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NL-12-170

November 27, 2012

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

SUBJECT: Flooding Walkdown Report - Entergy's Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Flooding Aspects of Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident
Indian Point Unit No. 3
Docket No. 50-286
License No. DPR-64

REFERENCE:
1. NRC letter to Entergy, 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 (ML12053A340).
2. Entergy's Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Flooding Aspects of Recommendations 2.1 and 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident, June 8, 2012 (NL-12-081)

Dear Sir or Madam:

On March 12, 2012, the NRC issued Reference 1 to all power reactor licensees. Enclosure 4 of the referenced letter contains specific requested actions, requested information, and required responses associated with Recommendation 2.3 for flooding walkdowns. Entergy Nuclear Operations, Inc. (Entergy) confirmed in Reference 2 that it would use the flooding walkdown procedure (Nuclear Energy Institute 12-07, Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features) as endorsed by the NRC as the basis to conduct the walkdowns and develop the needed information at Indian Point Energy Center (IPEC).

Pursuant to Required Response 2 of Reference 1, Enclosure 4, Entergy is providing the Flooding Walkdown Report for Indian Point Unit 3 (IP3) in the enclosure.

A001
NRR

This letter contains new regulatory commitments, which are identified in the attachment. Should you have any questions regarding this submittal, please contact Robert Walpole, Manager, Licensing at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 27, 2012.

Respectfully,

Patrick W. Conroy, acting for John A. Ventosa

JAV/sp

Enclosure: Indian Point Unit 3 Flooding Walkdown Report
Attachment: List of Regulatory Commitments

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL
Mr. William M. Dean, Regional Administrator, NRC Region 1
NRC Resident Inspectors
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA
Ms. Bridget Frymire, New York State Dept. of Public Service

ENCLOSURE TO NL-12-170

INDIAN POINT UNIT 3

FLOODING WALKDOWN REPORT

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

Entergy

ENTERGY NUCLEAR
Engineering Report Cover Sheet

Engineering Report Title:
Indian Point Energy Center Unit 3 Flooding Walkdown Submittal Report for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Flooding

Engineering Report Type:

New ☒ Revision ☐ Cancelled ☐ Superseded ☐

Applicable Site(s)

IP1	☐	IP2	☐	IP3	☒	JAF	☐	PNPS	☐	VY	☐	WPO	☐
ANO1	☐	ANO2	☐	ECH	☐	GGNS	☐	RBS	☐	WF3	☐	PLP	☐

EC Number 40458

Report Origin: ☐ Entergy ☒ Vendor
Vendor Document Number: IP-RPT-12-00038
Quality-Related: ☐ Yes ☒ No

Prepared by: ENERCON / _____ Date: 11-14-12
Responsible Engineer (Print Name/Sign)

Design Verified/ N/A Date:
Design Verifier (if required) (Print Name/Sign)

Reviewed by: John Skonieczny / _____ Date: 11-15-12
Reviewer (Print Name/Sign)

Reviewed by*: N/A Date: _____
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Approved by: Richard Drake / _____ Date: 11/15/12
Supervisor (Print Name/Sign)

ENGINEERING REPORT

INDIAN POINT ENERGY CENTER UNIT 3 FLOODING WALKDOWN SUBMITTAL REPORT FOR RESOLUTION OF FUKUSHIMA NEAR TERM TASK FORCE RECOMMENDATION 2.3: FLOODING

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Peer Reviewed By: Atwood A. Browning — Date: 11/14/2012
Atwood Browning (Enercon Services)

Approved by: Gloria Guerra — Date: 11/14/2012
Gloria Guerra (Enercon Services)

IP3 Flooding Walkdown Submittal Report for Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Flooding

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1.0 SCOPE AND OBJECTIVE

This report was developed to provide information requested by the United States Nuclear Regulatory Commission (NRC) pursuant to Title 10 of the Code of Federal Regulations, Section 50.54(f) on March 12, 2012 for Indian Point Energy Center (IPEC) Unit 3. In response to the NRC request, Entergy performed walkdowns to verify that plant features credited in the current licensing basis (CLB) for protection and mitigation from external flood events are available, functional, and properly maintained. The walkdowns were performed to verify that structures, systems, and components (SSCs), portable flood mitigation equipment, and the procedures needed to install and or operate them during a flood are acceptable and capable of performing their design function as credited in the CLB.

