NEXTera ENERGY POINT BEACH

September 10, 2021

L-2021-157
10 CFR 54.17

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
11545 Rockville Pike
One White Flint North
Rockville, MD 20852-2746

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

SUBSEQUENT LICENSE RENEWAL APPLICATION - AGING MANAGEMENT REQUESTS FOR ADDITIONAL INFORMATION (RAI) SET 6 RESPONSES

References:

1. NextEra Energy Point Beach, LLC (NEPB) Letter NRC 2020-0032 dated November 16, 2020, Application for Subsequent Renewed Facility Operating Licenses (ADAMS Package Accession No. ML20329A292)
2. U.S. Nuclear Regulatory Commission (NRC) Letter dated January 15, 2021, Point Beach Nuclear Plant, Units 1 and 2 - Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Notice of Opportunity to Request a Hearing Regarding the NextEra Energy Point Beach, LLC Application for Subsequent License Renewal (EPID No. L-2020-SLR-0002) (ADAMS Accession No. ML21006A417)
3. NRC Letter dated January 15, 2021, Point Beach Nuclear Plant, Units 1 and 2 - Aging Management Audit Plan Regarding the Subsequent License Renewal Application Review (ADAMS Accession No. ML21007A260)
4. US Nuclear Regulatory Commission Meeting with NextEra Energy Concerning the Point Beach Subsequent License Renewal Application Review – June 3, 2021 Public Meeting (ADAMS Accession No. ML21148A116)
5. NRC Email and Attachment dated August 12, 2021, Point Beach SLRA Safety RAIs Set 6 Final (ADAMS Accession Nos. ML21242A014, ML21242A015)
6. NRC Public Meeting Announcement, Meeting with NextEra Energy Point Beach, LLC (NextEra) to Discuss Subsequent License Renewal Application Proposed Aging Management Programs (ADAMS Accession No. ML21225A562)

NEPB, owner and licensee for Point Beach Nuclear Plant (PBN) Units 1 and 2, has submitted a subsequent license renewal application (SLRA) for the Facility Operating Licenses for PBN Units 1 and 2 (Reference 1). On January 15, 2021, the NRC determined that NEPB's SLRA was acceptable and sufficient for docketing (Reference 2), and on January 15, 2021 issued the regulatory audit plan for the aging management portion of the SLRA review (Reference 3). Based on the information exchanged and discussions held during the public meeting held on June 3, 2021 (Reference 4), the NRC issued its Set 6 RAIs to NEPB (Reference 5). Subsequent discussions were held with NRC staff and NEPB on September 2, 2021 (Reference 6) to further

clarify certain Set 6 RAIs. The attachments to this letter provide responses to those initial and clarified information requests.

For ease of reference, the index of attached information is provided on page 3 of this letter. Attachments may include associated revisions to the SLRA (Enclosure 3 Attachment 1 of Reference 1) denoted by ~~strikethrough~~ (deletion) and/or **bold red underline** (insertion) text. Any previous SLRA revisions are denoted by **bold black** text, and SLRA table revisions are included as excerpts from each affected table.

Should you have any questions regarding this submittal, please contact me at (561) 304-6256 or William.Maher@fpl.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 10h day of September 2021.

Sincerely,

William D. Maher
Licensing Director - Nuclear Licensing Projects

Cc Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
Public Service Commission Wisconsin

Attachments Index		
Attachment No.	RAI No.	Subject
1	B.2.3.21-1	Breakout Topic #2: Exclusion of Buried Components
2	B.2.3.21-2	Breakout Topic #3: Inspection Sample Size

1. SLRA Section B.2.3.21, "Selective Leaching"

Regulatory Basis:

Section 54.21(a)(3) of Title 10 of the Code of Federal Regulations (10 CFR) requires an applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the U.S. Nuclear Regulatory Commission (NRC) staff must make to issue a renewed license (10 CFR 54.29(a)) is that actions have been identified and have been or will be taken with respect to managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under 10 CFR 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis. In order to complete its review and enable it to make a finding under 10 CFR 54.29(a), the staff requires additional information in regard to the matters described below.

