Duke Energy®

Crystal River Unit 3 Nuclear Generating Plant
Docket No. 50-302
Operating License No. DPR-72

Ref: 10 CFR 50.54(f)

November 21, 2012
3F1112-05

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Crystal River Unit 3 – Response to Recommendation 2.3, Flooding Walkdown of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident

Reference: 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 (Accession No. ML12053A340)

Dear Sir:

By letter dated March 12, 2012, the Nuclear Regulatory Commission (NRC) issued a Request for Information (Reference) requesting Licensees to provide information regarding Recommendation 2.3 (Flooding) to support the evaluation of the NRC staff recommendations for the Near-Term Task Force (NTTF) review of the accident at the Fukushima Dai-Ichi nuclear facility.

By this letter, Florida Power Corporation submits the Crystal River Unit 3 response regarding the performance of flooding walkdowns to identify and address degraded, non-conforming or unanalyzed conditions and to verify the current plant configuration with the current flooding licensing basis. The Enclosure to this letter provides the requested information and is consistent with the guidance provided in NEI 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features," dated May 2012.

No new regulatory commitments are made in this submittal.

If you have any questions regarding this submittal, please contact, Mr. Daniel Westcott, Superintendent, Licensing and Regulatory Programs, at (352) 563-4796.

Sincerely,

Jon A. Franke
Vice President
Crystal River Nuclear Plant

Enclosure: Response to Recommendation 2.3 Flooding Walkdown of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector

A001
NRR

Crystal River Nuclear Plant
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STATE OF FLORIDA

COUNTY OF CITRUS

Jon A. Franke states that he is the Vice President, Crystal River Nuclear Unit 3 Nuclear Generating Plant for Florida Power Corporation, that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

Jon A. Franke
Vice President
Crystal River Nuclear Unit 3 Nuclear Generating Plant

The foregoing document was acknowledged before me this 21ST day of November 2012, by Jon A. Franke.

Signature of Notary Public
State of Florida

SHARON I. LAYTON
NOTARY PUBLIC
STATE OF FLORIDA
Comm# EE202310
Expires 6/13/2016

(Print, type, or stamp Commissioned Name of Notary Public)

ENCLOSURE

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302
LICENSE NO. DPR-72

RESPONSE TO RECOMMENDATION 2.3 FLOODING WALKDOWN OF THE NEAR-TERM TASK FORCE REVIEW OF INSIGHTS FROM THE FUKUSHIMA DAI-ICHI ACCIDENT

CRYSTAL RIVER UNIT 3
FLOOD PROTECTION FEATURES WALKDOWN REPORT

1 EXECUTIVE SUMMARY

This report summarizes the results of the flooding walkdowns performed at Crystal River Unit 3 Nuclear Generating Plant (CR-3) in response to the March 12, 2012, NRC 10CFR50.54(f) Request for Information, Recommendation 2.3. The flooding walkdowns were performed in compliance with the NRC-endorsed implementing guidance NEI 12-07, Revision 0-A, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features." This report follows the direction for NRC requested information provided in Appendix D of NEI 12-07.

The CR-3 site is constructed atop an island berm that rises 20.5 feet above the grade elevation of 98 feet-Plant Datum (ft-PD), to an elevation of 118.5 ft-PD. The Current Licensing Basis (CLB) flood elevation for CR-3 is based upon the Probable Maximum Hurricane (PMH) that strikes the site. The Final Safety Analysis Report (FSAR) documents the CLB elevation of 121.4 ft-PD as the maximum storm tide level with the maximum wave run-up CLB elevation of 127 ft-PD for the PMH. The plant is comprised of a continuous structure that is sub-divided into six buildings and is protected by a continuous flood wall. The flood wall consists of portions incorporated into the building walls and freestanding portions that generally extend to a minimum of two feet above the maximum wave run-up CLB flood elevation of 127 ft-PD to 129 ft-PD. Within the flood wall and at the entrances to some buildings that comprise portions of the incorporated plant flood wall, are water-tight doors and flood gates. The flood wall contains numerous piping and electrical conduit penetrations.

