

October 4, 2001

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

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - ISSUANCE OF
AMENDMENT RE: PRESSURE-TEMPERATURE CURVES
(TAC NOS. MB1848 AND MB1849)

Dear Mr. Keenan:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 214 to Facility Operating License No. DPR-71 and Amendment No. 241 to Facility Operating License No. DPR-62 for Brunswick Steam Electric Plant, Units 1 and 2. The amendments change the Technical Specifications in response to your submittal dated May 1, 2001, as supplemented on August 20, 2001.

The amendments change the Technical Specifications related to the pressure-temperature limit curves.

Prior to the issuance of this amendment, an exemption from specific requirements of Title 10 of the *Code of Federal Regulations* Part 50, Appendix G, must be granted. This exemption is being processed separately.

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,

/RA/

Donnie J. Ashley, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:

1. Amendment No. 214 to
License No. DPR-71
2. Amendment No. 241 to
License No. DPR-62
3. Safety Evaluation

cc w/encls: See next page

AMENDMENT NO. 214 TO FACILITY OPERATING LICENSE NO. DPR-71 - BRUNSWICK, UNIT 1
AMENDMENT NO. 241 TO FACILITY OPERATING LICENSE NO. DPR-62 - BRUNSWICK, UNIT 2

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CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 214
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 May 1, 2001, as supplemented on August 20, 2001, 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. 214, 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 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 4, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 241

FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

ii
3.4-21
3.4-23
3.4-24
3.4-25
3.4-26
3.4-27

Insert Pages

ii
3.4-21
3.4-23
3.4-24
3.4-25
3.4-26

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 241
License No. DPR-62

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated May 1, 2001, as supplemented on August 20, 2001, 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-62 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 241, 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 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 4, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 241

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

ii
3.4-21
3.4-23
3.4-24
3.4-25
3.4-26
3.4-27

Insert Pages

ii
3.4-21
3.4-23
3.4-24
3.4-25
3.4-26

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 241 TO FACILITY OPERATING LICENSE NO. DPR-71
AND AMENDMENT NO. 241 TO FACILITY OPERATING LICENSE NO. DPR-62
CAROLINA POWER & LIGHT COMPANY
BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated May 1, 2001, as supplemented by letter dated August 20, 2001, Carolina Power & Light Company (CP&L, the licensee) submitted changes related to the pressure-temperature (P-T) limit curves in the Technical Specifications (TS) for the Brunswick Steam Electric Plant (BSEP) Units 1 and 2. The proposed changes are based on the use of American Society of Mechanical Engineers (ASME) Code Case N-640, which was reviewed and approved by the staff in a separate Safety Evaluation. CP&L requested the use of this Code case in this same letter of May 1, 2001.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Sections 50.90 and 2.101, CP&L is requesting a revision to the TS for BSEP Units 1 and 2. The existing P-T limit curves for normal operation are valid for 16 effective full power years (EFPY), and the existing P-T limit curves for hydrostatic and leak testing are valid up to 14 and 16 EFPY. CP&L is requesting approval for revised P-T limit curves for normal operation and for hydrostatic and leak testing that will be valid up to 32 EFPY.

Due to questions regarding fluence calculations and regarding the inclusion of instrument uncertainty in their calculation, CP&L submitted a letter of response to a request for additional information. This response contains a statement that the P-T curves will only be applicable for 19 EFPY instead of the full 32 EFPY. When new P-T curves are submitted, instrument error will be included in their calculation. CP&L has stated in their letter of August 20, 2001, that the licensee will include these factors in their next submittal, which will be made by June 30, 2002.

The supplemental letter dated August 20, 2001, contained clarifying information only, and did not change the initial no significant hazards consideration determination, or expand the scope of the initial application.

2.0 EVALUATION

2.1 Licensee Evaluation

In accordance with 10 CFR 50.90 and 2.101, CP&L is requesting a revision to the TS for BSEP, Units 1 and 2. The existing P-T limit curves for normal operation are valid up to 16 EFPY, and the existing P-T limit curves for hydrostatic and leak testing are valid up to 14 and 16 EFPY. CP&L is requesting approval of revised P-T limit curves for normal operation and hydrostatic and leak tests that will be valid up to 32 EFPY.

In the BSEP TS, Figure 3.4.9-1 provides reactor coolant system (RCS) P-T limits applicable to normal operation with the core not critical. Figure 3.4.9-2 provides RCS P-T limits applicable to normal operation with the core critical. Figure 3.4.9-3 provides RCS P-T limits applicable to hydrostatic and leak tests up to 14 EFPY. Figure 3.4.9-4 provides RCS P-T limits applicable to hydrostatic and leak tests up to 16 EFPY.

Figure 3.4.9-1 is being revised to provide RCS P-T limits applicable to normal operation with the core not critical that are valid up to 32 EFPY. Figure 3.4.9-2 is being revised to provide RCS P-T limits applicable to normal operation with the core critical that are valid up to 32 EFPY. Figure 3.4.9-3 is being revised to provide RCS P-T limits applicable to hydrostatic and leak tests that are valid up to 32 EFPY. Figure 3.4.9-4 is being eliminated; to support the elimination of Figure 3.4.9-4, Surveillance Requirement 3.4.9.2.a is being revised to require completion of the following action within 30 minutes:

[Verify] RCS pressure and RCS temperature are within the applicable limits specified in Figure 3.4.9-3.