This report presents the findings of the flooding walkdown inspections completed at IPEC Unit 3 (IP3). The walkdowns were completed in accordance with the United States Nuclear Regulatory Commission (NRC) endorsed guidance of NEI 12-07, Rev. 0A, *Guidelines for Performing Verification of Plant Flood Protection Features*, dated May 31, 2012 and Entergy Nuclear procedure EN-DC-170 that was developed to provide instructions for implementation of the NRC endorsed guidelines. The walkdowns completed at IP3 were performed to verify that the structures, systems, and components (SSCs) credited for flood protection are capable of performing their design function as described in the current licensing basis. The walkdowns were also used to verify that plant modifications implemented since original construction, such as changes to topography, do not adversely affect flooding protection.

This report identifies the flooding hazards that comprise the current licensing basis and the protection and mitigation features that are credited with preventing the ingress of external water into SSCs important to safety at IP3. The effectiveness of the flood protection features is evaluated against a set of acceptance criteria. Results of the walkdowns, including key findings, available physical margin, and any identified degraded, or nonconforming conditions are addressed and a description of the actions taken or planned to address these conditions is provided.

2.0 DESIGN BASIS FLOOD HAZARD LEVEL

UFSAR Section 2.5 describes the hydrology, including the most severe flooding conditions at the IPEC site; and Section 16.4.6 discusses the effects of rainfall accumulation on buildings or structures that house safety related items.

Indian Point is a multi-unit site consisting of approximately 239 acres of land on the east bank of the Hudson River at Indian Point, village of Buchanan, in upper Westchester County, New York. Indian Point Units 2 and 3 are located north and south respectively, of Unit 1, which has been retired. The site is about 24-miles north of the New York City boundary line. The nearest city is Peekskill, located 2.5-miles northeast of Indian Point, with a population of about 20,000.

The Hudson River below the Federal Dam at Troy is a tide-influenced, estuarine waterway. Fresh water from the combined Hudson and Mohawk Rivers, as well as from numerous tributaries, discharges directly into the tidal portion of the river. Flow in the Hudson River, near Indian Point, is controlled more by the tides than by the runoff from the tributary watershed. River width opposite the plant ranges from 4500 to 5000-ft. Water depths within 1000-ft of the shore near the site are variable with an average depth of 65-ft; at some points the depth exceeds 85-ft. River cross-sectional areas in the vicinity of the site range from 165,000 to 170,000-ft2. Tidal flow past the plant is about 80 million gpm about 80-percent of the time, and it has been estimated that this frequency flow is at least 9 million gpm in a section 500-600-ft wide immediately in front of the facility. Mean tidal flow in the vicinity of the site is over 70 million gpm.

The flood hazards considered for the IPEC site are the flooding of the Hudson River and the probable maximum precipitation (PMP) event. The PMP event, although not part of the CLB at IP3, was evaluated as a flood hazard to take a proactive approach to assessing the plant flooding protection.

2.1 Flood Hazards Identified

2.1.1 Hudson River Flood

The most severe flooding condition at the Indian Point Site results from the simultaneous occurrence of a standard project flood, a failure of the Ashokan Dam and a storm surge in New York Harbor at the mouth of the Hudson River resulting from a standard project hurricane. The water level under these conditions would reach 14-ft above MSL. Local wave action due to wind effects has been determined to add 1-ft to the river elevation producing a maximum water elevation of 15-ft above MSL at the IP3.

This is below what the UFSAR refers to as the "critical control elevation" of 15-ft-3-in. This "critical control elevation" is defined in the UFSAR as the elevation the river water elevation would have to reach before it would seep into any of the Indian Point buildings. The UFSAR noted that flooding from the Hudson River does not present a hazard to IP3.

2.1.2 Probable Maximum Precipitation

There is no discussion in the CLB of localized flood or the impact of PMP on plant buildings and structure beyond a statement in Section 16.4.6 that buildings and

structures housing safety related items were evaluated for effects from rainfall accumulation. In particular, roof and storm drainage at the site was designed assuming rainfall intensities of 5 to 5.5 in./hour with roof design loadings of 40lb/ft^2.

The IP3 IPEEE response assessed the effect of applying the Probable Maximum Precipitation (PMP) criterion provided in Generic Letter 89-22 in terms of onsite flooding and roof ponding (in accordance with Section 6.2.2.2 of NUREG-1407) to determine if it would lead to severe accidents. The roofs of the structures containing safety related equipment were evaluated by converting the water depth to a loading and comparing to the allowable roof loading, where it was determined that these structures would retain their integrity. Ponding at grade level was assessed and it was concluded that ground drainage would be sufficient and the PMP event would not cause significant ponding in various areas that could result in an ingress of water and affect safety related equipment.

2.2 Assumptions

2.2.1 Hudson River Flood

No specific assumptions were identified for the Flood analysis.

