensee will complete the delayed walkdown items no later than the spring 2014 consistent with the regulatory commitment. The NRC staff reviewed the information provided and determined that sufficient information was provided to be responsive to Enclosure 4 of the 50.54(f) letter.

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[12] ADAMS Accession No. ML13039A321.
[13] ADAMS Accession No. ML13134A237.

If you have any questions, please contact me at (301) 415-1447 or by email at Farideh.Saba@nrc.gov.

Sincerely,

/RA/

Farideh E. Saba, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260,
and 50-296

Enclosure:
Staff Assessment of Flooding Walkdown Report

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