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July 29, 2003

U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555-0001  
Attention: Document Control Desk

Subject: Duke Energy Corporation  
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

Reference: 1) Letter, M. S. Tuckman (Duke Energy Corporation), to U. S. Nuclear  
Regulatory Commission, SUBJECT: "License Amendment Request,  
Implementation of Best-Estimate Large Break Loss of Coolant Accident Analysis  
Methodology," August 10, 2000.

10 CFR 50.46 (a)(3)(ii) requires the reporting of changes to or errors in ECCS evaluation models (EM) or in the application of such models that affect the temperature calculation. On July 11, 2003 Duke Energy Corporation received notification from Westinghouse Electric Company indicating a change in the limiting case for the Best-Estimate Large Break Loss of Coolant Accident (BELBLOCA) analysis in excess of 50°F.

The original BELBLOCA analysis considered a safety injection water temperature range of 70 - 100 °F. This temperature range was based on the temperature of the refueling water storage tank (RWST) temperature. Safety injection flow at McGuire/Catawba is provided by three different pumps: a charging pump, a safety injection pump, and a residual heat removal (RHR) pump. The injection flow from the RHR pumps passes through the RHR heat exchanger before entering the reactor coolant system. Thus, the water supplied by the RHR pump can be cooled prior to being injected into the RCS. McGuire system engineers observed that the component cooling water can be as low as 45 °F during winter conditions. With component cooling water temperatures below the RWST temperature, the injection water temperature could be below the temperature range considered in the BELBLOCA analysis.

Previous McGuire/Catawba large break LOCA calculations have shown that colder injection temperatures can lead to an increase in the calculated peak cladding temperature (PCT). To evaluate lower safety injection water temperatures additional WCOBRA/TRAC calculations were performed. The revised WCOBRA/TRAC results were used to assess a new injection temperature range 58 - 90 °F. The impact of this revised temperature range was determined to

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have a PCT penalty of 59 °F. The absolute values of the PCT change is greater than 50°F and therefore is considered to be a significant error/change per the definition in 10 CFR 50.46. It should be noted that the final PCT (2115 °F) is still within the 10 CFR 50.46 acceptance criteria.

Summaries of the large break LOCA peak cladding temperatures for the McGuire and Catawba units are provided in Tables 1 and 2, which are attached to this letter. At Catawba, the component cooling water temperature is maintained warm enough such that the original safety injection temperature range remains valid. However upon a safety injection signal, the temperature controller valve would open and the component cooling water temperatures could approach those observed at McGuire. Therefore, the PCT penalty calculated for the McGuire conditions is conservatively applied to Catawba as well.

This evaluation was performed consistent with the method prescribed in Reference 1. The impact of this plant change was first evaluated on the composite model. There are no differences in plant configuration that would suggest that the composite model evaluation of safety injection temperature effects would be not be applicable to the McGuire/Catawba units. The reference transient is not impacted by this evaluation, and the only change from this assessment is that a new safety injection temperature range is specified.

10 CFR 50.46 (a)(3)(ii) also requires a proposed schedule for reanalysis for changes that are determined to be significant. The assessment of the PCT impact is based on plant-specific WCOBRA/TRAC calculations and, therefore, no further analysis is needed.

Please address any comments or questions regarding this matter to J. S. Warren at (704) 382-4986.

Very truly yours,

A handwritten signature in black ink, appearing to read 'W. R. McCollum, Jr.', with a stylized flourish at the end.

W. R. McCollum, Jr.  
Senior Vice President, Nuclear Support

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xc w/Attachment:

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Table 1  
 Peak Cladding Temperature Summary – McGuire Units 1 & 2

LBLOCA	Cladding Temp (°F)	Comments
Evaluation model : <u>W</u> COBRA/TRAC		
Analysis of record PCT	2028	MNS/CNS Composite Model
Prior errors ( $\Delta$ PCT)		
1. Decay heat in Monte Carlo calculations	8	Reference A
2. MONTECF power uncertainty correction	20	Reference B
Prior evaluation model changes ( $\Delta$ PCT)		
1. None	0	
Errors ( $\Delta$ PCT)		
1. Safety Injection Temperature Range	59	Note (1)
Evaluation model changes ( $\Delta$ PCT)		
1. None	0	
Absolute value of errors/changes for this report ( $\Delta$ PCT)	0	
Net change in PCT for this report	59	
Final PCT	2115	

References:

- A) Letter, M. S. Tuckman (DEC) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model", May 3, 2001
- B) Letter, M. S. Tuckman (DEC) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model", April 3, 2002

Note:

- 1) An evaluation was performed to reduce the safety injection temperature range to 58 - 90 °F. The analysis supports a RWST temperature range of 70 - 100 °F and a component cooling water temperature range of 45 - 80 °F.

Table 2  
 Peak Cladding Temperature Summary – Catawba Units 1 & 2

LBLOCA	Cladding Temp (°F)	Comments
Evaluation model : <u>W</u> COBRA/TRAC		
Analysis of record PCT	2028	MNS/CNS Composite Model
Prior errors ( $\Delta$ PCT) 1. Decay heat in Monte Carlo calculations 2. MONTECF power uncertainty correction	8 20	Reference A Reference B
Prior evaluation model changes ( $\Delta$ PCT) 1. None	0	
Errors ( $\Delta$ PCT) 1. Safety Injection Temperature Range	59	Note (1)
Evaluation model changes ( $\Delta$ PCT) 1. None	0	
Absolute value of errors/changes for this report ( $\Delta$ PCT)	0	
Net change in PCT for this report	59	
Final PCT	2115	

References:

- A) Letter, G. R. Peterson (DEC) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model", April 11, 2001
- B) Letter, M. S. Tuckman (DEC) to USNRC, "Report Pursuant to 10 CFR 50.46, Changes to or Errors in an ECCS Evaluation Model", April 3, 2002

Note:

- 1) An evaluation was performed to reduce the safety injection temperature range to 58 - 90 °F. The analysis supports a RWST temperature range of 70 - 100 °F and a component cooling water temperature range of 45 - 80 °F.