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SUBJECT: Submit info re estimated effect on error identified in  
Siemens Power Corp EXEM PWR large break LOCA evaluation  
model, per 10CFR50.46(a)(3)(ii). Each error discovered &  
impact of each error on peak clad temp, discussed.

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Serial: RNP-RA/98-0187

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United States Nuclear Regulatory Commission  
Attn: Document Control Desk  
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261/LICENSE NO. DPR-23

ESTIMATES OF SIGNIFICANT ERRORS IN THE APPLICATION  
OF THE LARGE 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) EXEM PWR Large Break Loss-of-Coolant Accident (LBLOCA) evaluation model<sup>1</sup>. The sum of the absolute values of the estimated effects on calculated Peak Clad Temperature (PCT) of errors reported by this letter and by previous Carolina Power & Light (CP&L) Company letters to the NRC dated June 1, 1998, and July 30, 1998, 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 discovered and the impact of each error on PCT is discussed below.

SPC has identified an error regarding the calculation of an unrealistically high PCT in the region at the upper extremity of the core when three (3) inch axial nodes are modeled in the TOODEE2<sup>2</sup> code. The current analysis uses greater than three (3) inch nodes to model the upper extremity of the core. The unrealistically high PCT is caused by the Fuel Cell Test Facility (FCTF) heat transfer correlation which predicts unrealistically low heat transfer coefficients above the 10.5 foot elevation. To assure that a bounding PCT is calculated, an increased nodalization was used at the top of the core. The estimated effect of this error on PCT is +5°F.

<sup>1</sup> EXEM PWR LBLOCA Evaluation Model as accepted in NRC Letter, D. M. Crutchfield (NRC) to G. N. Ward, "Safety Evaluation of Exxon Nuclear Corporation's Large Break ECCS Evaluation Model EXEM/PWR and Acceptance for Referencing of Related Licensing Topical Reports," July 8, 1986.

<sup>2</sup> XN-NF-82-07(P)(A), "Exxon Nuclear Corporation ECCS Cladding, Swelling, and Rupture Model," Revision 1, Exxon Nuclear Corporation, Richland, WA 93352, November 19, 1982.

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SPC has identified an error in the asymmetric fuel density used in the RODEX2<sup>3</sup> Code. The value used for the asymmetric fuel density was not reflective of the current manufacturing process. The asymmetric fuel density parameter is a RODEX2 input that occurs after full densification and full accommodation of the solid swelling by the as-fabricated fuel porosity. The asymmetric fuel density value is determined by the processes employed during fuel manufacturing. The estimated effect of the error on PCT is +1 °F

The motor operated valve (MOV) stroke time for the Safety Injection (SI) System pumps discharge valves has been increased. The estimated effect of the change in the SI MOV stroke time on PCT was estimated to be no greater than approximately +10 °F.

The previously reported LBLOCA calculated PCT values for HBRSEP, Unit No. 2 was 2114 °F for the LBLOCA during the Emergency Core Cooling System (ECCS) Injection Mode. The total estimated PCT effect of the errors reported in this letter and in previous CP&L letters dated June 1, 1998, and July 30, 1998, is -42 °F. Since the total effects of these errors result in an estimated PCT that is less than the previously reported value, the currently reported LBLOCA Injection Mode PCT value of 2114 °F is not reduced.

The current PCTs associated with Loss-of-Coolant Accidents (LOCAs) are not changed but 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	1978
SB LOCA Transfer to Recirculation Mode	No Heatup During Switch-over

SPC submitted to the NRC a revised LBLOCA evaluation model that eliminates the excessive variability of the calculated PCT on August 31, 1998. A re-analysis of HBRSEP, Unit No. 2, LBLOCA PCT during the ECCS Injection Mode will be performed within nine (9) months of NRC approval of the SPC revision to the LBLOCA evaluation model.

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<sup>3</sup> XN-NF-81-58(P)(A), "RODEX2 Fuel Rod Thermal-Mechanical Response Evaluation Model," Supplements 1 and 2, Revision 2, SPC November 16, 1983.

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

Very truly yours,



fn

T. M. Wilkerson  
Manager, Regulatory Affairs

ALG/alg

c: Mr. L. A. Reyes, USNRC, Region II  
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