



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 4, 2020

Mr. Don Moul
Executive Vice President, Nuclear Division
And Chief Nuclear Officer
Florida Power & Light Company
NextEra Energy Point Beach, LLC
Mail Stop: NT3/JW
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Jupiter, FL 33478

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – APPROVAL OF RELIEF REQUESTS 1-RR-13 AND 2-RR-13 REGARDING EXTENSION OF INSPECTION INTERVAL FOR REACTOR PRESSURE WELDS FROM 10 TO 20 YEARS (EPID L-2019-LLR-0060)

Dear Mr. Moul:

By letter dated June 19, 2019, as supplemented by letter dated October 17, 2019 (Agencywide Document Access and Management System (ADAMS) Accession No. ML19170A285 and ML19291A016), NextEra Energy Point Beach, LLC (NextEra or the licensee) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Table IWB-2500-1, for Categories B-A and B-D examinations for Point Beach Nuclear Plant (PBNP), Units 1 and 2, reactor pressure vessel welds and nozzle welds.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to use the proposed alternative to extend the fifth inservice inspection (ISI) interval at PBNP, Units 1 and 2 from 2020 to 2029 for Categories B-A and B-D examinations so that the fifth ASME Code-required examination can be performed in 2029 for both units on the basis that the alternative provides an acceptable level of quality and safety.

The U.S. Nuclear Regulatory Commission (NRC) staff has reviewed the subject request and determined that the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1).

Therefore, the NRC staff authorizes the use of relief requests 1-RR-13 and 2-RR-13 at PBNP, Units 1 and 2, for the extended fifth ISI interval (or equivalently, the fifth and sixth 10-year ISI intervals) for ASME Code, Categories B-A and B-D, items until December 31, 2029.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including the third-party review by the Authorized Nuclear In-service Inspector.

If you have any questions, please contact Mahesh Chawla of my staff at (301) 415-8371 or via e-mail at Mahesh.Chawla@nrc.gov.

Sincerely,

/RA/

Nancy L. Salgado, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos: 50-266 and 50-301

Enclosure:
Safety Evaluation

cc: ListServ



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUESTS 1-RR-13 AND 2-RR-13 REGARDING

FIFTH AND SIXTH 10-YEAR INSERVICE INSPECTION PROGRAM INTERVALS

NEXTERA ENERGY POINT BEACH, LLC

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-266 AND 50-301

EPID: L-2019-LLR-0060

1.0 INTRODUCTION

By letter dated June 19, 2019, as supplemented by letter dated October 17, 2019 (Agencywide Document Access and Management System (ADAMS) Accession No. ML19170A285 and ML19291A016), NextEra Energy Point Beach, LLC (NextEra or the licensee) requested relief from the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Table IWB-2500-1, for Categories B-A and B-D examinations for Point Beach Nuclear Plant (PBNP), Units 1 and 2, reactor pressure vessel (RPV) welds and nozzle welds.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to use the proposed alternative to extend the fifth inservice inspection (ISI) interval at PBNP, Units 1 and 2, from 2020 to 2029 for Categories B-A and B-D examinations so that the fifth ASME Code required examination can be performed in 2029 for both units on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY EVALUATION

Adherence to Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4), which states, in part, that ASME Code Class 1, 2, and 3 components will meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in Section XI of the ASME Code.

Section 50.55a(z) of 10 CFR, "Alternatives to codes and standards," states that,

Alternatives to the requirements of paragraphs (b) through (h) of [10 CFR 50.55a]
or portions thereof may be used when authorized by the Director, Office of

Enclosure

Nuclear Reactor Regulation [this authorization has been delegated to the management of the Division of Operating Reactor Licensing].... A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) *Acceptable level of quality and safety.* The proposed alternative would provide an acceptable level of quality and safety; or

(2) *Hardship without a compensating increase in quality and safety.* Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety

Based on the above, and subject to the following technical evaluation, the U.S. Nuclear Regulatory Commission (NRC) staff finds that regulatory authority exists for the licensee to request the use of an alternative and the NRC to authorize the proposed alternative.