The walkdown was completed by personnel trained to the requirements of NEI 12-07. A total of 174 features were included in the walkdown, and 40 items were determined through evaluation against the CLB to be unable to effectively perform their credited flood protection functions. There were no items that could not be inspected. The deficiencies have been entered into the CR-3 Corrective Action Program (CAP). Of these 40 items, 25 are related to missing or inadequate penetration seals, two to flanges, one to a gate, one to a gasket, two to inadequate door seals, four to flood wall joints, four to potential roof drain clogging, and one to the equipment hatch missile shield. These items were evaluated in aggregate as part of the CAP. It was determined that, although these 40 items in their as-found condition allow a certain volume of water to pass through them due to a PMH storm event, the impact could be mitigated through use of portable pumps and would not be sufficient to expose any systems, structures, and components (SSCs) to flood hazards in a manner that degrades their ability to perform their key safety functions. Therefore, there is no affect to the CLB. Upon correction of these deficiencies, the plant features should perform their credited flood protection functions. It was determined that the existing CR-3 monitoring and maintenance programs should include additional flood protection features and a CAP Condition Report was initiated. Upon inclusion of the additional items, the monitoring and maintenance programs will adequately ensure that the flood protection features will continue to perform their credited functions.

2 DESIGN BASIS FLOOD HAZARD LEVEL

Design basis flood hazards for CR-3 were determined by reviewing the CLB. This includes all docketed and currently effective written commitments for ensuring compliance with NRC requirements and licensing basis information documented in the current CR-3 FSAR, including pending changes, and the CR-3 Topical Design Basis Document, "External and Internal Flooding," Revision 2.

The Crystal River Energy Complex is located in rural Citrus County, Florida, approximately 0.5 miles east of the Gulf of Mexico. The complex is comprised of four coal powered generation facilities and CR-3, a 2,609 MWt pressurized water reactor. The CR-3 facility was constructed atop an island berm placed in a coastal marsh, and the structures required for plant operation, safe shutdown, and reactor maintenance are located on this high ground. The elevation of the base of the berm is 98 ft-PD and the top of the berm is 118.5 ft-PD, with side slopes of 2:1. CR-3 is serviced by an intake canal that extends approximately 8 miles into the Gulf of Mexico from the CR-3 site as well as a discharge canal that extends 2.7 miles into the Gulf.

The major surface water bodies located in the general vicinity of CR-3 are the Withlacoochee River, Crystal River, the Cross-Florida Barge Canal, and Lake Rousseau. CR-3 is located approximately 3.8 miles south of the mouth of the Withlacoochee River, 3.8 miles north of the mouth of Crystal River, approximately two miles southwest of the mouth of the Cross-Florida Barge Canal, and approximately four miles southwest of the Inglis Dam, the impoundment on the Withlacoochee River that created Lake Rousseau. None of these bodies of water have the potential to produce flooding that would impact CR-3, according to numerous flood studies completed prior to construction of the plant. According to the Southwest Florida Water Management District and Floridian Aquifer Atlas HA-440, the main direction of groundwater flow in the plant vicinity is generally to the west-southwest, and the potential for pumping of groundwater in the vicinity of the site is extremely low.

The flood hazard determination for CR-3 was based on maximum storm surge levels, and wave action and wave run-up resulting from the impact of a PMH event. The critical path for a hurricane with onshore winds is from the southwest, tracking on a northeasterly course. It is postulated that the center of the PMH would pass north of the plant site at a distance that results in the maximum winds passing directly over the site area with estimated maximum winds of 149 miles per hour (mph). The approach path of wave trains that will produce the maximum run-up levels at the site is along a north-south section with waves approaching the plant from the south. The maximum tidal set-up is produced by winds blowing onshore to the east. The PMH will produce a maximum tidal level for the Gulf and the canals of 121.4 ft-PD, with median and maximum wave run-up elevations of 126 ft-PD and 127 ft-PD, respectively, occurring 22 hours after the center of the hurricane has crossed the Continental Shelf. No consideration of additional flood hazards or differences in flood hazard levels were found in the design or licensing basis documentation.

