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Director
Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Reload Methodology Topical Report NSPNAD-8102
Error in COBRA IIIC/MIT-Computer Code

An error has been identified and corrected in the COBRA IIIC/MIT computer code, NSP version CBR80250. This error has been evaluated and found not to create any substantial safety hazard. This is being reported for your information.

The error was identified during the Prairie Island Unit 2 Cycle 8 calculations when a "CHF ERROR" message was generated. The error was traced back to the calculation of a negative boiling height for use in the W-3 nonuniform heat flux correction factor calculation. The Jens-Lottes heat transfer correlation had been incorrectly programmed in the HCOOL subroutine such that uniform heat flux boiling was never calculated to occur. The node at which boiling occurs, for use in the W-3 calculation, is then never reset from the initial value of zero. Since, by definition, a zero value does not exist in the axial node array, the boiling height was set equal to a "garbage value". In the case of the PI 2 Cycle 8 calculations, the value was picked up as a negative value thereby producing a negative critical heat flux for all channels and hence the "CHF ERROR" message.

The error was corrected in NSP version CBR83180. This consisted of correcting the programming of the Jens-Lottes correlation as well as adding a check for nonboiling, before the W-3 nonuniform heat flux correction factor calculation, since some peripheral channels will not exceed the uniform heat flux boiling temperature.

The effect of this error on the MDNBR calculations in NSPNAD-8102 (Reload Safety Evaluation Methods for Application to PI Units, REv 1, December 1982) is insignificant. In these calculations, PI 1 Cycle 1, the boiling height was randomly set to a value which was approximately equal to the correct value

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for the hot channel. Also, the effect of the nonuniform heat flux correction on the W-3 correlation decreases up the flow channel. A spectrum of steady state and transient cases from the above referenced document were rerun on the new version and there was no change in the calculated MDNBRs. Therefore, the thermal margin methodology described in NSPNAD-8102 remains valid.

Please call us if further information is needed.

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DMM/TMP/dab

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