November 20, 2012

NRC 2012-0100
10 CFR 50.54(f)

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

Point Beach Nuclear Plant, Units 1 and 2
Docket 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

NextEra Energy Point Beach, LLC Response to 10 CFR 50.54(f) Request for Information Regarding Near-Term Task Force Recommendation 2.3, Flooding

References:
(1) NRC letter to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, 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 Dai-Ichi Accident (ML12056A046)
(2) NextEra Energy Point Beach, LLC letter to NRC, dated June 8, 2012, NextEra Energy Point Beach, LLC's Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendations 2.1 and 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident (ML12163A250)
(3) NRC letter to Nuclear Energy Institute, dated May 31, 2012, Endorsement of Nuclear Energy Institute (NEI) 12-07, "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features," (ML12144A142)

On March 12, 2012, the NRC staff issued Reference (1), requesting information pursuant to 10 CFR 50.54(f). Enclosure 4 of Reference (1) contains specific Requested Actions and Requested Information associated with Recommendation 2.3 for Flooding. Requested Information Item 2 of Reference (1), Enclosure 4, requested addressees conduct a flooding walkdown and submit a final report which addressed various requirements detailed in the item. Reference (1), Enclosure 4 required addressees submit a final flooding walkdown report within 180 days of the NRC's endorsement of the flooding walkdown procedure.

Via Reference (2), NextEra Energy Point Beach, LLC (NextEra) confirmed it will use the NRC-endorsed flooding walkdown procedure Nuclear Energy Institute (NEI) 12-07, Guideline for Performing Verification Walkdowns of Plant Flood Protection Features, Revision 0, and submit a report by November 27, 2012, which corresponds to 180 days after the NRC endorsed the NEI flooding walkdown guidance (Reference 3).

Enclosure 1 provides Flooding Walkdown Report NEE05-PR-001, Revision 0, which was prepared in accordance with the guidance of NEI 12-01, Revision 0, and provides the requested flooding walkdown information. This submittal completes the NextEra response to the Requested Information of Reference (1), Enclosure 4.

This letter contains no new Regulatory Commitments and no revision to existing Regulatory Commitments.

If you have any questions please contact Mr. Michael Millen, Licensing Manager, at 920/755-7845.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on November 20, 2012.

Very truly yours,

NextEra Energy Point Beach, LLC

Larry Meyer
Site Vice President

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
Director, Office of Nuclear Reactor Regulation, USNRC

ENCLOSURE 1

NEXTERA ENERGY POINT BEACH, LLC
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

NEXTERA ENERGY POINT BEACH, LLC RESPONSE TO 10 CFR 50.54(F) REQUEST FOR INFORMATION REGARDING NEAR-TERM TASK FORCE RECOMMENDATION 2.3, FLOODING

FLOODING WALKDOWN REPORT
NEE05-PR-001
REVISION 0

20 pages follow

FLOODING WALKDOWN REPORT
NEE05-PR-001, Rev 0

IN RESPONSE TO THE 50.54(f) INFORMATION REQUEST REGARDING NEAR-TERM TASK FORCE RECOMMENDATION 2.3: FLOODING

for the

Point Beach Nuclear Plant
6610 Nuclear Rd, Two Rivers, WI 54241
Facility Operating License No. DPR-24 and DPR-27
NRC Docket No. 50-266 and 50-301

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November 14, 2012

Contents

1. EXECUTIVE SUMMARY

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) [Ref. 2] on March 12, 2012 for the Point Beach Nuclear Plant (PBNP). In response to the NRC request, NextEra Energy Resources 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 permanent structures, systems, 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.

Walkdowns were performed in accordance with NEI 12-07 (Rev. 0-A), "Guidelines for Performing Verification of Plant Flood Protection Features", dated May, 2012 [Ref. 1]. This document was endorsed by the NRC on May 31, 2012. PBNP Units 1 & 2 configuration and procedures were compared to the flood protection features credited in the current licensing basis documents for external flooding events. Site-specific features credited for protection and mitigation against external flooding events were identified and evaluated. A summary of the PBNP CLB, flood protection features and the results of the inspections is provided below.

Current Licensing Basis

- There are two design basis floods for PBNP: a probable maximum wave run-up from Lake Michigan and a combined probable maximum rainfall and snowmelt. The probable maximum wave run-up reaches +8.42 ft relative to the plant's reference zero elevation of 580.2 ft International Great Lakes Datum 1955 (IGLD) and has no defined duration. The second design basis flood combines a probable maximum six-hour rainfall with the probable maximum snowmelt in the second half of March to generate 1400 acre-ft of runoff. This flood also has no defined duration. The floods are not assumed to occur concurrently.

Flood Protection Features

- The PBNP CLB does not state specific plant configurations during a flood event or the duration of the flood. The flood mitigation systems function independently of plant configuration.
- For the wave run-up flood, the site provides temporary concrete jersey barriers on the north and south sides of the Circulating Water Pump House (CWPH) that provide protection up to +9 ft. A site procedure prompts the installation of the barriers based on the results of a monthly check of the lake level. For the possible water that could splash over or through the barriers, there are storm drains around the CWPH, and the lowest critical equipment in the CWPH is mounted at +9 ft. The height of the critical equipment does not vary with respect to its operating mode; therefore the flood mitigation system remains independent of plant configuration.
- The combined rain and snowmelt flood is handled by a combination of the site's natural drainage, installed storm drain system in the plant yard, and various drainage ditches and culverts around the site. The drainage system provides a flow path to Lake Michigan for the runoff generated.