3 LICENSING BASIS FLOOD PROTECTION AND MITIGATION FEATURES

CR-3 site systems, structures, and components (SSCs) required for reaching and maintaining a safe plant shutdown condition during and after a severe weather event are protected to a maximum storm tide level of 121.4 ft-PD with the maximum wave run-up elevation of 127 ft-PD. The SSCs are located behind a flood wall that comprises freestanding portions and portions incorporated into building walls and are equipped with six water-tight (WT) doors and five flood gates. The flood wall is designed to protect the SSCs to the maximum storm tide level of 121.4 ft-PD with the maximum wave run-up elevation of 127 ft-PD, with the flood wall reaching a nominal elevation of 129 ft-PD. Power operation at sea levels above approximately 98 ft-PD is not possible as the circulating water pumps, located at the intake canal, and the transmission facilities in the switchyard will begin to flood. For the maximum tide level and wave action, which will have an approximate duration of 1.5 hours near the peak of PMH tide, local protection is provided to assure the integrity of safety-related structures and systems from wave

overtopping of the embankment. The protection and mitigation features were not found to be unique to any particular plant mode of operation.

Complete closure of the water-tight doors and gates at CR-3 is accomplished during execution of procedure EM-220, "Violent Weather." The plant has an established Violent Weather Committee that is responsible for determining the appropriate level of storm response based upon the forecast type and intensity of the weather event. Storm preparations at CR-3 begin when the National Weather Service (NWS) reports the forecasted storm surge in the vicinity of CR-3 will exceed four feet above mean high tide. During execution of EM-220, plant personnel in the various departments work through checklists of procedures and activities to be performed within a 36 to 48 hour timeframe, from first warning of an approaching storm until landfall of the storm. The only established time-dependant task within EM-220 is to completely close all water-tight doors and gates within two hours of the water level at the intake structure reaching elevation 98 ft-PD. During normal operations, the water level displayed on a sight gage installed at the Ultimate Heat Sink (UHS) intake is observed twice per day (once per shift) and recorded. During EM-220 implementation, Operations personnel will increase readings of the water level at the UHS intake to hourly until weather conditions will no longer allow safe reading of the gage. Operators also maintain the EM-220 Approaching Hurricane Chronological Data Sheet, a log of weather observations obtained from the National Hurricane Center and recorded every two hours for the duration of the threat. The two-hour threshold for door and gate closure is predicated on the hourly readings of the UHS water levels.

The Turbine Building (TB) is equipped with four water-tight doors at door openings, to protect the plant against flood levels to elevation 129 ft-PD. The water-tight doors have compression-type seals that are covered by metal panels when not in use. The metal panels are removed prior to door closure, exposing the seals. Flood Gate #2 (SW corner of TB, west side) is a "side-tight" door and consists of a 5,000 lb metal panel that is staged above the opening and is lowered with a crane into place on side rails. Flood Gate #5 (NE corner of TB, east side) is a sliding water-tight panel and is constructed of metal, weighing approximately 15,000 lbs and slides horizontally on an upper rail that must be installed prior to gate closure. Both TB gates are equipped with both compression-type seals and expandable seals that compress against the door casement, while the water-tight doors are equipped with compression-type seals only. The expandable seal serves as a backup in the event of failure of the compression seal. In the event of failure of both seals, hydrostatic pressure from the flood water column will force the door or gate against the back face of its guide rails and will compress the backup seal. Also, EM-220 specifies the use of temporary portable dewatering pumps and hoses to dispose of leakage through the water-tight door and gate seals.

The Air Intake Structure on the east side of the TB is protected from flooding by a concrete retaining wall to a height of 129 ft-PD, to serve as a flood barrier. This freestanding flood wall is connected to the TB eastern wall, which is an incorporated flood wall south of this point, and the joint is sealed to provide continuity. The Air Intake Structure on the west side of the TB has a similar freestanding flood wall that begins well north of the building and terminates at the Air Intake Structure, immediately adjacent to Flood Gate #2.

