Entergy

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Robert G. Smith, P.E.
Site Vice President

November 27, 2012

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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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

Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

REFERENCES:
1. NRC Letter, "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", March 12, 2012 (ADAMS Accession #ML12053A340)
2. Entergy's Response to NRC Request for Information (RFI) 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 (PNPS Letter 2.12.041)

LETTER NUMBER 2.12.076

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference 1 to all power reactor licensees. Enclosure 4 of Reference 1 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 Pilgrim Nuclear Power Station (PNPS).

Pursuant to Required Response 2 of Reference 1, Enclosure 4, Entergy is providing the Flooding Walkdown Report for PNPS in Attachment 1.

Should you have any questions concerning the content of this letter, please contact Mr. Joseph R. Lynch at (508) 830-8403.

This letter contains a new regulatory commitment, which is identified in Attachment 2.

ADD1
NRR

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

Sincerely,

R. Dodds, III AS ACTING SITE VICE President

Robert G. Smith
Site Vice President
RGS/rmb

Attachments: 1. Pilgrim Nuclear Power Station (PNPS) Flooding Walkdown Report

2. Pilgrim Nuclear Power Station (PNPS) List of Regulatory Commitments

cc: Mr. William M. Dean
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NRC Senior Resident Inspector
Pilgrim Nuclear Power Station

ATTACHMENT 1 to

PNPS Letter 2.12.076

Pilgrim Nuclear Power Station (PNPS)

FLOODING WALKDOWN REPORT

Entergy

ENTERGY NUCLEAR
Engineering Report Cover Sheet

Engineering Report Title:

Pilgrim Nuclear Power Station Flooding Walkdown Submittal Report for Resolution of Fukushima Near-Team 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 No. 40846

Report Origin: ☐ Entergy ☒ Vendor
Vendor Document No.: PNPS-CS-12-00002
Quality-Related: ☐ Yes ☒ No

Prepared by: Enercon Services — Date: 11/15/12
Responsible Engineer (Print Name/Sign)

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

Reviewed by: Amy Madeiros Amy Madeiros — Date: 11/15/12
Reviewer (Print Name/Sign)

Reviewed by*: N/A — Date:
ANII (if required) (Print Name/Sign)

Approved by: Raymond Pace — Date: 11/15/12
Supervisor (Print Name/Sign)

ENGINEERING REPORT

PILGRIM NUCLEAR POWER STATION FLOODING WALKDOWN SUBMITTAL REPORT FOR RESOLUTION OF FUKUSHIMA NEAR TERM TASK FORCE RECOMMENDATION 2.3: FLOODING

Prepared By: Paul N Hansen For Tom O'Reilly Date: 11/15/12

Tom O'Reilly (Enercon Services)

Reviewed By: Paul N Hansen Date: 11/15/12

Paul Hansen (Enercon Services)

Peer Reviewed By: Atwood A. Browning Date: 11-15-12

Atwood Browning (Enercon Services)

Approved by: T. Xhelo Date: 11/15/12

Tom Xhelo (Enercon Services)

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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 Pilgrim Nuclear Power Station (PNPS). In response to the NRC request, PNPS 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 PNPS. The walkdowns were completed in accordance with the NRC endorsed guidance of Nuclear Energy Institute document 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. The walkdowns completed at PNPS 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 CLB. The walkdowns were also used to verify that plant modifications implemented since original construction and changes to topography, do not adversely affect flooding protection.

This report identifies the flooding hazards that comprise the CLB and the protection and mitigation features that are credited with preventing the ingress of external water into SSCs important to safety at PNPS. The effectiveness of the flood protection features is evaluated against a predetermined 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

A general description of the PNPS site is provided as a point of reference for the flood hazards described in this section. The site is located on the south western shore of Cape Cod Bay in the town of Plymouth, Massachusetts, and is on the northeast side of the Pine Hills. The Pine Hills consist of a north-south ridge approximately 4 miles long which rises to an elevation of 395 feet mean sea level (msl). The ridge is the major drainage divide in the area, and all surface drainage in the station site area is into Cape Cod Bay. The grade elevation at the top of the slope on the shore front revetment is 20.2 feet msl while the elevation in the vicinity of the power block is 22 feet msl and the building floor elevation at grade level is 23 feet msl.

