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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-001
Attention: Document Control Desk

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station, Units 1, 2, and 3
Docket Numbers 50-269, 50-270, and 50-287

30-Day Report Pursuant to 10 CFR 50.46, Changes to or Errors in an
Evaluation Model

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 hereby submits information regarding the results of a full reanalysis of the Oconee Loss of Coolant Accident (LOCA), considering a full-core of Mk-B-HTP fuel. Oconee Unit 2 Cycle 26 began operation on November 18, 2011, with a full-core of Mk-B-HTP fuel. Oconee plans to transition Units 1 and 3 to full-core Mk-B-HTP loading patterns in 2012. Therefore, at this time, the new full-core Mk-B-HTP LOCA analysis results provided herein are only applicable to Oconee Unit 2.

The new full-core Mk-B-HTP LOCA analyses supports a 24-month fuel cycle with gadolinia as a burnable absorber, and were performed in accordance with the NRC-approved LOCA Evaluation Model described in AREVA Topical Report BAW-10192P-A. NRC approval for use of gadolinia fuel at Oconee is provided via Safety Evaluation dated July 21, 2011 [ADAMS Accession No. ML11137A150]. NRC approval for use of 24-month fuel cycles at Oconee is pending.

For the full-core Mk-B-HTP configuration, a full break size spectrum for the Small Break LOCA (SBLOCA) analyses was performed using an axial power shape peaked at approximately the 11-foot core elevation. Use of this top-skewed axial power shape in the full-core Mk-B-HTP analyses addresses the peak cladding temperature (PCT) assessments against the previous SBLOCA analyses. The SBLOCA EM error concerning potentially unbounded axial power shapes was previously submitted to the NRC as a 30-day report pursuant to 10 CFR 50.46 via Duke Energy letter dated August 19, 2010 [ADAMS Accession No. ML102360485]. As Oconee Units 1 and 3 transition to full-core Mk-B-HTP loading patterns, the PCT penalty of 225°F applied to the previous SBLOCA analyses will no longer be needed, as the new full-core Mk-B-HTP LOCA analyses will be applicable.

The new Oconee full-core Mk-B-HTP Large Break LOCA PCT result is 1913°F, which represents a significant change in PCT, as defined in 10 CFR 50.46(a)(3)(i), versus the previous analysis of record PCT of 2020°F for a mixed-core of Mk-B11 and Mk-B-HTP fuel. The new Oconee full-core Mk-B-HTP Small Break LOCA PCT result is 1598°F, which represents a significant change in PCT versus the previous analysis of record PCT of 1397°F for a mixed-core of Mk-B11 and Mk-B-HTP fuel. In the letter dated August 19, 2010, Duke Energy reported an error associated with this value and applied a 225°F penalty which resulted in a final PCT of 1622°F for the mixed-core.

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The Oconee Units also have a 75% partial-power SBLOCA analysis with one High Pressure Injection (HPI) pump out of service that supports a 30-day LCO operational window, per Oconee Technical Specification 3.5.2. New partial-power SBLOCA analyses to support the 30-day LCO window have been performed by AREVA, and include the revised axial power shape to address the SBLOCA EM error cited above. To offset the impact of the top-skewed axial power shape, the initial power level used in the full-core Mk-B-HTP partial-power SBLOCA analysis was reduced to 50% of current rated thermal power. At this time, entry into the LCO window is administratively not allowed. A future License Amendment Request will be submitted to revise Oconee Technical Specification 3.5.2, utilizing the 50% partial-power SBLOCA analysis as the basis. Therefore, the new partial-power SBLOCA PCT results for full-core Mk-B-HTP are not reported herein, as this is not an allowed condition. This issue has been entered into Oconee's corrective action program as PIP O-10-6229.

Included in this report are Mk-B11 fuel LOCA PCT summary tables and Mk-B-HTP mixed-core LOCA PCT summary tables for Units 1 and 3, and a full-core Mk-B-HTP LOCA PCT summary table for Unit 2. LOCA results for Units 1 and 3 remain unchanged from those previously reported, and are provided for completeness.

There are no regulatory commitments associated with this letter.

Please address any comments or questions regarding this matter to L. B. Jones at (704) 382-4753.