2.2.2 Probable Maximum Precipitation

No specific assumptions were identified for the PMP analysis.

2.3 Methodology

2.3.1 Hudson River Flood

To determine the maximum flood level several flooding conditions governing the maximum water elevation at the site were investigated, including:

a. Flooding resulting from runoff generated by a Hudson River Probable Maximum Precipitation (PMP)

b. Flooding caused by the occurrence of the Ashokan Dam failure concurrent with heavy runoff generated by a Hudson River Standard Project Flood (SPF). This condition was considered because the previous condition did not result in a dam failure.

c. Flooding due to the occurrence of a Probable Maximum Hurricane (PMH) for the New York Harbor area concurrent with spring high tide.

The determination of the most severe water surface elevations at the site was based upon the simultaneous occurrence of the above flooding conditions with several critical boundary conditions in the Hudson River including:

a. Mean Sea Level Water Elevation

b. High tide Water Elevation

c. Low tide Water Elevation

d. Standard Project Hurricane (SPH)

e. Probable Maximum Hurricane (PMH)

To calculate this flood level, backwater curves were calculated using the standard step method as well as numerical method of computing gradually varied flow profiles starting with several assumed water-surface elevations at a control point on the river. The hydrodynamic and physical characteristics of the Hudson River dictated the use of the ocean entrance at the Battery as the control section.

The tidal variation in the Hudson River Estuary influence the choice of the proper boundary conditions as well as the value of the discharge for which the flow profile is desired. The tidal variation was treated as an integral part of the system and its influence was simultaneously coupled with the other relevant hydraulic occurrences.

In the evaluation of the maximum water surface elevation at Indian Point resulting from the above flooding and boundary conditions, the local oscillatory short period waves produced by the wind were considered. The computed IPEC stages corresponding to the various flooding conditions were conservatively increased by one foot to account for this effect. Thus, the resulting maximum flood level calculated at IP3 is 15' above mean seal level.

2.3.2 Probable Maximum Precipitation

As stated previously, the roof and storm drainage at the site was designed on the basis of rainfall intensities of 5 to 5. 5 in./hr. with roof design loadings of 40 lb/ft^2.

Even though not credited in the CLB, the rates published by the National Weather Service (HMR 51 and HMR 52) subsequent to the plant commissioning call for higher rainfall intensities over shorter time intervals and smaller areas than had been considered in the design. Application of the HMR 51 and HMR 52 PMP criteria to IP3 indicated that the probable maximum rainfall intensity on site is 17.5 in./hr. for a 1-hour duration (17.5 in. rainfall), 37.1 in./hr. for a 15-minute duration (9.3 in. rainfall), and 71.4 in./hr. for a 5-minute duration (6 in. rainfall). These data are for a 1 square mile area. Given that the values for storms of one-hour duration or less are several times the design values, the IPEEE reviewed the impact of the revised PMP data. The review comprised a walkdown of the perimeters of plant buildings to examine ground water run-off and an evaluation of the adequacy of Primary Auxiliary Building (PAB), Auxiliary Boiler Feed Pump (ABFP) Building, Control Building, Fan House and Turbine Building roof drainage and the drainage of runoff from the containment building.

The IPEEE response concluded that there were no natural flow paths where run off would drain into plant buildings and no areas in which ponding might occur in the proximity of buildings.

The original roof drainage system designs are based on rates of precipitation of 5 to 5.5 in./hr. However, given that HMR 51 and 52 PMPs are several times those

predicted in the original design, the IPEEE determined that it is possible that the existing roof drainage systems may be undersized for such rates of precipitation. This would result in the accumulation of water upon the roofs behind the parapets. Hydraulic calculations performed using the higher PMPs showed the 40lbft^2 load capacity of the various roof areas were not exceeded. It was concluded that the PMP event poses no significant risk to roof damage or collapse.

2.4 Non Conformance

No differences or contradictions in flood hazard levels were found in design or licensing basis documentation.

3.0 EXTERNAL FLOOD PROTECTION AND MITIGATION FEATURES

3.1 Flooding Licensing Basis

The safety-related facilities, systems, and equipment at IP3 are capable of withstanding the most severe flooding condition in the Hudson River and the Probable Maximum Precipitation (PMP) event which results in rainwater collecting next to buildings in the power block, roof ponding, and flooding of manholes. The PMP event, although not part of the CLB at IP3, was evaluated as a flood hazard to take a proactive approach to assessing the plant flooding protection.

