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SUBJECT: Forwards suppl info to request for TS change re departure  
 from nucleate boiling correlation dtd 971217.

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**Carolina Power & Light Company**

Robinson Nuclear Plant  
3581 West Entrance Road  
Hartsville SC 29550

RNP File No: 13510HA

Serial: RNP-RA/98-0022

**FEB 06 1998**

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

SUPPLEMENT TO REQUEST FOR TECHNICAL SPECIFICATIONS

CHANGE DEPARTURE FROM NUCLEATE BOILING CORRELATION

Gentlemen:

Carolina Power & Light (CP&L) Company provides this supplement to a request for change to the Technical Specifications (TS) for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 provided to the NRC by letter dated December 17, 1997. The requested change involved adding to TS Section 5.6.5, "Core Operating Limits Report (COLR)," a reference to Siemens Power Corporation (SPC) Topical Report, EMF-92-153(P)(A), "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel."

Attachment I provides an affidavit as required by 10 CFR 50.30(b).

Attachment II provides the supplemental information in support of the CP&amp;L requested change to TS.

In accordance with 10 CFR 50.91(b), CP&amp;L is providing the State of South Carolina with a copy of this letter with attachments.

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United States Nuclear Regulatory Commission

Serial: RNP-RA/97-0022

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

Very truly yours,



T. M. Wilkerson

Manager - Regulatory Affairs

ALG/alg

Attachments

- I. Affidavit
- II. Supplemental Information In Support Of Request For Technical Specifications  
Change, Departure From Nucleate Boiling Correlation

c: Mr. Max K. Batavia, Chief, Bureau of Radiological Health (SC)  
Mr. L. A. Reyes, Regional Administrator, USNRC, Region II  
Mr. J. W. Shea, USNRC Project Manager, HBRSEP  
Mr. B. B. Desai, USNRC Resident Inspector, HBRSEP  
Attorney General (SC) (w/out Enclosures)

Affidavit

State of South Carolina

County of Darlington

J. S. Keenan, having been first duly sworn, did depose and say that the information contained in letter RNP-RA/98-0022 is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

John S. Keenan

Sworn to and subscribed before me

this 6<sup>th</sup> day of February 1998

(Seal) Albert L. Cannon  
Notary Public for South Carolina

My commission expires: March 22<sup>nd</sup>, 2005

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
SUPPLEMENTAL INFORMATION IN SUPPORT OF  
REQUEST FOR TECHNICAL SPECIFICATIONS CHANGE  
DEPARTURE FROM NUCLEATE BOILING CORRELATION

**Comparison of Operating Conditions and Fuel Design  
Characteristics to HTP Correlation Ranges of Applicability**

Carolina Power & Light (CP&L) Company requested a change to the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 Technical Specifications (TS) by letter dated December 17, 1997, to add to the approved methodologies of the Core Operating Limits Report (COLR), the Siemens Power Corporation (SPC) Topical Report EMF-92-153(P)(A)<sup>1</sup>. The NRC approved EMF-92-153(P)(A) in its Safety Evaluation (SE) issued by letter dated December 29, 1993. NRC approval of the High Thermal Performance (HTP) Departure from Nucleate Boiling (DNB) correlation, as stated in the NRC SE, was conditional that the characteristics of the fuel for which the HTP correlation is applied fall within the design characteristics specified in the SE, and that the application of the HTP correlation for DNB analysis is restricted to the operating conditions given in the SE. In its request, CP&L stated generally that both conditions are satisfied by the application of the HTP DNB correlation at HBRSEP, Unit No. 2 for HTP fuel. Additional details regarding the application of the SE limits to HBRSEP, Unit No. 2 are provided below.

The ranges of applicability for operating conditions and fuel design characteristics for the HTP correlation were designed to span the end-points for transients and accidents. To ensure that the correlation ranges of applicability for operating conditions are met, the operating conditions used in the calculation are checked by the computer code against the SE operating condition ranges of applicability, and a warning message is provided by the computer code which calculates the Minimum DNB Ratio (MDNBR) if the operating conditions are outside the SE ranges of applicability. The warning messages are printed in the output file created by the computer code performing the calculations. Procedures require the analyst to verify that there are no warning messages in the output file indicating non-compliance with the SE ranges of applicability.

For the analyses in support of Cycle 19 operation, which begins at the conclusion of Refueling Outage (RO) 18, which is scheduled to begin on March 7, 1998, the maximum and minimum operating conditions were obtained for the most limiting MDNBR in the MDNBR analyses, excluding the Reactor Coolant Pump (RCP) rotor seizure event analysis. The most limiting MDNBR was chosen for Table 1 since the MDNBR computer code performs the check for SE ranges of applicability at many points and times in the MDNBR analysis. As indicated on Table 1, the ranges of operating conditions for the most limiting MDNBR are within the SE ranges of applicability. The conditions used in the MDNBR calculations for the remaining

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<sup>1</sup> EMF-92-153(P)(A), "HTP: Departure from Nucleate Boiling Correlation for High Thermal Performance Fuel," Siemens Power Corporation, Richland, WA 99352.

cases in the completed analyses were within the SE ranges of applicability with no warning messages related to the HTP correlation validity check in the output files.

**Table 1**

**Range of Coolant Conditions Spanned by the HTP Correlation  
(RCP Rotor Seizure Analysis is not Included)**

| <b>Coolant Condition</b>                   | <b>HTP Correlation Range</b> | <b>HBRSEP, Unit No. 2<br/>Range</b> |
|--------------------------------------------|------------------------------|-------------------------------------|
| Pressure, psia                             | 1775 - 2425                  | 1863 - 2400                         |
| Local Mass Flux,<br>Mlb/hr/ft <sup>2</sup> | 0.936 - 3.573                | 0.978 - 1.812                       |
| Inlet Enthalpy, Btu/lb                     | 382.3 - 649.9                | 531.7 - 573.8                       |
| Local Quality                              | - 0.125 - 0.358              | -0.022 - 0.177                      |

The HBRSEP, Unit No. 2 Cycle 19 MDNBR analysis of the RCP rotor seizure event is incomplete at this time. However, the methodology described above, in which the computer code performing the analysis provides a warning message if operating conditions occur outside of the SE ranges of applicability during the analysis, is being applied to the RCP rotor seizure MDNBR analysis to ensure that the results of that analysis are within the SE ranges of applicability.

Table 2 below provides the comparison of HBRSEP, Unit No. 2 fuel design characteristics with the SE ranges of applicability for fuel design characteristics.

**Table 2**

**Range of Fuel Design Parameters in HTP Correlation Data Base**

| <b>Fuel Design Parameter</b> | <b>HTP Correlation Range</b> | <b>HBRSEP, Unit No. 2<br/>Range</b> |
|------------------------------|------------------------------|-------------------------------------|
| Fuel Rod Diameter, in        | 0.360 - 0.440                | 0.424                               |
| Fuel Rod Pitch, in           | 0.496 - 0.580                | 0.563                               |
| Axial Spacer Span, in        | 10.5 - 26.2                  | 12.87 - 26.2                        |
| Hydraulic Diameter, in       | 0.4571 - 0.5334              | 0.528                               |
| Heated Length, ft            | 8.0 - 14.0                   | 12.0                                |