Descriptions pertaining to the storm tide hazard and its protective features are taken from Section 2.4.4 of the PNPS FSAR (Ref. 10.4), and descriptions pertaining to the probable maximum precipitation (PMP) event are taken from the PNPS Individual Plant Examination for External Events (IPEEE) report (Ref. 10.5).

2.1 Flood Hazards Identified

The design basis flood at PNPS is the maximum northeaster or hurricane produced storm surge. The maximum storm tide level as defined in the FSAR is 13.5 feet msl. This event is the only CLB flood hazard at PNPS. The storm tide hazard also includes waves of variable heights and periods, which are most likely to occur at the site during a severe storm.

The PMP event, although not part of the CLB at PNPS, was evaluated as a flood hazard to take a proactive approach to assessing the plant flooding protection. The PMP event was evaluated as part of the IPEEE in response to Generic Letter 88-20. The PMP event, which exceeds the CLB flood level, produces water depths of 24.5 feet msl at buildings on the south side of the power block, and 22.5 feet msl at buildings on the north side of the power block. The PMP event would result in the flooding of manholes in the yard and the subgrade areas of the Retube Building. The Retube Building is known to collect water at its sub-grade elevation during precipitation events. This flooding produces the possibility of water ingress through conduits that originate in the manholes and then penetrate buildings in the power block. It also produces the possibility of water ingress to the Turbine Building through penetrations spanning between the Retube Building and Turbine Building. The PMP event would result in ponding on the roofs of the plant buildings of approximately 0.5 feet.

Groundwater ingress is not specifically identified or discussed in the licensing basis. The FSAR identifies that the groundwater table generally follows the site surface topography, and consequently moderately steep groundwater gradients are present with flow toward Cape Cod Bay.

2.2 Assumptions

There are no key assumptions associated with development of the storm tide level. In regard to conservatism associated with the storm tide, the FSAR identifies that the storm tide level of 13.5 feet msl is 3 feet higher than what has been observed in the Boston Harbor area in 244 years of record.

The open channel flow method used to determine the water depths at plant buildings during a PMP event conservatively assumes that the effective flow path width is approximately 50% of the actual width.

The roof ponding level of 0.5 feet during a PMP event assumes that all roof drains are 100% effective; i.e., there is no blockage or reduction in flow. Further discussion regarding roof ponding is contained in Section 2.3 of this report.

2.3 Methodology

The maximum storm tide level of 13.5 feet msl could result from either a northeaster or a hurricane. The methodologies used to develop this flood level are described below.

Northeaster: The hydrometeorological section of the U.S. Weather Bureau established a standard project northeaster for New England. Using this storm, the peak storm surge, having a return frequency of 1,000 years, is 6.6 feet. The concurrence of peak storm surge with an astronomical high tide of 6.9 feet msl would give an extreme storm tide level of 13.5 feet msl with a probability of occurrence of once every 4,000 years.

Hurricane: The most severe hurricane parameters from Hydrometeorological Branch Memorandum HUR 7-97 were used in the analysis and included the following: direction of approach of 315 degrees (true), maximum wind velocity of 131 mph, radius to region of maximum winds of 52 nautical miles, initial water level rise of 1.0 feet, spring high tide of 6.9 feet msl, and a Central Pressure Index (CPI) of 3.13 in Hg. The probable maximum storm surge level was determined using the bathystrophic storm tide theory. The analysis results in a maximum hurricane produced storm surge which corresponds to a still water level of 13.5 feet msl.