Additionally, there are a total of eight manholes that are part of the Circulating Water (CW) System for the plant located at the 95 ft-PD level of the TB. Four of the manholes are located in the southwestern portion of the TB and are related to the CW Intake system, and the four remaining manholes are located along the northern wall of the TB and are related to the CW Outlet system. The manhole covers on these structures are designed to protect the TB against

flood levels from 95 ft-PD to 129 ft-PD. Two safety-related discharge flume system drain valves are located within the manhole access panels for the CW Outlet manholes, located along the north wall of the TB at the 95 ft-PD level. EM-220 states that the two valves are to be confirmed closed and capped in advance of severe storms.

In the event hurricane winds are capable of blowing the siding off the TB and the associated rain is driven into the TB, the pumping system within the building is capable of removing an eight inch per hour rainfall continuously without accumulation, assuming offsite power is available. In the event that rainfall exceeds this rate for a short period of time, there remains a reserve sump capacity of approximately 30,000 gallons. Additionally, two temporary diesel-driven portable pumps are staged inside the TB during EM-220 preparations. These pumps are capable of a combined 1,400 gallons per minute from the 95 ft level of the TB.

The Auxiliary Building (AB) is equipped with three water-tight panels at door openings to protect the plant against flood levels to elevation 129 ft-PD. Flood Gate #7 is located on the eastern side of the AB immediately north of the Diesel Generator Building (DGB). The gate consists of a 1,775 lb metal panel that is staged above the opening and is lowered with an attached block-and-tackle apparatus on side rails. Flood Gates #8A and #8B (SE corner of AB, south side) are identical gates that consist of a metal panel weighing approximately 5,000 lbs staged above the opening and lowered into place with an air-operated winch system. The winch system is installed on the first gate and it is lowered into place, and then the maintenance crew transfers the winch system to the second gate, to lower it into place. The three AB gates are equipped with both compression-type seals and expandable seals that compress against the door casement. The expandable seal serves as a backup in the event of failure of the compression seal. In the event of failure of both seals, hydrostatic pressure from the flood water column will force the door or gate against the back face of its guide rails and will compress the backup seal. Also, EM-220 specifies the use of temporary portable dewatering pumps and hoses to dispose of leakage through the water-tight door and gate seals.

Additional SSCs located in the AB at the 95 ft-PD level include water-tight sleeves installed on the Raw Water Sump vents to protect the AB against flood levels up to elevation 129 ft-PD, manhole covers and level test flanges for the Seawater Room Raw Water Pit and Sea Water Room ceiling plugs to prevent water intrusion into the basement.

The DGB is equipped with two steel panels along the southern wall. These panels are similar to the other flood gates and panels, but are not movable. The panels are solid to elevation 127 ft-PD, and have vertical grates above that elevation. Each panel is equipped with a solid steel plate that is hinged on the top edge. In advance of a flooding event, these plates can be swung upward and attached to the panel with installed bolts, thus providing flood protection to elevation 129 ft-PD.

Two diesel fuel underground storage tanks (USTs) are located south of the DGB. Four vent pipes are located on the four corners of the UST pad, and extend to a top elevation exceeding 129 ft-PD, to prevent flood water from entering the USTs. These vents are protected from damage by a guard pipe as well. The annular space between the west wall of the DGB and the east wall of the AB contains a water-tight seal, to prevent flood water from entering the AB. The seal consists of a flexible flood-resistant material covered at the exposed ends by RTV sealant.

A concrete flood wall water barrier with a top elevation of 129 ft-PD is located approximately three feet outside the present Reactor Building (RB) wall, between the equipment access hatch

and the Intermediate Building (IB) and between the equipment access hatch and the AB. Both flood wall segments have water-tight seals at their extremities. The Equipment Access Hatch (RAX-3) is a water-tight door located at the entrance to the RB on the southwest side. This door is held in place with 72 bolts (with a minimum of 16 bolts installed at all times) and has an approximate diameter of 20 feet.

Within the two flood wall sections associated with the RB are two water-tight doors, installed to the east (WT Door #9) and west (WT Door #10) of the equipment access hatch area. The doors are identical to the TB WT Doors #1, 3, 4 and 6, and protect the RB against flood levels to elevation 129 ft-PD. Both water-tight doors have compression-type seals that are covered by metal panels when not in use. The metal panels are removed prior to door closure, exposing the seals. In the event of failure of the compression seal, hydrostatic pressure from the flood water column will force the door against the back face of its guide rails and will compress the backup seal. Also, EM-220 specifies the use of temporary portable dewatering pumps and hoses to dispose of leakage through the water-tight door seals.