The most severe flooding condition at IPEC results from the simultaneous occurrence of a standard project flood, a failure of the Ashokan Dam and a storm surge in New York Harbor at the mouth of the Hudson River resulting from a standard project hurricane. The water level under these conditions would reach 14-ft above MSL. Local wave action due to wind effects has been determined to add 1-ft to the river elevation producing a maximum water elevation of 15-ft above MSL at the Indian Point Site.

Since wind generated wave action in conjunction with extreme flooding conditions could raise the flood level above plant grade in the vicinity of the service water pumps, the Atomic Energy Commission (AEC) concluded in their original Safety Evaluation Report (SER) for the Indian Point Unit No. 3 Operating License that Technical Specification requirements were warranted to protect the service water pumps and shutdown the plant based on rising river water levels. These requirements are currently contained in the IP3 Technical Requirements Manual (TRM) section 3.7.E.

Roof drainage must be sufficient such that the 40 lb/ft^2 load capacity is not exceeded.

3.2 Flood Duration

The duration of the maximum flood level event was not specified. The rainfall intensities for the PMP, although not part of the CLB at IP3, are based on a 1-hour duration, 15-minute duration, and 5-minute duration. Note the Unit 2 examined rainfall intensities for durations up to 24 hours, however the shorter duration, higher intensity rainfall result in greater ponding levels on the roofs and at grade. Thus Unit 3 only examined intensities up to the 1 hour duration since these are bounding.

3.3 Flood Protection Features

The flood protection features that protect against the maximum flood level include both incorporated/exterior and temporary features. The incorporated/exterior features are exterior walls and floors of structures containing safety related SSCs, backflow prevention valves, penetration seals, and conduit seals. The temporary features include portable gas-powered pumps, submersible electric pumps and sandbags.

Based on the current licensing basis, the Intake Structure, Control Building, Diesel Generator Building and Primary Auxiliary Building contain safety related equipment at or below the 15' elevation that requires protection in the event of a CLB flood. The north wall of the Control Building is inspected up to the grade level in the transformer yard, due to the relatively large number of conduit penetrations out to electrical manholes in the yard.

In some instances, conduits penetrating exterior walls of a building of interest were not internally sealed. These conduits generally connect to an electrical manhole outside of the structure. According to drawings and other plant documents, the conduits should be sealed at either the manhole side or the building side. Thus, Manhole 31 (Intake Structure conduit) and Manhole 34 (Control Building conduit) are considered flood protection features since the conduit only needs to be sealed at one end.

The roof drains assure that loading resulting from the accumulation of rainwater from an intense precipitation would not exceed the design loading of those buildings that house safety related equipment.

3.4 Procedures

The flooding procedure for IP3 provides steps to mitigate flooding from possible sources both inside and outside the plant on the conventional side, nuclear side and inside containment. With respect to external flooding, the entry conditions for this procedure are: rising river water levels (greater than 7'); a high tide advisory; or a NOAA flood warning.

When the river water level exceeds 7'-4", the flood procedure has the operator monitor the strainer pit for leakage and install temporary pumps as necessary to assist the sump pump in maintaining the strainer pit dry. Also, actions are taken to direct maintenance to place sandbags around the strainer pit as necessary and to install temporary pumps as necessary to maintain the Service Water Valve pits dry.

When the river level reaches 10 feet, the flood procedure has the operator remove power from the Service Water Strainer Pit sump pump (SP-310) and close the pump discharge valve.

When the river level reaches 11 feet, the flood procedure has the operator direct maintenance to install sandbags around the Service Water Pump area, and states this action must be complete before the level reaches 15'. When the river level reaches 12'-5", the plant is shutdown.

Note that in addition to the flood procedure, there is a maintenance procedure for the location of sandbags in flood warning conditions. This procedure establishes the

requirements for the stacking and proper location of sandbags in order to protect the Service Water Pumps, the Turbine Building, and the Administration Building, in the event the Hudson River reaches 11' above mean sea level.

While IP3 has a flooding procedure that provides actions to protect equipment during a flood, based on river level, the time requirements for the completion of these activities is not defined. Thus there is no clear basis to evaluate whether the activities can be completed in the time from when the action is initiated to when the river reaches the 15' elevation.

To support the flooding walkdown effort, five reasonable simulations were performed in order to evaluate the flood procedure. These simulations are summarized in Table 2.

3.5 Adverse Weather

The procedural steps in the IP3 flooding procedure would presumably have to be carried out while there was intense precipitation and potentially high winds. The majority of the actions are performed where the operators are not directly exposed to the elements. The operators would have to transport the temporary pumps and hoses from the flood equipment storage area on the 33' elevation of the Unit 1 Turbine Building to the Intake Structure and to the Service Water Valve Pit; however this would be done before the river flood elevation reaches grade level. Thus, it is concluded that the adverse weather conditions would not prevent the operators from taking the required actions.

