

May 11, 1998

Mr. C. S. Hinnant, Vice President
Carolina Power & Light Company
Brunswick Steam Electric Plant
Post Office Box 10429
Southport, North Carolina 28461

SUBJECT: ISSUANCE OF AMENDMENT NO. 194 TO FACILITY OPERATING LICENSE NO. DPR-71 REVISING THE TECHNICAL SPECIFICATION (TS) FOR FUEL CYCLE 12 RELOAD TO CHANGE THE SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (SLMCPR) - BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1 (TAC NO. MA1044)

Dear Mr. Hinnant:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 194 to Facility Operating License No. DPR-71 for Brunswick Steam Electric Plant, Unit 1. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated February 23, 1998, as supplemented by your letter dated March 27, 1998.

The amendment modifies the values for the safety limit for the Minimum Critical Power Ratio (SLMCPR) in the TS and the associated action statement for Cycle 12 operation only. A reference in TS 6.9.3.2.c is also revised.

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

Sincerely,

Original signed by:

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. 194 to License No. DPR-71
- 2. Safety Evaluation

cc w/enclosures: See next page

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| DTrimble <i>DT</i> | EDunnington | | PTKuo <i>PTK</i> | |
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| Yes/No | Yes/No | Yes/No | Yes/No | |

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AMENDMENT NO. 194 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. 194
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 February 23, 1998, as supplemented by letter dated March 27, 1998, 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. 194 , 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 the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Fao-Tsin Kuo, 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: May 11, 1998

ATTACHMENT TO LICENSE AMENDMENT NO. 194

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

2-1
6-23

Insert Pages

2-1
6-23

2.0 SAFETY LIMITS AND LIMITING SAFETY SYSTEM SETTINGS

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 1.09* 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 1.09* 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 12 operation.

ADMINISTRATIVE CONTROLS

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. 194. |

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.



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

SAFETY EVALUATION

OFFICE OF NUCLEAR REACTOR REGULATION

AMENDMENT NO. 194 TO LICENSE NO. DPR-71

CAROLINA POWER & LIGHT

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

DOCKET NO. 50-325

1.0 INTRODUCTION

In its application of February 23, 1998, supplemented by its submittal of March 27, 1998, Carolina Power & Light (CP&L, the licensee) requested that the facility operating license for Brunswick Steam Electric Plant, Unit 1 (BSEP 1), be amended in accordance with 10 CFR 50.90.

Section 2.1.2 of the technical specifications (TS) establishes the minimum critical power ratio (MCPR) safety limit. Section 6.0 of the TS references NRC-approved topical reports used to determine the core operating limits. "General Electric Standard Application for Reactor Fuel" (NEDE-24011-P-A-13), GESTAR II, delineates the approved analytical methodologies and requirements for determining the MCPR safety limit and the MCPR operating limit. The cycle-specific thermal limit parameters, including the MCPR operating limit, are specified in the core operating limit report, which is reissued every reload.

The licensing basis document, GESTAR II, specifies, in part, that (1) for every new fuel design, a generic MCPR will be calculated for a large high-power density plant, assuming a bounding equilibrium core; (2) for each new fuel design, the applicability of the generic equilibrium core MCPR safety limit will be confirmed for each operating cycle or a plant-specific analysis will be performed; and (3) critical power ratio correlation will be reconfirmed or a new one established whenever there is a change in the wetted parameters of the flow geometry (i.e., fuel, water rod diameter, channel sizing, spacer design).

In addition, NRC and General Electric Nuclear Energy (GENE) instituted interim implementing procedures, which were developed as corrective actions to issues identified in GENE's Part 21 reporting and in the notice of noncompliance issued to GENE during the May 1996 NRC inspection. Amendment 25 to GESTAR II (NEDE-24011-P-A-13), which is being reviewed by the staff, incorporates the corrective actions. The interim procedures require, in part, that the licensees perform cycle-specific MCPR safety limit evaluation during each reload, until Amendment 25 to GESTAR II is approved.

2.0 EVALUATION

In its application of February 23, 1998, CP&L proposed the following changes to the TS. The corresponding evaluations are also discussed below.

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CP&L requested that:

- (1) The MCPR safety limit specified in TS 2.1.2 be changed from 1.10 to 1.09 for two recirculation loops in operation and from 1.12 to 1.10 for a single recirculation loop in operation. There is no single loop MCPR value in the current TS. The single loop MCPR value will be added to the TS at the time the licensee converts to improved TS (see NUREG-1433, Revision 1, "Standard Technical Specifications General Electric Plants, BWR/4" and the licensee's application for TS conversion dated November 1, 1996, as supplemented by letters dated October 13, 1998, February 26, 1998, March 13, 1998, and April 24, 1998), currently planned for July 1998.
- (2) The footnote in Section 2.1.2, which states "MCPR values in Technical Specification 2.1.2 are applicable only for Cycle 11 operation," be deleted.
- (3) The reference in Section 6.9.3.2.c. be deleted, which states, in part, that

"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.

c. The NRC Safety Evaluation for BSEP 1 Amendment No. 182."
- (4) The proposed changes be implemented in the BSEP TS and in the improved technical specification (ITS), which were submitted to the NRC on November 1, 1996. The supplement of March, 27, 1998, contained the recommended BSEP TS changes in Enclosure 5.

