

October 27, 1987

Dockets Nos. 50-325/324

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

Dear Mr. Utley:

SUBJECT: ISSUANCE OF AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71 AND AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-62 - BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2, REGARDING FUEL ASSEMBLY AND FUEL STORAGE DESCRIPTIONS (TAC NOS. 65599/65600)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. DPR-71 and Amendment No. 140 to Facility Operating License No. DPR-62, for Brunswick Steam Electric Plant, Units 1 and 2. The amendments consist of changes to the Technical Specifications in response to your submittal dated June 12, 1987, as supplemented by letters dated September 10 and 11, 1987.

The amendments change the Technical Specifications (TS) to add General Electric fuel type GE8 (GE8x8EB) to the list of fuels in the core in the TS Section 5.3.1 and remove the limitations on maximum fuel enrichments in TS Sections 5.3.1 and 5.6.1.2. In addition, TS Sections 5.6.1.1 and 5.6.1.2 are changed by requiring that specific values of k-infinity are met for fuel assemblies stored in the new and spent fuel pools.

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,



Ernest D. Sylvester, Project Manager
Project Directorate II-1
Division of Reactor Projects I/II

8711020054 871027
PDR ADOCK 05000324
P. PDR

Enclosures:

1. Amendment No. 113 to License No. DPR-71
2. Amendment No. 140 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures:
See next page

Anderson
PD21:DRPR
PAnderson
10/15/87

PD21:DRPR *ES*
ESylvester/dsf
10/15/87

Adams
PD21:DRPR
EAdams
10/15/87

Mr. E. E. Utley
Carolina Power & Light Company

Brunswick Steam Electric Plant
Units 1 and 2

cc:

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Vice President
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Plant General Manager
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Regional Administrator, Region II
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Atlanta, Georgia 30303

Mr. Dayne H. Brown, Chief
Radiation Protection Branch
Division of Facility Services
N. C. Department of Human Resources
701 Barbour Drive
Raleigh, North Carolina 27603-2008

AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71, Brunswick, UNIT 1
AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-62, Brunswick, UNIT 2

DISTRIBUTION:

Docket No. 50-325
Docket No. 50-324
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D. Hagan
E. Jordan
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Wanda Jones
E. Butcher
W. Brooks
ACRS (10)
GPA/PA
ARM/LFMB



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

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 113
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 June 12, 1987, as supplemented on September 10 and 11, 1987, 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:

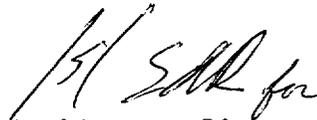
8711020059 871027
PDR ADOCK 05000324
P PDR

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 113, are hereby incorporated in the license. The licensee 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



Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects I/II

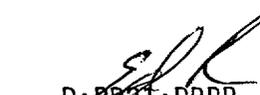
Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 27, 1987


LA:PD21:DRPR
PAnderson
10/5/87

PM:PD21:DRPR 
ESylvester / dsf
10/15/87


OGC-B
RBachmann
10/19/87


D:PD21:DRPR
EAdensam
10/26/87

ATTACHMENT TO LICENSE AMENDMENT NO. 113

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

5-1
5-4
5-5

Insert Pages

5-1
5-4
5-5

5.0 DESIGN FEATURES

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: 8x8R, P8x8R, BP8x8R, and GE8.

DESIGN FEATURES

5.3 REACTOR CORE

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 137 control rod assemblies, each consisting of a cruciform array of stainless steel tubes containing approximately 143 inches of boron carbide, B_4C , powder or hafnium absorber rods surrounded by a cruciform-shaped stainless steel sheath.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The nuclear boiler and reactor recirculation system is designed and shall be maintained:

- a. In accordance with the code requirements specified in Section 4.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements.
- b. For a pressure of 1250 psig, and
- c. For a temperature of 575°F.

VOLUME

5.4.2 The total water and steam volume of the reactor vessel and recirculation system is approximately 18,670 cubic feet.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown in Figure 5.1.1-1.