4.0 INTERNAL WARNING SYSTEMS

4.1 Room Water Level Warning Systems

No interior water level warning systems or alarms are credited for external flood protection in the plant's current licensing basis.

5.0 EFFECTIVENESS OF FLOOD PROTECTION SYSTEMS

5.1 Acceptance Criteria

Visual inspections of the external flood protection features were performed with the objective of comparing the observed condition of the feature to the acceptance criteria as defined in Section 6 of NEI 12-07 and Section 5.4[6](a) of EN-DC-170. The acceptance criteria for each feature was defined on the walkdown record forms prior to performing the walkdown to provide the walkdown team with the conditions of the feature that required documentation based on field observations. This approach provided the basis for assessing the feature's ability to perform its intended external flood protection function and identifying conditions warranting entry into the corrective action program.

The acceptance criteria for the exterior walls and floors are no signs of leakage on interior surfaces, no apparent degradation or cracks greater than 0.04", no undocumented holes or openings, and penetrations are sealed. The acceptance criteria for temporary sump pumps are no corrosion or degradation on pumps, free from obstructions preventing pumps from being moved to applicable area, and verifying

pumps are staged in correct location. The acceptance criteria for penetration seals are to ensure seal between outer surface of conduit/pipe and concrete will not allow a flow path for water and no visible signs of water intrusion. Note that the plugs for the floor drains at the 12' elevation of the Turbine Building were not included in the scope of this walkdown effort since there is no safety related equipment affected by backflow of external flood water through these drains.

5.2 Discussion

5.2.1 Overall Effectiveness

Based on the walkdowns completed at IP3 and the results of the operability determinations associated with the observations entered in the corrective action program (CAP), IP3 is determined to have sufficient protection available at the site to ensure the safe operation of the plant in the event of an external flood.

Except where noted in Sections 7.1 and 7.2, walls and penetrations at or below the CLB flood level of 15' MSL were walked down to ensure no cracks or openings were present which would allow water to leak into the structure. The north wall of the 480V switchgear room (which is adjacent to the transformer yard) was inspected up to an elevation of 18.7' (external grade level plus potential ponding).

Site topography, although not a credited flood protection feature, was verified against site drainage drawings and was determined to not direct flood waters towards protected features and was found to be consistent with the flood and PMP analyses.

The reasonable simulation of the procedural actions to install the temporary pumps in the Service Water (SW) Strainer Pit and the Service Water Valve Pit were completed successfully. The procedure was executed as written. These actions were completed in less than 15 minutes each, with two operators. The simulation to remove power from the SW Strainer Pit sump pump and close the pump discharge isolation valve was completed successfully in less than two minutes. Though the procedure does not specify criteria for the time of completion for these actions, and no basis for the time of the event was found, the completion times was judged to be sufficient. The required temporary pumps and associated equipment were properly staged on the 33' elevation in the Unit 1 Turbine Building. The execution of these activities would not be impeded by the event they are intended to mitigate, as movement of the equipment from the Unit 1 Turbine Building to the Intake Structure was across a paved surface, and therefore it would not be impeded by soft soil conditions created by excessive water. In addition, it was determined that the actions could be completed with the minimum staffing. The Non License Operators receive initial training on the flooding procedures and are requalified every 3 years.

Several issues were identified associated with the procedural actions to install the sandbags around the IP3 Intake Structure Service Water Pump motors and around the Zurn Strainer Pit inside the IP3 Intake Structure during preparations for Hurricane Sandy from 10/27/2012 – 10/29/2012. These issues are discussed in Section 7.1 of this report.

During the walkdowns, conditions that did not meet the acceptance criteria discussed in Section 5.1 above were entered into the Corrective Action Program.