The Borated Water Storage Tank (BWST) is located within a hardened concrete structure with incorporated flood walls that protect against flood waters to elevation 129 ft-PD. There is a segment of freestanding flood wall that connects from the BWST to the AB on the east side to form a water-tight barrier. The incorporated flood wall that extends around the west side of the BWST connects to the freestanding flood wall segment that includes WT Door #9. Vertical joint seals are installed at each end of this freestanding flood wall segment.

Three water-tight doors (WT Door E-201, E-202 and E-203) are located on the east and south sides of the Emergency Feedwater Pump Building (EFP-3), located southwest of the Fire Service Pump House on the stairs of the berm. The three doors in the EFP-3 are equipped with latches in the corners and along the sides of the door, and a marine-type closure wheel. As the wheel turns, the latches are moved from the open to closed position. These doors have compression-type seals built into the edges of the door, which compress against the door jamb when the latches are closed. In the event of failure of the compression seal, hydrostatic pressure from the flood water column will force the door against the back face of its guide rails and will compress the backup seal. Also, EM-220 specifies the use of temporary portable dewatering pumps and hoses to dispose of leakage through the water-tight door seals.

The Emergency Feedwater Tank Building (EFT-2) has one water-tight door on its eastern side of the building, to protect against flood levels up to elevation 135 ft-PD. The door installed at EFT-2, WT Door EFW-101, is constructed in similar fashion to the three water-tight doors at the EFP-3 building. The door has a central marine-type wheel closure and latches on the corners and sides of the door, and the central latch is also locked with a key. When the door is closed and latched, compression-type seals built into the edges of the door, which compress against the door jamb when the latches are closed. In the event of failure of the compression seal, hydrostatic pressure from the flood water column will force the door against the back face of its guide rails and will compress the backup seal. Also, EM-220 specifies the use of temporary portable dewatering pumps and hoses to dispose of leakage through the water-tight door seals.

To categorize the credited flood protection features, the ten water-tight doors (WT Doors #1, 3, 4, 6, 9, 10, E-201, E-202, E-203, and EFW-101) at CR-3 are classified as Incorporated Active flood protection features. The five flood gates at CR-3 (Flood Gates #2, 5, 7, 8A and 8B) are also classified as Incorporated Active flood protection features. The wall joint seals located at the ends of the freestanding flood wall segments, the wall joint between the DGB and AB, the

eight CW manholes at the 95-ft-PD level of the TB, the water-tight seals installed on the Raw Water Sump vents, and the diesel UST vents are all classified as Incorporated Passive flood protection features. Two portable dewatering pumps that are stored near the intake structure and staged within the TB during severe weather are classified as Temporary Active flood protection features.

Outside the CR-3 structures, the site drainage system has been designed to prevent ponding of runoff during the PMH. The system was designed using the Rational Method as a basis, with a rainfall intensity of ten inches per hour and various runoff coefficients (0.95 for roofs, 0.80 for paved areas, and 0.40 for grassed areas). Catch basins are placed at the site such that the greatest overland flow distance for runoff is 200 feet. The roof drains are designed to accommodate a rainfall intensity of six inches per hour and prevent ponding of water up to a 1,000-year rainfall event. The eaves of the building roofs are constructed such that a maximum of three inches of ponding could occur during a PMH at the eaves, but any water in excess of this amount would overflow the eaves and fall to the ground.

During the peak tide of the PMH, it is estimated that approximately 23.4 ft of water would cover the CR-3 site (from a base elevation of 98 ft-PD), which would inundate the plant canals and all topographic features. Assuming that the maximum wave action would occur in a northerly direction, perpendicular to the hurricane winds that approach from west to east, the maximum waves would enter the canals and would break over the intake structure.