3.0 TECHNICAL EVALUATION

3.1 Background

The NRC staff's review of the proposed alternatives assesses the consistency of the licensee's proposal with WCAP-16168-NP-A, Revision 3, "Risk-Informed Extension of the Reactor Vessel In-Service Inspection Interval" (ADAMS Accession No. ML11306A084). Henceforth, WCAP-16168-NP-A, Revision 3, will be referred to as WCAP-A. WCAP-A provides a basis for the acceptability of the proposed inspection intervals for Categories B-A and B-D components at United States pressurized-water reactors (PWRs) designed by Westinghouse, Combustion Engineering and Babcock and Wilcox (B&W) through the use of risk-informed analyses and probabilistic fracture mechanics for a pilot plant of each design. WCAP-A also contains the NRC staff's safety evaluation (SE) of the Westinghouse proposal. The SE finds the proposal acceptable for use based on consistency with the principles contained in Regulatory Guide (RG) 1.174, Revision 1, "An Approach For Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," (ADAMS Accession No. ML023240437). However, the SE imposes a condition that requires licensees to provide plant-specific information in six areas to demonstrate the applicability of WCAP-A to the licensee's plant. The plant-specific information required by the condition is:

- (1) Licensees must provide the 95th percentile total through-wall cracking frequency ($TWCF_{95-TOTAL}$) and its supporting material properties at the end of the proposed 20-year ISI interval. The $TWCF_{95-TOTAL}$ must be calculated based on the through-wall cracking frequency (TWCF) of controlling materials using the methodology in NUREG-1874, "Recommended Screening Limits for Pressurized Thermal Shock (PTS)" (ADAMS Accession No. ML070860156), which is frequently referred to as "the NRC PTS Risk Study." The RT_{MAX-X} and the shift in the Charpy transition temperature produced by irradiation defined at the 30 ft-lb energy level, ΔT_{30} , must be calculated using the latest revision of RG 1.99 or other NRC-approved methodology.

- (2) Licensees must report whether the frequency of the limiting design basis transients during prior plant operation are less than the frequency of the design basis transients identified in the PWR Owners Group (PWROG) fatigue analysis as significant contributors to fatigue crack growth.
- (3) Licensees must report the results of prior ISI of RPV welds and the proposed schedule for the next 20-year ISI interval. Each licensee shall identify the years in which future inspections will be performed, and the dates provided must be within plus or minus one refueling cycle of the dates identified in the implementation plan provided to the NRC in PWROG letter OG-10-238 (ADAMS Accession No. ML11153A033).
- (4) Licensees with B&W plants must (a) verify that the fatigue crack growth of 12 heat-up/cool-down transients per year that was used in the PWROG fatigue analysis bounds the fatigue crack growth for all of its design basis transients and (b) identify the design bases transients that contribute to significant fatigue crack growth.
- (5) Licensees with RPVs having forgings that are susceptible to underclad cracking and with RT_{MAX-FO} values exceeding 240 °F must submit a plant-specific evaluation because the analyses performed in the WCAP-A are not applicable.
- (6) Licensees seeking second or additional interval extensions shall provide the information and analyses requested in Section (e) of 10 CFR 50.61a, "Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events."

3.2 ASME Code Component Affected

The affected components are the subject plant RPV welds and full penetration nozzle welds. The following examination categories and item numbers from IWB-2500 and Table IWB-2500-1 of the ASME Code, Section XI, are listed in relief requests 1-RR-13 and 2-RR-13:

<u>Exam Category</u>	<u>Item Number</u>	<u>Description</u>
B-A	B1.11	Circumferential Shell Welds
B-A	B1.12	Longitudinal Shell Welds
B-A	B1.21	Circumferential Head Welds
B-A	B1.30	Shell-to-Flange Weld
B-D	B3.90	Nozzle-to-Vessel Welds
B-D	B3.100	Nozzle Inner Radius Section

3.3 Applicable Code Edition and Addenda

For the fifth 10-year ISI interval at PBNP, Units 1 and 2, the Code of Record for the inspection of ASME Code Class 1, 2, and 3 components is the 2007 Edition through 2008 Addenda of the ASME Code, Section XI.