5.2.2 Other SSCs and Procedures

Although not credited in the CLB, the Service Water Strainer Pit has a sump pump (SP-310) that will assist in removing inleakage

Entergy Corporate procedures associated with Maintenance Rule walkdowns at IP3 provide the guidance and requirements for conducting a structural condition monitoring program to meet the requirements of 10 CFR 50.65, Maintenance Rule. At IP3 the Maintenance Rule walkdowns are conducted a minimum of every five (5) years and are completed in accordance with the respective procedures. This program provides a systematic approach for evaluation of plant systems and structures which will provide a reasonable assurance that the structures are capable of fulfilling their intended 10CFR 50.65 functions. The program consists of periodic reviews of the condition of the plant structures via periodic inspections, routine walkdowns, surveillance tests, and ongoing review of the effect of the condition of plant structures on significant plant equipment. The program consists of defining and performing periodic structural evaluation which will ensure the timely identification, assessment, and repair of degraded structural elements. Concrete structures and penetration seals are inspected for cracking, spalling, erosion, corrosion of reinforcing bars, settlement, deformation, leaching, discoloration, groundwater leakage, rust stains, exposed rebar, rust bleeding, and other surface irregularities. All flood barriers and seals, with the exception of the internal conduit seals, for structures were determined to be within the scope of the Maintenance Rule and are therefore examined in accordance with these procedures. Maintaining the structures and materials monitored under these procedures provides a reasonable assurance that those structures that fall under the program will be able to perform their intended function.

6.0 IMPLEMENTATION OF WALKDOWNS

6.1 NEI-12-07 Guidance

The verification walkdowns were performed in accordance with the NRC endorsed guidance of NEI 12-07, Rev. 0A, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" dated May 31, 2012, and Entergy Nuclear procedure EN-DC-170 that was developed to provide instructions for implementation of the NRC endorsed guidelines. Additional guidance for implementation was also obtained from the Flooding Walkdown Frequently Asked Questions (FAQs) and NRC responses, which are based on discussions between NEI and the NRC.

The basis for establishing the walkdown scope and the flood protection features included the preparation of a walkdown list in accordance with the guidance provided in Section 4 of NEI 12-07. As part of this preparation, the current licensing basis was reviewed to determine the flood protection features and actions that are necessary to prevent an external flooding event at the site from adversely impacting safety-related SSCs. In addition to the identification of passive and active protection features, existing site and

Entergy Corporate procedures were reviewed to determine if any procedures were necessary to ensure existing flood protection features would be functional in the event of a flood at the site.

Walkdown packages were prepared in accordance with the guidance provided in Section 5.2 and walkdown team personnel were selected based on the requirements provided in Section 5.3 of NEI 12-07.

Prior to each walkdown, a pre-job brief was conducted. All walkdown results were documented in accordance with the recommendations of Section 7 of NEI 12-07 on the Flooding Walkdown Record Form provided in Attachment 9.3 of EN-DC-170. The walkdown record form provided in Attachment 9.3 is consistent with the record form template provided in Appendix B of NEI 12-07.

6.2 Team Organization

Consistent with Section 5.3 of NEI 12-07, the walkdown team consisted of two trained individuals with a complementary set of skills. The walkdown team consisted of two degreed engineers (or equivalent) that had familiarity with the site. The walkdown team was supplemented as required by plant maintenance and/or operations personnel.

6.3 Training Approach

Consistent with Section 5.3 of NEI 12-07 and Section 4.1 of EN-DC-170, personnel selected to perform walkdown inspection activities were experienced and knowledgeable of the site current licensing basis. Personnel were also trained to perform the visual inspections and met the knowledge requirements specified in EN-DC-170 and Appendix C of NEI 12-07. Team members associated with the flooding walkdowns also satisfactorily completed the NANTEL Generic Verification Walkdowns of Plant Flood Protection Features lesson and were knowledgeable of the 50.54(f) letter dated March 12, 2012.

Plant maintenance and/or operations personnel who supplemented the walkdown teams did not need to be qualified the aforementioned requirements.

7.0 WALKDOWN RESULTS

The walkdown scope included a total of 65 walkdown packages of features credited for flood protection, with some of the packages containing multiple features. Multiple features are identified as attributes. For example, a duct bank entering a room through a blockout is the feature, and the internal conduit seals for each conduit in the duct bank are the attributes. The second column of Table #1 identifies the number of walkdown packages, and the third column identifies the total number of attributes. Table #2 lists the simulations performed.

Table #1: Summary – Features Included in the Walkdown Scope		
Flood Protection Type	**Total Number of Features**	**Total Number of Attributes**
Passive – Incorporated	59	212
Passive – Temporary	2	2
Active – Incorporated	2	2
Active – Temporary	2	2

Table #2: Reasonable Simulations			
No.	**Simulation or Drill**	**Description**	**Criteria**
1	Drill	Install Temporary pumps to assist sump pump in SW Strainer Pit per flood procedure.	Verify pump operable and record time to install.
2	Drill	Place sandbags around SW Strainer Pit per flood procedure.	Record time and number of resources required.
3	Drill	Install Temporary pumps for Service Water Valve Pit per flood procedure.	Verify pump operable and record time to install and number of staff required.
4	Simulation	Simulate actions to remove power from Sump Pump SP-310 and close pump discharge valve FD-V-4 per flood procedure.	Simulate completion and record time.
5	Drill	Install sandbags of Service Water Pump Area per flood procedure.	Install sandbags around Service water pump area. Record time and number of resources required.