Inspection Results

- The concrete jersey barriers installed at the CWPH did not extend far enough to the north and south to provide a barrier up to +9 ft. Also due to uneven ground and features on the barriers, some gaps existed in the installed configuration. Work requests were written to add additional barriers and pour a concrete pad to correct these issues.
- The site procedure for the installation of the concrete jersey barriers was found to be deficient. It did not identify that the barriers were being installed in a B.5.b staging area and also did not provide pertinent information for the support equipment that would be needed. A procedure change will be generated to address these issues as well as institute a regular check on the staging condition of the barriers.
- The control panel and battery for the diesel fire pump in the CWPH were below +9 ft. The control panel, which also has circuitry for the battery, contains electrical components at +8.375 ft which is below the flood height of +8.42 ft. The FSAR [Ref. 8] will be updated to credit installed floor dampers for external as well as internal flooding. This will reduce the flood height within the CWPH to +7.75 ft.
- A catch basin in the plant yard near the NW corner of the Unit 2 Façade was covered with a metal plate. This plate was removed, and procedural controls to prevent this condition from reoccurring are being evaluated.
- The FSAR states that PBNP has north and west interceptor ditches outside of the plant yard to divert runoff to the lake. The west side interceptor ditch runs between the plant yard and switchyard, but is obstructed by newly installed equipment and is not continuous. The north side ditch was not found. The FSAR will be updated to replace the northern interceptor ditch with the storm drain system, and a re-evaluation of the drainage near the western interceptor ditch will be performed.
- There were several instances of inadequate drainage ditch maintenance including partially obstructed culverts and some cases of drainage ditches needing to be cleared out or re-graded. The maintenance program and supporting documentation will be updated to accurately reflect the drainage ditch configuration on site and ensure its functionality, and a work request was generated to clean out the ditches and culverts where the inspection criteria were not met.

PBNP is found to be in compliance with its flood protection requirements per the current site licensing basis upon completion of corrective actions for the above deficiencies discussed further in section 4f.

2. PURPOSE

a. Background

In response to the nuclear fuel damage at the Fukushima-Dai-ichi power plant due to the March 11, 2011 earthquake and subsequent tsunami, the NRC established the Near Term Task Force (NTTF) to conduct a systematic review of NRC processes and regulations, and to make recommendations to the Commission to clarify and strengthen the regulatory framework for protection against natural phenomena. On March 12, 2012, the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.54 (f) [Ref. 2].

In Enclosure 4 of Reference 2, the NRC requested that licensees 'perform flood protection walkdowns using an NRC-endorsed walkdown methodology to identify and address plant-specific degraded, nonconforming, or unanalyzed conditions and cliff-edge effects through the corrective action program (CAP) and verify the

adequacy of monitoring and maintenance procedures.' The flooding walkdowns have been completed and the results are described in this report.

b. Site Description

Point Beach Units 1 and 2 are located in east-central Wisconsin on the west shore of Lake Michigan, approximately 30 miles SE of Green Bay. The site is located in the NE corner of Manitowoc County, Wisconsin, and comprises approximately 1260 acres. The ground surface at the site is gently rolling to flat with elevations varying from 5 to 60 ft above the mean level of Lake Michigan. The plant reference 0.00 ft elevation is 580.2 ft IGLD. In the area around the plant, the land surface either slopes from west to east towards the lake or to the north and south to divert runoff away from the plant. A high point just to the west of the switchyard prevents any runoff inland of the plant from affecting plant operations. [Ref. 8]

In relation to the lake, a majority of the plant grounds are located at the 26 ft elevation and are not threatened by the wave run-up flood of +8.42 ft described in detail in Section 4a. The only exception to this is the area near the CWPH where the plant draws its circulating water from the lake and has a ground floor elevation of 7 ft. On the east side of the plant, the service roads slope down from the 26 ft elevation to elevations around 7 ft near the CWPH. From the CWPH, the structures next closest to the lake are the Units 1 and 2 Turbine Buildings (TB) with the Control Building (CB) located in between the TBs. The ground floor elevation of the CB and TBs is 8 ft, and they are about 100 ft to the west of the CWPH.

3. METHODOLOGY

The walkdowns were performed in accordance with NEI 12-07 (Rev. 0-A), "Guidelines for Performing Verification of Plant Flood Protection Features," dated May, 2012 [Ref. 1]. This document was endorsed by the NRC on May 31, 2012.

4. REQUESTED INFORMATION

The information requested in Reference 2, Enclosure 4, under paragraph 2 of the 'Requested Information' section, is provided below. The contents of each item were developed in accordance with Reference 1, Appendix D.

a. Requested Information Item 2(a) – Design Basis Flood Hazards

Describe the design basis flood hazard level(s) for all flood-causing mechanisms, including groundwater ingress.

There are two different design basis external flooding hazards considered at PBNP. The first is the flood level resulting from a probable maximum wave run-up from Lake Michigan, and the other is a combination of a probable maximum snowmelt with a probable maximum precipitation.

The determination of the flood level for the probable maximum wave run-up conservatively combines the historical high lake level of +1.7 ft, a maximum deep water wave run-up on a vertical surface of +6.55 ft, and a wind tide setup of +0.17 ft for a total wave run-up of +8.42 ft above the plant's reference 0.00 ft elevation of 580.2 ft IGLD. The original analysis of the deep water wave run-up was performed by Sargent & Lundy in Reference 5. This analysis starts by calculating the deep water wave heights based upon data taken from Reference 4. However, the very shallow slope of the beach out into the lake at PBNP (1 on 100 for the first 1000 ft into the lake and 1 on 200 for the next 4000 ft) causes these larger deep water waves to break offshore. The maximum wave run-up results from estimating the probable maximum secondary wave that would reform after the deep water wave has broken and the resulting run-up on the beach. The limiting case

for PBNP is +6.55 ft of run-up on a vertical structure with a period of 8 seconds. In addition to this wave run-up, wind tide setup is considered for the conservative conditions of a concurrent sustained easterly wind of 40 mph over a fetch length of 70 miles and average water depth of 465 ft, which produces an additional +0.17 ft. Therefore, the combination of the run-up, wind tide setup, and previously recorded high lake level of +1.7 ft produces a design basis flood level of +8.42 ft or approximately 8' 5". [Ref. 5]

The other design basis external flood threat at PBNP is a large snowmelt in the spring combined with sustained heavy rainfalls to produce a total of 1400 acre-ft of runoff on the site. This analysis was performed in Reference 7. The report states that the once in 50 years snowmelt potential (defined as the water content of snow in late March) at the site is 360 acre-ft in each of the two drainage areas on site. For the once in 50 years six-hour rainfall expected on site, the report gives a value of 317 acre-ft in each drainage area. Therefore, the design basis flood threat from a combined snowmelt and six-hour rainfall is conservatively given as 1400 acre-ft of runoff. There is no mention of an associated flood height for this design basis flood.