Wave Action: A series of wave action model studies were performed for the site waterfront development using a model with an undistorted scale of 1:50. The effects of wave setup and wave runup were included in the wave action model studies. The waterfront design was subjected to tests at three still water elevations: (1) 11 feet msl, the level of the 100 year storm, (2) 13.5 msl, the design maximum storm level, and (3) 14.7 msl, an arbitrary elevation which exceeds any postulated design condition and is the highest elevation at which the model could be operated satisfactorily. Slope protection and the effectiveness of the breakwaters were evaluated by tests at all three still water elevations during which waves were simulated from due north and from north 60 degrees east, with wave periods ranging from 8 to 18 seconds. The wave heights were adjusted to give maximum runup at the Intake Structure and revetments.

PMP: The water depths at the power block buildings due to the PMP event are based on one hour precipitation rates that have a probability of occurrence of 1×10^{-6} per year. Data from the National Weather Service HYDRO-35 report was used to develop these rates of rain fall. The runoff flowrate for the site drainage path to Cape Cod Bay was developed using the U.S. Army Corp of Engineers Flood Hydrograph Package, HEC-1. This runoff flowrate was then used to determine the water depths next to the power block buildings. The runoff is modeled as overland flow around the east and west sides of the plant buildings. The flood depths determined are based on weir flow into Cape Cod Bay over the revetment structure.

Roof ponding: A rain fall ponding of approximately 0.5 feet is equivalent to the design snow load for the roofs. With all drains 100% effective, the IPEEE analysis determines a rainfall rate that would result in ponding of 0.5 feet. This rainfall rate is then correlated to a rainfall probability of 10^{-5} or less per year. The screening criteria given in NUREG-1407, "Procedural

and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities" characterizes an annual hazard frequency of 10^{-5} and an annual core damage frequency of 10^{-6} as being sufficiently conservative. Given the rainfall probability of 10^{-5} per year resulting in a 0.5 foot ponding level, it is seen that the hazard frequency of exceeding the design structural capacity of the roofs is 10^{-5} or less per year. Considering a breach in the structural integrity of the roof, the conditional core damage frequency for this flooding event is judged to be less than 10^{-1} per year. Therefore, the annual core damage frequency would be 10^{-6} or less per year, which meets the IPEEE criteria for being sufficiently conservative. Additionally, the rainfall accumulation on the roofs corresponding to a probability of occurrence of 10^{-5} per year would be less than 0.5 feet, which shows there is margin in the assumption that the roof drains are 100% effective.

2.4 Non Conformance

Differences or contradictions in flood hazard levels were not found in the CLB.

3.0 EXTERNAL FLOOD PROTECTION AND MITIGATION FEATURES

3.1 Flooding Licensing Basis

The flooding licensing basis consists of the maximum storm tide in Cape Cod Bay. The PMP event, which is not part of the CLB, but was considered to proactively assess plant flooding protection, results in rainwater collecting next to buildings in the power block, roof ponding, and flooding of manholes.

The shore front features (breakwaters, jetties, and onshore revetments) protect the plant from the maximum storm tide. The effectiveness of the waterfront design in protecting the plant site and circulating water system against wave action was demonstrated and evaluated via the wave action model studies conducted. Wave runup effects were determined by operation of the model at appropriate wave heights and periods representative of those likely to occur during a severe storm. Test results indicated adequate reduction of the in-coming wave at the intake structure. Minor overtopping of the adjacent revetment occurred with the 13.5 feet msl still-water elevation but yard flooding was limited to the open space northeast of the Reactor Building. The Reactor Building was at no time subjected to flooding. A series of tests were run which confirmed that storm wave action at the intake structure for still water elevations up to 14.7 feet msl would not adversely affect circulating water or service water pump operation. No Reactor Building wetting occurred during any of the wave action tests although open ocean wave heights as high as 31 feet were generated.