7.1 Deficiencies

There were some observed conditions of features that did not meet the NEI 12-07 acceptance criteria. These conditions were entered into the Corrective Action Program (CAP); however, only four of these observations were determined to be a deficiency as defined in NEI 12-07. The operability determinations for the deficiencies concluded that the features did not pose a threat to operability. Work orders were created to repair the deficient conditions that did not meet the NEI 12-07 acceptance criteria.

A manhole near the southwest corner of the Diesel Generator Building, Manhole D1, contains backflow prevention for the building. A 24" flapper valve is located in the manhole and prevents any site drainage or river high water level from backing up into the Diesel Generator Building. During a visual inspection, it was noted the valve did not fully close and seal completely. It appears debris at the bottom of the flapper may be preventing the flapper from seating flush on the flange.

During preparations for Hurricane Sandy from 10/27/2012 – 10/29/2012, sandbagging was initiated around the IP3 Intake Structure Service Water Pump motors and around the Zurn Strainer Pit inside the IP3 Intake Structure. Several issues were identified:

- There does not appear to be a dedicated sand pile solely for use for flooding mitigation to assure there will be enough sand available to meet the requirements of the flood procedure.
- The flood procedure does not cross-reference the maintenance procedure which provides the details and extent of the sandbagging requirements.
- The sandbagging requirements of the maintenance procedure need to be revisited, as it requires the building of a berm six feet tall and two sandbags deep around the perimeter of the service water pumps.
- The maintenance procedure does not address the sandbagging around the Zurn Strainer Pit area.
- It was observed that three persons were only able to fill 300 sandbags over a period of roughly one day. This number of sandbags is not adequate to meet the needs of the plant in a CLB flood event.

It was also observed during the reasonable simulations that the flood procedure did not correctly identify the location of the temporary pumps on the 33' Elevation of the Unit 1 Turbine Building and the incorrect valve number for the Zurn strainer pit sump pump discharge isolation valve was referenced in the procedure. The acceptability to place and run gasoline powered pumps in the Intake Structure Enclosure to keep the Strainer Pit dry should be addressed.

Water damage was observed during a visual inspection of IP3-CTL-009. Box XV2, located in the 480V Switchgear room of the IP3 Control Building, showed signs of prolonged exposure to water on the terminals.

There were two conduits that penetrate the south wall and one that penetrates the east wall of the Strainer Pit that do not have internal seals and therefore are potential leak paths into the pit. The 4" and 2" conduits that penetrate the south wall terminate in Manhole 31. Subsequent inspection of Manhole 31 observed that these conduits are not sealed at the manhole either. The termination point of the 2" conduit that penetrates the east wall is unknown.

There were several conduits whose internal seals are currently not part of a preventive maintenance program. These include the conduits that run from Manhole 34 to the 480V Switchgear room and those that run from Manhole 31 to the Zurn Strainer Pit.

7.2 Observations

All condition reports that were written due to observed conditions not meeting the acceptance criteria were input into the corrective action program and an operability determination to address the observation was completed prior to this report being written. Based on the operability determinations, none of the conditions observed during the walkdowns were determined to pose a risk to the safe operation of the plant.

7.3 Corrective Actions

Based on the operability determinations for the flapper valve and for the flood procedure issues, there is no risk to the site. A Work Order was created to pump out the manhole and clean and inspect the area around the valve and check for proper operation.

The sandbagging requirements of the flood procedure are being evaluated. Alternate flood mitigation barriers for the Service Water pumps and Strainer Pit are being considered that will meet the commitment in the IP3 SER that requires the Service Water pumps to be protected, and a time line will be established to assure that the flood mitigation barrier can be installed prior to the river reaching the 15' Elevation. The acceptability to place and run gasoline powered pumps in the Intake Structure Enclosure to keep the Strainer Pit dry is being evaluated.

A corrective action was issued to address the condition of the observed water damage to the XV2 electrical box in the Control Building. The actions to assess the condition and assign actions to correct the problem has been completed. The assessment concluded that the source of the water was due to condensation and not from the conduits in the wall. An additional action was issued to create 3 weep holes in Box XV2 and to seal the open conduits in Box XV2. The completion date for these actions is 11/29/2012.

Work requests have been written to seal the conduits in the Strainer Pit.