In its supplement of March 27, 1998, CP&L withdrew its request to delete the footnote in Section 2.1.2 and the statement in Section 6.9.3.2.c, and requested that Section 6.9.3.2.c reference this SE.

Enclosure 2 to the amendment request contains GE's evaluation, which discusses the basis for the Brunswick Unit 1 cycle-specific MCPR safety limit evaluation, including the mixed (GE10 and GE13) core-specific input parameters, the corresponding assumptions, and a comparative discussion of why the cycle-specific MCPR safety limit calculations yield equivalent values in comparison with the generic equilibrium core GE 13 MCPR safety limit.

The licensee stated that the generic equilibrium core MCPR safety limit for the part-length GE13 fuel core was calculated in accordance with the topical report "General Electric Standard Application for Reactor Fuel" (NEDE-24011-P-A-13). The cycle-specific safety limits for Brunswick Cycle 12 were evaluated in accordance with the topical report "General Electric BWR Thermal Analysis Basis: Data, Correlation, and Design Application," (GETAB, NEDO-10958). For the cycle-specific MCPR safety limit calculations, the uncertainties were calculated according to "General Electric Fuel Bundle Design" (NEDE-31152-P, Revision 6).

GESTAR II forms, in part, a compilation of all the methodologies that are given in numerous topical reports and references all the necessary documents. GETAB, instead, provides the

analytical technique used to determine the MCPR, and the latest approved version did not incorporate the interim procedure.

On March 27, 1998, the licensee submitted a supplement to the amendment request complying with the issues discussed in a February 23, 1998, telephone conference. Accordingly, CP&L rescinded its request to delete the cycle-specific footnote and statements. The licensee also confirmed that the cycle-specific MCPR safety limits were evaluated in compliance with the licensing document GESTAR, as supplemented by Amendment 25.

The staff reviewed the R-factor calculation method for the GE13 fuel product line. The proposed cycle-specific MCPR safety limit analysis is based on the NRC-approved methodologies specified in GESTAR II (NEDE-24011-P-A-13, Sections 1.1.5 and 1.2.5, which references NEDO-10985-A, January 1977) for two-loop operations. The revised R-factor calculation method uses the same NRC-approved equation stated in GESTAR II (NEDE-24011-P-A-13), except that it substitutes rod-integrated powers for the lattice peaking factors to account for the effects of the part length rod design. This approach is acceptable for BSEP 1.

The BSEP 1 core-specific MCPR safety limits were derived using cycle-specific fuel and core parameters, including the actual core loading, conservative variations of projected control blade patterns, the actual bundle parameters, and the cycle exposure range. The key parameters for the MCPR safety limit calculations developed by GE (see Table 1.0 on page 4 of 5 in the attachment to the amendment) indicate that the cycle-specific safety limit for Cycle 12 has a flatter radial power distribution than the generic GE13 calculations. However, the cycle 12 bundle wide critical power ratio distributions are more peaked in reference to the generic GE13 equilibrium core. The higher core enrichment and the flatter core-wide power distribution for Cycle 12 are offset by the more peaked pin power in comparison to the GE13 equilibrium core. Consequently, the Cycle 12 MCPR safety limit for BSEP 1 resulted in an equivalent value to the generic GE13 equilibrium core.

On the basis of our review, the NRC staff finds the proposed changes to the BSEP 1 MCPR safety limit acceptable for Cycle 12 for two recirculation loop and single recirculation loop operation because the MCPR safety limits: (1) are based on cycle-specific inputs and analysis; (2) were obtained using NRC-approved methods and procedures; and (3) ensure that 99 percent of the rods in the core will not experience boiling transition during a normal or anticipated operational occurrence. Operation in a single recirculation loop configuration, however, will continue to be restricted under the current TS by TS 3.4.1.1, Recirculation System, and will not be authorized until the time of NRC approval of and the licensee's conversion to the improved TS. The staff finds the change proposed to TS 6.9.3.2 referencing this SE acceptable in that it specifies the appropriate analytical methods reviewed and approved by the NRC to determine the MCPR safety limits for Cycle 12 operation. Use of NRC-approved methodologies ensures that values for cycle-specific parameters are determined such that all applicable limits of the plant safety analysis are met.

The current generic MCPR safety limits are equivalent to the Cycle 12 MCPR safety limits; however, the generic MCPR safety limits may not bound the cycle-specific MCPR safety limits for the future cycles. Consequently, the MCPR safety limit values are limited to the Cycle 12 reload as stated in the proposed footnote to Section 2.1.2 of the BSEP Unit 1 TS.

Furthermore, the staff reviewed the changes made in the proposed BSEP TS provided in Enclosure 5 of the March 27, 1998, submittal. The staff concluded that the changes accurately

reflect the appropriate Cycle 12 MCPR values in TS 2.1.2, include a footnote appropriately stating that the MCPR values are applicable for Cycle 12 only, and appropriately reference this SE in TS Section 6.9.3.2.c to reflect the NRC-approved analytical methods.

In summary, the staff reviewed CP&L's request to amend the BSEP Unit 1 TS for Cycle 12 reload. On the basis of the review, the staff has approved the proposed MCPR safety limit changes for the Cycle 12 reload only and the changes to TS Section 6.9.

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 (63 FR 17900). The amendment also changes reporting or record keeping requirements. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and (c)(10). 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 CONCLUSION

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: Zena Abdullahi

Date: May 11, 1998