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10 CFR 50.46(a)(3)(ii)

Serial: RA-21-0154 May 26, 2021

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

Brunswick Steam Electric Plant, Unit Nos. 1 and 2 Renewed Facility Operating License Nos. DPR-71 and DPR-62 Docket Nos. 50-325 and 50-324

SUBJECT: 30-Day Report Pursuant to 10 CFR 50.46, Changes to or Errors in an Acceptable Loss of Coolant Evaluation Model

REFERENCES:

- Duke Energy Progress, LLC letter to NRC, Supplement to Request for License Amendment Regarding Application of Advanced Framatome Methodologies, dated July 2, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19183A108)
- 2. NRC letter to Duke Energy Progress, LLC, *Brunswick Steam Electric Plant, Units 1 and* 2 – *Issuance of Amendment Nos. 299 And 327 to Revise Technical Specification 5.6.5b to Allow Application of Advanced Framatome Atrium 11 Fuel Methodologies (EPID L-2018-LLA-0273)*, dated March 6, 2020 (ADAMS Accession No. ML20073F186)
- 3. Duke Energy Progress, LLC letter to NRC, *30-Day Report Pursuant to 10 CFR 50.46, Changes to or Errors in an Acceptable Loss of Coolant Evaluation Model*, dated February 9, 2021 (ADAMS Accession Nos. ML21040A382 and ML21040A383)

Ladies and Gentlemen:

10 CFR 50.46(a)(3)(ii) requires the reporting of changes to or errors in Emergency Core Cooling System (ECCS) evaluation models (EMs), or in the application of such models that affect the temperature calculation within 30 days if the change or error is determined to be significant. 10 CFR 50.46(a)(3)(i) specifies a significant change is one which results in a calculated peak fuel cladding temperature different by more than 50 °F from the temperature calculated for the limiting transient using the last acceptable model, or is a cumulation of changes and errors such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50 °F. As such, Duke Energy Progress, LLC (Duke Energy) hereby submits information regarding changes to the Brunswick Steam Electric Plant Unit Nos. 1 and 2 (BNP) Loss of Coolant Accident (LOCA) methodology for ATRIUM 11 fuel, resulting in a -7 °F change in Peak Cladding Temperature (PCT). These changes result in a calculated peak fuel cladding temperature different by more than 50 °F from the temperature calculated for the limiting transient using the last acceptable model as well as the sum of the absolute magnitudes of the cumulative temperature calculated for the limiting transient using the last acceptable model as well as the sum of the absolute magnitudes of the cumulative temperature changes to be greater than 50 °F.

U.S. Nuclear Regulatory Commission RA-21-0154 Page 2

This submittal satisfies the notification of a significant change, as required by 10 CFR 50.46(a)(3)(ii), due to a sum of the absolute magnitudes of the cumulative temperature changes to be greater than 50 °F in the AURORA-B LOCA methodology calculated PCT. The BNP licensing basis PCT was established as 1957 °F in a letter to the NRC dated July 2, 2019 (Reference 1), which supplemented the License Amendment Request to support loading Framatome ATRIUM 11 fuel, as approved by the NRC in letter dated March 6, 2020 (Reference 2). In a letter to the NRC dated February 9, 2021, Duke Energy submitted information regarding identification of a significant error in the AURORA-B LOCA methodology and established a licensing basis PCT of 1882 °F (Reference 3). Enclosure 1 contains a discussion of changes to the BNP ATRIUM 11 fuel LOCA analyses and establishes a new licensing basis PCT of 1875 °F. The new licensing basis PCT in Enclosure 1 will be used to determine whether future changes or errors are significant in accordance with 10 CFR 50.46(a)(3)(i).

Since the changes in PCT were significant, a schedule for providing a reanalysis or other actions to show compliance with 10 CFR 50.46 as discussed in 10 CFR 50.46(a)(3)(ii) is required. BNP will complete a full LOCA reanalysis, with the newly identified changes included, prior to startup after the Unit 1 Cycle 24 outage, no later than June 1, 2022. The date of June 1, 2022 is chosen based on the planned action by Framatome to deliver an updated BNP LOCA report in November 2021, and additional time for Duke Energy to implement the reanalysis. This schedule is unchanged from the one proposed in Reference 3.

There are no new regulatory commitments contained in this submittal.

If you have additional questions, please contact Mr. Art Zaremba, Manager – Regulatory Affairs, at 980-373-2062.

Sincerely,

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John A. Krakuszeski Vice President – Brunswick

Enclosures:

1. Discussion of Changes to LOCA Analyses

cc:

L. Dudes, Regional Administrator USNRC Region II A. Hon, NRR Project Manager – BNP G. Smith, USNRC Senior Resident Inspector for BNP

Chair - NC Utilities Commission (swatson@ncuc.net)

Enclosure 1 RA-21-0154

> Enclosure 1 Discussion of Changes to LOCA Analyses

Enclosure 1 RA-21-0154 Page 1

Reference 1 documents two ATRIUM 11 evaluations with a cumulative impact of -7 °F. First, an update to S-RELAP5 changes the way the recirculation pump model is handled to address potential errors that could occur in the pump volume while also maintaining a conservative compliance with Limitation and Condition 21 in the AURORA-B LOCA methodology. Limitation and Condition 21 of the AURORA-B LOCA methodology stated that prior to permitting plant-specific application of a proprietary nonrepresentative recirculation loop modeling practice, the NRC staff required adequate justification that the excessive sensitivity displayed in the S-RELAP5 calculations regarding the modeling practice will not have an adverse effect on the conservatism of the calculated figures of merit. To ensure conservative compliance with this Limitation and Condition, the resolution to the S-RELAP5 recirculation pump model resulted in a -7 °F PCT impact.

The second evaluation corrects the RODEX4 kernel of S-RELAP5 where the iteration non convergence limit counter was not being reset for each time step. This condition could lead to cases crashing unnecessarily and the resolution resulted in a 0 °F PCT impact.

There are no impacts to the ATRIUM 10XM nor ATRIUM 11 Lead Use Assembly (LUA) evaluation models or PCT.

References:

1) FS1-0052486 Revision 3.0, "10 CFR 50.46 PCT Error Report for Brunswick Units 1 and 2 ATRIUM 11 Fuel," Framatome Inc., April 2021.

ATRIUM11 Summary

10 CFR 50.46 Report for Brunswick Steam Electric Plant Units 1 and 2

Plant:	Brunswick Steam Electric Plant, Units 1 and 2	
Reporting Period:	January 1, 2021 – April 29, 2021	
LOCA Analysis Type (if applicable):		
Evaluation Model:	ANP-10332P-A, Revision 0 AURORA-B LOCA Evaluation Model, March 2019	
Fuel:	ATRIUM 11 (A11)	
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A. Analysis of Record PCT	1957 °F	
B. Net Cumulative 10 CFR 50.46	Net PCT Effect	Absolute PCT Effect
- Previously Reported	-75 °F	85 °F
C. Baseline PCT for assessing new changes for significance (A + B)	1882 °F	
 D. Cumulative 10 CFR 50.46 Changes and Error Corrections This Reporting Period 		
1. S-RELAP5 Limitation and Condition 21 Implementation	-7 °F	
2. RODEX4 iteration counter update	+0 °F	
E. Sum of 10 CFR 50.46 Changes and	Net PCT Effect	Absolute PCT Effect
PCT	-7 °F	7 °F
F. Licensing Basis PCT (C + E)	1875 °F	