A PMCR will be created to perform periodic inspections of the internal seals of the conduits that run from the Manhole 34 into the 480V Switchgear Room and those conduits that run from Manhole 31 to the Zurn Strainer Pit.

7.4 Flood Protection Features Not Inspected

Table #3 identifies the features classified as restricted access. These features could not be inspected during the scheduled walkdowns due to industrial safety concerns and the plant configuration/operating mode. These features will be inspected at a later date when conditions permit. Work Requests have been initiated for performance of these inspections.

Feature	Scheduled Date
Electrical Manhole #34 in Transformer Yard	12/31/2012
Roof and Associated Drains on PAB, ABFP Building, CB, TB, and Fan House.	6//17/2013
Nine Service Water Pump Conduits that Penetrate the Floor of the 480V Switchgear Room underneath the Switchgear	3R17
Electrical Manhole #33 in Turbine Building	3R17
Seals around the Service Water piping that penetrates the floor of the Zurn Strainer Pit	2/22/2013

Table #4 identifies the features classified as inaccessible. The south wall, west wall, and floor of the Primary Auxiliary Building in Unit 3 are partially inaccessible because of high radiation. The Spent Resin Storage Tank room is a Locked High Radiation Area (LHRA) and makes part of the south wall, floor and west wall inaccessible. The Chemical Drain Tank and Pump room is a High Radiation Area (HRA) and makes part of the south wall and floor inaccessible. The Pipe chase along the south wall, which contains potentially radioactive piping, was physically inaccessible and makes part of the south wall and floor inaccessible. Sump Pump 36 and Sump Pump 317 are incorporated into the 15' elevation floor of the Primary Auxiliary Building, radiologically controlled areas and would require extensive disassembly for parts of the floor to be visually inspected.

For all of these inaccessible areas of the south wall, west wall and floor of the Primary Auxiliary Building, reasonable assurance can provided to assure these features will perform their flood mitigating function. In the visible parts of the inaccessible areas, there were no signs of water intrusion or water damage. There were no penetrations that appeared unsatisfactory. Additionally, the thickness of the concrete walls and floor ($\geq$ 2' for both) provides reasonable assurance the features are able to perform their flood mitigating function.

Table #4 **Features Classified as Inaccessible**
PAB South Wall (partial)
PAB Floor (partial)
PAB West Wall (partial)

8.0 AVAILABLE PHYSICAL MARGIN

As indicated in Section 3.12 of NEI 12-07, Rev. 0A, the NRC is no longer expecting the Recommendation 2.3: Flooding Walkdowns to include an evaluation of the cliff-edge effects at the site. The available physical margin (APM) has been determined and documented on the walkdown record forms. The APMs provided on the walkdown record forms will allow flood hazard reevaluations completed in response to Recommendation 2.1: Flooding to be completed.

9.0 NEW FLOOD PROTECTION SYSTEMS

No new flood protection enhancements or mitigation measures have been installed at IPEC Unit 3, and no additional enhancements or measures are planned.

The peer review, as described in Section 7 of NEI 12-07, was completed with station staff to ensure that the actions required for could be completed. The results of the reviews resulted in no change to the walkdown process or methodology.

10.0 REFERENCES

10.1 NRC Letter to Licensees, dated March 12, 2012, "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 Daiichi Accident."

10.2 Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features (NEI 12-07 [Rev. 0-A]), NEI, dated May 2012.

10.3 EN-DC-170, "Fukushima Near Term Task Force Recommendation 2.3 Flooding Walkdown Procedure"

10.4 Indian Point 3 UFSAR Revision 4.

10.5 Letter IPN-97-132 from James Knubel, Senior Vice President and Chief Nuclear Officer, New York Power Authority, to U.S. Nuclear Regulatory Commission, "Indian Point 3 Nuclear Power Plant, Docket No. 50-286, Individual Plant Examination of External Events (IPEEE) ," September 26, 1997.

10.6 Hydrometeorological Report No. 52, Application of Probable Maximum Precipitation Estimates, United States, East of the 105th Meridian, August 1982.

10.7 Hydrometeorological Report No. 51, Probable Maximum Precipitation Estimates, United States, East of the 105th Meridian, June 1978.

11.0 ATTACHMENTS

None

ATTACHMENT TO NL-12-170

LIST OF REGULATORY COMMITMENTS

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3
DOCKET NO. 50-286

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check One)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Entergy will perform walkdowns for equipment that could not be inspected as identified in Section 7.4 of the Flooding Walkdown Report (Table 4 items are excluded).	✓		On a schedule specified in Section 7.4 of the Flooding Walkdown Report