DESIGN FEATURES5.6 FUEL STORAGECRITICALITY

5.6.1.1 The new fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.90 when dry and less than 0.95 when flooded with unborated water. In order to meet these limits, new fuel assemblies shall have an infinite core geometry lattice multiplication factor less than or equal to 1.31 at 20°C.

5.6.1.2 The spent fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.95 with the storage pool filled with unborated water with:

- a. PWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.41 at 20°C.
- b. BWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.33 at 20°C.

5.6.1.3 The k_{eff} for the unpoisoned racks includes a conservative allowance of 0.5% $\Delta k/k$ for uncertainties. The k_{eff} calculated for the poisoned racks includes the sum of all appropriate biases and the root-mean-square (RMS) of the uncertainties.

DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 116'4".

CAPACITY

5.6.3 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 160 PWR fuel assemblies and 1803 BWR fuel assemblies.

5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7.1-1 are designed and shall be maintained within the cycle or transient limits of Table 5.7.1-1.



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

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
License No. DPR-62

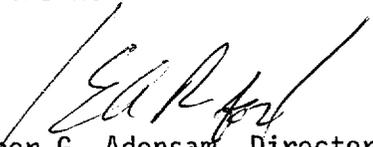
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by Carolina Power & Light Company (the licensee), dated June 12, 1987, as supplemented on September 10 11, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, 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. 140, are hereby incorporated in the license. The licensee 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


Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 27, 1987


LA:PD21:DRPR
PAnderson
10/1/87

PM:PD21:DRPR
ESylvester /dsf
10/5/87


OGC-B
E Bachmann
10/19/87


D:PD21:DRPR
EAdensam
10/27/87

ATTACHMENT TO LICENSE AMENDMENT NO. 140

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

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

Remove Pages

5-1
5-4
5-5

Insert Pages

5-1
5-4
5-5

5.0 DESIGN FEATURES

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.

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: 8x8R, P8x8R, BP8x8R, and GE8.

DESIGN FEATURES

5.3 REACTOR CORECONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 137 control rod assemblies, each consisting of a cruciform array of stainless steel tubes containing approximately 143 inches of boron carbide, B_4C , powder or hafnium absorber rods surrounded by a cruciform-shaped stainless steel sheath.

5.4 REACTOR COOLANT SYSTEMDESIGN PRESSURE AND TEMPERATURE

5.4.1 The nuclear boiler and reactor recirculation system is designed and shall be maintained:

- a. In accordance with the code requirements specified in Section 4.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
- b. For a pressure of 1250 psig, and
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VOLUME

5.4.2 The total water and steam volume of the reactor vessel and recirculation system is approximately 18,670 cubic feet.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown in Figure 5.1.1-1.

DESIGN FEATURES5.6 FUEL STORAGECRITICALITY

5.6.1.1 The new fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.90 when dry and less than 0.95 when flooded with unborated water. In order to meet these limits, new fuel assemblies shall have an infinite core geometry lattice multiplication factor less than or equal to 1.31 at 20°C.

5.6.1.2 The spent fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.95 with the storage pool filled with unborated water with:

- a. PWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.41 at 20°C.
- b. BWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.33 at 20°C.

5.6.1.3 The k_{eff} for the unpoisoned racks includes a conservative allowance of 0.5% $\Delta k/k$ for uncertainties. The k_{eff} calculated for the poisoned racks includes the sum of all appropriate biases and the root-mean-square (RMS) of the uncertainties.

DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 116'4".

CAPACITY

5.6.3 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 144 PWR fuel assemblies and 1839 BWR fuel assemblies.

5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7.1-1 are designed and shall be maintained within the cycle or transient limits of Table 5.7.1-1.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71
AND AMENDMENT NO. 140 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 June 12, 1987, as supplemented on September 10 and 11, 1987, Carolina Power & Light Company submitted a request for changes to the Brunswick Steam Electric Plant, Units 1 and 2, Technical Specification (TS) Sections 5.3.1, 5.6.1.1 and 5.6.1.2.

The proposed amendment to TS Section 5.3.1 would add General Electric 8 x 8EB (GE8) fuel to the list of fuels acceptable for use in the Brunswick reactor cores and delete the specification for maximum fuel enrichment. The proposed amendment to TS Section 5.6.1.1 and 5.6.1.2 would change the parameter which is used to define acceptability for storage in the Brunswick fuel storage racks. Currently the parameter used is either fuel enrichment (PWR fuel) or linear U-235 loading (grams U-235 per inch of assembly length) for the BWR fuel. The proposed amendment would change the parameter to the limiting value of k-infinity (calculated for the core configuration).

The fuel storage racks at Brunswick consist of:

1. General Electric low-density new fuel storage racks,
2. General Electric high-density poisoned BWR spent fuel storage racks,
3. High-density unpoisoned BWR spent fuel storage racks, and
4. High-density unpoisoned PWR spent fuel storage racks.

Currently, the fuel racks for unused fuel are required to meet a k-effective value of less than 0.90 when dry and less than or equal to 0.95 when flooded with fresh water. No specific prescription for meeting

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these requirements is given in Technical Specification 5.6.1.1 for new fuel storage. The proposed amendment would add the requirement that fuel assemblies to be stored in the new fuel racks not have a k-infinity value greater than 1.31 when calculated in the core configuration.

The current Technical Specification 5.6.1.2 for spent fuel storage contains a maximum value of U-235 loading and enrichment for both types of BWR racks (poisoned and unpoisoned) of 15.6 gm/cm and an enrichment of 3.0 weight percent. These limits would be changed by the proposed amendment to k-infinity values of 1.33 for the BWR racks and 1.41 for the PWR racks.

2.0 EVALUATION

The use of the assembly k-infinity value as the parameter for determining the acceptability for storage in new and spent fuel racks is well established for BWR racks. Its use has been approved in GESTAR II, NEDE-24011-P-A-8, for racks that are designed and built by General Electric. The value of k-infinity = 1.31 has been approved for the low-density new fuel racks as has the value of k-infinity = 1.33 for the poisoned high-density spent fuel racks.

The value of k-infinity to be used for the unpoisoned high-density racks has been obtained for the licensee by General Electric. Calculations were performed in core geometry for an infinite array of assemblies. The General Electric Monte Carlo code, MERIT, which was used for the analysis of the poisoned high-density racks, was used. The fuel assembly used in the analysis was one having a uniform enrichment equivalent to the present maximum value. The value of k-infinity thus obtained is used (after some reduction for uncertainties) as the storage acceptance criterion in the proposed Technical Specifications. Thus, the proposed acceptance criteria are equivalent to present ones and are acceptable. It should be noted that the present enrichment limits for these racks include allowances for all calculational and mechanical uncertainties. The calculated k-infinity values are reduced by an amount necessary to account for the statistical uncertainty in the calculation. A further reduction in the BWR k-infinity value was made in order to be consistent with the value for the poisoned racks. (The proposed k-infinity values for the non-poisoned racks are 1.33 and 1.41 for BWR and PWR fuel, respectively). The staff reviewed the proposed Technical Specification changes and concludes that the acceptance criterion values for k-infinity are consistent with the analyses and are acceptable.

The changes proposed, by letter dated June 12, 1987, to the fuel description in Section 5.3.1 of the specifications were sufficiently vague to allow the possibility of using fuel for which the particular k-infinity value discussed above might be non-conservative. In response to the staff's concern, the licensee further revised TS Section 5.3.1, by letter dated September 10, 1987, to preclude the use of fuel other than that manufactured by General Electric in the Brunswick reactors. The amendment proposed by the September 10, 1987

letter adds the General Electric 8x8EB (GE8) fuel to the list of General Electric fuels acceptable for use in the Brunswick cores. The GE8 extended burnup fuel has previously been found to be acceptable by the NRC in a letter from H. N. Berkow (NRC) to J. S. Charnley (GE). "Acceptance for Approval of Fuel Designs Described in Licensing Topical Report NEDE-24011-P-A-6, Amendment 10 for Extended Burnup Operation," dated December 3, 1985. Operation of the Brunswick reactors with the GE8 fuel will require changes to other TS sections. However, we find the change to TS Section 5.3.1, proposed by the September 10, 1987 letter, to be acceptable as a description of the fuels approved for loading in the Brunswick cores.

Based on its review of the submittals dated June 12 and September 11, 1987, which is described above, the staff finds the proposed changes to the Technical Specifications of the Brunswick Steam Electric Plant, Units 1 and 2, to be acceptable.

3.0 ENVIRONMENTAL CONSIDERATIONS

These amendments change a requirement with respect to installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20. The staff has determined that these amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, these 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 these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration which was published in the Federal Register (52 FR 35787) on September 23, 1987, and consulted with the State of North Carolina. No public comments or requests for hearing were received and the State of North Carolina did not have any comments.

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and 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: W. Brooks, Reactor Systems Branch

Dated: October 27, 1987

October 27, 1987

Dockets Nos. 50-325/324

DISTRIBUTION
See attached list

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

Dear Mr. Utley:

SUBJECT: ISSUANCE OF AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71 AND AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-62 - BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2, REGARDING FUEL ASSEMBLY AND FUEL STORAGE DESCRIPTIONS (TAC NOS. 65599/65600)

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 113 to Facility Operating License No. DPR-71 and Amendment No. 140 to Facility Operating License No. DPR-62, for Brunswick Steam Electric Plant, Units 1 and 2. The amendments consist of changes to the Technical Specifications in response to your submittal dated June 12, 1987, as supplemented by letters dated September 10 and 11, 1987.

The amendments change the Technical Specifications (TS) to add General Electric fuel type GE8 (GE8x8EB) to the list of fuels in the core in the TS Section 5.3.1 and remove the limitations on maximum fuel enrichments in TS Sections 5.3.1 and 5.6.1.2. In addition, TS Sections 5.6.1.1 and 5.6.1.2 are changed by requiring that specific values of k-infinity are met for fuel assemblies stored in the new and spent fuel pools.

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,



Ernest D. Sylvester, Project Manager
Project Directorate II-1
Division of Reactor Projects I/II

Enclosures:

1. Amendment No. 113 to License No. DPR-71
2. Amendment No. 140 to License No. DPR-62
3. Safety Evaluation

cc w/enclosures:
See next page

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Panderson
10/15/87

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ESylvester/dsf
10/15/87

Handwritten initials
PD21:DRPR
EAdensam
10/15/87

Mr. E. E. Utley
Carolina Power & Light Company

Brunswick Steam Electric Plant
Units 1 and 2

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Mr. P. W. Howe
Vice President
Brunswick Nuclear Project
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Mr. C. R. Dietz
Plant General Manager
Brunswick Nuclear Project
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Special Deputy Attorney General
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Mr. Mark S. Calvert
Associate General Counsel
Carolina Power & Light Company
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Raleigh, North Carolina 27602

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

Mr. Christopher Chappell, Chairman
Board of Commissioners
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Bolivia, North Carolina 28422

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Resident Inspector
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Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 2900
Atlanta, Georgia 30303

Mr. Dayne H. Brown, Chief
Radiation Protection Branch
Division of Facility Services
N. C. Department of Human Resources
701 Barbour Drive
Raleigh, North Carolina 27603-2008

AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71, Brunswick, UNIT 1
AMENDMENT NO. 140 TO FACILITY OPERATING LICENSE NO. DPR-62, Brunswick, UNIT 2

DISTRIBUTION:

Docket No. 50-325
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

CAROLINA POWER & LIGHT COMPANY, et al.

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 140
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 June 12, 1987, as supplemented on September 10 11, 1987, 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:

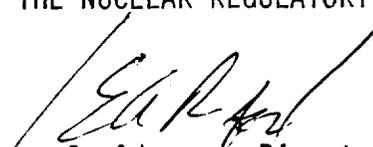
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(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 140, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

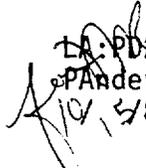
3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Elinor G. Adensam, Director
Project Directorate II-1
Division of Reactor Projects I/II

Attachment:
Changes to the Technical
Specifications

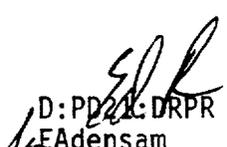
Date of Issuance: October 27, 1987


LA:PD21:DRPR
PAnderson

10/15/87

PM:PD21:DRPR
ESylvester /dsf
10/15/87


OGC-B
R. Bachmann
10/19/87


D:PD21:DRPR
EAdensam
10/24/87

ATTACHMENT TO LICENSE AMENDMENT NO. 140

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

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

Remove Pages

5-1
5-4
5-5

Insert Pages

5-1
5-4
5-5

5.0 DESIGN FEATURES

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.

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: 8x8R, P8x8R, BP8x8R, and GE8.

DESIGN FEATURES

5.3 REACTOR CORE

CONTROL ROD ASSEMBLIES

5.3.2 The reactor core shall contain 137 control rod assemblies, each consisting of a cruciform array of stainless steel tubes containing approximately 143 inches of boron carbide, B_4C , powder or hafnium absorber rods surrounded by a cruciform-shaped stainless steel sheath.

5.4 REACTOR COOLANT SYSTEM

DESIGN PRESSURE AND TEMPERATURE

5.4.1 The nuclear boiler and reactor recirculation system is designed and shall be maintained:

- a. In accordance with the code requirements specified in Section 4.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
- b. For a pressure of 1250 psig, and
- c. For a temperature of 575°F.

VOLUME

5.4.2 The total water and steam volume of the reactor vessel and recirculation system is approximately 18,670 cubic feet.

5.5 METEOROLOGICAL TOWER LOCATION

5.5.1 The meteorological tower shall be located as shown in Figure 5.1.1-1.

DESIGN FEATURES5.6 FUEL STORAGECRITICALITY

5.6.1.1 The new fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.90 when dry and less than 0.95 when flooded with unborated water. In order to meet these limits, new fuel assemblies shall have an infinite core geometry lattice multiplication factor less than or equal to 1.31 at 20°C.

5.6.1.2 The spent fuel storage racks are designed and shall be maintained with sufficient center-to-center distance between fuel assemblies placed in the storage racks to ensure a k_{eff} equivalent to less than 0.95 with the storage pool filled with unborated water with:

- a. PWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.41 at 20°C.
- b. BWR fuel assemblies with a maximum infinite core geometry lattice multiplication factor less than or equal to 1.33 at 20°C.

5.6.1.3 The k_{eff} for the unpoisoned racks includes a conservative allowance of 0.5% $\Delta k/k$ for uncertainties. The k_{eff} calculated for the poisoned racks includes the sum of all appropriate biases and the root-mean-square (RMS) of the uncertainties.

DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 116'4".

CAPACITY

5.6.3 The fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 144 PWR fuel assemblies and 1839 BWR fuel assemblies.

5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7.1-1 are designed and shall be maintained within the cycle or transient limits of Table 5.7.1-1.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-71
AND AMENDMENT NO. 140 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 June 12, 1987, as supplemented on September 10 and 11, 1987, Carolina Power & Light Company submitted a request for changes to the Brunswick Steam Electric Plant, Units 1 and 2, Technical Specification (TS) Sections 5.3.1, 5.6.1.1 and 5.6.1.2.

The proposed amendment to TS Section 5.3.1 would add General Electric 8 x 8EB (GE8) fuel to the list of fuels acceptable for use in the Brunswick reactor cores and delete the specification for maximum fuel enrichment. The proposed amendment to TS Section 5.6.1.1 and 5.6.1.2 would change the parameter which is used to define acceptability for storage in the Brunswick fuel storage racks. Currently the parameter used is either fuel enrichment (PWR fuel) or linear U-235 loading (grams U-235 per inch of assembly length) for the BWR fuel. The proposed amendment would change the parameter to the limiting value of k-infinity (calculated for the core configuration).

The fuel storage racks at Brunswick consist of:

1. General Electric low-density new fuel storage racks,
2. General Electric high-density poisoned BWR spent fuel storage racks,
3. High-density unpoisoned BWR spent fuel storage racks, and
4. High-density unpoisoned PWR spent fuel storage racks.

Currently, the fuel racks for unused fuel are required to meet a k-effective value of less than 0.90 when dry and less than or equal to 0.95 when flooded with fresh water. No specific prescription for meeting

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these requirements is given in Technical Specification 5.6.1.1 for new fuel storage. The proposed amendment would add the requirement that fuel assemblies to be stored in the new fuel racks not have a k-infinity value greater than 1.31 when calculated in the core configuration.

The current Technical Specification 5.6.1.2 for spent fuel storage contains a maximum value of U-235 loading and enrichment for both types of BWR racks (poisoned and unpoisoned) of 15.6 gm/cm and an enrichment of 3.0 weight percent. These limits would be changed by the proposed amendment to k-infinity values of 1.33 for the BWR racks and 1.41 for the PWR racks.

2.0 EVALUATION

The use of the assembly k-infinity value as the parameter for determining the acceptability for storage in new and spent fuel racks is well established for BWR racks. Its use has been approved in GESTAR II, NEDE-24011-P-A-8, for racks that are designed and built by General Electric. The value of k-infinity = 1.31 has been approved for the low-density new fuel racks as has the value of k-infinity = 1.33 for the poisoned high-density spent fuel racks.

The value of k-infinity to be used for the unpoisoned high-density racks has been obtained for the licensee by General Electric. Calculations were performed in core geometry for an infinite array of assemblies. The General Electric Monte Carlo code, MERIT, which was used for the analysis of the poisoned high-density racks, was used. The fuel assembly used in the analysis was one having a uniform enrichment equivalent to the present maximum value. The value of k-infinity thus obtained is used (after some reduction for uncertainties) as the storage acceptance criterion in the proposed Technical Specifications. Thus, the proposed acceptance criteria are equivalent to present ones and are acceptable. It should be noted that the present enrichment limits for these racks include allowances for all calculational and mechanical uncertainties. The calculated k-infinity values are reduced by an amount necessary to account for the statistical uncertainty in the calculation. A further reduction in the BWR k-infinity value was made in order to be consistent with the value for the poisoned racks. (The proposed k-infinity values for the non-poisoned racks are 1.33 and 1.41 for BWR and PWR fuel, respectively). The staff reviewed the proposed Technical Specification changes and concludes that the acceptance criterion values for k-infinity are consistent with the analyses and are acceptable.

The changes proposed, by letter dated June 12, 1987, to the fuel description in Section 5.3.1 of the specifications were sufficiently vague to allow the possibility of using fuel for which the particular k-infinity value discussed above might be non-conservative. In response to the staff's concern, the licensee further revised TS Section 5.3.1, by letter dated September 10, 1987, to preclude the use of fuel other than that manufactured by General Electric in the Brunswick reactors. The amendment proposed by the September 10, 1987

letter adds the General Electric 8x8EB (GE8) fuel to the list of General Electric fuels acceptable for use in the Brunswick cores. The GE8 extended burnup fuel has previously been found to be acceptable by the NRC in a letter from H. N. Berkow (NRC) to J. S. Charnley (GE). "Acceptance for Approval of Fuel Designs Described in Licensing Topical Report NEDE-24011-P-A-6, Amendment 10 for Extended Burnup Operation," dated December 3, 1985. Operation of the Brunswick reactors with the GE8 fuel will require changes to other TS sections. However, we find the change to TS Section 5.3.1, proposed by the September 10, 1987 letter, to be acceptable as a description of the fuels approved for loading in the Brunswick cores.

Based on its review of the submittals dated June 12 and September 11, 1987, which is described above, the staff finds the proposed changes to the Technical Specifications of the Brunswick Steam Electric Plant, Units 1 and 2, to be acceptable.

3.0 ENVIRONMENTAL CONSIDERATIONS

These amendments change a requirement with respect to installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20. The staff has determined that these amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, these 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 these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that this amendment involves no significant hazards consideration which was published in the Federal Register (52 FR 35787) on September 23, 1987, and consulted with the State of North Carolina. No public comments or requests for hearing were received and the State of North Carolina did not have any comments.

The staff 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and 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: W. Brooks, Reactor Systems Branch

Dated: October 27, 1987