The PMP event is one hour in duration and results in accumulation of water against exterior doors of the power block buildings. During this time period, the flood level starts at zero height, increases to the PMP levels, and then recedes back to zero height. The maximum flood depth on the south side of the plant is 1.5 feet above the bottom of the doors. The doors were evaluated for a hydrostatic load due to the height of water and it was determined

that the doors would not fail. However, the doors are not credited as water tight. The IPEEE report documents that internal flooding has previously been evaluated, and any minimal water intrusion through the perimeter of the door is bounded by the internal flooding analysis, or is mitigated by the plant configuration as discussed in Section 5.2.2 of this report.

Roof ponding during a PMP event will not exceed the design capacity of the roof. This conclusion is based on taking full credit for the roof drains.

Manhole flooding and subsequent water ingress though a conduit is prevented by cable to conduit seals at the end of the exposed run, or mitigated by tortuous paths through conduit joints, and junction boxes. Cable to conduit seals are also referred to as internal conduit seals.

Flood protection must be provided during all plant operating modes. The CLB does not indicate that the protection provided by the features differs depending on the plant operating mode. The shorefront features, internal conduit seals, and roof drains are passive features that will provide the same level of protection during any operating mode. The exterior doors could be open during a refueling outage or other scheduled maintenance activities; however, plant procedures for severe weather ensure that the doors are closed when severe external event(s) are predicted.

3.2 Flood Duration

The duration of the maximum storm tide is not defined. Flooding from the PMP event is based on a one hour duration of maximum precipitation, during which time the flood level starts at zero height, increases to the PMP levels, and then recedes back to zero height.

3.3 Flood Protection Features

The flood protection features that protect against the maximum storm tide are exterior passive features and include the main and east breakwaters, the east and west jetties at the end of the discharge canal, the east and west discharge canal revetments, and the shorefront revetment.

The flood protection features protecting against the PMP event are the exterior doors on the power block buildings, the roof drains, and internal conduit seals for those conduits originating in a manhole. Per NEI 12-07, the doors are incorporated active features, and the roof drains and internal conduit seals are incorporated passive features.

Prior to performing the flooding walkdowns, structures that could be impacted by flooding events were reviewed to determine if any other features performed flood protection functions and required inspection. The exterior surfaces of the power block buildings were inspected and no openings or penetrations exist that could be impacted by the PMP flood levels. The Intake Structure was assessed since it houses the safety related Service Water pumps. These pumps are enclosed within a concrete compartment inside the Intake Structure. The

south side of the compartment is the exterior wall of the Intake Structure. There are no openings or penetrations on this surface that could be impacted by the PMP flood levels. If the PMP event resulted in rain water intrusion into other areas of the Intake Structure, the water would cascade to the suction bay through gratings and would not affect the Service Water pumps. The wave model study demonstrated that storm wave action at the Intake Structure would not adversely affect Service Water pump operation. The configuration of the Intake Structure, with the Service Water pump compartment on the south side of the structure away from any wave run-up that would occur on the north side, substantiates these test results. Any water that could potentially enter the Intake Structure during a wave run-up would cascade to the suction bay through gratings and would not affect the Service Water pumps. Considering these assessments, there are no flood protection features included in the walkdown scope other than those identified in the first two paragraphs of this section.

PNPS does not have any actions or procedures that are credited for flooding protection, and as such there are no time dependent actions to perform under flooding conditions. Warnings of a storm surge or maximum precipitation event would be well in advance of the onset of the severe weather via weather monitoring services such as the National Weather Service. The site surface drainage path is into Cape Cod Bay.

3.4 Procedures

The PNPS procedure for operation during severe weather contains basic steps and practices to prepare the plant for the arrival of severe weather such as a storm surge or intense precipitation event. The procedure is invoked when severe weather is predicted. However, use of this procedure is conservative as the actions in this procedure are not credited in the licensing basis for protection against a CLB flooding event. The passive shorefront features are the only credited protection against a storm surge. There are no actions required to mitigate a storm surge or protect from it.

