

October 17, 1996

Mr. W. R. Campbell  
Vice President  
Brunswick Steam Electric Plant  
Carolina Power & Light Company  
Post Office Box 10429  
Southport, North Carolina 28461

SUBJECT: ISSUANCE OF AMENDMENT NO. 182 TO FACILITY OPERATING LICENSE NO. DPR-71 REGARDING THE FUEL CYCLE 11 RELOAD - BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1 (TAC NO. M95263)

Dear Mr. Campbell:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 182 to Facility Operating License No. DPR-71 for Brunswick Steam Electric Plant (BSEP), Unit 1. The amendment changes the Technical Specifications (TS) in response to your submittal dated April 8, 1996, as supplemented on July 30, 1996, October 4, 1996, October 8, 1996, and October 16, 1996.

The amendment changes the TS to (1) reflect the use of a new type of fuel (GE13) and (2) modify the minimum critical power ratio (MCPR) safety limit and the standby liquid control system sodium pentaborate limits to accommodate the GE13 fuel.

A copy of the related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's bi-weekly Federal Register Notice.

Sincerely,

*David C. Trimble*  
David C. Trimble, Project Manager  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-325

Enclosures:

- 1. Amendment No. 182 to License No. DPR-71
  - 2. Safety Evaluation
- cc w/enclosures: See next page  
FILENAME - G:\BRUNSWIC\BR195263.AMD

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PM:PDII-1	LA:PDII-1	OGC <i>all/nc</i>	D:PDII-1	
DTrimble <i>DET</i>	EDunnington <i>ED</i>	<i>W Young</i>	MReinhart	
10/16/96	10/17/96	10/16/96	10/17/96	
Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

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OGC comments incorporated  
*D Trimble*  
10/16/96

**NRC FILE CENTER COPY**

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AMENDMENT NO. 182 TO FACILITY OPERATING LICENSE NO. DPR-71 - BRUNSWICK, Unit 1

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, Unit 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 182  
License No. DPR-71

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated April 8, 1996, as supplemented on July 30, 1996, October 4, 1996, October 8, 1996, and October 16, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment; and paragraph 2.C.(2) of Facility Operating License No. DPR-71 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 182, are hereby incorporated in the license. Carolina Power & Light Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of as of the date of its issuance and shall be implemented prior to the startup of Unit 1 from the Refueling Outage 10 (B111R1).

FOR THE NUCLEAR REGULATORY COMMISSION

  
Mark Reinhart, Acting Director  
Project Directorate II-1  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: October 17, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 182

FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Remove Pages

XVI

2-1

3/4 1-20

5-1

6-23

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Insert Pages

XVI

2-1

3/4 1-20

5-1

6-23

6-23a

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<u>SECTION</u>	<u>PAGE</u>
6.10 <u>RECORD RETENTION</u> .....	6-23a 1
6.11 <u>RADIATION PROTECTION PROGRAM</u> .....	6-25
6.12 <u>HIGH RADIATION AREA</u> .....	6-25
6.13 <u>OFFSITE DOSE CALCULATION MANUAL (ODCM)</u> .....	6-26
6.14 <u>PROCESS CONTROL PROGRAM (PCP)</u> .....	6-26
6.15 <u>MAJOR CHANGES TO LIQUID, GASEOUS, AND SOLID WASTE TREATMENT SYSTEMS</u> .....	6-27

## 2.1 SAFETY LIMITS

### THERMAL POWER (Low Pressure or Low Flow)

2.1.1 THERMAL POWER shall not exceed 25% of RATED THERMAL POWER with the reactor vessel steam dome pressure less than 800 psia or core flow less than 10% of rated flow.

APPLICABILITY: CONDITIONS 1 and 2.

ACTION:

With THERMAL POWER exceeding 25% of RATED THERMAL POWER and the reactor vessel steam dome pressure less than 800 psia or core flow less than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours.

### THERMAL POWER (High Pressure and High Flow)

2.1.2 The MINIMUM CRITICAL POWER RATIO (MCPR) shall not be less than 1.10\* with the reactor vessel steam dome pressure greater than 800 psia and core flow greater than 10% of rated flow.

APPLICABILITY: CONDITIONS 1 and 2.

ACTION:

With MCPR less than 1.10\* and the reactor vessel steam dome pressure greater than 800 psia and core flow greater than 10% of rated flow, be in at least HOT SHUTDOWN within 2 hours.

