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SUBJECT: Submits rept re error related to application of LBLOCA  
evaluation model, per 10CFR50.46.

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Executive Vice President  
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July 8, 1999

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

Subject: Duke Energy Corporation

Oconee Nuclear Station, Units 1, 2, and 3  
Docket Numbers 50-269, 50-270, and 50-287

Report Pursuant to 10 CFR 50.46, Error Related to  
Application of the LBLOCA Evaluation Model

10 CFR 50.46 requires reporting of changes to or errors in ECCS Evaluation Models or in the application of such models that affects the temperature calculation. On June 14, 1999 Duke Energy Corporation received a report (Reference 1) which identified guidance used to show compliance with the large break LOCA (LBLOCA) Evaluation Model. This guidance document deals with selecting the limiting radial and axial peaking to be used in the LBLOCA analysis. This document also defined a LOCA linear heat rate (LHR) limit penalty to be used when the limiting axial power shape is significantly different from the reference analysis. Following this guidance document, the LBLOCA LHR limits penalties were calculated for all core designs that utilized the RELAP5 based LBLOCA model. These adjusted LHR limits were then compared to the operating limits. For core designs analyzed, no impact on the operating limit resulted. //

Alternately, a PCT impact could be assessed for axial peaking values that differ significantly from the reference value (1.7). Using this approach, a significant PCT change could result. Therefore pursuant to 10 CFR 50.46 (a)(3)(ii), Duke Energy Corporation is hereby reporting this error in the Oconee Units 1, 2, and 3 LBLOCA ECCS analysis. The details of this concern, as applicable to the Oconee units, are provided in the attachment to this letter. AW,

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U. S. Nuclear Regulatory Commission

Page 2

July 8, 1999

For the Oconee units, when applying the LHR adjustment (penalty) in the maneuvering analysis, the PCT impact is offset by the LHR penalty. Thus, no PCT impact is calculated and therefore the Oconee units continue to be in compliance with the requirements of 10 CFR 50.46.

Our plans are to use the approach identified in Reference 1 in the maneuvering analyses for current operating cycles and to develop operating limits for future core designs. Please address any comments or questions regarding this matter to J. S. Warren at (704) 382-4986.

Very truly yours,

A handwritten signature in dark ink, appearing to read "M. S. Tuckman", with a horizontal line extending to the right.

M. S. Tuckman

Attachment

U. S. Nuclear Regulatory Commission  
Page 3  
July 8, 1999

cc: L. A. Reyes  
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Washington, DC 20555-0001

M. A. Scott, NRC Senior Resident Inspector  
Oconee Nuclear Site

## Attachment

### Oconee Nuclear Station Report Pursuant to 10 CFR 50.46 - Error Related to Application of the LBLOCA Evaluation Model

In the application of the LOCA limits provided by FTI, there was an error related to the evaluation of the limiting axial peaks. The SER for the Evaluation Model states, "FTI must revalidate the acceptability of the evaluation model peaking methods if: (1) significant changes are found in the core elevation at which the minimum core LOCA margin is predicted or (2) the core maneuvering analyses radial and axial peaks that approach the LOCA LHR limits differ appreciably from those used to demonstrate Appendix K compliance.", yet the maneuvering analyses identified axial peaks that were appreciably different.

To assess the impact of this error, two approaches were considered. The first approach is to estimate the Peak Cladding Temperature (PCT) impact of axial peaks that are appreciable different from 1.7 (at the current LOCA limits). This evaluation estimated that for some axial shapes, the impact might have exceeded 50 °F. A second approach (documented in Reference 1) provides a LHR adjustment to the LOCA limits to be applied for axial shapes significantly different than the analyzed value of 1.7. This approach is applied in the maneuvering analyses to axial peaks that differ appreciably from 1.7 in a manner that maintains the calculated PCT and satisfies the SER restriction. This method has been utilized to evaluate the impact on the operating limits for all those past and currently operating Oconee core designs which utilized the RELAP-based evaluation model. The results of this evaluation identified that there was sufficient margin available between the calculated LHR in the maneuvering analyses and the LOCA LHR limits to accommodate this change without impacting the operating limits. Effectively, those power distributions in the maneuvering analyses with axial peaks appreciably different than 1.7 had sufficient retained margin to accommodate the adjustments to the LHR limit. Therefore, the current operating limits continue to preclude exceeding the calculated PCT are not impacted by this error. This approach will be applied in future

## **Attachment (Continued)**

maneuvering analysis applications to ensure that the calculated PCT is maintained for axial shapes appreciably different from 1.7.

Duke has determined the second approach, applying the LHR adjustment identified in Reference 1, satisfies the SER requirements and no PCT impact is required.

### **REFERENCES**

- 1) FTI document 51-5004541-00, "Radial vs Axial Core Peaking for LOCA", dated June 1999.