

APR 13 1976

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Docket No. 50-261

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

Gentlemen:

The Commission has issued the enclosed Amendment No. 20 to Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant Unit No. 2. The amendment consists of changes to the Technical Specifications in response to your application dated January 14, 1976.

file (6)

This amendment changes the Technical Specifications to incorporate requirements for additional incore monitoring and control under certain conditions.

Copies of the Safety Evaluation and the Federal Register Notice are also enclosed.

Sincerely,

Original signed by

Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors

Enclosures:

1. Amendment No. 20
2. Safety Evaluation
3. Federal Register Notice

cc: See next page

OFFICE >	ORB4 <i>DWB</i>	ORB4 <i>Ri</i>	OELD <i>ROSSMAN</i>	C-ORB4 <i>RWReid</i>		
SURNAME >	DBridges:mmt	RIngram	<i>Rossman</i>	RWReid		
DATE >	3/11/76	3/5/76	3/9/76	4/13/76		

April 13, 1976

cc w/enclosures:

G. F. Trowbridge, Esq.
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, D.C. 20036

Mr. McCuen Morrell, Chairman
Darlington County Board of Supervisors
County Courthouse
Darlington, South Carolina 29532

Hartsville Memorial Library
Home and Fifth Avenues
Hartsville, South Carolina 29550

John D. Whisenhunt, Esquire
Bridges and Whisenhunt
Bridges Building
P. O. Box 26
Florence, South Carolina 29501

cc w/enclosures & incoming
dated 1/14/76

Office of Intergovernmental Relations
116 West Jones Street
Raleigh, North Carolina 27603

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 20
License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Carolina Power and Light Company (the licensee) dated January 14, 1976, 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. An environmental statement or negative declaration need not be prepared in connection with the issuance of this amendment.

2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors

Attachment:
Changes to the
Technical Specifications

Date of Issuance:
April 13, 1976

ATTACHMENT TO LICENSE AMENDMENT NO. 20

FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Revise Appendix A Technical Specifications as follows:

Remove Pages

3.10-2

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Insert Pages

3.10-2

3.10-2a

4.11-1

4.11-2

3.10.2

Power Distribution Limits

3.10.2.1

At all times except during low power physics tests, the hot channel factors defined in the basis must meet the following limits:

$$F_Q(Z) \leq (2.30/P) \times K(Z) \text{ for } P > .5$$

$$F_Q(Z) < (4.60) \times K(Z) \text{ for } P \leq .5$$

$$F_{\Delta H}^N < 1.55 (1 + 0.2(1-P))$$

where P is the fraction of rated power at which the core is operating, K(Z) is the function given in Figure 3.10-3, and Z is the core height location of F_Q .

3.10.2.1.1

If the value of F_{xy} for the unrodded plane of the core exceeds 1.435 as determined from power distribution maps using the movable detector system, the Axial Power Distribution Monitoring System (APDMS) will be employed to monitor $F_Q(Z)$ above a predetermined power level, P_{APDMS} . The limiting value is expressed as:

$$[F_j(Z)S(Z)]_{\max} \leq \frac{2.085/P}{\bar{R}_j(1+\sigma_j)}$$

where:

- a. P is the fraction of rated power at which the core is operating ($P \leq 1.0$)
- b. \bar{R}_j , for thimble j, is determined from core power maps i and is by definition:

$$\bar{R}_j = 1/6 \sum_{i=1}^6 \frac{F_{qi}^N}{[F(Z)_{ij}S(Z)]_{\max}}$$

F_{qi}^N is the value obtained from a full core map without the measurement uncertainty factor F_u^N . The quantity $F(Z)_{ij}S(Z)$ is the measured value without inclusion of the instrument uncertainty factor F_q^a . Those uncertainty factors, $F_u^N = 1.05$ and $F_q^a = 1.02$, have been included in the limiting value of $2.085/P$.

- c. σ_j is the standard deviation associated with the determination of \bar{R}_j .
- d. $S(Z)$ is the inverse of the $K(Z)$ function given in Figure 3.10-3.

This limit is not applicable during physics tests and excore calibrations.

- 3.10.2.1.2 The predetermined power level at which APDMS initiation is required is given by the relation

$$P_{APDMS} \leq \frac{1.435}{F_{xy}}$$

- 3.10.2.1.3 F_{xy} shall be determined for the unrodded core plane regions away from fuel support grids, located between a core plane elevation 2.0 feet from the top of the core and a core plane elevation 2.0 feet from the bottom of the core, with no full or part length control rod inserted more than 2.0 feet into the core. This determination shall be made from the movable incore detector maps specified in 3.10.2.3.

- 3.10.2.2 If either measured hot channel factor exceeds these values, the reactor power shall be reduced so as not to exceed a fraction of the design value equal to the ratio of the F_Q^N or $F_{\Delta H}^N$ limit to measured value, whichever is less, and the high neutron flux trip setpoint shall be reduced by the same ratio. If subsequent incore mapping cannot, within a 24-hour period, demonstrate that the hot channel factors are met, the over-power ΔT and overtemperature ΔT trip setpoints shall be similarly reduced.

- 3.10.2.3 Following initial loading and at regular monthly intervals thereafter, power distribution maps using the movable detector system, shall be made to confirm that the hot channel factor limits of specification 3.10.2.1 are satisfied. For the purpose of this confirmation:

4.11

REACTOR CORE

Applicability:

Applies to surveillance of the reactor core.