### REACTOR COOLANT SYSTEM PRESSURE

2.1.3 The reactor coolant system pressure, as measured in the reactor vessel steam dome, shall not exceed 1325 psig.

APPLICABILITY: CONDITIONS 1, 2, 3, and 4.

ACTION:

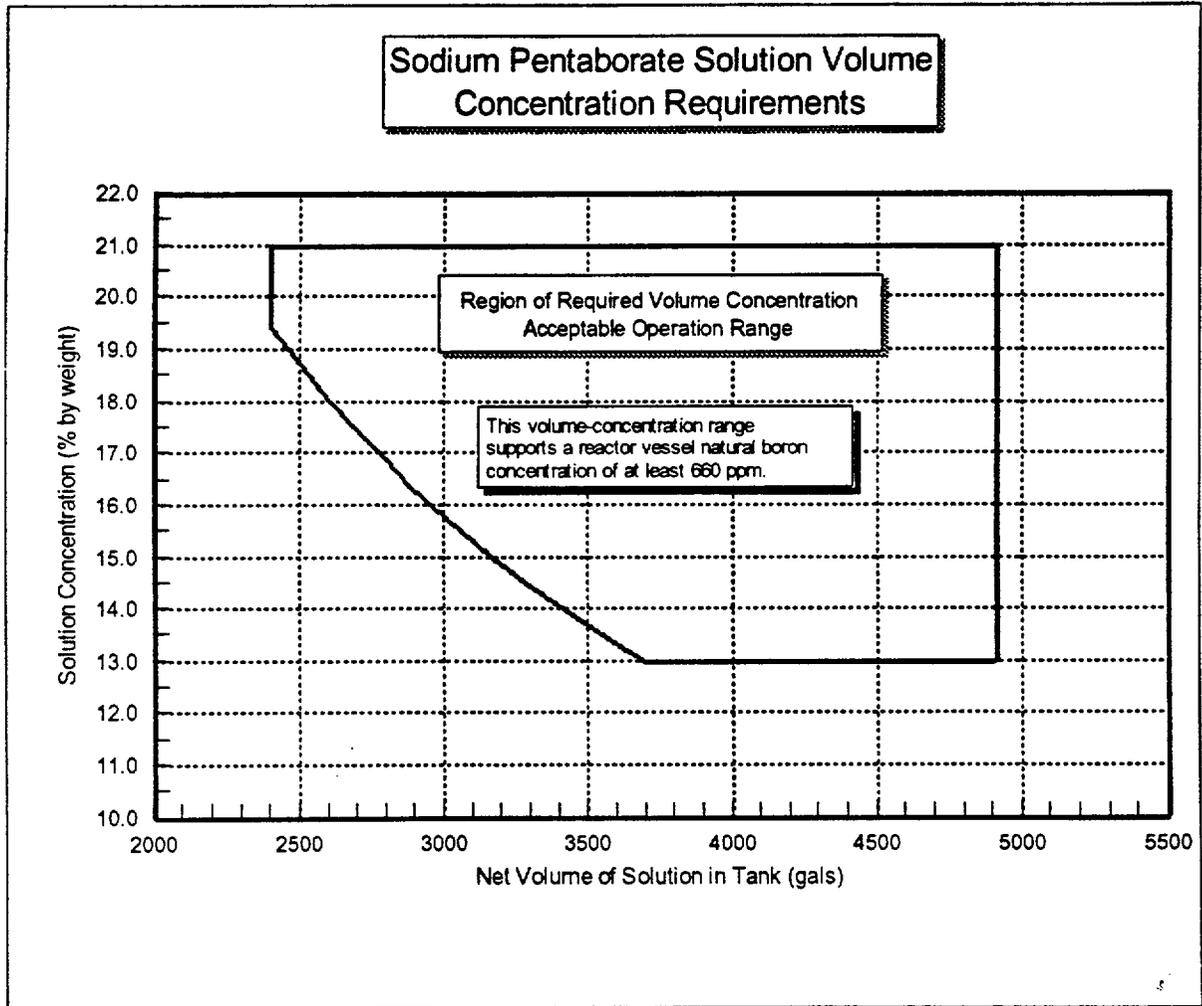
With the reactor coolant system pressure, as measured in the reactor vessel steam dome, above 1325 psig, be in at least HOT SHUTDOWN with reactor coolant system pressure  $\leq$  1325 psig within 2 hours.

