10 CFR 50.46(a)(3)(ii)
TS 5.6.5.d

**CP&L**

**Carolina Power & Light Company**
Robinson Nuclear Plant
3581 West Entrance Road
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Serial: RNP-RA/99-0226

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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

SUBMITTAL OF CORE OPERATING LIMITS
REPORT AND REPORT OF NON-SIGNIFICANT
CHANGES AND ERROR CORRECTIONS IN ACCEPTABLE LOSS-
OF-COOLANT ACCIDENT EVALUATION MODELS AND EVALUATION
MODEL APPLICATIONS FOR THE EMERGENCY CORE COOLING SYSTEM

Ladies and Gentlemen:

The purpose of this letter is to transmit the Carolina Power & Light (CP&L) Company report of non-significant changes and error corrections in acceptable Loss of Coolant Accident (LOCA) evaluation models (EMs) and EM applications for the Emergency Core Cooling System (ECCS), and to transmit to the NRC the latest revision to the Core Operating Limits Report (COLR) at the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2. The LOCA EMs are referenced in the Core Operating Limits Report (COLR), which is submitted to the NRC in accordance with Technical Specification 5.6.5.d. Non-significant changes in EMs and EM applications were previously reported to the NRC by letter dated November 25, 1998. This report describes non-significant changes and error corrections in the Siemens Power Corporation (SPC) EXEM Pressurized Water Reactor (PWR) Small Break LOCA (SBLOCA) EM for SBLOCAs and the EXEM PWR Large Break LOCA (LBLOCA) EM for LBLOCAs. The effects of the non-significant changes and error corrections on HBRSEP, Unit No. 2 Peak Clad Temperature (PCT) are summarized in Attachment I.

By letter dated November 19, 1999, CP&L reported the latest PCT estimates for the LBLOCA, SBLOCA, and transfer of the ECCS from the Injection Mode to the Recirculation Mode. The PCT effects of the non-significant changes and errors reported in Attachment I are included in the latest PCT estimates in Attachment II.

The LOCA EMs are referenced in the Core Operating Limits Report (COLR), provided as Attachment III to this letter.

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The LOCA EMs are referenced in the Core Operating Limits Report (COLR), provided as Attachment III to this letter.

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

Sincerely,

FOR

R. L. Warden
Manager - Regulatory Affairs

ALG/alg

Attachments
I. Report of Non-Significant Changes and Error Corrections in Acceptable Loss-of-Coolant Accident Evaluation Models and Evaluation Model Applications for the Emergency Core Cooling System
II. Latest Peak Clad Temperature Estimates
III. Core Operating Limits Report

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

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

## REPORT OF NON-SIGNIFICANT CHANGES AND ERROR CORRECTIONS IN ACCEPTABLE LOSS-OF-COOLANT ACCIDENT EVALUATION MODELS AND EVALUATION MODEL APPLICATIONS FOR THE EMERGENCY CORE COOLING SYSTEM

This report provides non-significant changes and error corrections in acceptable Loss of Coolant Accident (LOCA) evaluation models (EMs) and EM applications for the Emergency Core Cooling System (ECCS) at the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2. Non-significant changes in EMs and EM applications were previously reported to the NRC by letter dated November 25, 1998. This report describes non-significant changes and error corrections in the SPC EXEM Pressurized Water Reactor (PWR) Small Break LOCA (SBLOCA) EM for SBLOCAs and the EXEM PWR Large Break LOCA (LBLOCA) EM[1] for LBLOCAs. The LOCA EMs are referenced in the Core Operating Limits Report (COLR), provided as Attachment III to this letter.

### Large Break Loss-of-Coolant Accident Evaluation Model

1. Siemens Power Corporation (SPC) identified two deficiencies in the cladding corrosion calculation in the version of RODEX2[2] (RDX2LSE) used for LBLOCA calculations. There were errors in the coding of the model and an error in the enhancement factor utilized in the corrosion model. The coding was corrected to implement the approved corrosion model and the input changed to use the correct enhancement factor. The PCT effect of these errors during the ECCS Injection Mode was estimated to be -2°F.

2. SPC has analyzed the effect of operating Cycle 20 fuel using an approved LBLOCA EM. The net effect of changes in fuel parameters associated with Cycle 20 operation for the LBLOCA has resulted in an increase in PCT during the Emergency Core Cooling System (ECCS) Injection Mode of +15°F.

3. The containment net free volume, containment heat sink information, and initial containment temperature assumptions were changed as a result of analyses performed in support of a license amendment request dated May 27, 1999. SPC has analyzed the effect of the changes. The net effect of changes for the LBLOCA has resulted in a decrease in PCT during the Emergency Core Cooling System (ECCS) Injection Mode of -2°F.

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[1] 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.

[2] XN-NF-81-58(P)(A), "RODEX 2 Fuel Rod Thermal-Mechanical Response Evaluation Model," Supplements 1, 2, 3, and 4, Revision 2, Siemens Power Corporation.

**Small Break Loss-of-Coolant Evaluation Model**

1. SPC 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 was +2°F. This error was also reported to the NRC by letter dated May 20, 1999.

2. SPC has analyzed the effect of operating Cycle 20 fuel using the approved SBLOCA EM. The net effect of changes in fuel parameters associated with Cycle 20 operation for the SBLOCA has resulted in an increase in PCT during the Emergency Core Cooling System (ECCS) Injection Mode of +30°F. This change was also reported to the NRC by letter dated November 19, 1999.

3. Emergency operating procedures have been revised to ensure that certain switchover operations from the ECCS Injection Mode to the ECCS Recirculation Mode are limited in duration to 10 minutes. The previous duration limit for the affected emergency operations was 3 minutes. SPC has analyzed the effect of a 10 minute switchover time for the SBLOCA. The estimated effect of this change in PCT for the switchover from the ECCS Injection Mode to the ECCS Recirculation Mode is a PCT of +900°F as compared to no PCT increase (i.e., no heat-up) previously. This change was also reported to the NRC by letter dated November 19, 1999.

## H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
## LATEST PEAK CLAD TEMPERATURE ESTIMATES

The current Peak Clad Temperatures (PCTs) associated with Loss of Coolant Accidents (LOCAs) are listed below. The estimates include the cumulative effects of significant and non-significant error corrections and evaluation model changes to date.

The previously reported LBLOCA calculated PCT value 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 error and changes reported in this letter is +11°F. The reported LBLOCA ECCS Injection Mode PCT value is therefore changed from 2114°F to 2125°F. There is no change to the LBLOCA PCT value for the ECCS Recirculation Mode. By letters dated May 20, 1999, and November 19, 1999, the reported PCTs associated with the SBLOCA were changed. The LOCA PCT during the ECCS Injection Mode and during the switchover to the ECCS Recirculation Mode are listed below.

| Event | PCT (°F) |
|---|---|
| LBLOCA ECCS Injection Mode | 2125 |
| LBLOCA Transfer to Recirculation Mode | 2102 |
| SBLOCA ECCS Injection Mode | 2010.6 |
| SBLOCA Transfer to Recirculation Mode | 900 |

U. S. Nuclear Regulatory Commission
Attachment III to Serial RNP-RA/99-0226
23 pages

# H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
# CORE OPERATING LIMITS REPORT (COLR)