Other flood causing mechanisms were considered when determining the maximum flood threat from the lake, but were not found to be the bounding cases. The maximum storm surge level was calculated based upon Reference 6. The analysis arrived at a water rise of +4.14 ft assuming the passage of a squall line with a pressure jump of 8 millibars and a speed of movement of 65 knots with a shoaling factor of 3.5. The analysis also states that an additional 1 ft could be added if wind velocities are greater than or equal to 70 knots. Regardless, the storm surge's maximum water rise of +5.14 ft is bounded by the water rise of +6.72 ft resulting from the wave action.

Seiches were also considered in the vicinity of PBNP. Most of the data reviewed concerned seiches on the southern end of Lake Michigan near Chicago. These data indicated that a record seiche occurred in 1954 that produced a rise of 2-4 ft in Chicago harbors. However, this event is not representative of the conditions at PBNP because Chicago is subject to the seiche's reflection off of the south end of the lake, whereas PBNP is located on an open shoreline and is not susceptible to this reflection. Therefore, it was concluded that a seiche 1-2 ft in amplitude would bound any seiche near PBNP, and the deep water wave run-up is still the bounding flood threat from Lake Michigan at PBNP. It should be noted that a search of records did not discover any evidence of a coincident occurrence of a major seiche with a major high wave occurrence [Ref. 8].

Groundwater ingress is not considered as a design basis flooding event due to the high clay content of the soil at PBNP, which inhibits percolation and drainage to Lake Michigan [Ref. 8].

b. Requested Information Item 2(b) – CLB Protection and Mitigation Features

Describe protection and mitigation features that are considered in the licensing basis evaluation to protect against external ingress of water into SSCs important to safety.

The external flood licensing basis at PBNP provides for the mitigation of design basis floods that keeps external ingress of water from occurring in rooms with structures, systems, and components (SSCs) important to safety with the exception of possible water intrusion to the service and fire water pump rooms in the CWPH during a wave run-up event. The CLB does not specify which plant configurations are considered. The flood protection systems considered in the walkdown are independent of the plant configuration.

The first situation to consider is the design basis maximum probable wave run-up of +8.42 ft from Lake Michigan. The CLB calls for the installation of temporary concrete jersey barriers to provide a flooding barrier at the CWPH that would protect equipment in the CWPH, TBs, and CB from the flood waters up to +9 ft. These barriers are installed under a site procedure, which prompts the installation if a monthly check of the Lake Michigan water level indicates a value of 580.7 ft IGLD or higher. The installation of these barriers is anticipatory and dependent on the undisturbed lake level. Since lake level change is a slow process, there

are many days before the barriers must be in place. The actual installation time is much less than the required time, therefore it is not credible that there will be inclement weather that will prevent the installation of the barriers within the required time. The barriers are installed on both the north and south sides of the CWPH forebay structure as indicated within the procedure in two rows of three barriers each. This means that 12 barriers are installed and extend approximately 37.5 ft to the north and south of the CWPH. The CWPH is also protected from direct impact of the wave run-up by the three foot thick reinforced concrete walls of the forebay structure which rise to heights of +15.4 ft parallel to the shore (front) and +12 ft perpendicular to the shore.

Since some water is likely to spill over or through the jersey barriers, the storm drains around the CWPH are also credited to provide a relief flow path for any water that may begin to collect behind the barriers by draining it to the lake. Since the water that collects behind the barriers could challenge the doors into the CWPH, the CLB further clarifies that the lowest pieces of essential equipment in the CWPH are the service water and fire water pump motors that are mounted at +9 ft. The fire pumps in the CWPH are designated as augmented quality equipment and are not safety-related. For this inspection, support equipment necessary for the operation of these pump motors was also considered, including the control panels for both fire pumps as well as the battery for the diesel fire pump. It can also be noted that while not yet explicitly credited for external flooding situations, there are internal flood relief dampers in the floor of the CWPH that prevent water from building up to certain heights inside the pump house as a part of the internal flooding program.

The CLB does not define a duration for this design basis flood, only the probable maximum height of the wave run-up.

The other design basis situation that is considered in the CLB is the mitigation of the combined rain and snowmelt flood that generates 1400 acre-ft of runoff. The CLB for this flooding situation in Reference 8 states that the natural site drainage is "adequate to remove this amount of water," and a storm drain system as well as drainage interceptor ditches are provided in addition to the natural drainage.

Per Section 2.2 "Topography" of Reference 8, the general site topography is credited with diverting surface runoff away from the plant. The wording in Section 2.2 is used as the main basis for the CLB that the ground should slope either generally from west to east towards the lake or to the north and south to drain away from the plant.

The credited storm drain system handles runoff within the plant protected area. The system consists of a main drain line on both the north and south side of the plant and two smaller drain lines that drain to the north and south of the CWPH. The drain lines consist of open catch basins and underground piping that empty out onto outfalls at the beach.

Finally, there are also several drainage ditches around the site that provide relief paths for the flood waters to flow away from the plant. Section 2.5 of Reference 8 states, "An interceptor ditch draining to the lake is provided outside the yard on the north and west sides and on the south side where the original ground elevation is above the plant yard." In addition to these main ditches, a small drainage ditch to the north of the switchyard and a drainage ditch running along the north plant access road exist and drain down into the northern storm drain line. There are also several ditches along the service roads on the west side of the plant protected area that drain either to the storm drain system or to one of the main drainage ditches.