---

\*MCPR values in Technical Specification 2.1.2 are applicable only for Cycle 11 operation.

FIGURE 3.1.5-1

SODIUM PENTABORATE SOLUTION VOLUME  
CONCENTRATION REQUIREMENTS



5.1 SITE

EXCLUSION AREA

5.1.1 The exclusion area shall be as shown in Figure 5.1.1-1.

LOW POPULATION ZONE

5.1.2 The low population zone shall be as shown in Figure 5.1.2-1, based on the information given in Section 2.2 of the FSAR.

SITE BOUNDARY

5.1.3 The SITE BOUNDARY shall be as shown in Figure 5.1.3-1. For the purpose of effluent release calculations, the boundary for atmospheric releases is the SITE BOUNDARY and the boundary for liquid releases is the SITE BOUNDARY prior to dilution in the Atlantic Ocean.

5.2 CONTAINMENT

CONFIGURATION

5.2.1 The PRIMARY CONTAINMENT is a steel-lined, reinforced concrete structure composed of a series of vertical right cylinders and truncated cones which form a drywell. This drywell is attached to a suppression chamber through a series of vents. The suppression chamber is a concrete, steel-lined pressure vessel in the shape of a torus. The primary containment has a minimum free air volume of 288,000 cubic feet.

DESIGN TEMPERATURE AND PRESSURE

5.2.2 The primary containment is designed and shall be maintained for:

- a. Maximum internal pressure 62 psig.
- b. Maximum internal temperature: drywell 300°F  
suppression chamber 200°F
- c. Maximum external pressure 2 psig.

5.3 REACTOR CORE

FUEL ASSEMBLIES

5.3.1 The reactor core shall contain 560 fuel assemblies limited to the following fuel types: BP8x8R, GE8x8EB, GE8x8NB-3, and GE13. |

CORE OPERATING LIMITS REPORT (Continued)

- b. The core flow and core power adjustments for Specification 3.2.2.1.
- c. The MINIMUM CRITICAL POWER RATIO (MCPR) for Specifications 3.2.2.1 and 3.2.2.2.
- d. The rod block monitor upscale trip setpoint and allowable value for Specification 3.3.4.

and shall be documented in the CORE OPERATING LIMITS REPORT.

6.9.3.2 The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents.

- a. NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (latest approved version).
- b. The May 18, 1984 and October 22, 1984 NRC Safety Evaluation Reports for the Brunswick Reload Methodologies described in:
  - 1. Topical Report NF-1583.01, "A Description and Validation of Steady-State Analysis Methods for Boiling Water Reactors," February 1983.
  - 2. Topical Report NF-1583.02, "Methods of RECORD," February 1983.
  - 3. Topical Report NF-1583.03, "Methods of PRESTO-B," February 1983.
  - 4. Topical Report NF-1583.04, "Verification of CP&L Reference BWR Thermal-Hydraulic Methods Using the FIBWR Code," May 1983.
- c. The NRC Safety Evaluation for Brunswick Unit 1 Amendment No. 182. |

6.9.3.3 The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, transient analysis limits, and accident analysis limits) of the safety analysis are met.

6.9.3.4 The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements shall be provided, upon issuance for each reload cycle, to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

6.10 RECORD RETENTION

Facility records shall be retained in accordance with ANSI-N45.2.9-1974.

6.10.1 The following records shall be retained for at least five years:

- a. Records and logs of facility operation covering time interval at each power level.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO AMENDMENT NO. 182 TO LICENSE NO. DPR-71

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, Unit 1

DOCKET NO. 50-325

1.0 INTRODUCTION

By letter dated April 8, 1996 (BSEP 96-0061), as supplemented by letters dated July 30, 1996 (BSEP 96-0271), October 4, 1996 (BSEP 96-0366), October 8, 1996 (BSEP 96-0376), and October 16, 1996 (BSEP 96-0390) Carolina Power & Light Company (CP&L, the licensee) proposed changes to the Technical Specifications (TS) for the Brunswick Steam Electric Plant (BSEP), Unit 1. The requested changes would revise the safety limit minimum critical power ratio (SLMCPR) from 1.07 to 1.10 for two recirculation loop operation, include the use of a new type of fuel (GE-13), and revise the acceptable range of sodium pentaborate concentration for the standby liquid control system (SLCS) to support use of GE-13 fuel for BSEP, Unit 1, Cycle 11 operation.

