



Steve Snider
Vice President

Nuclear Engineering
526 South Church Street, EC-07H
Charlotte, NC 28202
980-382-6195
Steve.Snider@duke-energy.com

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

Serial: RA-21-0094
April 5, 2021

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

Oconee Nuclear Station, Unit Nos. 1, 2 and 3
Renewed Facility Operating License Nos. DPR-38, DPR-47 and DPR-55
Docket Nos. 50-269, 50-270 and 50-287

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

REFERENCES:

1. Letter from Duke Energy to NRC, "Duke Energy Carolinas, LLC (Duke Energy): 10 CFR 50.46 - 30-Day Report for Oconee Nuclear Station, Units 1, 2, and 3; Estimated Impacts to Peak Cladding Temperature due to Fuel Pellet Thermal Conductivity Degradation," dated December 17, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14353A214)
2. Letter from Duke Energy to NRC, "Duke Energy Regulatory Commitment Change Related to Loss of Coolant Accident Reanalysis to Address Fuel Pellet Thermal Conductivity Degradation," dated September 22, 2016 (ADAMS Accession No. ML16271A357)
3. Letter from Duke Energy to NRC, "Oconee Regulatory Commitment Change Related to Loss of Coolant Accident Reanalysis to Address Fuel Pellet Thermal Conductivity Degradation Completion Date," dated June 22, 2020 (ADAMS Accession No. ML20174A043)
4. Letter from Duke Energy to NRC, "Annual Report of Changes Pursuant to 10 CFR 50.46", dated April 5, 2021 (ADAMS Accession No. ML21096A005)

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. As such, Duke Energy Carolinas, LLC (Duke Energy) hereby submits information regarding the results of a reanalysis of the Oconee Nuclear Station (ONS) Units Nos. 1, 2, and 3 Large Break Loss of Coolant Accident (LBLOCA) methodology, incorporating the fuel thermal conductivity degradation (TCD) error correction as reported in Reference 1. Reference 1 contained a regulatory commitment to perform a LBLOCA reanalysis, with a commitment date updated in Reference 2, and subsequently in Reference 3.

This submittal satisfies the notification of a significant change, as required by 10 CFR 50.46(a)(3)(ii), due to a greater than 50°F change in the LBLOCA methodology calculated peak cladding temperature (PCT). The ONS licensing basis PCT is changed from 1864°F, as previously reported for the ONS LBLOCA analysis in Reference 4, to 1988°F as a result of the reanalysis described in Enclosure 1. The details of the LBLOCA reanalysis are contained in Enclosure 1 to this letter, and were incorporated into the ONS licensing bases on March 16, 2021. The existing ONS Small Break LOCA analyses of record was not reanalyzed because it is not affected by the TCD issues, and is unchanged as reported in Reference 4.

This submittal completes the commitment to perform the ONS LBLOCA reanalysis prior to the date established in Reference 3.

Since the changes in PCT were identified as part of a reanalysis, the 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) are considered complete and no additional actions beyond reporting are required.

No regulatory commitments are contained in this submittal.

Should you have any questions concerning this letter and its enclosures, please contact Art Zaremba, Manager - Nuclear Fleet Licensing at (980) 373-2062.

Sincerely,

A handwritten signature in black ink, appearing to read "Steve Snider", written in a cursive style.

Steve Snider
Vice President, Nuclear Engineering

Enclosures:

1. Discussion of Changes to LOCA Analyses

U.S. Nuclear Regulatory Commission

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cc:

L. Dudes, USNRC, Region II Regional Administrator
S. Williams, USNRC NRR Project Manager for ONS
J. Nadel, USNRC Senior Resident Inspector for ONS

L. Garner (garnerld@dhec.sc.gov); SC DHEC
A. Nair (naira@dhec.sc.gov); SC DHEC

ENCLOSURE 1: Discussion of Changes to LOCA Analyses

The new Oconee Nuclear Station (ONS) Large Break LOCA (LBLOCA) analyses incorporating the fuel thermal conductivity degradation (TCD) error correction was performed in accordance with the NRC approved LOCA Evaluation Model described in Framatome Topical Report BAW-10192P-A, Revision 0 (Reference 1), and BAW-10192PA, Revision 0, Supplement 1-PA, Revision 0 (Reference 2). All NRC limitations applicable to usage of these LOCA Evaluation Models have been satisfactorily addressed in the ONS LBLOCA TCD reanalysis. All previously identified LBLOCA model error corrections identified since the last ONS LBLOCA analysis have also been incorporated. The existing ONS Small Break LOCA analyses of record is not affected by the TCD issues, and was not reanalyzed.