Protection from the PMP event is provided via cable to conduit seals, roof drains, and exterior doors. The cable to conduit seals and roof drains are passive features, which do not require any procedural actions to provide their protection. The roof drains are periodically maintained to assure their functionality. The exterior doors provide protection during a PMP event by being in the closed position and not failing. The site preparations prior to the arrival of severe weather include closing and securing all Reactor Building and Turbine Building doors. This procedural step is not considered an action for flood protection that should be demonstrated via a reasonable simulation for the following reason. This action would occur when severe weather is predicted as opposed to when it is occurring, so there would be adequate time to ensure the doors were closed prior to any water building up against the door. Further, the exterior personnel doors that would be subjected to flooding from a PMP event are normally closed doors, so they would almost always be in the required position to provide protection. If one of these doors were open, the Operations staff would be aware of it and would have adequate time to close it prior to the PMP event. Similarly, if an exterior roll-up door that would be subjected to water depth from a PMP event were open, the Operations staff would

be aware of it, by procedure, and would have adequate time to close it prior to the PMP event. As another consideration, if a roll-up door were open for equipment transport, there would be plant staff in the immediate vicinity that could close the door if directed by Operations. Note that Operations provides the transport function and controls the evolution.

3.5 Adverse Weather

The adverse weather conditions assumed to exist during flooding events are a hurricane, Northeaster weather front, and intense precipitation. The flood protection features would be subjected to these conditions. Since there are not any manual actions required for flood protection that must be performed during a flooding event, there is no concern regarding adverse weather affecting or impeding any flood protection activities.

4.0 INTERNAL WARNING SYSTEMS

4.1 Room Water Level Warning Systems

Room water level warning systems at PNPS are not credited for any external flood protection function. The storm surge will not result in flooding of the plant buildings so a room water level warning system to detect an external flood is not required. During a PMP event, exterior doors are credited to remain in place and not fail, and any minimal water intrusion through door perimeters is bounded by the internal flooding analysis. As such, protection from a PMP event does not require a room water level warning system. An internal flooding alarm system does exist, but it is not credited for external flood protection.

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. The acceptance criteria for each feature was defined on the walkdown record forms prior to performing the walkdown so the walkdown team knew the conditions of the feature that required documentation based on the observations in the field. 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 criterion for the shorefront features is that the rocks are in place and there are no visible gaps that would prevent the feature from performing its function. The acceptance criterion for the doors is that they are intact and do not exhibit any damage or corrosion that would challenge the integrity of the door as a barrier. The configuration of the door as viewed from the interior must be such that it could withstand a hydrostatic head

forcing the door inward. The acceptance criteria for the internal conduit seals is that they are intact and do not exhibit any degradation or have any visible gaps that could allow water intrusion. The acceptance criterion for the roof drains is that they are free and clear.

5.2 Discussion

5.2.1 Overall Effectiveness

The shorefront features are capable of performing their flood protection function. Visual inspections revealed that the rocks were in place, including the capstones on the breakwaters, and gaps that would diminish the effectiveness of the barrier did not exist. Some crevices exist in the main breakwater but they do not result in a gap that extends through the barrier. Further, the effectiveness of the shorefront features is periodically assured because the features are included in a condition monitoring program under the Maintenance Rule that requires a periodic visual inspection to ensure that there are no displaced rocks that would violate the design function of the feature. Visual inspections are required yearly, or after a major storm when onshore winds are in excess of 50 mph for 2 consecutive hours as measured at the site.