2.0 EVALUATION

The licensee requested TS changes in accordance with 10 CFR 50.90 and 2.101. The revised TS were proposed as follows:

(1) Specification 2.1.2

Due to the use of GE13 fuel, the licensee proposed to change the SLMCPR from 1.07 to 1.10 for operation with the reactor steam dome pressure greater than 800 psia and core flow greater than 10% of rated flow, which is based on a cycle-specific analysis performed by the General Electric Company (GE) for BSEP, Unit 1 Cycle 11. BSEP, Unit 1 cycle-specific fuel and core parameters were used in the analysis including the actual core loading, the most limiting permissible control blade patterns, the actual bundle parameters, and the cycle exposure range.

The NRC staff has reviewed the proposed TS change which is based on the analysis performed using BSEP, Unit 1 cycle-specific inputs and approved methodologies including GESTAR II (NEDE-24011-P-A-11, Sections 1.1.5 and 1.2.5) and has found it acceptable. Because the R-factor methodology referenced in NEDE-24011-P-A-11 is not applicable to the part-length GE13 fuel, an improved R-factor methodology described in NEDC-32505P, "R-Factor Calculation Method for GE11, GE12 and GE13 Fuel," November 1995, was used. The improved R-factor calculation method uses the same NRC-approved equation stated in GESTAR (NEDE-24011-P-A) with correction factors to account for the peaking factor effects due to the part-

length-rod design. The staff has reviewed the R-factor calculation method for GE13 and finds it acceptable because it provides appropriate correction for peaking factor effects for the GE 13 fuel in BSEP Unit 1 in the calculation of the safety limit MCPR. A telephone conference was held on October 3, 1996 with CP&L and GE to request additional information on the cycle-specific analysis with respect to the cause of a 0.01 increase above the generic SLMCPR of 1.09 reported in a letter report "Safety Limit MCPR for GE13 Fuel," transmitted to NRC by GE letter (JFK94-014) dated September 28, 1994, and the search procedure for variations of projected control blade patterns. The responses to the information requests discussed in the conference call were documented in a letter dated October 4, 1996, from CP&L to the NRC.

(2) Specification 5.3.1

The GE13 fuel type is added to the list of fuel assembly types contained in the reactor core. This addition is acceptable since the licensee indicated that the GE13 fuel type design fully complies with the acceptance criteria contained in the approved Amendment 22 of NEDE-24011-P-A.

(3) Figure 3.1.5-1

A portion of the SLCS sodium pentaborate volume-concentration range shown in TS Figure 3.1.5-1 (applicable to the lower range of tank volume) is being revised to increase the required concentration of sodium pentaborate solution to account for the additional shutdown reactivity needed based on the planned use of GE13 fuel assemblies as reload for the Unit 1, Cycle 11 reactor core. For the currently approved fuel types, a minimum shutdown margin of 2.6%ΔK is required in the SLCS analysis; and for the GE13 fuel type, GE methodology requires a shutdown margin of greater than 3.2%ΔK. GE calculations show that an in-vessel concentration of 660 ppm boron results in an estimated SLCS shutdown margin of 3.6%ΔK (at 20°C, Xenon free), which exceeds the minimum required shutdown margin of 3.2%ΔK, based on the current minimum SLCS tank concentration of 13% by weight. The proposed increase of the required concentration of sodium pentaborate solution to raise the in-vessel concentration from 600 to 660 ppm boron is acceptable for this plant-specific application, since the proposed concentration results in a higher shutdown margin than the required minimum of 3.2%ΔK. In addition, the previously approved methodologies used in support of this application were documented in a GE submittal (RJR-96-020) dated February 29, 1996.

Based on NRC staff review, the NRC staff concludes that the proposed changes to the BSEP, Unit 1, TS are acceptable; however, the SLMCPR TS change is acceptable only for the Brunswick, Unit 1 Cycle 11 operation since the change was analyzed based on the NRC-approved method using BSEP Unit 1 cycle-specific inputs.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of North Carolina official was notified of the proposed issuance of the amendment. The State official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 42276). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

### 5.0 CONCLUSIONS

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: T. Huang

Date: October 17, 1996