The CLB does not define a duration for this flood and only provides that the amount of runoff from rain was calculated based on the once in 50 years six-hour rainfall. It is also unclear what height the flood waters would reach because only a given volume of runoff was quoted for this design basis flood.

In accordance with FAQ-007 [Ref. 10], exterior walls that were subject to groundwater intrusion were included as a part of the walkdown scope even though they are not credited external flood features within the PBNP CLB. Data on the groundwater table depth taken as a part of the site's Groundwater Monitoring

Program was used to determine the scope of the walls to be inspected. The water depths were taken on the west side of the plant in the Unit 1 and 2 Facades on the 6.5 ft elevation. The data indicated that the groundwater depths fell below the 6.5 ft level by several feet except near the western walls. Combining this with the information that the groundwater has a gradient towards the east means that the groundwater table is below the plant's 8 ft ground floor elevation. Therefore, only the walls on the west side of the facades at the 6.5 ft level and the Primary Auxiliary Building (PAB) at the 8 ft level, the tendon galleries under both units' containments, and the external walls of the Residual Heat Removal (RHR) areas on the -5 ft and -19 ft elevations need to be inspected.

c. Requested Information Item 2(c) – Flood Warning Systems

Describe any warning systems to detect the presence of water in rooms important to safety.

The primary flood warning system employed at the site for external flood protection is the periodic check, which prompts a monthly check on the level of Lake Michigan. If the lake level is greater than or equal to 580.7 ft (2.5 ft above nominal lake level), then the temporary barriers that protect the CWPH, TBs, and CB are installed within the next three weeks and are to stay installed until the next monthly check falls below the 580.7 ft threshold.

No water level monitoring systems internal to the plant are credited for mitigation of an external flood. It should be noted that there are high water level switches in all four RHR pump cubicles on the -19 ft elevation of the PAB that initiate an alarm response procedure for draining the pump cubicles.

d. Requested Information Item 2(d) – Flood Protection System/Barrier Effectiveness

Discuss the effectiveness of flood protection systems and exterior, incorporated, and temporary flood barriers. Discuss how these systems and barriers were evaluated using the acceptance criteria developed as part of Requested Information Item 1.h [in Enclosure 4 of the March 12, 2012, 50.54(f) letter]

Visual inspections of the external flood protection features identified in the PBNP CLB 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. 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 CAP. Observations entered into the CAP and dispositioned as deficient are discussed in Section 4f of this report.

With the exception of features entered into the CAP and deemed deficient as discussed in section 4f, the walkdowns found that the flood protection features meet their applicable acceptance criteria.

The following sections detail whether or not the acceptance criteria were met for the features inspected, and a discussion of the mitigation system's effectiveness:

- Temporary Concrete Jersey Barriers Installation

  The temporary concrete jersey barriers were installed on the north and south sides of the CWPH to ensure that they were available, functional, and implementable to provide protection up to +9 ft as stated in the PBNP CLB. The reasonable simulation for installing the barriers met the acceptance criteria for successfully installing the jersey barriers within three weeks of the lake level determination per the site procedure for installation and with necessary support equipment readily available, proving the feasibility of the operator actions required. However, the procedure did not identify that the barriers were installed in B.5.b staging areas on either side of the CWPH, so it was determined that it was not able to be completed as written. The associated corrective actions for the installation procedure are described in section 4f.

  The configuration of the jersey barriers was visually inspected after installation. The barriers did not meet the acceptance criteria for providing a barrier to +9 ft against the wave action because the

jersey barriers did not extend far enough to the north and south where the site grade reaches +9 ft. The barriers also sat on uneven ground in some areas causing unacceptable gaps underneath the barriers to form. The configuration of the actual barrier system inspected upon installation was considered to be ineffective, pending the corrective actions to be taken detailed in section 4f.

- CWPH Structure and Critical Equipment

  The forebay structure of the CWPH is credited for protecting the CWPH from the probable maximum wave run-up. The external forebay wall parallel to the lake was inspected to ensure that the barrier had adequate height, surface cracking was minor, and no obvious signs of structural degradation were present. The structure met these acceptance criteria and was deemed an effective barrier to the expected wave action.

  The CLB also credits the height of the lowest critical equipment in the CWPH, the fire and service water pump motors, as +9 ft. The heights of these motors and their associated support equipment were visually inspected to verify the credited height. All of the pump motors were mounted at least +9 ft, but the control panel and battery for the diesel fire pump did not meet the acceptance criteria. It should be noted that the fire pumps in the CWPH are considered augmented quality pieces of equipment and are not safety-related. The corrective action for this situation is detailed in section 4f.

- Storm Drain System

  The storm drain system on the site is credited for mitigating both the probable maximum wave run-up (only the drains around the CWPH) and the probable maximum combined rainfall and snowmelt (all storm drains). The acceptance criteria used for the inspection was that all drains were installed per design, cleaned, and unobstructed. The storm drain system is maintained by a preventative maintenance (PM) program performed once every six months. A PM is performed for the CWPH drains that cleans and tests the storm drains, and another PM inspects and cleans the remainder of the storm drain system. The PM program was deemed to meet the functional requirements of these acceptance criteria, and the storm drains are considered to be achieving their flood protection function. In addition to the credited PM program established for the storm drains, an extensive inspection of the storm drain system was conducted in June of 2010 by AECOM [Ref. 11], which also concluded that "none of the structures in the storm drain system appeared to shown any significant deterioration." Pipe segments were generally in good condition with small amounts of gravel or dirt on the bottom of the pipes, which was determined to not significantly restrict the capacity of the pipe. During a visual inspection to ensure no unexpected conditions existed, one storm drain was found to be covered with a metal plate, and the corrective action associated with that is detailed in section 4f.