4 ROOM WARNING SYSTEMS TO DETECT WATER

Water level warning systems exist in sumps of safety-related buildings for the purpose of detecting internal flooding; while not specifically credited for external flooding, these systems would be available to detect water entering from an external source.

5 FLOOD PROTECTION FEATURES EFFECTIVENESS

5.1 Acceptance Criteria

The effectiveness of flood protection features inspected during the walkdown is evaluated in terms of Acceptance Criteria. For the credited features inspected at CR-3, the acceptance criteria are summarized as follows:

Site elevations and topography: Any minor or noticeable site topography changes from topography used in CLB flooding evaluation do not adversely affect the site drainage pattern.

Flood Wall: No significant surface deterioration, deep cracks, scaling or spalling is present. No significant discrepancy between current and original design dimensions which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Concrete retaining walls: No signs of leaning, settlement, cracks more than 0.04 inches wide, or blockage of drains are present. No significant discrepancy between current and original design dimensions which may affect the intended functionality is present.

Concrete structure, building walls: No signs of structural degradation or opening, no apparent degradation in structural members, no water stains emanating from surface, no leakage on interior surface, and no surface cracks more than 0.04 inches in width are present. No significant discrepancy between current and original design dimensions which may affect the intended functionality is present.

Penetrations/Seals/Cork Seals: No signs of water stains below the penetrations, openings, or holes are present. No significant discrepancy between the current and original design characteristics that may affect the intended functionality is present. Monitoring and maintenance programs are adequate.

Drains: No signs of obstructions or blockage are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Plugs: No apparent signs of cracks or gaps are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Manhole Covers: No apparent signs of cracks or gaps, bends, rust, etc. are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Piping: No signs or defects or damage are present and intended function is met. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Cable Vaults, Tunnels, Electrical Cable Conduit: No signs of seal or device damage are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Credited Watertight Doors: No signs of degraded door seals or broken/cracked door jams/fittings/fasteners are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Pumps (temporary): No signs of damage (oil/fuel leaks, broken/cracked gauges, corrosion, etc.) are present. No significant discrepancy between current and original design characteristics which may affect intended functionality of the feature is present. Monitoring and maintenance programs are adequate.

Flood Mitigation Procedures: Procedures that exist for the operation, positioning, or installation of flood protection features, will work under the conditions expected during a licensing basis flood, and the steps can be completed within the time available. Procedures that include a process for obtaining the credited warnings

have sufficient time to perform the necessary actions. The instructions in the procedure are accurate and any needed support equipment is staged, available, and appropriate for completing the function. Training on the procedures is appropriate.

5.2 Effectiveness of Flood Protection Features at CR-3

Seven reasonable simulations of incorporated active or passive and temporary active flood protection and mitigation features were performed. The simulations were performed on flood gates, water-tight doors, the Equipment Access Hatch, Equipment Access Hatch Missile Shield, and temporary portable dewatering pumps. The simulations walked through the procedure or activity to verify it can be executed as specified. There were two main areas noted for improvement as a result of the reasonable simulations and they were entered into the CAP in order to ensure that operator actions are feasible: more specific training to procedure implementation and more detailed instructions for flood gates and water-tight doors.

The deficiencies identified at CR-3 include several inadequate seals at the joints of the flood wall, inadequate procedural direction to ensure water tightness of the equipment hatch missile shield (a portion of the flood wall that is removable to access the Reactor Building Equipment Hatch), and inadequate or missing seals surrounding various piping or conduit penetrations. These items were evaluated in aggregate as part of the CAP. It was determined that, although these 40 items in their as-found condition allow a certain volume of water to pass through them due to a PMH storm event, the impact could be mitigated through use of portable pumps and would not be sufficient to expose any SSCs to flood hazards in a manner that degrades their ability to perform their key safety functions. During normal operation, the missile shield is fully installed and provides a water-tight barrier. During outages and construction, the missile shield is disassembled to provide access to the Reactor Building Equipment Hatch. The procedure for disassembly and reassembly of the equipment hatch missile shield is being enhanced to provide further direction on the configuration of the missile shield panels required to create a water-tight barrier that meets the credited flood protection function of the flood wall. While the procedure is being modified, temporary measures have been put in place to ensure water tightness of the missile shield in the event of a potential flood. There is no affect to the CLB. Upon correction of the stated deficiencies, the features should effectively perform their credited flood protection function under all plant configurations.

