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AUTH.NAME . AUTHOR AFFILIATION
WARDEN,R.L. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
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SUBJECT: Submits info to NRC re estimated effect of error identified
in Siemens Power Corp SBLOCA evaluation model & error
identified in RODEX2 used for SBLOCA calculations, required
IAW 10CFR50.46(a)(3)(ii) for HBRSEP.

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Robinson Nuclear Plant
 3581 West Entrance Road
 Hartsville SC 29550

Robinson File No: 13510

Serial: RNP-RA/99-0103

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United States Nuclear Regulatory Commission

Attn: Document Control Desk

Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261/LICENSE NO. DPR-23

**REPORT OF SIGNIFICANT ERRORS IN THE APPLICATION
 OF THE SMALL BREAK LOSS OF COOLANT ACCIDENT MODEL**

Sir or Madam:

This letter submits information to the NRC required in accordance with 10 CFR 50.46(a)(3)(ii) for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, regarding the estimated effect of an error identified in the Siemens Power Corporation (SPC) Small Break Loss-of-Coolant Accident (SBLOCA) evaluation model¹ and an error identified in RODEX2² used for the SBLOCA calculations. The sum of the absolute values of the estimated effects on calculated Peak Clad Temperature (PCT) of errors reported by this letter are greater than 50°F. Therefore, the estimated effect on PCT of these errors are required to be reported to the NRC within 30 days, in accordance with 10 CFR 50.46(a)(3)(ii). Each error identified and the impact of each error on PCT is discussed below.

SPC has identified an error regarding the convergence of nodalization in the application of the SBLOCA evaluation model. The core nodalization has been found to be non-convergent with respect to core node length. The evaluation of nodalization consisted of a series of calculations using the current methodology in conjunction with combinations of core cross flow models, level models, and node length, to steady state conditions at approximately 1500 transient seconds. From the evaluation, two models were identified as the principle contributors to non-convergence. They were the two-velocity cross flow model and the level model. The two velocity cross flow model lacks sophisticated treatment for the two phase momentum equations and causes severe oscillations during two phase flow conditions. The level model, which sharpens the liquid vapor interface, can have spurious behavior under some conditions. When these models were used in conjunction, the

¹ XN-NF-82-49(P)(A), "EXEM PWR Small Break Model," Revision 1, Supplement 1, December 1994.

² XN-NF-81-58(P)(A), "RODEX2 Fuel Rod Thermal-Mechanical Response Evaluation Model," Supplements 1 and 2, Revision 2, November 16, 1983.

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core nodalization was not converged in the hot assembly solution. The estimated effect of this error on PCT is -330°F. Since the estimated PCT value is less than the currently reported value, the current, more conservative, SBLOCA PCT value is not reduced by this error estimate.

SPC has identified an error in the cladding corrosion calculation in RODEX2 (RDX2LSE) used for SBLOCA calculations. The deficiency required modification of a computer code and an update to the corrosion enhancement factor. The estimated effect of this error on PCT is +2°F

The previously reported SBLOCA calculated PCT value for HBRSEP, Unit No. 2 was 1978.6°F for the SBLOCA during the Emergency Core Cooling System (ECCS) Injection Mode. The total estimated PCT effect of the errors reported in this letter, taking into account that the negative impact of the nodalization error is not credited to the reported value, is +2°F, and the reported PCT associated with the SBLOCA during the ECCS Injection Mode is raised from 1978.6°F to 1980.6°F.

The current PCTs associated with Loss-of-Coolant Accidents (LOCAs) are listed below.

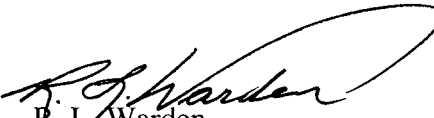
| <u>Event</u> | <u>PCT (°F)</u> |
|---------------------------------------|-----------------|
| LBLOCA ECCS Injection Mode | 2114 |
| LBLOCA Transfer to Recirculation Mode | 2102 |

| <u>Event</u> | <u>PCT (°F)</u> |
|---|---------------------------------|
| Small Break (SB) LOCA ECCS Injection Mode | 1980.6 |
| SB LOCA Transfer to Recirculation Mode | No Heatup During Switch-over |

Since the core nodalization error is not being credited to the reported PCT value, a reanalysis of the HBRSEP, Unit No. 2, SBLOCA PCT during the ECCS Injection Mode is not needed. Additionally, the cladding corrosion calculation error is too small to warrant a SBLOCA PCT reanalysis.

If you have any questions concerning this matter, please contact me or Mr. H. K. Chernoff.

Sincerely,


R. L. Warden
Manager, Regulatory Affairs

ALG/alg

U. S. Nuclear Regulatory Commission

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c: L. A. Reyes, USNRC, Region II
R. Subbaratnam, NRC, NRR
NRC Resident Inspector, HBRSEP