The doors that could be subject to a water pressure due to flood water level on the exterior side during a PMP event were found to be capable of remaining intact without failure. The jambs of the personnel doors as inspected from the interior showed that the doors contacted against a stop on the frame such that it could withstand an inward force due to water head on the exterior side. The jambs were secured to the wall and were in good condition with minimal corrosion. The doors were intact and showed minimal corrosion. The tracks of the roll-up doors were fastened to the wall and the door panels were intact such that the doors could withstand an inward force (water pressure) from standing water on the exterior side. The tracks, their fastening system, and the door panels showed minimal corrosion and damage. Further, the ability of the doors to provide a barrier that can withstand hydrostatic forces from a PMP event is periodically assured because the doors are included in a condition monitoring program under the Maintenance Rule. This program ensures that the doors are in good condition and do not have signs of broken or cracked frames, missing hardware, or loss of mechanical closure integrity. Observations not meeting the NEI 12-07 acceptance criteria are discussed in Section 7.0 of this report.

Ductbanks penetrating the power block exterior walls use cable to conduit seals where ductbanks interface with cable trays. Junction boxes are used where ductbanks interface with conduits. The internal conduit seals in the scope of the walkdown were inspected and found to be in satisfactory condition without signs of degradation or visible gaps that would allow a path for water ingress. The walls beneath ductbanks containing internal conduit seals did not show any significant water stains, which provide further assurance that the seals are performing their function. These satisfactory conditions were observed for both the conduits originating in manholes and the penetrations between the Retube

Building and the Turbine Building. Observations not meeting the NEI 12-07 acceptance criteria are discussed in Section 7.0 of this report.

The roof drains were not inspected, but their ability to limit roof ponding to 0.5 feet or less is assured via periodic maintenance that requires the drains to be inspected and cleaned to remove debris, asphalt, gravel, or other foreign matter that would prevent them from functioning properly. The last performance of this maintenance was completed on 5/30/12 and 5/31/12. The roof drains were identified as clear and free to drain.

The site topography was inspected as it relates to the drainage path for the PMP event. The rain water drains overland around the east and west sides of the plant buildings and flows in the plant north direction over the shore revetment and into Cape Cod Bay. This overland drainage path including the shore revetment still exists. Since the time of the PMP analysis, security fences, which are installed on a raised base, have been installed on the north side of the plant in front of Cape Cod Bay. Additionally, the Engineering and Plant Support Building has been constructed and is located on the east side of the plant. As discussed in Section 2.2 of this report, the effective flow path for rain water drainage used in the PMP analysis was conservatively assumed to be 50% less than its actual width. Based on the current site layout, it is judged that this conservatism in the original analysis offsets any change in the flow path that may result from the new installations since the time of the PMP analysis. This assessment will be confirmed when reanalysis is performed for Recommendation 2.1 of the 10CFR50.54(f) letter.

5.2.2 Other SSCs and Procedures

The exterior doors on the power block buildings are credited to remain intact and not fail during a PMP event. These doors are not credited with preventing water intrusion since the effect of any minimal rain water entering the buildings is bounded by the internal flooding analysis. Further, as defense in depth, curbs in the Turbine Building would stop the flow of any water seeping past the Turbine Building truck lock door, and prevent it from reaching the switch gear in the Turbine Building.

The plant procedure for operation during severe weather includes measures that are not part of the flooding CLB, but could be used to mitigate an external flood. A step in the procedure directs Operations to consider taking a precautionary measure to install sandbags around ground level flow paths such as door bottoms and drain scuppers.

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 CLB 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 four trained and qualified individuals with a complementary set of skills. 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 CLB. 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 were not required to be qualified to the aforementioned requirements.

7.0 WALKDOWN RESULTS

The walkdown scope included a total of 33 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 ductbank entering a room through a blockout is the feature, and the internal conduit seals for each conduit in the ductbank 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. There are no temporary passive or temporary active flood protection features at PNPS.

Table #1: Summary – Features Included in the Walkdown Scope

Flood Protection Type	Total Number of Features	Total Number of Attributes
Passive – Incorporated	28	133
Passive – Temporary	0	0
Active – Incorporated	5	5
Active – Temporary	0	0

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, none of these observations were determined to be deficiencies, which is a condition that causes the feature to be unable to perform its intended flood protection function as defined in NEI 12-07. The functionality determinations for these conditions concluded that the feature could perform its intended flood protection function when subject to its design basis flooding hazard. However, as a proactive measure, work orders were created to repair the conditions that did not meet the NEI 12-07 acceptance criteria.

