January 17, 1984

Docket Nos. 50-325/324

Mr. E. E. Utley
Executive Vice President
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Dear Mr. Utley:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - RELOAD METHODOLOGY (FIBWR CODE)

Re: Brunswick Steam Electric Plant, Unit Nos. 1 and 2

We have reviewed your submittal dated May 31, 1983, and find that additional information is necessary in order for us to complete our review. We have enclosed a request for information for the report you submitted: (NF-1583.04, "Verification of CP&L Reference BWR Thermal - Hydraulic Methods Using the FIBWR Code", May 1983. This additional information is needed to permit the completion of our review of these codes. Please respond within 60 days of receipt of this letter.

This request for information was approved by the Office of Management and Budget under clearance number 3150-0065 which expires September 30, 1985.

Sincerely,

Original signed by/

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Enclosures:
As stated

cc w/enclosures
See next page

DISTRIBUTION:	Docket File	NRC PDR	LPDR	ORB#2 Reading	DEisenhut
EJordan	MGrotenhuis	OELD	NSIC	SNorris	JTaylor
ACRS(10)	Gray				

DL:ORB#2	DL:ORB#2	DL:ORB#2
SNorris:pob	MGrotenhuis	DVassallo
1/17/84	1/17/84	1/17/84

Mr. E. E. Utley
Carolina Power & Light Company
Brunswick Steam Electric Plant, Units 1 and 2

cc:

Richard E. Jones, Esquire
Carolina Power & Light Company
336 Fayetteville Street
Raleigh, North Carolina 27602

George F. Trowbridge, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N. W.
Washington, D. C. 20036

Mr. Charles R. Dietz
Plant Manager
Post Office Box 458
Southport, North Carolina 28461

Mr. Franky Thomas, Chairman
Board of Commissioners
Post Office Box 249
Bolivia, North Carolina 28422

Mrs. Chrys Baggett
State Clearinghouse
Budget and Management
116 West Jones Street
Raleigh, North Carolina 27603

U. S. Environmental Protection
Agency
Region IV Office
Regional Radiation Representative
345 Courtland Street, N. W.
Atlanta, Georgia 30308

Resident Inspector
U. S. Nuclear Regulatory Commission
Star Route 1
Post Office Box 208
Southport, North Carolina 28461

James P. O'Reilly
Regional Administrator
Region II Office
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Dayne H. Browns, Chief
Radiation Protection Branch
Division of Facility Services
Department of Human Resources
Post Office Box 12200
Raleigh, North Carolina 27605

QUESTIONS REGARDING THE USE OF FIBWR ON BRUNSWICK UNITS 1 AND 2

1. Please identify any changes or modifications over the EPRI version of the FIBWR code. For these changes, if any, the modified models (e.g., conservation equations, the void fraction and subcooled boiling models, etc.) should be described.

2. Define the "slow transients" in Item 2 on page 4. Specify which transients will be analyzed by the FIBWR code for the hot bundle analysis.

3. Describe how the FIBWR code is coupled to the neutronics code for power distribution calculations (e.g., the iteration between the neutronic and thermal-hydraulic calculations and the differences in input to FIBWR between the neutronic-type calculations and the CPR-type calculations). Also describe the coupling between the FIBWR code and the plant process computer as mentioned in Item 4 on page 2.

4. The form loss coefficients in Table 2 were partly obtained from the General Electric Company proprietary information. Provide or reference (if previously submitted) documents containing the derivation and justification of these form loss coefficients.

5. Explain the applicability of the spacers and lower and upper tie plate form loss coefficients from Reference 3, Table 5.1 (i.e., EPRI-NP-1923) to the Brunswick core thermal-hydraulic analysis (cf. Table 2 of CP&L Topical).

6. Explain how the water rods are modeled hydraulically. Are they different from the active flow channels?

7. Only form loss coefficients for water rod entrances are given in Table 2. Explain why the exit form loss coefficients are not given.

8. As stated by CP&L, Reference 5 to NF-1583.04 provided the water tube flow that was used to obtain the water tube form loss coefficients. It also provided the bypass flow fractions used by CP&L for FIBWR benchmark. Please provide this document for our review.

9. Provide the detailed derivation of the leakage coefficients (C1, C2, C3 and C4) for bypass flow paths in Table 4. Justify the parameters needed in the derivations, such as pressure differentials and flow fractions of different paths. If General Electric Company information is used, provide those documents.

10. Provide the values of A and B in Equation 4 used for Brunswick analyses. Also, provide the values of ELDE and ELDG, which are inputs to the FIBWR code, as the adjustment factors for the upper tie plate and grid spacers, respectively (see pages 6-15 of EPRI-NP-1924-CCM). Explain why the modified homogeneous model for the two-phase, form-loss multiplier (Equation 4-24 of EPRI-NP-1924-CCM versus Equation 5 of the CP&L Topical) is not used.

11. In benchmarking the core pressure drop and flow distributions, the plant process computer outputs were used. As explained in the topical (page 14), the process computer models use the same iterative calculational techniques as the FIBWR code but with different and sometimes less detailed models. In light of this, explain the usefulness of these benchmark comparisons.

12. Discuss if there were any corrections to the FIBWR calculated pressure drop across the core support plate to match the exact locations where the pressure tap measurements were made (cf. Table 6). If the locations for calculated and measured ΔP's are different, the errors could be large in low-flow situations where the static head becomes more important than in high-flow situations.

13. Explain how the bypass flow rates as provided by the plant process computer data book were obtained (cf. page 15). If they were from hydraulic calculations, provide the calculational details. If they were based on vendor's documentation, provide the source.

14. Provide the documents that give the vendor-calculated critical power ratios used in Figures 6 and 7 data comparisons.

15. Discuss the sensitivity of the axial node sizes on the thermal-hydraulic results. The topical report presented results using one channel to represent one fuel bundle. If "collapsed" channels (one channel representing several fuel bundles) are intended for future analysis, discuss how it will be approached and the sensitivities on hot bundle parameters.