- Site Topography

  The natural drainage of the site is credited for providing a flow path for the generated runoff during the probable maximum rain and snowmelt. The acceptance criteria developed were based upon Section 2.2 of the FSAR [Ref. 8], which stated that the topography of the site either provided a gradient from west to east towards the lake or towards the north and south away from the plant. The addition of pavement to the site was not considered to increase the impermeability of the ground because the site already has a high clay content preventing percolation as stated in Reference 8. A visual inspection was conducted around the site area to verify this, and no changes in land use or topography were noted that caused adverse impact to drainage. On the north side, the addition of the Diesel Generator Building (DGB) and North Service Building have built up some areas closer to the lake eliminating the west to east flow path, but this change is supplemented by the storm drain system, which drains out the potential areas of ponding created by these changes and deemed to be

acceptable. A similar situation exists near the CWPH where security measures installed created a possible hindrance for the flow path towards the lake, but the possible area of ponding is adequately drained by the CWPH storm drains. Otherwise, the additional buildings and changed land use were not found to cause adverse impacts to the site's drainage.

- Drainage Ditches

  The CLB credits interceptor ditches on the north, south, and west sides of the plant that drain to the lake for providing a flow path for the generated runoff. The acceptance criteria developed for these ditches included confirming their configuration as described in the FSAR [Ref. 8] as well as the lack of obstructions in the ditch pathways and culverts. The south drainage ditch was found configured as described in Reference 8. The western interceptor ditch was found to run between the plant yard and switchyard, but the addition of new plant equipment created unacceptable obstructions in the drainage pathways, and it was not a continuous ditch. The northern interceptor ditch was not found during walkdowns, and the runoff generated on the north side of the plant area is handled by the storm drain system instead. The corrective actions associated with the deficiencies for the interceptor ditches on the north and west sides are detailed in section 4f.

  In addition to the issues with the north and west interceptor ditches, there were several areas around the site where drainage ditches were not found to be maintained adequately. This includes three drainage culverts on the south side of the site that were either partially obstructed or submerged in ponding. Another drainage culvert near the north security gate was also found to be obstructed. Some drainage ditches had buildups of dirt and silt that indicated poor drainage flow and required upkeep or possible re-grading. This primarily applied to the drainage paths along the north and south sides of the switchyard. The corrective actions associated with these observations are detailed in section 4f.

- Subgrade Walls

  The subgrade walls at PBNP are not credited features, but were inspected in accordance with FAQ-007 [Ref. 10]. The groundwater table and subgrade walls are inspected in the PBNP Facilities Monitoring Program (FMP), which contains acceptance criteria for inspection as stringent as those used in Reference 1 and 10 CFR 50.65. This includes confirming that there are no unacceptable signs of water seepage through the walls, and surface cracking is less than 0.04 in. Therefore, walls already being tracked adequately by the FMP were visually scanned only for unexpected conditions not previously documented within the FMP.

  - Units 1 and 2 Facades

    The subgrade walls and floors in the Units 1 and 2 Facades were confirmed to be structurally sound with no unexpected cracking or water seepage. However, three areas were identified where duct banks penetrating the walls have partially or fully degraded seals by design with open drain pans to prevent cable submersion. These showed signs of water seepage and are points of prior water intrusion into the facades. However, this is not considered to be a violation of the CLB because the façade walls do not protect safety-related equipment.

  - Units 1 and 2 Tendon Galleries

    The walls of the Units 1 and 2 Tendon Galleries have not been tracked by the FMP, and during inspection of these walls, several areas of water seepage were found. This observation was noted in the PBNP CAP, which determined that the leakage rate through the walls is not enough to challenge any safety related equipment. The tendon gallery walls will be tracked in the FMP beginning with the Fall 2012 Unit 2 refueling outage.

- Units 1 and 2 RHR Pipeways

  The Units 1 and 2 RHR Pipeways on the -5 ft and -19 ft elevations are high radiation and high contamination areas causing them to be infrequently inspected by the FMP. During inspections of these areas, signs of groundwater seepage through the walls were found in both Pipeways. On the Unit 1 side, the NW corner of the area showed signs of water ingress behind the ductwork in the corner, and previous instances of groundwater intrusion at this point of entry have been documented in the CAP. For the Unit 2 RHR Pipeway, a buildup of efflorescence was found underneath penetrations to the Unit 2 Tendon Gallery. It could not immediately be determined if the water causing this efflorescence originated from within the tendon gallery or an external groundwater intrusion. These observations were not considered to be deficiencies by the CAP, citing a prior evaluation of the groundwater leakage rates and drainage capacity of the RHR pump cubicles.

In general, the subgrade walls are considered to be effective in preventing groundwater intrusion into the plant based upon the adequate site monitoring program they are included on with the exception of the noted observations above. These observations will be handled by the PBNP CAP and tracked within the FMP in the future.

Overall, PBNP employs a number of different flooding protection features that are available, functional, and implementable respective to their credited flood protection functions upon completion of the corrective actions detailed in section 4f.

e. Requested Information Item 2(e) – Implementation of Walkdown Process

Present information related to the implementation of the walkdown process (e.g., details of selection of the walkdown team and procedures) using the documentation template discussed in Requested Information Item 1.j [in Enclosure 4 of the March 12, 2012, 50.54(f) letter], including actions taken in response to the peer review.

Consistent with Section 5.3 of NEI 12-07, walkdown teams consisted of at least two trained individuals with a complementary set of skills. The walkdown team consisted of three mechanical engineers from ENERCON and three mechanical engineers from the site. Each walkdown was performed by at least two members of the walkdown team. The members of the walkdowns team had varying levels of experience with plant modifications, engineering walkdowns, and prior flooding work both at PBNP and other sites. In addition, a civil hydraulic engineer provided expertise during the development of the walkdown package for surface drainage features.

Per Section 5.3 of NEI 12-07, personnel selected to perform walkdown inspection activities were experienced and knowledgeable of the site current licensing basis. Personnel were experienced or trained to perform visual inspections of SSCs and met the knowledge requirements of Appendix C of NEI 12-07.