Sincerely,



R. Michael Glover

Attachments

- Table 1: Mk-B11 Peak Cladding Temperature Summary – Oconee Units 1 and 3
- Table 2: Mk-B-HTP Mixed Core Peak Cladding Temperature Summary – Oconee Units 1 and 3
- Table 3: Mk-B-HTP Full Core Peak Cladding Temperature Summary – Oconee Unit 2

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ATTACHMENT

**Table 1: Mk-B11 Peak Cladding Temperature Summary
Oconee Units 1 and 3**

**Table 2: Mk-B-HTP Mixed Core Peak Cladding Temperature Summary
Oconee Units 1 and 3**

**Table 3: Mk-B-HTP Full Core Peak Cladding Temperature Summary
Oconee Unit 2**

Table 1: Mk-B11 Peak Cladding Temperature Summary – Oconee Units 1 and 3

LBLOCA	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	2035	Mark-B11 (M5), 17.7 kW/ft at 6.021 ft elevation
Prior errors (Δ PCT) 1. Various	0	References A and B
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. None	0	
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	0	
Net change in PCT for this report	0	
Final PCT	2035	
SBLOCA Full Power -100% FP	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	1461	(2 HPI Case) 0.15 ft ² break
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. EOC SBLOCA Axial Power Shape Error	+225	Reference C
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	225	
Net change in PCT for this report	+225	
Final PCT	1686	
SBLOCA Reduced Power – 75% FP	PCT(°F)	Comments
Analysis of record PCT	1774	(1 HPI case) 0.075 ft ² break
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. EOC SBLOCA Axial Power Shape Error	Unknown	Reference C
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	Unknown	
Net change in PCT for this report	Unknown	
Final PCT	Unknown	Operation Not Justified

Reference

- A) Letter, T. C. Geer (Duke) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an Evaluation Model", December 18, 2007. [ADAMS ML073580171]
- B) Letter, T. C. Geer (Duke) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an Evaluation Model", July 29, 2008. [ADAMS ML082130096]
- C) Letter, T. C. Geer (Duke) to USNRC, "30-Day Report Pursuant to 10 CFR 50.46, Changes to or Errors in an Evaluation Model", August 19, 2010. [ADAMS ML102360485]

Table 2: Mk-B-HTP Mixed Core Peak Cladding Temperature Summary – Oconee Units 1 & 3

LBLOCA	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	2020	
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. None	0	
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	0	
Net change in PCT for this report	0	
Final PCT	2020	
SBLOCA Full Power -100% FP	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	1397	(2 HPI Case) 0.15 ft ² break
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. EOC SBLOCA Axial Power Shape Error	+225	Reference C (per Table 1)
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	225	
Net change in PCT for this report	+225	
Final PCT	1622	
SBLOCA Reduced Power – 75% FP	PCT(°F)	Comments
Analysis of record PCT	1788	(1 HPI case) 0.075 ft ² break
Prior errors (Δ PCT) 1. Not Applicable (New Analysis performed in 2008)	N/A	
Prior evaluation model changes (Δ PCT) 1. Not Applicable (New Analysis performed in 2008)	N/A	
Errors (Δ PCT) 1. EOC SBLOCA Axial Power Shape Error	Unknown	Reference C (per Table 1)
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	Unknown	
Net change in PCT for this report	Unknown	
Final PCT	Unknown	Operation Not Justified

Table 3: Mk-B-HTP Full Core Peak Cladding Temperature Summary – Oconee Unit 2

LBLOCA	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	1913	
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. None	0	
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	0	
Net change in PCT for this report	0	
Final PCT	1913	
SBLOCA Full Power -100% FP	PCT(°F)	Comments
Evaluation model: RELAP5/MOD2-B&W		
Analysis of record PCT	1598	(2 HPI Case) 0.15 ft ² break
Prior errors (Δ PCT) 1. None	0	
Prior evaluation model changes (Δ PCT) 1. None	0	
Errors (Δ PCT) 1. None	0	
Evaluation model changes (Δ PCT) 1. None	0	
Absolute value of errors/changes for this report (Δ PCT)	0	
Net change in PCT for this report	0	
Final PCT	1598	
SBLOCA Reduced Power – 50% FP	PCT(°F)	Comments
Analysis of record PCT	N/A	Will be reported under a separate LAR
Prior errors (Δ PCT) 1.	N/A	
Prior evaluation model changes (Δ PCT) 1.	N/A	
Errors (Δ PCT) 1.	N/A	
Evaluation model changes (Δ PCT) 1. None	N/A	
Absolute value of errors/changes for this report (Δ PCT)	N/A	
Net change in PCT for this report	N/A	
Final PCT	N/A	Operation Not Justified