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

Subject: Duke Energy Corporation
Catawba Nuclear Station, Unit 2
Docket Number 50-414
Topical Report DPC-NE-3002-A
Notification of Methodology Error

Reference: DPC-NE-3002-A, Revision 2, December 1997, "FSAR Chapter 15 System Transient Analysis Methodology"
SER Dated April 26, 1996.

The purpose of this letter is to notify the NRC that the referenced computer code nodalization model has recently been determined to predict the Catawba Unit 2 plant response for the loss of normal feedwater event in a non-conservative manner. The loss of normal feedwater transient has been analyzed with a different nodalization model in order to predict the plant response conservatively. NRC review of this methodology change to topical report DPC-NE-3002-A is requested.

Duke Power analyzes the Catawba UFSAR Chapter 15 non-LOCA transients and accidents with analytical methodologies that have been reviewed and approved by the NRC. Specifically, topical report DPC-NE-3002-A, Revision 2, December 1997, "FSAR Chapter 15 System Transient Analysis Methodology", details the methodology for most of the Chapter 15 events. Section 3.3 of this topical report describes the methodology for analyzing the loss of normal feedwater event, which is the analysis in UFSAR Section 15.2.7. In Section 3.3.3.1 of the DPC-NE-3002-A topical report, the computer code nodalization used for the loss of normal feedwater core cooling capability analysis is identified as the RETRAN model described in Section 3.2 of the NRC-approved Duke Power topical report DPC-NE-3000-PA, "Thermal-Hydraulic Transient Analysis Methodology". (SER dated December 27, 1995)

A-UDI/D

The RETRAN computer code model used by Duke Power to model UFSAR Chapter 15 transients and accidents is described in the DPC-NE-3000-PA topical report. The RETRAN model nodalization includes a multi-node model of the steam generator secondary. This model has the potential for predicting excessive primary-to-secondary post-trip heat transfer during events which significantly uncover the steam generator tube bundle. This model limitation was discussed in detail with the NRC during a meeting on October 7 & 8, 1991. During this meeting Duke demonstrated that the model provided conservative predictions of primary-to-secondary heat transfer as long as the steam generator water inventory did not decrease to less than 10% of the full power inventory.

Recently completed analyses of the loss of normal feedwater event for Catawba Unit 2 have resulted in minimum post-trip steam generator water inventories of less than 10% of the full power inventory. These results prompted an evaluation and an assessment of the analytical methodology and model. As a result of this evaluation it has been concluded that the methodology for analyzing the loss of normal feedwater event for Catawba Unit 2 must be revised in order to ensure conservative predictions of the plant response.

The proposed methodology revision is two additional sentences to be inserted in Section 3.3.3.1 of the DPC-NE-3002-A topical report. This revision will require using a single volume steam generator secondary model for the post-trip phase of the loss of normal feedwater analysis for Catawba Unit 2. This single volume steam generator secondary model is already used for analyzing the uncontrolled bank withdrawal from a subcritical or low power startup condition transient (UFSAR Section 15.4.1), which is described in Section 5.1.1.1 of the DPC-NE-3002-A topical report. Therefore, this model has already been reviewed and approved by the NRC. This letter is requesting NRC approval to apply an approved model to a different analysis.

The current Section 3.3.3.1 of the DPC-NE-3002-A topical report reads as follows:

> "3.3.3.1 Nodalization - Since the transient response of the loss of normal feedwater event is the same for all loops, the single-loop model described in Section 3.2 of Reference 2 is utilized for this analysis."

The proposed revision is as follows:

> "3.3.3.1 Nodalization - Since the transient response of the loss of normal feedwater event is the same for all loops, the single-loop model described in Section 3.2 of Reference 2 is utilized for this analysis. For Catawba Unit 2 only, the post-trip phase of the analysis uses a single volume steam generator secondary model. This model uses the bubble rise option with the local-conditions heat transfer model applied to the steam generator tube conductors."

The non-conservative results predicted by the multi-node steam generator secondary model can be characterized as an underprediction of the cold leg temperatures, which then produce an underprediction of bulk average temperature, and pressurizer level and pressure. With the revised model the corrected results maintain a large margin to the acceptance criteria, and therefore no safety significance is associated with this modeling error. The revised analyses will be incorporated into the UFSAR following NRC review and approval of this methodology change to topical report DPC-NE-3002-A. The above revision to Section 3.3.3.1 of the DPC-NE-3002-A topical report will be included in a future revision to the published version.

Should you have any questions concerning this information, please call G.B. Swindlehurst at (704) 382-5176.

Very truly yours,

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