Flood protection features were reviewed to ensure that their flood protection function is adequately maintained. The review ensured that the feature is included in a periodic test, monitoring, or inspection program, verified that testing, monitoring, or inspection is being performed, and determined whether the scope of the test, monitoring, or inspection is adequate to confirm the credited flood protection function of the feature. It was determined that a number of pipe penetration features and associated seals are not included in a preventive maintenance (PM) program. This condition was entered in to the CAP to be evaluated and to determine the appropriate programs into which these features should be placed.

6 FLOOD PROTECTION WALKDOWN IMPLEMENTATION PROCESS

6.1 Methodology of Walkdown

All walkdowns were completed in compliance with the guidance in NEI 12-07. A peer review was completed and identified no issues that resulted in a change to the walkdown process or methodology.

6.2 Organization and Training

The Flooding Walkdown Team for CR-3 consisted of flooding walkdown engineers (FWEs), site support engineers, licensing basis reviewers, and plant operations personnel. The site support engineers consisted of at least one mechanical engineer and one civil engineer who identified all features to be inspected and prepared the walkdown forms. At least one mechanical and one civil engineer were assigned as FWEs, selected for experience in the evaluation of structures and equipment, knowledge of nuclear design standards, and understanding of sources of external flooding. Before completing the walkdowns, the FWEs completed general and site licensing basis training, which included familiarization with walkdown scope, preliminary analysis activities, field walkdown approach, and documentation, in addition to the required NANTeL "Generic Training for Flooding Walkdowns" completed by all the walkdown team members.

7 FLOOD PROTECTION WALKDOWN RESULTS

7.1 Identified Deficiencies

There were 40 items that were determined, through evaluation against the CLB, to be deficient. These items were evaluated in aggregate as part of the CAP. It was determined that, although these 40 items in their as-found condition allow a certain volume of water to pass through them due to a PMH storm event, the impact could be mitigated through use of portable pumps and would not be sufficient to expose any SSCs to flood hazards in a manner that degrades their ability to perform their key safety functions. These items have all been entered into the CR-3 CAP for corrective actions (CAs) to be established. Of these 40 items, 25 are related to missing or inadequate penetration seals, two to flanges, one to a gate, one to a gasket, two to inadequate door seals, four to flood wall joints, four to potential roof drain clogging, and one to the equipment hatch missile shield. The disposition for all 40 items has been determined, with corrective actions scheduled or completed.

During normal operation, the missile shield is fully installed and provides a water-tight barrier connected to other portions of the flood wall. During outages and construction, the missile shield is disassembled to provide access to the Reactor Building Equipment Hatch. In preparation for the approach of a hurricane, the missile shield is required to be reassembled in order for the flood wall to provide its flood protection function. However, the crane required to reassemble the missile shield was not operational during the EM-220 preparations in advance of Hurricane Isaac, which occurred August 24-28, 2012. Because the as-written procedure was not readily implementable to provide full installation of the missile shield in order to be water-tight, this was considered a

deficiency. However, at the time of the EM-220 implementation, alternate temporary actions had been taken to enable the missile shield to provide a flood protection function. The shield was assembled to the height of the connecting portions of the flood wall, elevation 129 feet, and gaps at the vertical seams were sealed with RTV sealant in order to form a water-tight barrier. The procedure is being enhanced to further detail alternate acceptable configurations, such as that described, to forming a water-tight barrier and fulfilling the flood protection function of the flood wall.

A summary of the deficient items is shown in the table below along with the resolution status.