The ONS LBLOCA TCD reanalysis results in a new set of maximum allowable Linear Heat Rate (LHR) limits. The new LBLOCA TCD LHR limits were evaluated in the cycle-specific Maneuvering Analyses for the currently operating cycles. The maneuvering analyses concluded that LBLOCA TCD LHR limits resulted in acceptable axial offset margins, and that there is no need to update the corresponding limits and setpoints in the current cycle-specific Core Operating Limits Reports (COLR). The updated maneuvering analyses conclusions were also reflected in the cycle-specific Reload Safety Evaluations for the current operating cycles. The cycle-specific COLRs for the current operating cycles were updated to reflect the revised maneuvering analyses and Reload Safety Evaluation calculation citations.

ONS Technical Specification 5.6.5.b lists the analytical methods used to determine the core operating limits, and currently identifies BAW-10192 as the applicable LOCA evaluation methodology. ONS Technical Specification 5.6.5.b states that the approved revision number, and any supplements, of the analytical methods used to determine the core operating limits shall be identified in the Core Operating Limits Report. The Core Operating Limits Reports for the currently operating ONS cycles will specify the appropriate revision number and supplement number for these NRC-approved LOCA methodologies. Therefore, a change to the ONS Technical Specification Section 5.6.5 is not required for this submittal.

The Oconee LBLOCA TCD reanalysis explicitly analyzes a full-core configuration of Mark-B-HTP fuel assemblies and meets the Emergency Core Cooling System (ECCS) performance acceptance criteria in 10 CFR 50.46(b) paragraphs (1) through (3), summarized below.

10 CFR 50.46(b) Criteria	ONS Results for LBLOCA TCD
Peak Cladding Temperature	1988°F
Maximum Local Oxidation	< 3.0% (includes pre-transient oxidation)
Total Core-wide Oxidation	< 0.2%

Included in this report are Oconee LBLOCA PCT summary tables for the current Mark-B-HTP fuel design.

References:

1. BAW-10192PA, Revision 0, BWNT LOCA - BWNT Loss of Coolant Accident Evaluation Model for Once-Through Steam Generator Plants, June 1998.
2. BAW-10192PA, Revision 0, Supplement 1P-A Revision 0, BWNT LOCA - BWNT Loss of Coolant Accident Evaluation Model for Once-Through Steam Generator Plants, November 2017.

10 CFR 50.46 Report for Oconee Units 1, 2, & 3 – Large Break LOCA

Plant:	Oconee Nuclear Station, Units 1, 2, & 3	
Reporting Period:	30-Day Report relative to implementation of Large Break LOCA reanalysis	
LOCA Analysis Type (if applicable):	Large Break	
Evaluation Model:	BAW-10192P-A, Revision 0, BWNT LOCA Evaluation Model for Once-Through Steam Generator Plants and BAW-10192PA, Revision 0, Supplement 1P-A, Revision 0	
Fuel:	15x15 Mark-B-HTP	
A. Analysis of Record PCT	1852 °F	
B. Net Cumulative 10 CFR 50.46 Changes and Error Corrections - Previously Reported	Net PCT Effect +12 °F	Absolute PCT Effect 868 °F
C. Baseline PCT for assessing new changes for significance (A + B)	1864 °F	
D. Cumulative 10 CFR 50.46 Changes and Error Corrections – This Reporting Period 1. Reanalysis to fully incorporate fuel TCD, and other errors previously reported	+124 °F	
E. Sum of 10 CFR 50.46 Changes and Error Corrections against Baseline PCT	Net PCT Effect +124 °F	Absolute PCT Effect 124 °F
F. Licensing Basis PCT (C + E)	1988 °F	