All team members that performed the visual inspections were trained to and knowledgeable of the below information:

- NANTEL lesson on Generic Flood Protection Walkdowns
- Specific PBNP licensing basis material
- NTTF recommendation 2.3-Flooding and the NRC letter dated March 12, 2012 [Ref. 2]
- NEI 12-07, Revision 0-A [Ref. 1]

ENERCON personnel were supported by site and craft personnel during the walkdown who were not required to meet the above requirements. These personnel were used because of their familiarity with plant

SSC's and protective measures. Generally, these personnel met the knowledge requirements but did not undergo the required training. A pre-job brief was performed prior to conducting the walkdowns using plant human performance procedures and was tailored to the walkdown task. Each walkdown performed a specified inspection to assess the capability of the item to perform its required function. All walkdown results were documented in accordance with the recommendations of Section 7 of NEI 12-07 and using the walkdown record form template in Appendix B of NEI 12-07.

f. Requested Information Item 2(f) – Findings and Corrective Actions Taken/Planned

Results of the walkdown including key findings and identified degraded, non-conforming, or unanalyzed conditions. Include a detailed description of the actions taken or planned to address these conditions using the guidance in Regulatory Issues Summary 2005-20, Rev 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety," including entering the condition in the corrective action program.

All observations made during the walkdowns that were not immediately judged as acceptable were entered into the CAP to be dispositioned by the site. The following details the observations that were determined to be deficiencies and their respective corrective actions planned in accordance with Reference 3:

Description of Deficiency	Feature Category	Disposition	Status
The configuration of the jersey barriers was found to be inadequate. Field measurements indicated that on both sides of the CWPH, the barriers did not extend far enough north and south to provide flood protection up to the design flood height of +8.42 ft. In the current configuration, the length of the three-barrier-long arrangement on either side is approximately 37.5 ft. On the north side, it was found that the barriers need to extend another 115 inches to protect against the flood level, and on the south side, the barriers need to extend another 122 inches. In addition, the rigid concrete barriers do not sit flush on the uneven ground in the vicinity of the forebay, and some gaps exist between the ground and the barriers. Finally, on the sides of the barriers, there are metal loops that are used for anchoring the barriers together, and these loops cause gaps of approximately 3 inches to exist in between the barriers.	Temporary Passive	Due to the insufficient length of the jersey barrier configuration and the possibly unacceptable gaps in between barriers, this situation was entered into the CAP and determined to be a deficiency. The corrective actions (CAs) planned include: 1) Adding four more jersey barriers to the current configuration to achieve the needed flood protection height 2) Pouring a new concrete pad to provide the jersey barriers with an even surface to be installed upon and eliminate gaps underneath the barriers There is no operability issue because the current lake level is low enough that the probable maximum run-up would not affect plant equipment.	Being tracked under corrective action program

Description of Deficiency	Feature Category	Disposition	Status
The reasonable simulation for the installation of the barriers showed the procedure cannot be executed as written. The jersey barriers are installed in a location on either side of the CWPH that is marked as a B.5.b staging area, and no provisions are made to ensure B.5.b requirements are met while the barriers are installed. Also, the entry into the CAP suggests that the necessary support equipment (forklifts, etc.), site support (security coverage), and a periodic check of the staging condition of the barriers be added to further enhance the procedure.	Temporary Passive	These observations were determined to be a deficiency, and a CA was generated to write a procedure change to eliminate the procedure's inadequacies and incorporate the suggested enhancements. There is no operability issue because the current lake level is low enough that the probable maximum run-up would not affect plant equipment, and the jersey barriers would not be needed.	Being tracked under corrective action program
When the heights of the fire and service water pump motors were obtained within the CWPH, a deficiency was found relating to the diesel fire pump. The diesel fire pump's control panel C-61 and battery D-600 did not meet the credited height of +9 ft. The terminations of the battery were measured to be +8.5 ft off of the floor, just above the flood height of +8.42 ft, and the electrical panel that contained C-61 and circuitry for D-600 had electrical components at +8.375 ft off of the floor, which is below the flood height. It should be noted the fire pump is augmented quality equipment, not safety-related.	Incorporated Passive	This observation was determined to be a deficiency, and the planned CA is to credit the CWPH floor dampers for external as well as internal flooding. This will reduce the flood height to +7.75 ft from +8.42 ft based upon the existing capacity for flood relief in the CWPH. There is no functionality issue because the current lake level is low enough that the probable maximum run-up would not affect plant equipment. These are not Technical Specification equipment.	Being tracked under corrective action program

Description of Deficiency	Feature Category	Disposition	Status
It was observed that the catch basin in the plant yard near the NW corner of the Unit 2 façade was covered with a metal plate, preventing it from accomplishing its flood protection function.	Incorporated Passive	This observation was determined to be a deficiency, and the plate has been removed. A CA was created to update the model work orders (MWOs) for dry fuel storage to include a step to remove ground support plates after completion of the campaign.. No safety significant plant equipment is challenged because there are no identified intrusion paths into the façade, Diesel Generator Building, and the PAB above grade level.	Being tracked under corrective action program
During the walkdown of the drainage ditches, it was discovered that the interceptor ditches on the north and west side of the plant [Ref. 8] were either not found or inadequate. The west side interceptor ditch that runs between the plant yard and switchyard on either side of the 13.8 kV Building was deemed inadequate. On the south side of the 13.8 kV Building, the ditch is obstructed by a new transformer and propane tank. On the north side, the ditch is not well defined and also has a new transformer and capacitor bank blocking its path. For the north interceptor ditch, no apparent ditch was found that drained to the lake. All of the drainage found in or near the plant yard on the north side feeds down to the north storm drain line.	Incorporated Passive	This situation was determined to be a deficiency by the CAP and the planned CAs include: 1) Updating FSAR to replace the north interceptor ditch with the storm drain system on the north side. This is an equivalent change that was never incorporated after the construction of the DGB. 2) Performing a re-evaluation of the drainage on the west side of the plant yard around the ditch, taking into consideration the added equipment that has obstructed the ditch. No safety significant plant equipment is challenged because there are no identified intrusion paths into the façade, Diesel Generator Building, and the PAB above grade level.	Being tracked under corrective action program