In accordance with 10 CFR 50, Appendix G, the BSEP TS limit RCS P-T changes during heatup and cooldown to within the design assumptions and stress limits for cyclic operation. These limits are defined by the P-T limits curves for heatup, cooldown, and hydrostatic and leak testing. These curves are used during heatup and cooldown maneuvering, when P-T indications are monitored and compared to the applicable P-T limits curve to determine that operation is within the allowable limits.

The P-T limits curves in the BSEP TS were established in accordance with 10 CFR 50, Appendix G, and the ASME Boiler and Pressure Vessel Code, Section XI, Appendix G, to provide adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests.

Revised P-T limits curves are being requested which provide P-T limitations valid until 32 EFPY. Each revised P-T limits curve is represented by two curves, a beltline curve and a bottom head curve. The beltline curve is based on the N 16A/B nozzles; the N 16A/B nozzles are the limiting reactor pressure vessel (RPV) material and are located in the beltline region. The bottom head curves define the P-T limits for the bottom head region of the RPV.

Due to questions regarding fluence calculations and regarding the inclusion of instrument uncertainty in their calculation, CP&L submitted a letter of response to a request for additional information. This response contains a statement that the P-T curves will only be applicable for 19 EFPY instead of the full 32 EFPY. When new P-T curves are submitted, instrument error will be included in their calculation. CP&L has stated in their letter of August 20, 2001, that they will include these factors in their next submittal, which will be made by June 30, 2002.

The revised P-T limits being proposed for BSEP, Units 1 and 2, are based on ASME Code Case N-640, "Alternative Reference Fracture Toughness for Development of P-T Limit Curves for ASME Section XI, Division I," as an alternative method for determining the fracture toughness of RPV materials for use in determining P-T limits. ASME Code Case N-640 permits the use of the K_{Ic} fracture toughness curve of ASME Code, Section XI, Appendix A, Figure A-2200-1, in lieu of the K_{Ia} fracture toughness curve from ASME Code, Section XI, Appendix G, Figure G-2200-1, as the lower bound for fracture toughness. In the development of P-T limits curves, use of the K_{Ic} curve in determining the lower bound fracture toughness is more technically correct than the K_{Ia} curve. The

K_{Ic} curve appropriately implements the use of static initiation fracture toughness behavior to evaluate the controlled heat-up and cooldown process of an RPV. The use of the initial conservatism of the K_{Ia} curve, when the curve was codified in 1974, was necessary due to the limited knowledge of RPV materials. Since 1974, additional knowledge has been gained about RPV materials that demonstrates that the lower bound on fracture toughness provided by the K_{Ia} curve is well beyond the margin of safety required to protect the public health and safety from potential RPV failure. Based on this, CP&L has concluded that the proposed changes to the P-T limits curves will not present an undue risk to the public health and safety.

Use of the K_{Ic} fracture toughness curve results in a reduction in allowable temperatures, for a given pressure, compared to allowable temperatures without the use of the Code case. P-T limits curves based on the K_{Ic} curve will enhance overall plant safety by opening the P-T operating window, especially in the region of low temperature operations. Safety benefits during the pressure test include a reduction in challenges to plant operators in maintaining a high temperature in a limited operating window, personnel safety while conducting inspections in primary containment at elevated temperatures, and increased availability of plant systems, including the Residual Heat Removal system due to the reduction of the heatup and testing time.

2.2 Staff Evaluation

Pursuant to 10 CFR 50.90 and 2.101, CP&L has requested a revision to the TS for BSEP Units 1 and 2. The proposed amendment revises the Units 1 and 2 P-T limit curves for normal operation and hydrostatic and leak tests with curves that will be valid up to 32 EFPY. Use of stress intensity factor K_{Ic} , permitted by ASME Code Case N-640, makes it possible to increase the EFPY. Use of Code Case N-640 to generate P-T curves is not currently permitted by the regulations. Therefore, a request for exemption to use ASME Code Case N-640 was made. This exemption was reviewed and approved by the staff in a separate Safety Evaluation.

In this evaluation, the staff performed independent calculations of the adjusted reference temperature (ART) values for the limiting materials using the methodology in Regulatory Guide 1.99, Revision 2. Based on these calculations, the staff verified the licensee's limiting materials for BSEP Units 1 and 2 reactor vessels. The staff's calculated ART values for the limiting material agreed with the licensee's calculated ART values. With this newly calculated ART used for calculating the revised P-T limit curves, the licensee requested to increase the applicable years for the curves to 32 EFPY.

The staff performed check calculations to verify the revised P-T limit curves using the stress intensity factor K_{Ic} , permitted by ASME Code Case N-640. This Code case is being approved in a separate Safety Evaluation. The staff found agreement with the submitted P-T curves, as calculations confirmed various points on the submitted P-T limit curves were bounded by the indicated temperature.

However, the staff has determined that the neutron fluences specified in the submittal of May 1, 2001, may not be sufficiently adequate. Based on the staff's independent assessment of the neutron fluence calculations, and given that the 32 EFPY neutron fluence calculations for BSEP were not determined to be credible by the staff, the staff concludes that the updated P-T limit curves proposed by CP&L will continue to provide an acceptable level of margin and safety, and provide sufficient assurance that the BSEP reactor will be operated in a manner that will protect the RPV against brittle fracture for a period of less than the full 32 EFPY. By letter dated August 20, 2001, CP&L informed the staff that the applicability of the proposed P-T limit curves would be limited to 19

EFPY. The proposed curves are, therefore, approved for incorporation into the BSEP TS for use for 19 EFPY. The staff has also determined that the curves must include a provision for instrument error for temperature and pressure, which must be factored into the calculations of the P-T curves. CP&L has stated in their letter of August 20, 2001, that they will include these factors in their next submittal, which will be made by June 30, 2002. It was determined that this would be acceptable since the curves were submitted for the full 32 EFPY but will only be approved for 19 EFPY, and this margin is considered sufficient to account for any instrument error.

Thus, the staff determined that the P-T limit curves satisfy the requirements in Paragraph IV.A.2 of Appendix G of 10 CFR Part 50 as modified by Code Case N-640, and hence, the requirements of 10 CFR 50.60.

The staff concludes that the proposed P-T limit curves for the RCS for heatup and cooldown satisfy the requirements in Appendix G to Section XI of the ASME Code, as modified by Code Case N-640, and Appendix G of 10 CFR 50 for 19 EFPY. Hence, the proposed P-T limit curves as amended are acceptable for incorporation in the BSEP Units 1 and 2 TS.

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 amendments. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change a Surveillance Requirement. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards consideration, and there has been no public comment on such finding (66 FR 29350). Accordingly, the amendments meet 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 amendments.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: E. Andruszkiewicz

Date: October 4, 2001

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

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - ISSUANCE OF
 AMENDMENT RE: PRESSURE-TEMPERATURE CURVES
 (TAC NOS. MB1848 AND MB1849)

Dear Mr. Keenan:

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Sincerely,

/RA/

Donnie J. Ashley, Project Manager, Section 2
 Project Directorate II
 Division of Licensing Project Management
 Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

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Accession Number ML012780286
 *See previous concurrence
 **SE dated 9/4/01

cc w/encls: See next page

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OFFICE	PM:PDII/S2	LA:PDII/S2	SC:PDII/S2	OGC*	EMCB**
NAME	DAshley	Dunnington	RCorreia	DCummings	KWichman
DATE	9/26/01	9/26/01	9/26/01	9/21/01	9/4/01
COPY	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

OFFICIAL RECORD COPY

Mr. J. S. Keenan
Carolina Power & Light Company

Brunswick Steam Electric Plant
Units 1 and 2

cc:

Mr. William D. Johnson
Vice President and Corporate Secretary
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602

Ms. Margaret A. Force
Assistant Attorney General
State of North Carolina
Post Office Box 629
Raleigh, North Carolina 27602

Mr. Donald E. Warren
Brunswick County Board of Commissioners
Post Office Box 249
Bolivia, North Carolina 28422

Mr. Robert P. Gruber
Executive Director
Public Staff - NCUC
Post Office Box 29520
Raleigh, North Carolina 27626-0520

Resident Inspector
U.S. Nuclear Regulatory Commission
8470 River Road
Southport, North Carolina 28461

Mr. J. J. Lyash
Director - Site Operations
Carolina Power & Light Company
Brunswick Steam Electric Plant
Post Office Box 10429
Southport, North Carolina 28461

Mr. John H. O'Neill, Jr.
Shaw, Pittman, Potts & Trowbridge
2300 N Street, NW.
Washington, DC 20037-1128

Mr. Norman R. Holden, Mayor
City of Southport
201 East Moore Street
Southport, North Carolina 28461

Mr. Mel Fry, Director
Division of Radiation Protection
N.C. Department of Environment
and Natural Resources
3825 Barrett Dr.
Raleigh, North Carolina 27609-7721

Mr. Dan E. Summers
Emergency Management Coordinator
New Hanover County Department of
Emergency Management
Post Office Box 1525
Wilmington, North Carolina 28402

Mr. C. J. Gannon
Plant Manager
Carolina Power & Light Company
Brunswick Steam Electric Plant
Post Office Box 10429
Southport, North Carolina 28461

Mr. Terry C. Morton
Manager
Performance Evaluation and
Regulatory Affairs CPB 7
Carolina Power & Light Company
Post Office Box 1551
Raleigh, North Carolina 27602-1551

Public Service Commission
State of South Carolina
Post Office Drawer 11649
Columbia, South Carolina 29211

Mr. David C. DiCello
Manager - Regulatory Affairs
Carolina Power & Light Company
Post Office Box 10429
Southport, NC 28461