Feature Description	Description of Condition	Resolution Status
West wall TB at water-tight (WT) Door #1	1 in. conduit open on both ends	Corrected 8/22/12
North wall TB, behind Transformer MTTR-3A	Conduit inside box not sealed	Corrective action (CORR) issued to determine if enclosures are water-tight
North wall TB, behind Transformer MTTR-3A	Conduit inside box not sealed	CORR issued to determine if enclosures are water-tight
North wall TB, behind Start-up Transformer	Conduit inside box not sealed	CORR issued to determine if enclosures are water-tight
North wall TB, behind Start-Up Transformer	Conduit inside box not sealed	CORR issued to determine if enclosures are water-tight
North wall TB, behind Transformer MTTR-3C	Conduit inside box not sealed	Action Request (AR) written to investigate
Fire line, North wall TB, at Transformer MTTR-3B	No flood seal around fire line	Engineering Change (EC) to determine appropriate sealant
Fire line, North wall TB, at Transformer MTTR-3B	No flood seal around fire line	EC to determine appropriate sealant
Fire line, North wall TB, at Transformer MTTR-3B	No flood seal around fire line	EC to determine appropriate sealant
Fire line, North wall TB, at Transformer MTTR-3B	No flood seal around fire line	EC to determine appropriate sealant
Fire line, North wall TB, at Transformer MTTR-3B	No flood seal around fire line	EC to determine appropriate sealant
Southeast corner TB, above WT Door #6	No penetration seal	Work Request (WR) written to repair
Southeast corner TB, above WT Door #6	No penetration seal	WR written to repair
Southeast corner TB, above WT Door #6	No penetration seal	WR written to repair

Feature Description	Description of Condition	Resolution Status
East wall TB, inside 480V Switchgear Room	Penetration not confirmed sealed	EC to fill or cover penetration
East wall TB, inside 480V Switchgear Room	Penetration behind box not sealed	Work Order (WO) written to seal open penetration
North wall TB, Northwest corner	Penetration seal inadequate	WO written to re-grout
North wall TB, behind Auxiliary Transformer	Box rusted out on bottom; inner conduit seals	WR written to repair
South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM
South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM
South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM
South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM
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South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM
South interior wall TB penetration	Unsealed penetration in wall	EC to remove corroded pipes and replace with stainless steel pipe and check valve to prevent backflow from TB/add penetration to PM

Feature Description	Description of Condition	Resolution Status
West wall IB, south of WT Door #1	Flange of pipe is open and has temporary cords	Step added to EM-220 checklist to verify closure
West wall TB, north of WT Door #3	Missing bolts on flange	WR written to repair
South wall DGB, at metal gates	Missing bolts and damaged seal on metal gates	WO written to repair
West wall TB, above WT Door #1	Gasket on electrical box is missing	WR written to repair
WT Door to EFT-2 Building (EFW-101)	Rust and deterioration of bottom seal on door	WR written to repair
East of Equipment Access Hatch doghouse (WT Door #9)	Rust and deterioration of seals on door	WR written to repair
Wall joint behind Start-Up Transformer	Gaps in joint seal on flood wall segment	WO written to repair
Flood wall seal Equipment Access Hatch Missile Shield Doghouse	Inadequate flood wall joint seal	EM-220 to be revised to require 6 panels of shield to be installed
Flood wall seal adjacent to WT Door #9	Inadequate flood wall joint seal	WO written to repair
Flood wall seal at west Air Intake	Inadequate joint seal on flood wall segment	WO written to renew joint seal
Roof of AB	Missing and damaged roof drain covers	WR written to repair
Roof of DGB	Replace damaged/missing roof drain covers	WR written to repair
Roof of TB	Replace damaged/missing roof drain covers	WR written to repair
Roof of IB	Sandbags and debris may clog roof drains	AR written to remove sand bags and debris from roof
Equipment Access Hatch Missile Shield Doghouse	Inadequate for flood wall in current configuration	EM-220 to be revised

7.2 Flood Protection Features That Could Not Be Inspected

There were no inaccessible or restricted access features that could not be inspected. All flooding walkdown features were inspected.

8 DOCUMENTATION OF AVAILABLE PHYSICAL MARGINS

APMs have been collected and documented in the walkdown record forms and are available for use in the flood hazard reevaluations performed in response to Item 2.1: Flooding in the 50.54(f) letter.

9 PLANNED AND NEWLY INSTALLED FLOOD PROTECTION AND MITIGATION MEASURES

There were no planned or newly installed flood protection or mitigation measures.