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DUKE POWER

July 17, 1991

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

Subject: McGuire Nuclear Station
Docket Numbers 50-369 and -370
Catawba Nuclear Station
Docket Numbers 50-413 and -414
ECCS Model Changes; Report Required by 10CFR 50.46

Attached are summaries of changes to Emergency Core Cooling System models which are used for McGuire (Attachment 1) and Catawba (Attachment 2) Nuclear Stations. Reports of changes to these models are required by 10CFR 50.46(a) (3) (ii). Duke received notification of these changes by letters from Westinghouse Electric Corporation dated June 20, 1991. In keeping with the significance of the changes, this report is provided within 30 days of that notification.

If there are any questions, please call Scott Gewehr at (704) 373-7581.

Very truly yours,

Handwritten signature of M. S. Tuckman in cursive script.
M. S. Tuckman

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11

Nuclear Regulatory Commission
July 17, 1991
Page 2

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Attachment 2
1990/1991 Catawba ECCS Evaluation Model Change Summary

I. LARGE BREAK LOCA EVALUATION MODEL

- A. Changes were made to make the LOCA fuel rod models consistent with the design fuel rod models. The increase in peak clad temperature (PCT) is less than 10°F for the BASH evaluation model.
- B. The combination of LOCA + safe shutdown earthquake (SSE) loadings might cause steam generator tube collapse to an extent greater than had previously been evaluated, resulting in a reduction in the available area through which to vent the steam generated during core reflood and an accompanying increase in peak clad temperature. This effect is bounded by an 8°F PCT increase for split flow preheat steam generators (Unit 1) and a 20°F PCT increase for counterflow preheat steam generators (Unit 2).
- C. The prediction of fuel rod cladding burst was based on the average power in the hot assembly. Since some fuel rods are at a higher power than this average, the time of cladding burst, and of the accompanying channel flow blockage and downstream cladding heatup, could be underpredicted. Because the effect of this underprediction on PCT depends on reflooding rate and on the time of PCT, the penalty, if any, is plant specific. For Catawba the PCT penalty is 110°F. It has been confirmed by Westinghouse that there is no corresponding McGuire PCT penalty.
- D. The axial power distribution sensitivity study performed for the older evaluation models did not remain completely valid for the BART/BASH evaluation models. It is possible that certain skewed axial power distributions might result in higher calculated PCTs than does the analyzed distribution. This effect may be accounted for in two ways. A PCT penalty of 100°F will bound the increase if these distributions are encountered. Alternatively, the Core Operating Limits Report K(z) limit may be reduced ensure that these distributions do not arise. Catawba takes the former approach, necessitating a 100°F penalty. McGuire takes the latter approach and therefore has no corresponding penalty.

These penalties are in addition to the 10°F penalty currently documented in Table 15-35 of the October 1, 1990 Catawba FSAR update.

II. SMALL BREAK LOCA EVALUATION MODEL

- A. Changes were made to make the LOCA fuel rod models consistent with the design fuel rod models. The increase in peak clad temperature (PCT) is less than 37°F for the NOTRUMP evaluation model.

- B. An input to the evaluation model is the time required to purge high enthalpy main feedwater from the steam generator inlet piping before the lower enthalpy auxiliary feedwater is delivered. The standard input for this time was found to be nonconservative with respect to the plant specific value. The impact on PCT is 27°F for this effect.
- C. A correction to the cladding strain model caused a plant specific PCT penalty, due to a smaller fuel clad gap, for situations in which the RCS pressure was above the fuel rod internal pressure at the time of PCT. The value of the Catawba penalty is 30°F. It has been confirmed by Westinghouse that there is no corresponding McGuire penalty.

Penalties A and C are in addition to the 69°F penalty currently documented in Table 15-39 of the October 1, 1990 Catawba PSAR update. Penalty B is already included in this 69°F value.