Description of Deficiency	Feature Category	Disposition	Status
The maintenance of drainage ditches and culverts was not found to be adequate after several drainage paths were found to be partially obstructed. This included three drainage culverts on the south side of the site that were either partially obstructed or submerged in ponding. Another drainage culvert near the north security gate was also found to be obstructed. Some drainage ditches had buildups of dirt and silt that indicated poor drainage flow and required clearing or possible re-grading. This primarily applied to the drainage paths along the north and south sides of the switchyard.	Incorporated Passive	These observations were entered into the CAP and determined to be a deficiency. The drainage ditch maintenance will be updated to address the shortcomings in the current PM program. In addition, the plant drawing used to guide the PMs will be updated to more accurately reflect the configuration of the surface drainage features at the site. No safety significant plant equipment is challenged because there are no identified intrusion paths into the façade, Diesel Generator Building, and the PAB above grade level.	Being tracked under corrective action program

PBNP has no flood protection features designated as restricted access or inaccessible.

g. Requested Information Item 2(g) – Cliff –Edge Effects and Available Physical Margin

Document any cliff-edge effects identified and the associated basis. Indicate those that were entered into the corrective action program. Also include a detailed description of the actions taken or planned to address these effects.

In accordance with NEI 12-07, Available Physical Margins have been collected and documented in the Walkdown Record form (Appendix B). The guidance provided in FAQ-006 [Ref. 9] was also followed. This information will be used in the flood hazard reevaluations performed in response to Item 2.1: Flooding in the 50.54(f) letter [Ref. 2].

h. Requested Information Item 2(h) – Planned/Newly-Installed Flood Protection Enhancements

Describe any other planned or newly installed flood protection systems or flood mitigation measures including flood barriers that further enhance the flood protection. Identify results and any subsequent actions taken in response to the peer review.

Currently, there are no planned or newly installed flood protection enhancements or flood mitigation measures at PBNP.

There were no changes to the walkdown process as described in Section 7 or the walkdown record form in Appendix B of Reference 1.

5. CONCLUSIONS

Walkdowns were performed in accordance with NEI 12-07 (Rev. 0-A), "Guidelines for Performing Verification of Plant Flood Protection Features," dated May, 2012 [Ref. 1]. This document was endorsed by the NRC on May 31, 2012. PBNP Units 1 & 2 configuration and procedures were compared to the flood

protection features credited in the current licensing basis documents for external flooding events. Site-specific features credited for protection and mitigation against external flooding events were identified and evaluated. The results of the inspections are summarized below.

Reasonable Simulations

The reasonable simulation of the installation of the jersey barriers did not raise any concerns over completion of time sensitive actions but did identify some shortcomings in the procedure concerning the conflict with B.5.b staging requirements and other suggested enhancements that are being added. These have been entered into the PBNP CAP.

Inspection Deficiencies

The flooding walkdowns verified that permanent structures, systems, components (SSCs), temporary flood mitigation barriers, 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 current licensing basis (CLB) with these exceptions.

- The jersey barrier configuration was found to be insufficient in length to the north and south of the CWPH to provide protection to + 9 ft.
- The procedure for the installation of the jersey barriers did not provide provisions for the fact that the jersey barriers are installed in B.5.b staging areas on either side of the CWPH.
- The control panel and battery for the diesel fire pump in the CWPH was below the flood height.
- A catch basin in the plant yard near the NW corner of the Unit 2 Façade was found to be covered with a metal plate.
- The north and west interceptor ditches called out in Reference 8 were either not found (north interceptor) or inadequate (west interceptor).
- Several drainage culverts and ditches were found to be partially obstructed.

Corrective Actions

The following CAs were taken in response to the above identified deficiencies:

- Additional jersey barriers will be acquired to extend the length of the barrier configuration, and a concrete pad will be poured to address potentially unacceptable gaps in the configuration.
- A procedure change will be completed to address the inadequacies in the site procedure for jersey barrier installation.
- Installed floor dampers in the CWPH will be credited for external as well as internal flooding to reduce the flood height in the CWPH to +7.75 ft.
- The metal plate was removed from the catch basin, and the addition of procedural controls to prevent future obstructions is being reviewed.
- The FSAR will be updated to replace the northern interceptor ditch with the storm drain system, and a re-evaluation of the drainage near the western interceptor ditch will be performed.
- Both the maintenance program for the drainage ditches and the plant drawing used to guide the PMs will be updated.

Newly installed and planned flood protection enhancements

There are no newly installed or planned flood protection enhancements at PBNP.

6. REFERENCES

1. Nuclear Energy Institute (NEI), Report 12-07 [Rev 0-A]. *Guidelines for Performing Verification Walkdowns of Plant Protection Features*. May 2012 [NRC endorsed May 31, 2012; updated and re-issued June 18, 2012].
2. U.S. Nuclear Regulatory Commission. Letter to Licensees. *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.
3. U.S. Nuclear Regulatory Commission. *Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety*. NRC Inspection Manual. Part 9900: Technical Guidance. Regulatory Issues Summary 2005-20, Revisions 1. September 26, 2005.
4. Technical Memorandum No. 36, Beach Erosion Board, Office of the Chief of Engineers, Department of the Army.
5. "Maximum Deep Water Waves & Beach Run-up at Point Beach," Sargent & Lundy, 1967.
6. "The Prediction of Surges in the Southern Basin of Lake Michigan, Part I, The Dynamical Basis for Prediction", G.W. Platzman, 1965
7. "Preliminary Hydrologic and Hydraulic Studies for Nuclear Power Plant Site Selection," Harza Engineering Company, 1966.
8. Point Beach Units 1 & 2 Updated Final Safety Analysis Report, Chapter 2 "Site and Environment."
9. FAQ-006, Inquiry Form-NRC Submittal, Revision 4, Applicable Features for Quantifying APM, September 13, 2012.
10. FAQ-007, Inquiry Form-NRC Submittal, Revision 0, Inspection of Exterior Walls, August 1, 2012.
11. AECOM Technical Services, Inc. "Final Report: Drainage System Inspection; Point Beach Nuclear Plant; Two Rivers, Wisconsin." June 2010.