3.4 Applicable Code Requirements

ASME Code, Section XI, paragraph IWB-2411, "Inspection Program," requires volumetric examination of essentially 100 percent of the RPV pressure-retaining welds identified in Table IWB-2500-1, once each 10-year interval.

3.5 Licensee's Proposed Alternative

In relief requests 1-RR-13 and 2-RR-13, the licensee proposed to perform ASME Code required volumetric examination for Categories B-A and B-D examination items for the fifth ISI interval at PBNP, Units 1 and 2, during the extended fifth 20-year ISI interval in 2029 for both units. The licensee stated that the proposed inspection date for PBNP, Unit 1, is a slight deviation from the schedule proposed in the PWROG letter OG-10-238 (2030). The licensee further stated that the impact due to the deviation is small because it would only increase the number of industry inspection for RPVs in 2029 from five to six, and decrease such inspections in 2030 from five to four. For PBNP, Unit 2, the licensee stated that the proposed inspection date is consistent with PWROG letter OG-10-238.

3.6 Licensee's Basis for Alternative

The licensee stated that the alternative is based on a negligible change in risk, satisfying the risk criteria specified in RG 1.174. The licensee further states that the methodology used to conduct this analysis is based on the study defined in WCAP-A. This study focuses on risk assessments of materials within the beltline region of the RPV wall. Appendix A of the WCAP-A identifies the parameters to be compared between an applicant's plant and the appropriate pilot plant. These items include:

- dominant PTS transients in the NRC PTS risk study
- $TWCF_{95-TOTAL}$
- frequency and severity of design basis transients
- cladding layers (single/multiple).

Table 1 of each relief request provides the above parameters for each PBNP unit and the Westinghouse pilot plant. Based on this information, the licensee concludes that the parameters are bounded by the results of the Westinghouse pilot plant and therefore, PBNP, Units 1 and 2, are qualified for the ISI interval extension.

For the parameter, $TWCF_{95-TOTAL}$, the licensee's calculated value, is $1.38E-11$ events per year for PBNP, Unit 1, and $4.55E-12$ for PBNP, Unit 2, as compared to the WCAP-A $TWCF_{95-TOTAL}$ of $1.76E-08$ events per year for the Westinghouse pilot plant. The details of the $TWCF$ calculation are presented in Table 3 of each relief request.

Table 2 of each relief request contains inspection results for a PBNP unit, showing that RPV examinations have been performed with satisfactory results.

3.7 Duration of Alternative

The licensee stated that the request is applicable to the PBNP, Units 1 and 2, ISI program for the fifth and sixth 10-year ISI intervals. The licensee further proposed to perform these examinations by no later than 2029.

4.0 NRC STAFF EVALUATION

Since the WCAP-A methodology has already been accepted by the NRC staff, the current evaluation focused on the manner in which the licensee addresses the four critical parameters in Table A-1 of WCAP-A, Appendix A, and the six plant-specific information items specified in the NRC SE enclosed in WCAP-A (reproduced in Section 3.1 of this SE).

The NRC staff reviewed the licensee's evaluation of the four critical parameters in Section 5 of relief requests 1-RR-13 and 2-RR-13. Regarding the PTS transients, the licensee identified the NRC letter report, "Generalization of Plant-Specific Pressurized Thermal Shock (PTS) Risk Results to Additional Plants" (ADAMS Accession No. ML042880482), as its plant-specific basis. This is acceptable because the SE in WCAP-A concludes that based on this letter report the PTS transient characteristics are generally applicable for plants from the same reactor vendor. Regarding the cladding layers, the licensee reports "single layer" for both units. This is also acceptable because it is consistent with the Westinghouse pilot plant.

The remaining two critical parameters are among the six plant-specific information items discussed below.