7.2 Observations

Observations during the walkdowns that did not meet the NEI 12-07 acceptance criteria were documented in the CAP. The features were determined to be operable and none of the observations were determined to be deficiencies. All observations entered into the CAP as a result of the flooding walkdowns have been dispositioned as of the writing of this report.

7.3 Corrective Actions

There were no observations identified that required actions to address a deficiency. Since the CAP has determined that there are no deficiencies, there are no planned actions pending.

7.4 Flood Protection Features not Inspected

Table #2 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.

Table #2
Features Classified as Restricted Access

Ductbank in the NW corner of the B RBCCW room, located ~18" from the north wall
Conduits in the Condenser Bay, Turbine Building, Area 8
Start-up Transformer (SUT E3) J122 Ductbank located in the Monitor Tank Room
Shut-down Transformer (SDT E3) J653 Ductbank located in the Monitor Tank Room

Table #3 identifies the features classified as inaccessible. The features are internal conduit seals and are inaccessible because the component configuration does not permit inspection without performing destructive work tasks to the subject and/or surrounding components. Reasonable assurance that these internal conduit seals exist and can perform their flood protection function is provided below.

Design documentation for these conduits requires that sealing compound be installed around the cable to prevent water from entering the conduit. The PNPS specification for raceway installation includes instructions for installing water intrusion barriers in conduits. Further, similar internal conduit seals were inspected and found to meet the NEI 12-07 acceptance criteria. Internal conduit seals, inside of closed conduits, are not subject to degradation like seals in open conduits or external seals. Based on the preceding discussion, it is concluded that these internal conduit seals are installed and are capable of performing their design function.

Table #3 Features Classified as Inaccessible
Seals in conduits from Screenhouse, located in B-RBCCW room
Ductbank in the NW corner of the B RBCCW room, located ~10' from the north wall
Monitor Tank Room A-8 ductbank
Appendix R Ductbank to Auxiliary Building – "A" heat exchanger room – Junction Box J2300
CAS ductbank in Monitor Tank Room

8.0 AVAILABLE PHYSICAL MARGIN (APM)

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 APM has been determined and documented on the walkdown record forms. The APMs provided on the walkdown record forms will allow flood hazard reevaluations to be completed in response to Recommendation 2.1: Flooding.

9.0 NEW FLOOD PROTECTION SYSTEMS

No new flood protection enhancements or mitigation measures were determined to be necessary based on the flooding walkdowns, and therefore additional enhancements or measures are not planned.

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 Regulatory Issues Summary 2005-20, Revision 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety."

10.4 PNPS FSAR, Rev. 28, Section 2.4.4

10.5 IPEEE, PNPS Individual Plant Examination for External Events GL 88-20

10.6 Entergy Procedure EN-DC-170, Rev. 0, Fukushima Near Term Task Force Recommendation 2.3 Flooding Walkdown Procedure

10.7 NUREG-1407, Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities

10.8 Model Wave Study of the Boston Edison Company Pilgrim Nuclear Power Station Unit No. 1, Albert G. Ferron, Alden Research Laboratories

10.9 EN- DC-150, Condition Monitoring of Maintenance Rule Structures, Rev. 2

10.10 3.M.5-3, Water Control Structures Monitoring Procedure, Rev. 2

10.11 SUDDSRF96-38, BEC-039 IPEEE External Flooding Local Intense PMP

11.0 ATTACHMENTS

None

ATTACHMENT 2 to

PNPS Letter 2.12.076

Pilgrim Nuclear Power Station (PNPS)

List of Regulatory Commitments

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	
PNPS will perform walkdowns for equipment that could not be inspected as identified in Section 7.4 of the Flooding Walkdown Report and document results. PNPS Commitment No. A16838	[✓]		September 30, 2013