RAI B.2.3.21-1 [Breakout Topic #2: Exclusion of buried components from scope based on external coatings and cathodic protection]

Background:

SLRA Section B.2.3.21, "Selective Leaching," states, in part, that "[t]he PBN Selective Leaching AMP will be consistent with the ten elements of NUREG-2191, Section XI.M33, 'Selective Leaching.'"

GALL-SLR Report AMP XI.M33, "Selective Leaching," states that depending on plant-specific operating experience (OE) and implementation of preventive actions, certain components may be excluded from the scope of this program in each 10-year inspection interval as follows:

- The external surfaces of buried components that are externally-coated in accordance with Table XI.M41-1, ["Preventive Actions for Buried and Underground Piping and Tanks,"] of GALL-SLR Report AMP XI.M41, "Buried and Underground Piping and Tanks," and where direct visual examinations of buried piping in the scope of license renewal have not revealed any coating damage.
- The external surfaces of buried gray cast iron and ductile iron components that have been cathodically protected since installation and meet the criteria for Preventive Action Category C in GALL-SLR Report AMP XI.M41, Table XI.M41-2, "Inspections of Buried and Underground Piping and Tanks."

Based on its audit and review of the SLRA, the staff noted the following: (a) cathodic protection system performance will provide OE to determine whether the Selective Leaching program may exclude buried and cathodically protected components from scope; (b) a majority of potentials measured during the 2015 cathodic protection survey did not meet the -850 mV polarized potential criterion; (c) cathodic protection systems at Point Beach were originally installed to provide corrosion control for the containment

structures and buried circulating water piping; (d) there is uncoated buried piping in the fire protection system; and (e) as amended by letter dated April 21, 2021 (ADAMS Accession No. ML21111A155), buried fire protection piping at PBN includes the following material types susceptible to selective leaching: ductile iron and gray cast iron.

Issue:

1. External Coatings Exclusion

   Buried components can be excluded from the scope of the Selective Leaching program based on the external coatings being provided; however, the staff seeks clarification regarding why this exclusion is applicable at PBN based on the applicant's documentation [FPLCORP00036-REPT-058, "Point Beach Units 1 and 2 Subsequent License Renewal Aging Management Program Basis Document – Buried and Underground Piping and Tanks," Revision 0] that indicates that there is uncoated buried piping in the fire protection system.

2. Cathodic Protection Exclusion

   Buried components can be excluded from the scope of the Selective Leaching program based on cathodic protection efficacy; however, the staff seeks clarification regarding why this exclusion is applicable at PBN based on the following: (a) cathodic protection systems at PBN were not originally installed to provide corrosion control for buried components susceptible to selective leaching; (b) the SLRA does not describe how the criteria for Preventive Action Category C have been met for buried gray cast iron and ductile iron fire protection system piping since installation; and (c) potentials measured during the 2015 cathodic protection survey did not meet the criteria for Preventive Action Category C (i.e., cathodic protection acceptance criteria were not met 80 percent of the time).

Request:

State the basis for why the above exclusions for buried components are applicable to the Selective Leaching program at PBN. Alternatively, revise the SLRA as appropriate to reflect that these exclusions are not applicable to the Selective Leaching program at PBN.

NEPB Response:

Since the fire protection system at Point Beach has uncoated buried piping, the external coatings exclusion is not applicable. Likewise, since the cathodic protection system does not provide complete protection for the buried piping, Preventive Category C is not applicable (refer to NEPB responses to Set 2 RAI B.2.3.27-1 in Reference 3) and the cathodic protection exclusion is not applicable.

Since the exclusions are not applicable, the new PBN Selective Leaching AMP as described in Appendix B of the SLRA is revised accordingly.

References:

1. “Point Beach Nuclear Plant Units 1 and 2 Subsequent License Renewal Application (Public Version),” Enclosure 3, Attachment 1, dated November 2020 (ADAMS Accession No. ML20329A247)
2. NextEra Energy Point Beach, LLC (NEPB) Letter to NRC L-2021-081 dated April 21, 2021, Subsequent License Renewal Application – Aging Management Supplement 1 (ADAMS Accession No. ML21111A155)
3. NextEra Energy Point Beach, LLC (NEPB) Letter to NRC L-2021-144 dated August 11, 2021, Subsequent License Renewal Application – Aging Management Requests for Additional Information (RAI) Set 2 Responses

Associated SLRA Revisions:

SLRA Appendix B, Section B.2.3.21, page B-160 is revised as follows:

B.2.3.21 Selective Leaching

Program Description

The PBN Selective Leaching AMP is a new AMP that has the principal objective to manage the aging effect of loss of material due to selective leaching.

The PBN Selective Leaching AMP includes inspections of components made of gray cast iron, ductile iron, and copper alloys (except for inhibited brass) that contain greater than 15 percent zinc or greater than 8 percent aluminum exposed to a raw water, closed-cycle cooling water, treated water, waste water, or soil environment. For closed-cycle cooling water and treated water environments, the AMP includes one-time visual inspections of selected components that are susceptible to selective leaching, coupled with mechanical examination techniques (e.g., chipping, scraping). For raw water, waste water, and soil environments, the AMP includes opportunistic and periodic visual inspections of selected components that are susceptible to selective leaching, coupled with mechanical examination techniques. Destructive examinations of components to determine the presence of and depth of dealloying through-wall thickness are also conducted. These techniques can determine whether loss of material due to selective leaching is occurring and whether selective leaching will affect the ability of the components to perform their intended function for the SPEO.

NUREG-2191, Section XI.M33, Element 1 allows the external surfaces of buried components to be excluded from the scope of the program if they are externally coated in accordance with NUREG-2191, Table XI.M41-1 and inspections show no coating damage OR if they are buried gray cast iron or ductile iron components cathodically protected since installation and meet the NUREG-2191, Table XI.M41-2 criteria for Preventive Category C. However, since portions of the buried piping are not coated and the buried piping is not completely cathodically protected and does not meet Preventive Category C, such exclusions will not be used.

Each of the one-time and periodic inspections for the various material and environment populations at each unit comprises a 3 percent sample or a maximum of 10 components. For each material and environment population with 35 or more susceptible components, two destructive examinations will be performed in each 10-year inspection interval at each unit. For each material and environment population with less than 35 susceptible components, one destructive examination will be performed in each 10-year inspection interval at each unit.

RAI B.2.3.21-2 [Breakout Topic #3: Inspection sample size for gray cast iron piping exposed to soil]

Background:

SLRA Table 3.3.2-6, "Fire Protection System – Summary of Aging Management Evaluation," states that loss of material due to selective leaching for gray cast iron piping exposed to soil will be managed by the Selective Leaching program.

SLRA Section B.2.3.21 states the following:

- Each of the one-time and periodic inspections for the various material and environment populations at each unit comprises a 3 percent sample or a maximum of 10 components.
- For raw water, waste water, and soil environments, the AMP includes opportunistic and periodic visual inspections of selected components that are susceptible to selective leaching, coupled with mechanical examination techniques. Destructive examinations of components to determine the presence of and depth of dealloying through-wall thickness are also conducted.

The "Plant Specific Operating Experience" summary in SLRA Section B.2.3.21 does not describe any operating experience or results of inspections related to gray cast iron piping exposed to soil.

NUREG-2222, "Disposition of Public Comments on the Draft Subsequent License Renewal Guidance Documents NUREG–2191 and NUREG–2192," states the following regarding the staff's basis for reducing the extent of inspections for selective leaching during the subsequent period of extended operation (i.e., 3 percent with a maximum of 10 components per GALL-SLR guidance) when compared to the extent of inspections for selective leaching during the initial period of extended operation (i.e., 20 percent with a maximum of 25 components per GALL Report, Revision 2 guidance):

1. Opportunistic inspections will be conducted throughout the period of extended operation whenever components are opened, buried, or submerged surfaces are exposed, whereas opportunistic inspections were not recommended in the previous version of AMP XI.M33;
2. Destructive examinations provide a more effective means to detect and quantify loss of material due to selective leaching;
3. The slow growing nature of selective leaching generally coupled *with the inspections conducted prior to the initial period of extended operation* [emphasis added] provides insights into the extent of loss of material due to selective leaching that can be used in the subsequent period of extended operation;
4. The staff's review of many license renewal applications has not revealed any instances where loss of intended function has occurred due to selective leaching;

5. The staff's review of industry operating experience has not detected any instances of loss of material due to selective leaching, which resulted in a loss of intended function for the component; and

6. Regional inspector input (provided based on IP 71003, "Post-Approval Site Inspection for License Renewal,") that selective leaching has been noted during visual and destructive inspections; however, no instances have been identified where there was the potential for loss of intended function.

The NRC issued Information Notice (IN) 2020-04, "Operating Experience Related to Failure of Buried Fire Protection Main Yard Piping," to inform the industry of OE involving the loss of function of buried gray cast iron fire water main yard piping due to multiple factors, including graphitic corrosion (i.e., selective leaching), overpressuration, low-cycle fatigue, and surface loads. As noted in the IN, a contributing cause to the failures of buried gray cast iron piping at Surry Power Station (SPS) was the external reduction in wall thickness at several locations due to graphitic corrosion.

Issue:

The recommended extent of inspections in GALL-SLR AMP XI.M33 is based on the six conditions noted by the staff in NUREG-2222. The staff's comparison of these six conditions to the Selective Leaching program at PBN follows:

- Based on its review of SLRA Section B.2.3.21, the staff notes that opportunistic inspections and destructive examinations for selective leaching will be performed, consistent with the first and second conditions in NUREG-2222.
- Based on its review of plant-specific operating experience in SLRA Section B.2.3.21, the staff could not determine if selective leaching inspections have been conducted for gray cast iron piping exposed to soil. Based on this observation (i.e., inspections for this material and environment combination may not have been performed prior to the initial period of extended operation), the third condition in NUREG-2222 may not be met at PBN for gray cast iron piping exposed to soil.
- The fourth, fifth, and sixth conditions in NUREG-2222 focus on the staff's review of industry OE not identifying any instances of loss of material due to selective leaching which had resulted in a loss of intended function for the component. Based on recent industry OE at SPS (as documented in IN-2020-04), the last three conditions in NUREG-2222 are no longer applicable for gray cast iron piping exposed to soil. Since these conditions are no longer applicable (i.e., there is now industry OE involving loss of material due to selective leaching which resulted in a loss of intended function for gray cast iron piping exposed to soil), the staff requires additional information to determine if the reduced extent of inspections in GALL-SLR AMP XI.M33 are appropriate for this material and environment combination.

Request:

Provide additional OE, or other technical justification (e.g., discussion of historical cathodic protection efficacy with respect to buried gray cast iron piping, discussion of type(s) of external coatings utilized on buried gray cast iron piping, discussion of soil corrosivity and backfill quality in the vicinity of buried gray cast iron piping, discussion of external surface loss of material rates for buried steel or cast iron piping), to demonstrate that the extent of inspections in GALL-SLR AMP XI.M33 (i.e., 3 percent with a maximum of 10 components) are appropriate for gray cast iron piping exposed to soil.

NEPB Response:

The following discussion of soil corrosivity, backfill quality and plant-specific OE demonstrates that the extent of inspections by the PBN Selective Leaching AMP (i.e., 3 percent with a maximum of 10 components) is appropriate for gray cast iron piping exposed to soil. As previously acknowledged in the response to Set 2 RAI B.2.3.27-1 (Reference 3), not all of the buried piping is cathodically protected and per the 2015 cathodic protection survey, many of the measured potentials did not meet the -850 mV polarized potential criterion for Preventive Category C.

Soil Corrosivity

As stated in the recent NEPB response to Set 2 RAI B.2.3.27-1 (Reference 3), the soil was determined to have low aggressiveness as proven by the following soil analyses:

- A 1992 analysis of soil samples was obtained during the installation of 4 groundwater monitoring wells in the Unit 1 and Unit 2 facades, near the containment structures. The soil samples were extracted every 5 feet during the well borings and the samples were analyzed for pH, resistivity, and chlorides. The samples had an average resistivity of 16,740 ohm-cm, which was considered “mildly corrosive” per the sampling manual used, “Corrosion Control,” *Air Force Manual (AFM), No. 88-9*. The average pH was 9.52, which was considered to be within the optimum range of 8.5 to 11.0. The average amount of chlorides was approximately 59 ppm, which was well below the 500 ppm minimum for an aggressive chloride environment. In general, the soil analyses showed no signs of aggressive chemical exposure to subsurface systems around the containment structures at PBN.
- A 2009 analysis of soil samples in the immediate vicinity of the buried fire protection system piping, some of which is gray cast iron, was performed after the piping had been excavated for 10-year inspections. The moisture content was analyzed in accordance with ASTM D2974-87; resistivity was analyzed in accordance with EPA 120.1; pH was analyzed in accordance with EPA 9045; oxidation and reduction potential were analyzed in accordance with SM 2580B; and anions were analyzed using ion chromatography in accordance with EPA 300.0. The sample results indicated that resistivity was within the 13,800-16,600

Ohm-cm range, redox potential had a range of 81.9-172 mV, the soil pH was 7.9, chlorides were measured at 31.8 mg/kg, sulfides were within a range of 11.6-13.4 mg/kg, and moisture content was at 19.1 percent. These soil sample results indicate that the soil has low aggressiveness when analyzed in accordance with EPRI Technical Report (TR) 1021470 (Reference 4).

- A 2012 soil analysis was performed on soil near the original construction fire protection main ring header, some of which was gray cast iron. The sample results indicated the resistivity to be 6740 Ohm-cm, the redox potential to be 107 mV, the soil pH was 8.6, chlorides were measured at 22.4 mg/kg, sulfides were within a range of 1.1 to 1.2 mg/kg, and moisture content was at 7.9 percent. These results also support a categorization of low aggressiveness.

Given the distribution of soil samples taken, there is reasonable assurance that the PBN soil is of low aggressiveness.

Backfill Quality

The respective backfill for buried piping is installed in accordance with the original plant design specifications or NFPA 24. Additional backfill information was provided in the response to RAI B.2.3.27-4 (Reference 3).

Plant-Specific OE

The OE review provided within SLRA Section B.2.3.27 was inclusive of all buried components, including components outside the scope of SLR. In 2009 and 2012, during fire protection piping excavations, hardness testing was performed to detect potential selective leaching. In both instances, the hardness was satisfactory. No aging-related failures were identified for buried piping or tank components. The only failure identified for a pressure-retaining component was related to freeze-induced cracking of a fire hydrant header in 2015. The OE review indicated that when excavations were performed in 2009, 2012, 2015, and 2016, the corrosion rate was either determined to be negligible or no evidence of wall loss was identified.

The above site-specific information demonstrates that the sample population recommended by NUREG-2191, Section XI.M33, Element 4 (i.e., 3 percent with a maximum of 10 components) will provide reasonable assurance that selective leaching will be identified if it occurs, prior to loss of intended function. If the selective leaching inspections identify components not meeting acceptance criteria, then per Element 7 of the PBN Selective Leaching AMP, the number of inspections will be increased. Consistent with the requirements of NUREG-2191 XI.M33, the number of additional inspections will be equal to the number of failed inspections for each material and environment population with a minimum of five additional visual and mechanical inspections when visual and mechanical inspections(s) did not meet acceptance criteria, or 20 percent of each applicable material and environment combination will be inspected, whichever is less, and a minimum of one additional destructive examination when destruction examination(s) did not meet acceptance criteria.

References:

1. "Point Beach Nuclear Plant Units 1 and 2 Subsequent License Renewal Application (Public Version)," Enclosure 3, Attachment 1, dated November 2020 (ADAMS Accession No. ML20329A247)
2. NextEra Energy Point Beach, LLC (NEPB) Letter to NRC L-2021-081 dated April 21, 2021, Subsequent License Renewal Application – Aging Management Supplement 1 (ADAMS Accession No. ML21111A155)
3. NextEra Energy Point Beach, LLC (NEPB) Letter to NRC L-2021-144 dated August 11, 2021, Subsequent License Renewal Application – Aging Management Requests for Additional Information (RAI) Set 2 Responses
4. EPRI, Technical Report 1021470, "Balance of Plant Corrosion - The Buried Pipe Reference Guide," Electric Power Research Institute, Palo Alto, California, 2010.

Associated SLRA Revisions:

None.

Associated Enclosures:

None.