4.1 Plant-Specific Information Item (1)

Plant-specific information item 1 addresses TWCFs. Table 3 of each relief request pertains to this item. As contained in the guidance provided in Appendix A in WCAP-A, Table 3, contains a summary of the input parameters for all RPV materials and the resulting TWCFs for the controlling materials of a PBNP unit. The licensee proposed that the negligible risk contained in Table 3 of each relief request demonstrate that PBNP, Units 1 and 2, are bounded by WCAP-A and are, therefore, acceptable. Specifically, Table 3 of 1-RR-13 and Table 3 of 2-RR-13 s input chemistry data, unirradiated nil-ductility transition reference temperatures (RT_{NDT}), neutron fluence values for all RPV materials, and output shifts and TWCFs for controlling RPV materials for PBNP, Units 1 and 2.

The NRC staff compared Table 3 information in each relief request with that in the Supplement to license amendment request (LAR) 252 for PBNP, Units 1 and 2 (ADAMS Accession No. ML13063A292). Material and neutron fluence information in LAR 252, which was approved by the NRC on June 30, 2014 (ADAMS Accession No. ML14126A378), is considered as the current licensing basis (CLB) values for 50 effective full-power years (EFPYs). The NRC staff found that the material and neutron fluence information in Table 3 of each relief request is identical to the CLB values.

The part of Table 3 titled "Outputs" in 1-RR-13 and 2-RR-13 shows that the calculated total $TWCF_{95-TOTAL}$ is $1.38E-11$ events per year for PBNP, Unit 1, and $4.55E-12$ for PBNP, Unit 2. The $TWCF_{95-TOTAL}$ values were obtained by the licensee using the WCAP-A methodology with inputs from the part of Table 3 titled "Inputs." Table 3 used RG 1.99, Revision 2, Position 1.1

(without surveillance data) or Position 2.1 (with surveillance data), to calculate $RT_{MAX} (\Delta T_{30} + \text{unirradiated } RT_{NDT} + 460 \text{ }^{\circ}\text{F})$ for 50 EFPYs for all RPV beltline materials for PBNP, Units 1 and 2. Using Table 3 input values, the NRC staff has verified the licensee's calculated ΔT_{30} values, RT_{MAX} values, and the resulting $TWCF_{95-TOTAL}$ for PBNP, Units 1 and 2. Based on this, the NRC staff found that the TWCFs can support relief requests 1-RR-13 and 2-RR-13 because they are several orders of magnitude lower than the value of $1.76\text{E-}08$ for the Westinghouse pilot plant in the WCAP-A. Hence, the NRC staff found that the licensee has addressed plant-specific information item (1) satisfactorily and that the embrittlement of the PBNP, Units 1 and 2, RPVs is within the envelope used in the Westinghouse pilot plant analysis and determined by the NRC to be acceptable in its review of WCAP-A.

4.2 Plant-Specific Information Item (2)

The NRC staff then reviewed plant-specific information item (2) regarding the frequency of the limiting design basis transients. Table 1 of each relief request states that the heatup/cooldown cycles per year for the PBNP unit is bounded by the heatup/cooldown cycles (7 per year) for the Westinghouse pilot plant. The NRC staff examined the heatup/cooldown design cycles for 60 years of operation in Table 4.1-8 of PBNP Updated Final Safety Analysis Report dated September 1, 2016 (ADAMS Accession No. ML16251A154), and verified the above Table 1 statement for each unit. Therefore, the NRC staff found that the licensee has addressed plant-specific information item (2) satisfactorily.