7. ATTACHMENTS

Attachment 1: FAQ-006 [Ref. 9]

A. TOPIC: **Applicable Features for Quantifying APM**

Source document: NEI 12-07 Section: 3.13 & 5.8

B. DESCRIPTION:

Sections 3.13 and 5.8 provide a definition, description, and examples for Available Physical Margin (APM). In Section 3.13, APM is defined as "the difference between licensing basis flood height and the flood height at which water could affect an SSC important to safety". This inquiry is intended to clarify the latter part of this definition, considering that that some features will not have a clearly defined exceedance height.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 2)

Inquiry number: 006 Priority: H

Sections 3.13 and 5.8 provide a definition, description, and examples for Available Physical Margin (APM). In Section 3.13, APM is defined as "the difference between licensing basis flood height and the flood height at which water could affect an SSC important to safety". The latter (underlined) part of the definition can be interpreted as the height at which the flood protection capability of a feature is exceeded. For some features, the exceedance height can be clearly defined (e.g. flood walls, levees, dikes, cofferdams, flood gates, the elevation of unsealed penetrations or other openings, etc.). For other features (e.g. seal, plug, or water-tight door pressure ratings, pump flow rates, etc.), the exceedance height cannot be clearly defined without performing an engineering analysis that is beyond the scope of the flooding walkdowns. As a result, it is appropriate to record APM as a simple measurement of height difference, however additional considerations apply.

There is a concern that recording a large APM on the Walkdown Record Form could be misleading if the APM is interpreted as margin that is available for additional flood protection without further evaluation. For example, for a flood protection wall that is 10-ft high and the CLB water height is 9.5-ft., it is reasonable to state that the APM is 6-inches for the wall. However, if the previous wall is now 20-ft high and CLB water height is still 9.5-ft, it cannot be stated that the wall's APM is 10.5-ft based on engineering judgment alone. In order to verify a large APM that is not already defined in the existing design documents, an analysis would have to be performed to evaluate the effect of the additional flood height on wall loads and pressure retention capability for any associated penetration seals. As a result, the manner in which an APM should be recorded on the Walkdown Record form depends upon whether the APM is considered large (an interpretation of what constitutes a "large" APM is at the discretion of the utility).

The following guidance applies.

For walkdowns that have not yet been performed and/or documented:

Recording APMs on the Walkdown Record Sheet as a difference in height is a reasonable statement of the available margin based on engineering judgment unless the APM is large. For large APMs , three options are available: (1) record a smaller, but defensible, APM value based

on engineering judgment with a corresponding note in the "comments" section; (2) record no value for the APM with a corresponding note in the "comments" section that an engineering analysis is necessary to determine the maximum APM the wall can withstand before a functional failure; or (3) reference the existing FSAR section or design document that supports the APM.

Note that this notation should be made in the response to Q11, Q23, or Q27 of the Walkdown Record Form, as applicable.

For walkdowns that have been completed:

Recognizing that it is not resource effective to revise completed paperwork, it is not necessary to change the way the APM was recorded in completed portions of the Walkdown Record Form. In these cases, APMs that have been recorded as simple measurements of height differences are acceptable as long as the APM determination process did not result in overlooking some potential small margins, as defined by the site per Section 5.8 of NEI 12-07.

For Walkdown Reports:

Indicate in the walkdown report if any APM information was recorded before the large APM approach described in this FAQ was developed.

Notes:

1. Typically, the CLB for the site will indicate what the probable maximum flood level is and the level to which the SSC important to safety is protected. If the recorded APM exceeds the difference between these two values and the margin is to be credited for additional flood protection, the margin must be justified by one of the following methods:
    a. Documented application of reasonable and independently verified engineering judgment
    b. Performance of new engineering analysis
    c. Reference to an existing document or analysis that supports the higher protection level

Revision: 4 Date: 9/13/12

E. NRC Review:

Not Necessary_____ Necessary X
Explanation:_____

F. Industry Approval:

Documentation Method: Sept 13, 2012 meeting Date:_____

G. NRC Acceptance:

Interpretation X Agency Position_____

Documentation Method: Sept 13, 2012 meeting Date:__

Attachment 2: FAQ-007 [Ref. 10]

A. TOPIC: Inspection of exterior walls

Source document: NEI 12-07 Section: 5.5.2

B. DESCRIPTION:

We have a wet site where the SSCs are licensed to flood and the core is protected using mitigating actions. Some of the buildings have safety-related equipment below grade and below groundwater levels. The building's concrete walls keep groundwater from entering the structure but there is no mention of the walls being credited flood or groundwater protection features in the CLB. If the walls and any associated penetration seals are not credited in the CLB as providing protection (against surface water or groundwater flooding), do they need to be included in the walkdown scope?

On the other hand, if the walls and associated seals are performing a flood protection function, specifically for groundwater ingress, even though the CLB for flooding is silent on it, should a visual observation of the walls be performed?

C. Initiator:

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Date: 7/31/12 E-Mail: joe.bellini@amec.com

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

Inquiry number: 007 Priority: H

Any exterior wall (above or below grade) protecting space credited as dry in the CLB from groundwater or surface water flooding should be included in the walkdown scope, even if the exterior walls are not explicitly mentioned in the CLB. The inspection of the walls should also note degrading or nonconforming conditions for associated penetrations, seals, etc., although the penetrations/seals themselves do not need to be listed as separate features, with separate walkdown record forms, unless individually credited in the CLB. The inspection applies to portions of the walls below design basis flood and/or groundwater levels.

Note that Available Physical Margin should be obtained to the lowest unsealed, unqualified and or inspected sealed penetration above the design basis water level.

Revision: 0 Date: 8/1/2012

E. NRC Review:

Not Necessary X Necessary

Explanation:

F. Industry Approval:

Documentation Method: Date: