



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

December 9, 1981

Docket Nos. 50-325
50-324

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Posted
Amdt. 66
to DPR-62

Mr. J. A. Jones
Senior Executive Vice President
Carolina Power & Light Company
336 Fayetteville Street
Raleigh, North Carolina 27602

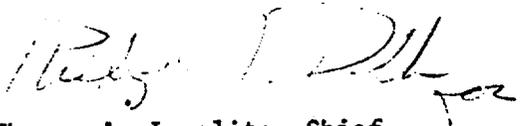
Dear Mr. Jones:

The Commission has issued the enclosed Amendment Nos. 43 and 66 to Facility Operating License Nos. DPR-71 and DPR-62 for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2, respectively. These amendments consist of changes to the Appendix B Technical Specifications in response to your application dated November 25, 1981, as supplemented by your letter dated October 30, 1981. We have made some changes to your proposed Technical Specification revisions. These changes have been discussed with and agreed to by members of your staff.

The changes revise the Appendix B Technical Specifications to clarify action requirements and reflect current methodology based on dose factors for radioactive materials in gaseous effluents. The changes will assure that releases of radioactive materials in gaseous effluents are as low as reasonably achievable.

Copies of our Safety Evaluation and Notice of Issuance are also enclosed.

Sincerely,


Thomas A. Ippolito, Chief
Operating Reactors Branch #2
Division of Licensing

Enclosures:

1. Amendment No. 43 to DPR-71
2. Amendment No. 66 to DPR-62
3. Safety Evaluation
4. Notice

cc: w/enclosures
See next page

Mr. J. A. Jones
Carolina Power & Light Company

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

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-325

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 43
License No. DPR-71

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power & Light Company dated November 25, 1981, as supplemented October 30, 1981, 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. 43, 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 issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Thomas A. Ippolito, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 9, 1981

ATTACHMENT TO LICENSE AMENDMENT NO. 43

FACILITY OPERATING LICENSE NO. DPR-71

DOCKET NO. 50-325

Revise the Appendix B Technical Specifications as follows:

<u>Remove</u>	<u>Insert</u>
ii	ii
2-10	2-10
2-11	2-11
2-12	2-12
--	2-12a
2-13	2-13
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2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

Liquid Waste Effluents (cont'd)

- g. The maximum radioactivity to be contained in any liquid radwaste tank that can be discharged directly to the environs shall not exceed 10 Ci, excluding tritium and dissolved and entrained fission and activation gases.
- h. If the cumulative release of radioactive materials in liquid effluents excluding tritium and dissolved and entrained fission and activation gases, exceeds 2.5 Ci per reactor in a calendar quarter, the licensee shall make an investigation to identify the causes of such releases, define and initiate a program of action to reduce such releases to the design objective levels listed in Section 2.5, and report these actions to the Commission within 30 days from the end of the quarter during which the release occurred.

2.2 Specifications for Gaseous Waste Discharges

- a. (1) The release rate limit of noble gases from this site shall be:

$$\sum_{i=1}^n [DETB_i(8.0 \times 10^3)Q_{s_i} + DTB_i(1.3 \times 10^4)Q_{v_i}] \leq 1$$

where Q_s = release rate from main stack in Ci/sec (elevated release)

Q_v = release rate from vents in Ci/sec (ground release)

i = the i^{th} individual nuclide.
 n = total number of nuclides.

$DETB_i$ = Total-body elevated release dose factor from Table 3.5-5 in mrem/Ci

DTB_i = Total-body dose factor from Table 3.5-5 in mrem-m³/pCi-yr

3.5.1 Liquid Waste Effluents (cont'd)

- e. The flow rate of liquid radioactive waste shall be continually measured and recorded during release.
- f. All liquid effluent radiation monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall also have a functional test monthly and an instrument check prior to making a release.

3.5.2 Specifications for Gaseous Waste Sampling and Monitoring

- a. Plant records shall be maintained and records of the sampling and analysis results shall be submitted in accordance with Section 5.4 of these Specifications. Estimates of the sampling and analytical error associated with each reported value should be included.
- b. Gaseous releases to the environment from the two reactor building vents, the two turbine building vents, and the off gas vent (stack), except as noted in Specification 3.5.2.c below, shall be continuously monitored for gross radioactivity and the flow measured and recorded. Whenever these monitors are inoperable, grab samples shall be taken and analyzed daily for gross gaseous radioactivity. If these monitors are inoperable for more than seven days, these releases shall be terminated or the plant shall be shut down.
- c. An isotopic analysis shall be made of a representative sample of gaseous activity, excluding tritium, at the discharge of the steam jet air ejectors and at a point prior to dilution and discharge.
 (1) at least monthly.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.5.2 Gaseous Waste Effluents (cont'd)

(2) The release rate limit of I-131 and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of the gaseous wastes from the site shall be:

$$[3.7 \times 10^4] Q_s + [5.8 \times 10^6] Q_v \leq 1$$

where Q_s = release rate from the main stack in Ci/sec (as elevated release)

Q_v = release rate from the vents in Ci/sec (ground release)

- b. Should any of the conditions of Specifications 2.5.2.b(1) or 2.5.2.b(2) listed below be exceeded, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Sections 2.5.a and 2.5.b for gaseous wastes and report these actions to the Commission within 30 days from the end of the calendar quarter during which the releases occurred.

(1) the calculational method for determining the average release rate of noble gases from the site during any 12 consecutive months shall be:

$$\sum_{i=1}^n DAB_i [(4.0 \times 10^2) Q_{s1} + (1.6 \times 10^5) Q_{v1}] \leq 1$$

and

$$\sum_{i=1}^n [DETA_i (1.9 \times 10^5) Q_{s1} + DAG_i (3.2 \times 10^5) Q_{v1}] \leq 1$$

where Q_{s1} = release rate of radioisotope 1 from the main stack in Ci/sec.

Q_{v1} = release rate of radioisotope 1 from the vents of each reactor in Ci/sec.

3.5.2 Gaseous Waste Effluents (cont'd)

- (2) within 1 month, following each refueling outage.
 (3) within 72 hours, if the gaseous waste monitors indicate an increase of greater than 50% in the steady state fission gas release after factoring out increases due to power changes.

- d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall have a functional test at least monthly and an instrument check at least daily excluding days of no discharge.
- e. Sampling and analysis of radioactive material in gaseous waste, particulate form, and radioiodine shall be performed in accordance with Table 3.5-2.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

Gaseous Waste Effluents (cont'd)

DAB₁ = The beta air dose factor from Table 3.5-5 in mrad-m³/pCi-yr

DETA₁ = Gamma air elevated release dose factor from Table 3.5-5 in mrad/Ci

DAG₁ = The gamma air dose factor from Table 3.5-5 in mrad-m³/pCi-yr

(2) The calculational method for determining the average release rate from the site of I-131 and radioactive materials in particulate form with half-lives greater than eight days during any 12 consecutive months shall be:

$$(6.56 \times 10^6 Q_S) + (7.46 \times 10^7 Q_V) \leq 1$$

(If no teen, child or infant milk consumption)

The consumption of milk must be demonstrated by the Radiological Environmental Monitoring Program 4.2.7. If the Radiological Environmental Monitoring Program determines the consumption of milk by teen, child, or infant the above equation shall be modified by the appropriate coefficient (Dose Factors) of Regulatory Guide 1.109.

- c. Should any of the conditions of Specifications 2.5.2.c(1) or 2.5.2.c(2) listed below be exceeded, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Sections 2.5.a and 2.5.b for gaseous wastes and report these actions to the Commission within 30 days from the end of the calendar quarter during which the releases occurred.

3.5.2 Gaseous Effluents (cont'd)

- f. Calculations for meeting the requirements of Specifications 2.5.2.b(1) and (2) shall be performed at least once every 31 days.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.2 Gaseous Waste Effluents (cont'd)

(1) The calculational method for determining the average release rate of noble gases during any calendar quarter from the site shall be:

$$\sum_{i=1}^n DAB_i [(2.0 \times 10^2) Q_{si} + (8.0 \times 10^4) Q_{vi}] \leq 1$$

$$\sum_{i=1}^n [DETA_i (9.3 \times 10^4) Q_{si} + DAG_i (1.6 \times 10^5) Q_{vi}] \leq 1$$

(2) The calculational method for determining the average release rate of I-131 and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter from the site shall be:

$$[3.26 \times 10^6 Q_s] + [3.74 \times 10^7 Q_v] \leq 1$$

(if no teen, child or infant milk consumption)

The consumption of milk must be demonstrated by the Radiological Environmental Monitoring Program 4.2.7. If the Radiological Environmental Monitoring Program determines the consumption of milk by teen, child, or infant, the above equation shall be modified by the appropriate coefficients (Dose Factors) of Regulatory Guide 1.109.

3.5.2 Gaseous Waste Effluents (cont'd)

g. Calculations for meeting the requirements of Specifications 2.5.2.c(1) and (2) shall be performed at least once every 31 days.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.5.2 Gaseous Waste Effluents (cont'd)3.5.2 Gaseous Waste Effluents (cont'd)

d. Whenever the augmented off gas (AOG) system is out of service, at least one of the condenser/air ejector off gas monitors listed in Table 3.5-4 shall be operating and set to alarm and capable to initiate the automatic closure of the waste gas discharge valve prior to exceeding the limits specified in 2.5.2.a above.

h. The operability of each automatic isolation valve in the gaseous radwaste discharge line shall be demonstrated quarterly.

e. If both condenser/air ejector off gas monitors are incapable of initiating automatic closure of the waste gas discharge valves, a shutdown shall be initiated so that the reactor will be in the hot shutdown condition within 24 hours.

The augmented off gas (AOG) process monitor shall be operable whenever a release is being made from the AOG system storage tanks.

If the augmented off gas system is out of service and the air ejector off gas monitors are inoperative, a reactor shutdown shall be initiated so that the reactor will be in the hot shutdown condition within 24 hours.

f. If the release rate from the site of noble gases is not:

$$\sum_{i=1}^n \text{DAB}_i [(2.0 \times 10^2) Q_{si} + (8.0 \times 10^4) Q_{vi}] \leq 1$$

$$\sum_{i=1}^n [\text{DETA}_i (9.3 \times 10^4) Q_{si} + \text{DAG}_i (1.6 \times 10^5) Q_{vi}] \leq 1$$

GASEOUS WASTE EFFLUENT - The release of radioactive materials in gaseous waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20, and should be as low as reasonably achievable in accordance with the requirements of 10 CFR Part 50.36. These specifications provide reasonable assurance that the resulting annual air dose from this site due to gamma radiation will not exceed 20 mrad, and an annual air dose due to beta radiation will not exceed 40 mrad from noble gases, and that the annual dose to any organ of an individual from I-131 and particulates with half-lives greater than 8 days will not exceed 30 mrem.

Table 3.5-5 provides dose factors for DTB, DAB and DAG from Table B-1 in Regulatory Guide 1.109. Values for DETB and DETA in Table 3.5-5 are based on the NRC meandering plume model as described in Appendix F of Regulatory Guide 1.109.

A continuous release rate of gross radioactivity in the amount specified in 2.5.2.a(1) will not result in offsite annual doses above background in excess of the limits specified in 10 CFR Part 20.

The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the site boundary to less than or equal to 500 mrem/year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an

infant via the cow-milk-infant pathway to less than or equal to 1500 mrem/year for the nearest cow to the plant.

For Specification 2.5.2.a(2), dose calculations have been made for the critical sectors and critical pathways for I-131 and radioactive material in particulate form with half-lives greater than eight days. The calculations consider site meteorology for these releases.

Specification 2.5.2.b establishes upper site levels for the releases of noble gases, iodines and particulates with half lives greater than eight days, and iodine-131 at the design objective annual quantity during any period of 12 consecutive months. Since BSEP does not have an AOG that has been demonstrated to be continuously operable, the content of these limiting conditions for operation assumes that the design objectives of 2.5a and b for gaseous wastes can be met. This specification does not limit the instantaneous gaseous radioactive release rate, but permits the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in higher releases than the objectives and yet remain below annual design objective releases. The equation limiting radioactivity releases was established based on on-site meteorological data and methodology of Regulatory Guides 1.109 and 1.111, and methods provided in Meteorology and Atomic Energy (1968).

For iodine-131 and radioactive material in particulate form with half-lives greater than eight days, the critical location for ground releases is the SSE sector distance of 1464 meters where X/Q is 6.5×10^{-6} sec/m³ for the dose due to inhalation. The critical location for elevated releases is the SSE sector at a distance of 1464 meters where the X/Q is 3.45×10^{-8} sec/m³ for the dose, due to inhalation. The assumptions for the grass-cow-milk-thyroid chain are listed in Table 3.5-6. The grass-cow-milk-thyroid chain is controlling.

The reporting requirements of 2.5.2.b and 2.5.2.c delineate that the cause be identified whenever the release of gaseous effluents exceeds the annual objective during any 12 consecutive months or one-half the annual objective quantity during any calendar quarter, and describe the proposed program of action to reduce such release rates to the design objectives.

Specifications 2.5.2.d and 2.5.2.e assure compliance with NRC general design criterion 64. The 24-hour period will allow an investigation of several hours to determine the cause of the monitor inoperability and possible repair prior to initiating the hot-shutdown.

Specification 2.5.2.f is to monitor the performance of the core. A sudden increase in the activity levels of gaseous releases may be the result of defective fuel. Since core performance is of utmost importance in the resulting doses, a report must be filed within 10 days following the specified increase in gaseous radioactive releases.

Specification 2.5.2.g requires that the primary containment atmosphere receive treatment for the removal of gaseous iodine and particulates prior to its release.

Specification 2.5.2.h requires that hydrogen concentration in the system shall be monitored at all times during AOG operation to prevent buildup of combustible concentrations.

The sampling and monitoring requirements given under Specification 3.5.2 provide assurance that radioactive materials released in gaseous wastes are properly controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive wastes released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents are furnished to the Commission on the basis of Section 5.4 of these Technical Specifications and in conformance with Regulatory Guide 1.21. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

Table 3.5-5
DOSE FACTORS

ISOTOPE	DETB mrem/Ci	DTB $\frac{\text{mrem-m}^3}{\text{pCi-yr}}$	DAB $\frac{\text{mrad-m}^3}{\text{pCi-yr}}$	DETA mrad/Ci	DAG $\frac{\text{mrad-m}^3}{\text{pCi-yr}}$
Kr-83m	1.0×10^{-9}	7.6×10^{-8}	2.9×10^{-4}	6.0×10^{-8}	1.9×10^{-5}
Kr-85	6.0×10^{-7}	1.6×10^{-5}	2.0×10^{-3}	7.5×10^{-7}	1.7×10^{-5}
Kr-85m	4.5×10^{-5}	1.2×10^{-3}	2.0×10^{-3}	4.5×10^{-5}	1.2×10^{-3}
Kr-87	2.0×10^{-4}	5.9×10^{-3}	1.0×10^{-2}	2.0×10^{-4}	6.2×10^{-3}
Kr-88	6.0×10^{-4}	1.5×10^{-2}	2.9×10^{-3}	6.0×10^{-4}	1.5×10^{-2}
Kr-89	2.7×10^{-4}	1.7×10^{-2}	1.1×10^{-2}	2.7×10^{-4}	1.7×10^{-2}
Kr-90	2.7×10^{-4}	1.6×10^{-2}	7.8×10^{-3}	2.7×10^{-4}	1.6×10^{-2}
Xe-131m	1.1×10^{-5}	9.1×10^{-5}	1.1×10^{-3}	1.2×10^{-5}	1.6×10^{-4}
Xe-133	9.0×10^{-6}	2.9×10^{-4}	1.0×10^{-3}	1.0×10^{-5}	3.5×10^{-4}
Xe-133m	8.2×10^{-6}	2.5×10^{-4}	1.5×10^{-3}	9.5×10^{-6}	3.3×10^{-4}
Xe-135	7.0×10^{-5}	1.8×10^{-3}	2.5×10^{-3}	8.0×10^{-5}	1.9×10^{-3}
Xe-135m	1.1×10^{-4}	3.1×10^{-3}	7.4×10^{-4}	1.3×10^{-4}	3.4×10^{-3}
Xe-137	3.5×10^{-5}	1.4×10^{-3}	1.3×10^{-2}	3.5×10^{-5}	1.5×10^{-3}
Xe-138	3.0×10^{-4}	8.8×10^{-3}	4.8×10^{-3}	3.3×10^{-4}	9.2×10^{-3}
Ar-41	3.7×10^{-4}	8.8×10^{-3}	3.3×10^{-3}	4.0×10^{-4}	9.3×10^{-3}



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

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-324

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 66
License No. DPR- 62

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power & Light Company dated November 25, 1981, as supplemented October 30, 1981, 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. 66, 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 issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Thomas A. Ippolito, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: December 9, 1981

ATTACHMENT TO LICENSE AMENDMENT NO. 66

FACILITY OPERATING LICENSE NO. DPR-62

DOCKET NO. 50-324

Revise the Appendix B Technical Specifications as follows:

<u>Remove</u>	<u>Insert</u>
ii	ii
2-10	2-10
2-11	2-11
2-12	2-12
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2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

1 Liquid Waste Effluents (cont'd)

- g. The maximum radioactivity to be contained in any liquid radwaste tank that can be discharged directly to the environs shall not exceed 10 Ci, excluding tritium and dissolved and entrained fission and activation gases.
- h. If the cumulative release of radioactive materials in liquid effluents excluding tritium and dissolved and entrained fission and activation gases, exceeds 2.5 Ci per reactor in a calendar quarter, the licensee shall make an investigation to identify the causes of such releases, define and initiate a program of action to reduce such releases to the design objective levels listed in Section 2.5, and report these actions to the Commission within 30 days from the end of the quarter during which the release occurred.

2.5.2 Specifications for Gaseous Waste Discharges

- a. (1) The release rate limit of noble gases from this site shall be:

$$\sum_{i=1}^n [DTB_i(8.0 \times 10^3)Q_{si} + DTB_i(1.3 \times 10^4)Q_{vi}] \leq 1$$

where Q_s = release rate from main stack in Ci/sec (elevated release)

Q_v = release rate from vents in Ci/sec (ground release)

i = the i^{th} individual nuclide.
 n = total number of nuclides.

DTB_i = Total-body elevated release dose factor from Table 3.5-5 in mrem/Ci

DTB_i = Total-body dose factor from Table 3.5-5 in mrem-m³/pCi-yr

3.5.1 Liquid Waste Effluents (cont'd)

- e. The flow rate of liquid radioactive waste shall be continually measured and recorded during release.
- f. All liquid effluent radiation monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall also have a functional test monthly and an instrument check prior to making a release.

3.5.2 Specifications for Gaseous Waste Sampling and Monitoring

- a. Plant records shall be maintained and records of the sampling and analysis results shall be submitted in accordance with Section 5.4 of these Specifications. Estimates of the sampling and analytical error associated with each reported value should be included.
- b. Gaseous releases to the environment from the two reactor building vents, the two turbine building vents, and the off gas vent (stack), except as noted in Specification 3.5.2.c below, shall be continuously monitored for gross radioactivity and the flow measured and recorded. Whenever these monitors are inoperable, grab samples shall be taken and analyzed daily for gross gaseous radioactivity. If these monitors are inoperable for more than seven days, these releases shall be terminated or the plant shall be shut down.
- c. An isotopic analysis shall be made of a representative sample of gaseous activity, excluding tritium, at the discharge of the steam jet air ejectors and at a point prior to dilution and discharge.
 (1) at least monthly.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.5.2 Gaseous Waste Effluents (cont'd)

(2) The release rate limit of I-131 and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of the gaseous wastes from the site shall be:

$$[3.7 \times 10^4]Q_s + [5.8 \times 10^6]Q_v \leq 1$$

where Q_s = release rate from the main stack in Ci/sec (as elevated release)

Q_v = release rate from the vents in Ci/sec (ground release)

- b. Should any of the conditions of Specifications 2.5.2.b(1) or 2.5.2.b(2) listed below be exceeded, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Sections 2.5.a and 2.5.b for gaseous wastes and report these actions to the Commission within 30 days from the end of the calendar quarter during which the releases occurred.

(1) The calculational method for determining the average release rate of noble gases from the site during any 12 consecutive months shall be:

$$\sum_{i=1}^n DAB_i [(4.0 \times 10^2)Q_{s_i} + (1.6 \times 10^5)Q_{v_i}] \leq 1$$

and

$$\sum_{i=1}^n [DETA_i (1.9 \times 10^5)Q_{s_i} + DAG_i (3.2 \times 10^5)Q_{v_i}] \leq 1$$

where Q_{s_i} = release rate of radioisotope i from the main stack in Ci/sec.

Q_{v_i} = release rate of radioisotope i from the vents of each reactor in Ci/sec.

3.5.2 Gaseous Waste Effluents (cont'd)

- (2) within 1 month, following each refueling outage.
 (3) within 72 hours, if the gaseous waste monitors indicate an increase of greater than 50% in the steady state fission gas release after factoring out increases due to power changes.

- d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall have a functional test at least monthly and an instrument check at least daily excluding days of no discharge.
- e. Sampling and analysis of radioactive material in gaseous waste, particulate form, and radioiodine shall be performed in accordance with Table 3.5-2.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2 Gaseous Waste Effluents (cont'd)

- DAB₁ = The beta air dose factor from Table 3.5-5 in mrad-m³/pCi-yr
- DETA₁ = Gamma air elevated release dose factor from Table 3.5-5 in mrad/Ci
- DAG₁ = The gamma air dose factor from Table 3.5-5 in mrad-m³/pCi-yr

(2) The calculational method for determining the average release rate from the site of I-131 and radioactive materials in particulate form with half-lives greater than eight days during any 12 consecutive months shall be:

$$(6.56 \times 10^6 Q_S) + (7.46 \times 10^7 Q_V) \leq 1$$

(If no teen, child or infant milk consumption)

The consumption of milk must be demonstrated by the Radiological Environmental Monitoring Program 4.2.7. If the Radiological Environmental Monitoring Program determines the consumption of milk by teen, child, or infant the above equation shall be modified by the appropriate coefficient (Dose Factors) of Regulatory Guide 1.109.

- c. Should any of the conditions of Specifications 2.5.2.c(1) or 2.5.2.c(2) listed below be exceeded, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Sections 2.5.a and 2.5.b for gaseous wastes and report these actions to the Commission within 30 days from the end of the calendar quarter during which the releases occurred.

3.5.2 Gaseous Effluents (cont'd)

- f. Calculations for meeting the requirements of Specifications 2.5.2.b(1) and (2) shall be performed at least once every 31 days.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.5.2 Gaseous Waste Effluents (cont'd)

(1) The calculational method for determining the average release rate of noble gases during any calendar quarter from the site shall be:

$$\sum_{i=1}^n \text{DAB}_i [(2.0 \times 10^2) Q_{si} + (8.0 \times 10^4) Q_{vi}] \leq 1$$

$$\sum_{i=1}^n [\text{DETA}_i (9.3 \times 10^4) Q_{si} + \text{DAG}_i (1.6 \times 10^5) Q_{vi}] \leq 1$$

(2) The calculational method for determining the average release rate of I-131 and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter from the site shall be:

$$[3.26 \times 10^6 Q_s] + [3.74 \times 10^7 Q_v] \leq 1$$

(if no teen, child or infant milk consumption)

The consumption of milk must be demonstrated by the Radiological Environmental Monitoring Program 4.2.7. If the Radiological Environmental Monitoring Program determines the consumption of milk by teen, child, or infant, the above equation shall be modified by the appropriate coefficients (Dose Factors) of Regulatory Guide 1.109.

3.5.2 Gaseous Waste Effluents (cont'd)

- g. Calculations for meeting the requirements of Specifications 2.5.2.c(1) and (2) shall be performed at least once every 31 days.

2.0 ENVIRONMENTAL PROTECTION CONDITIONS

3.0 SURVEILLANCE REQUIREMENTS

2.5.2 Gaseous Waste Effluents (cont'd)3.5.2 Gaseous Waste Effluents (cont'd)

d. Whenever the augmented off gas (AOG) system is out of service, at least one of the condenser/air ejector off gas monitors listed in Table 3.5-4 shall be operating and set to alarm and capable to initiate the automatic closure of the waste gas discharge valve prior to exceeding the limits specified in 2.5.2.a above.

e. If both condenser/air ejector off gas monitors are incapable of initiating automatic closure of the waste gas discharge valves, a shutdown shall be initiated so that the reactor will be in the hot shutdown condition within 24 hours.

The augmented off gas (AOG) process monitor shall be operable whenever a release is being made from the AOG system storage tanks.

If the augmented off gas system is out of service and the air ejector off gas monitors are inoperative, a reactor shutdown shall be initiated so that the reactor will be in the hot shutdown condition within 24 hours.

f. If the release rate from the site of noble gases is not:

$$\sum_{i=1}^n DAB_i [(2.0 \times 10^2) Q_{Si} + (8.0 \times 10^4) Q_{Vi}] \leq 1$$

or

$$\sum_{i=1}^n [DETA_i (9.3 \times 10^4) Q_{Si} + DAG_i (1.6 \times 10^5) Q_{Vi}] \leq 1$$

h. The operability of each automatic isolation valve in the gaseous radwaste discharge line shall be demonstrated quarterly.

GASEOUS WASTE EFFLUENTS - The release of radioactive materials in gaseous waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20, and should be as low as reasonably achievable in accordance with the requirements of 10 CFR Part 50.36. These specifications provide reasonable assurance that the resulting annual air dose from this site due to gamma radiation will not exceed 20 mrad, and an annual air dose due to beta radiation will not exceed 40 mrad from noble gases, and that the annual dose to any organ of an individual from I-131 and particulates with half-lives greater than 8 days will not exceed 30 mrem.

Table 3.5-5 provides dose factors for DTB, DAB and DAG from Table B-1 in Regulatory Guide 1.109. Values for DETB and DETA in Table 3.5-5 are based on the NRC meandering plume model as described in Appendix F of Regulatory Guide 1.109.

A continuous release rate of gross radioactivity in the amount specified in 2.5.2.a(1) will not result in offsite annual doses above background in excess of the limits specified in 10 CFR Part 20.

The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the site boundary to less than or equal to 500 mrem/year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an

infant via the cow-milk-infant pathway to less than or equal to 1500 mrem/year for the nearest cow to the plant.

For Specification 2.5.2.a(2), dose calculations have been made for the critical sectors and critical pathways for I-131 and radioactive material in particulate form with half-lives greater than eight days. The calculations consider site meteorology for these releases.

Specification 2.5.2.b establishes upper site levels for the releases of noble gases, iodines and particulates with half lives greater than eight days, and iodine-131 at the design objective annual quantity during any period 12 consecutive months. Since BSEP does not have an AOG that has been demonstrated to be continuously operable, the content of these limiting conditions for operation assumes that the design objectives of 2.5a and be for gaseous wastes can be met. This specification does not limit the instantaneous gaseous radioactive release rate, but permits the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in higher releases than the objectives and yet remain below annual design objective releases. The equation limiting radioactivity releases was established based on on-site meteorological data and methodology of Regulatory Guides 1.109 and 1.111, and methods provided in Meteorology and Atomic Energy (1968).

For iodine-131 and radioactive material in particulate form with half-lives greater than eight days, the critical location for ground releases is the SSE sector distance of 1464 meters where X/Q is 6.5×10^{-6} sec/m³ for the dose due to inhalation. The critical location for elevated releases is the SSE sector at a distance of 1464 meters where the X/Q is 3.45×10^{-8} sec/m³ for the dose, due to inhalation. The assumptions for the grass-cow-milk-thyroid chain are listed in Table 3.5-6. The grass-cow-milk-thyroid chain is controlling.

The reporting requirements of 2.5.2.b and 2.5.2.c delineate that the cause be identified whenever the release of gaseous effluents exceeds the annual objective during any 12 consecutive months or on-half the annual objective quantity during any calendar quarter, and describe the proposed program of action to reduce such release rates to the design objectives.

Specifications 2.5.2.d and 2.5.2.e assure compliance with NRC general design criterion 64. The 24-hour period will allow an investigation of several hours to determine the cause of the monitor inoperability and possible repair prior to initiating the hot-shutdown.

Specification 2.5.2.f is to monitor the performance of the core. A sudden increase in the activity levels of gaseous releases may be the result of defective fuel. Since core performance is of utmost importance in the resulting doses, a report must be filed within 10 days following the specified increase in gaseous radioactive releases.

Specification 2.5.2.g requires that the primary containment atmosphere receive treatment for the removal of gaseous iodine and particulates prior to its release.

Specification 2.5.2.h requires that hydrogen concentration in the system shall be monitored at all times during AOG operation to prevent buildup of combustible concentrations.

The sampling and monitoring requirements given under Specification 3.5.2 provide assurance that radioactive materials released in gaseous wastes are properly controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive wastes released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents are furnished to the Commission on the basis of Section 5.4 of these Technical Specifications and in conformance with Regulatory Guide 1.21. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

Table 3.5-5
DOSE FACTORS

ISOTOPE	DETB mrem/Ci	DTB $\frac{\text{mrem-m}^3}{\text{pCi-yr}}$	DAB $\frac{\text{mrad-m}^3}{\text{pCi-yr}}$	DETA mrad/Ci	DAG $\frac{\text{mrad-m}^3}{\text{pCi-yr}}$
Kr-83m	1.0×10^{-9}	7.6×10^{-8}	2.9×10^{-4}	6.0×10^{-8}	1.9×10^{-5}
Kr-85	6.0×10^{-7}	1.6×10^{-5}	2.0×10^{-3}	7.5×10^{-7}	1.7×10^{-5}
Kr-85m	4.5×10^{-5}	1.2×10^{-3}	2.0×10^{-3}	4.5×10^{-5}	1.2×10^{-3}
Kr-87	2.0×10^{-4}	5.9×10^{-3}	1.0×10^{-2}	2.0×10^{-4}	6.2×10^{-3}
Kr-88	6.0×10^{-4}	1.5×10^{-2}	2.9×10^{-3}	6.0×10^{-4}	1.5×10^{-2}
Kr-89	2.7×10^{-4}	1.7×10^{-2}	1.1×10^{-2}	2.7×10^{-4}	1.7×10^{-2}
Kr-90	2.7×10^{-4}	1.6×10^{-2}	7.8×10^{-3}	2.7×10^{-4}	1.6×10^{-2}
Xe-131m	1.1×10^{-5}	9.1×10^{-5}	1.1×10^{-3}	1.2×10^{-5}	1.6×10^{-4}
Xe-133	9.0×10^{-6}	2.9×10^{-4}	1.0×10^{-3}	1.0×10^{-5}	3.5×10^{-4}
Xe-133m	8.2×10^{-6}	2.5×10^{-4}	1.5×10^{-3}	9.5×10^{-6}	3.3×10^{-4}
Xe-135	7.0×10^{-5}	1.8×10^{-3}	2.5×10^{-3}	8.0×10^{-5}	1.9×10^{-3}
Xe-135m	1.1×10^{-4}	3.1×10^{-3}	7.4×10^{-4}	1.3×10^{-4}	3.4×10^{-3}
Xe-137	3.5×10^{-5}	1.4×10^{-3}	1.3×10^{-2}	3.5×10^{-5}	1.5×10^{-3}
Xe-138	3.0×10^{-4}	8.8×10^{-3}	4.8×10^{-3}	3.3×10^{-4}	9.2×10^{-3}
Ar-41	3.7×10^{-4}	8.8×10^{-3}	3.3×10^{-3}	4.0×10^{-4}	9.3×10^{-3}



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 43 TO FACILITY OPERATING LICENSE NO. DPR-71

AND AMENDMENT NO. 66 TO FACILITY OPERATING LICENSE NO. DPR-62

CAROLINA POWER AND LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-325 AND 50-324

INTRODUCTION

By letter dated November 25, 1981, as supplemented by letter dated October 30, 1981, the Carolina Power and Light Company (CP&L) requested a change to the Appendix B Technical Specifications of Facility Operating License Nos. DPR-71 and DPR-62 for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2. This change provides clarification to the action required whenever the average release rate of noble gases or the average release rate of iodine-131 and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months exceeds the design objectives of Appendix I to 10 CFR Part 50. In addition, the proposed change is the result of the NRC request by letter of November 12, 1981 to use dose factors for determining the dose impact rather than the average gamma and beta energy per disintegration for noble gas effluents and to include surveillance requirements for calculating the dose impact.

DISCUSSION

The proposed change to the Brunswick Appendix B Technical Specification 2.5.2.b clarifies that the licensee report within 30 days to the Commission whenever the average release rate of radioactive materials in gaseous effluents during 12 consecutive months exceeds the annual design objective levels of Appendix I to 10 CFR Part 50. The present technical specifications did not specify the action required for this environmental protection condition. This is an edit change which the staff finds acceptable.

The proposed change to the Brunswick Appendix B Technical Specifications 2.5.2.a(1), 2.5.2.b(1), 2.5.2.c(1) and 2.5.2.f revise the equations for these environmental protection conditions in terms of dose impact rather than release quantity in order to meet the requirements of 10 CFR Part 20 and provide reasonable assurance that radioactive materials in gaseous effluents are ALARA. The methodology uses dose factors (Table 3.5-5) rather than the average gamma and beta energy per disintegration for noble gas effluents. This is an administrative change recommended by the staff and found acceptable by the licensee.

In addition, Surveillance Requirements 3.5.2.f and g were included to determine compliance with the environmental protection conditions 2.5.2.b and 2.5.2.c. This requirement is presently being performed and is acceptable to the licensee and the staff.

EVALUATION

We reviewed the proposed change to the Brunswick Unit Nos. 1 and 2 Appendix B Technical Specifications and the methodology used for calculating doses. We find that the proposed changes adequately address the limits of 10 CFR Part 20 and satisfies the recommendations of Regulatory Guide 1.109, "Calculation of Annual Average Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluation Compliance with 10 CFR Part 50, Appendix I" (Rev. 1), October 1977 and, therefore, we find the revised technical specifications acceptable.

ENVIRONMENTAL CONSIDERATION

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendments.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendments do not involve a significant increase in the probability or consequences of accidents previously considered and do not involve a significant decrease in a safety margin, the amendments do not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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.

Date: December 9, 1981

UNITED STATES NUCLEAR REGULATORY COMMISSIONDOCKET NOS. 50-325 AND 50-324CAROLINA POWER & LIGHT COMPANYNOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY
OPERATING LICENSES

The U.S. Nuclear Regulatory Commission (the Commission) has issued Amendments Nos. 43 and 66 to Facility Operating License Nos. DPR-71 and DPR-62 issued to Carolina Power & Light Company (the licensee) which revised Technical Specifications for operation of the Brunswick Steam Electric Plant, Unit Nos. 1 and 2 (the facility) located in Brunswick County, North Carolina. The amendments are effective as of the date of issuance.

The amendments revise the Technical Specifications to clarify action requirements and reflect current methodology based on dose factors for radioactive materials in gaseous effluents. The change will assure that releases of radioactive materials in gaseous effluents are as low as reasonably achievable.

The application for the amendment complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments. Prior public notice of the amendments was not required since the amendments do not involve a significant hazards consideration.

The Commission has determined that the issuance of the amendments will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of the amendments.

For further details with respect to this action, see (1) the application for amendment dated November 25, 1981, as supplemented October 30, 1981, (2) Amendment No. 43 to License No. DPR-71 and Amendment No. 66 to DPR-62, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555, and at the Southport-Brunswick County Library, 109 West Moore Street, Southport, North Carolina 28461. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 9th day of December 1981.

FOR THE NUCLEAR REGULATORY COMMISSION


Philip J. Polk, Acting Chief
Operating Reactors Branch #2
Division of Licensing