4.3 Plant-Specific Information Item (3)

The NRC staff reviewed plant-specific information item (3) regarding the results of prior ISI of RPV welds and the proposed schedule for the extended ISI interval. Table 2 in the submittal contains additional information pertaining to previous RPV inspections and the schedule for the future inspection. Specifically, Table 2 indicated that four 10-year ISIs have been performed for PBNP, Units 1 and 2. There were three indications identified in the RPV beltline region for PBNP, Unit 1, during the last ISI. Two are within the inner $1/10^{\text{th}}$ or one inch of the vessel thickness and needs further evaluation. No indications were identified for PBNP, Unit 2, during the last ISI. Table 2 for PBNP, Unit 1, shows that the number of indications depthwise are within the limits of the scaled maximum number of flaws depthwise based on the 10 CFR 50.61a Table. Further, the licensee's response to the NRC request for additional information explained how the PBNP, Unit 1, maximum number of flaws depthwise were scaled from the 10 CFR 50.61a table, using plant-specific inspection area. Therefore, the NRC staff found that the licensee has addressed the first part of plant-specific information item (3) satisfactorily.

The licensee proposed to conduct the next RPV inspection in 2029 for both units. This is acceptable because the proposed date is before the ending date of July 31, 2032 of the extended fifth 20-year ISI interval. The proposed inspection date for PBNP, Unit 1 is not consistent with the proposed schedule in the PWROG letter OG-10-238. However, based on the percentage of the inspection unit change, the NRC staff found that increasing the number of industry inspection for RPVs in 2029 from 5 to 6 and decreasing such inspections in 2030 from 5 to 4, as stated by the licensee, has insignificant impact to the overall industry inspection effort. For PBNP, Unit 2, the NRC staff confirmed that the proposed inspection date is consistent with PWROG letter OG-10-238. Therefore, the NRC staff found that the licensee has addressed the second part of plant-specific information item (3) satisfactorily.

4.4 Plant-Specific Information Items (4), (5), and (6)

The licensee did not address plant-specific information items (4), (5), and (6). The NRC staff examined the specifics in each of these three items and confirmed that the information requirements are not applicable to PBNP, Units 1 and 2.

4.5 Clarification on Duration of Alternative

The licensee stated that the requests are applicable to the PBNP, Units 1 and 2, ISI program for the fifth and sixth 10-year ISI intervals. The licensee also stated that the fifth 10-year ISI interval ends on July 31, 2022. The NRC staff determined that extending the fifth ISI interval to 20 years would result in an interval with an ending date of July 31, 2032. Since this date is the same as the ending date for the sixth 10-year ISI interval, the licensee's statement regarding the duration of alternative is correct. Therefore, the NRC staff considers that the licensee proposal to perform these examinations by no later than 2029 to be acceptable.

4.6 Summary

The NRC staff has reviewed the licensee's submittal and determined that it has satisfied all plant-specific information items specified in the SE for WCAP-16168-NP-A, Revision 3. For the risk-informed parameter, $TWCF_{95-TOTAL}$, the NRC staff performed independent calculations to verify the input data and output results in Table 3 of 1-RR-13 and 2-RR-13. The staff verified that the licensee's calculations were acceptable. Based on the staff's review and verification of input data and output results, the NRC staff determined that the proposed alternative is based on the WCAP-A methodology and the $TWCF_{95-TOTAL}$ values for PBNP, Units 1 and 2, of the submittal are bound by the corresponding pilot plant parameter in the WCAP-A. Consequently, the licensee has demonstrated that the proposed alternative meets the guidance provided by RG 1.174, Revision 1, for risk-informed decisions and, therefore, will provide an acceptable level of quality and safety.

5.0 CONCLUSION

As set forth above, the NRC staff determines that the licensee has demonstrated that the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the use of relief requests 1-RR-13 and 2-RR-13 at PBNP, Units 1 and 2, for the extended fifth ISI interval (or equivalently, the fifth and sixth 10-year ISI intervals) for the ASME Code, Category B-A and B-D examinations to be performed no later than December 31, 2029.

All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: J. Jenkins, DNRL/NVIB

Date of issuance: March 4, 2020

SUBJECT: POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 – APPROVAL OF RELIEF REQUESTS 1-RR-13 AND 2-RR-13 REGARDING EXTENSION OF INSPECTION INTERVAL FOR REACTOR PRESSURE WELDS FROM 10 TO 20 YEARS (EPID L-2019-LLR-0060) DATED MARCH 4, 2020

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