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

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David.Baxter@duke-energy.com

Subject: Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Units 1 and 2
Docket Numbers 50-369 and 50-370
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414

Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS
Evaluation Model

10 CFR 50.46(a)(3)(ii) requires the reporting of changes to or errors in the Emergency Core Cooling System (ECCS) evaluation models (EMs). This report covers the time period from January 1, 2010 to December 31, 2010.

During this time period, there were no errors or evaluation model changes identified by Westinghouse that exhibited changes to the peak cladding temperature (PCT) results. However, three non-discretionary changes were made to the large break loss of coolant accident (LBLOCA) EM. The specific details of these changes are provided in Table 1, and were not considered to have an impact on the calculated PCTs. Since there was no PCT impact due to these non-discretionary changes, they are not included in the PCT summary tables.

For completeness, Westinghouse also informed Duke Energy of a number of discretionary coding changes that were made as part of normal code maintenance and general code cleanup for the small break LOCA analyses. Specific details of these changes are also provided in Table 1 and were not considered to have an impact on the calculated PCTs. As such, they are not included in the PCT summary tables.

All McGuire and Catawba units were loaded with cores comprised entirely of Westinghouse fuel for the calendar year 2010. Therefore, no transition core PCT penalties are included in the PCT summary tables.

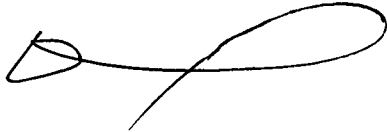
Table 2 provides the PCT summary for McGuire Units 1 and 2 and Catawba Unit 1, and Table 3 provides the PCT summary for Catawba Unit 2.

There are no regulatory commitments associated with this letter.

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NRK

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

Sincerely,



David A. Baxter
Vice President, Nuclear Engineering

Attachments

- Table 1 Errors/Evaluation Model Changes with no PCT Impact
- Table 2 Peak Cladding Temperature Summary – McGuire Units 1 & 2 and Catawba Unit 1
- Table 3 Peak Cladding Temperature Summary – Catawba Unit 2

xc: (with attachments)

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ATTACHMENTS

Table 1 – Errors/Evaluation Model Changes with no PCT Impact

**Table 2 – Peak Cladding Temperature Summary
McGuire Units 1 & 2 and Catawba Unit 1**

Table 3 – Peak Cladding Temperature Summary – Catawba Unit 2

Table 1
Errors / Evaluation Model Changes with no PCT Impact

Discretionary Changes:

General Code Maintenance

Affected Evaluation Model(s): SBLOCA, 1985 NOTRUMP Model

Various changes were made to enhance the usability of the codes and to help preclude errors in analyses. Examples of these changes include modifying input variable definitions, units, and defaults; improving the input diagnostic checks; enhancing the code output; optimizing active coding; and, eliminating inactive coding. The nature of these code changes leads to an estimated PCT impact of 0°F.

Non-Discretionary Changes:

Urania-Gadolinia Pellet Thermal Conductivity Calculation

Affected Evaluation Model(s): SBLOCA, 1985 NOTRUMP Model

Two errors were discovered in the pellet thermal conductivity calculation for uranium-gadolinia pellets in the SBLOCA code. First, the calculation did not include the terms required to adjust for pellet densities other than 95% of the theoretical density. Second, the conversion from Fahrenheit to Rankine used an adder of 459 instead of 459.67. These errors have been corrected and evaluated for impact on existing Small Break LOCA analysis results. SBLOCA sensitivity calculations led to an estimated PCT effect of 0°F for existing Small Break LOCA analysis results.

Pellet Crack and Dish Volume Calculation

Affected Evaluation Model(s): SBLOCA, 1985 NOTRUMP Model

Two errors were discovered in the calculation of the normalized pellet crack and dish volumes in the SBLOCA code. First, an incorrect operator was used to select between two tables of normalized volume vs. linear heat generation rate. Second, the normalized volume at 18 kW/ft was incorrectly programmed in one of the tables as 1.58 instead of 1.59. These errors have been corrected in the SBLOCA code and will be corrected (where applicable) in future versions of the BASH and LOCBART codes. A combination of SBLOCA sensitivity calculations and engineering judgment led to an estimated PCT effect of 0°F for existing Large and Small Break LOCA analysis results.

Treatment of Vessel Average Temperature Uncertainty

Affected Evaluation Model(s): SBLOCA, 1985 NOTRUMP Model , BELOCA 1996 Model

Historically, the overall vessel average temperature uncertainty calculated by Westinghouse considered only "-" instrument uncertainties, corresponding to the indicated temperature being lower than the actual temperature. This uncertainty was then applied as a "+/-" uncertainty in some LOCA analyses, rather than using specific "+" and "-" uncertainties. This issue was judged to have a negligible impact on existing Large and Small Break LOCA analysis results, leading to an estimated PCT impact of 0°F.

Table 2
Peak Cladding Temperature Summary – McGuire Units 1 & 2 and Catawba Unit 1

LBLOCA	Cladding Temp (°F)	Comments
Evaluation model : WCOBRA/TRAC, CQD 1996		
Analysis of record PCT	2028	MNS/CNS Composite Model
Prior errors (Δ PCT)		
1. Decay heat in Monte Carlo calculations	8	Reference A
2. MONTECF power uncertainty correction	20	Reference B
3. Safety Injection temperature range	59	Reference C
4. Input error resulting in an incomplete solution matrix	25	Reference D
5. Revised Blowdown Heatup Uncertainty Distribution	5	Reference E
6. Vessel Unheated Conductor Noding	0	Reference F
Prior evaluation model changes (Δ PCT)		
1. Revised Algorithm for Average Fuel Temperature	0	Reference F
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	2145	
SBLOCA		
Evaluation model : NOTRUMP		
Analysis of record PCT	1323	2 inch 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	1323	

Reference:

- A) Letter, M. S. Tuckman (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," May 3, 2001 (ML011310391)
- B) Letter, M. S. Tuckman (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," April 3, 2002 (ML021070656)
- C) Letter, W. R. McCollum, Jr. (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," July 29, 2003 (ML032170639)
- D) Letter, W. R. McCollum, Jr. (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," May 26, 2004 (ML041560349)
- E) Letter, J. R. Morris (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," June 21, 2005 (ML051790210)
- F) Letter, T. C. Geer (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," March 13, 2007 (ML070800546)

**Table 3
Peak Cladding Temperature Summary – Catawba Unit 2**

LBLOCA	Cladding Temp (°F)	Comments
Evaluation model : WCOBRA/TRAC, CQD 1996		
Analysis of record PCT	2028	MNS/CNS Composite Model
Prior errors (Δ PCT)		
1. Decay heat in Monte Carlo calculations	8	Reference A
2. MONTECF power uncertainty correction	20	Reference B
3. Safety Injection temperature range	59	Reference C
4. Input error resulting in an incomplete solution matrix	25	Reference D
5. Revised Blowdown Heatup Uncertainty Distribution	5	Reference E
6. Vessel Unheated Conductor Noding	0	Reference F
Prior evaluation model changes (Δ PCT)		
1. Revised Algorithm for Average Fuel Temperature	0	Reference F
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	2145	
SBLOCA		
Evaluation model : NOTRUMP		
Analysis of record PCT	1243	4 inch 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	1243	

Reference:

- A) Letter, M. S. Tuckman (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," May 3, 2001 (ML011310391)
- B) Letter, M. S. Tuckman (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," April 3, 2002 (ML021070656)
- C) Letter, W. R. McCollum, Jr. (Duke Energy) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model," July 29, 2003 (ML032170639)
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