Objective:

To ensure the integrity of the fuel cladding.

Specifications:

4.11.1

APDMS Operation

4.11.1.1

Prior to establishing normal operation with APDMS, at least six maps will be taken to determine applicable values of \bar{R} and σ for surveillance thimbles.

4.11.1.2

Plant operation up to full rated power shall be permitted for the purposes of obtaining the initial maps of Specification 4.11.1.1, provided the APDMS is operational and hot channel factors are shown to be below the limiting values set forth in Specification 3.10.2. Suitably conservative values of \bar{R} and σ shall be derived from maps previously run during the current fuel cycle for use in the APDMS system during this initial period.

4.11.1.3

Subsequent update of \bar{R} and σ shall employ the last six maps run in accordance with Specification 4.11.1.1.

4.11.1.4

Each power distribution map will be based on flux traverses obtained from 36 or more of the 46 monitoring channels.

4.11.2

Axial surveillance of F(Z)S(Z) shall consist of traverses with the movable incore detectors in appropriate pairs of detector paths, taken every eight hours, or a frequency of approximately 0, 10, 30, 60, 120, 180, 240, 360, and 480 minutes following accumulated control rod motion in any one direction of five steps or more, exclusive of control rod movement within 15 steps from the top of the core. From the traverses, determination of F(Z)S(Z) shall be made and shown to result in a value less than the limiting value specified in 3.10.2. If the APDMS is out of service, reactor operation above P_{APDMS} can be continued for fourteen equivalent full power days provided that traverses are taken manually at equivalent frequencies, and a log of accumulated rod motion and time of manual traverses is kept.

4.11.3

The following criteria will be used for selecting the channels for measuring $F(Z)S(Z)$:

- a. The channel is not acceptable if it contains a control rod allowed by the insertion limits at power levels requiring APDMS.
- b. For the latest full core power map, i , channels, j , are acceptable if:

$$\left| \frac{R_{ij} - \bar{R}_j}{\bar{R}_j} \right| \leq 2\sigma_j$$

Basis

The \bar{R} technique provides a means for using many of the monitoring thimbles to determine $F_Q(Z)$ without fully mapping the core. Frequent core maps assure that appropriate values of \bar{R} are being used for each thimble.

Upon return to power following a refueling outage or other situation where establishment of normal APDMS operation is required, power operation above P_{APDMS} is desirable to establish hot channel factors at full power. By using maps that have been previously obtained during the power ascension and deriving conservative values of \bar{R} and σ from these maps for use in the APDMS, operation of the plant within the peaking factor limitations can be ensured.

If the APDMS is out of service, adequate monitoring of the core power distribution can be maintained for a limited period of time by manual actuation of the flux mapping system and calculation of the values of $F(Z)S(Z)$.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 20 TO LICENSE NO. DPR-23

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT NO. 2

DOCKET NO. 50-261

INTRODUCTION

By letter dated January 14, 1976, Carolina Power and Light Company (CP&L) proposed changes to the Technical Specifications appended to Facility Operating License DPR-23 for H. B. Robinson Steam Electric Plant Unit No. 2 (Robinson 2). CP&L provided supplementary information regarding the need for the Technical Specification change in their correspondence dated December 18, 1975. The proposed Technical Specification change incorporates the requirement for additional incore monitoring and control under certain conditions.

DISCUSSION

During the startup physics and power ascension testing for H. B. Robinson Unit No. 2 Cycle 4, it was discovered that the measured radial power distribution in the core was significantly different from the predicted power distribution. It was further discovered that the planar peaking factor (F_{xy}) or radial peaking factor was sufficiently large to exceed the nominal maximum assumed F_{xy} value of 1.435 at full power. This could potentially lead to a problem near full power since the allowable peaking factor for Robinson 2 of 2.30 is controlled by a power distribution control technique known as the constant axial offset method (CAOC). Implicit in the use of CAOC is the assumption that the maximum F_{xy} encountered in reactor operation does not exceed a value of 1.435. Operation with an F_{xy} value in excess of 1.435 invalidates the technique and no longer assures that the peaking factor Technical Specification limit of 2.30 is not exceeded. To maintain adequate power distribution control, CP&L has proposed additional monitoring of the peaking factor when the F_{xy} value exceeds 1.435. The supplementary monitoring proposed by CP&L is the Axial Power Distribution Monitoring System (APDMS).

EVALUATION

CP&L proposes to supplement the COAC method of power distribution control when the F_{xy} becomes sufficiently large to invalidate the CAOC technique. This would occur at a value of F_{xy} of $\left(\frac{1.435}{P(\%)} \times 100\right)$ where P is the value of reactor power in percent. The proposed method to supplement the CAOC method is the APDMS. The APDMS technique has been utilized at Robinson 2 in recent months and was considered acceptable until vendor (Westinghouse) studies indicated that under certain transient conditions, the APDMS is inadequate for providing an acceptable Departure from Nucleate Boiling (DNB) margin. However, the CAOC was demonstrated to be adequate under these conditions. By using both methods of control the peaking factors will be adequately monitored and controlled since the APDMS adequately monitors and controls peaking factors except for the transient condition under which the CAOC method is valid. The CAOC method of control will adequately control DNB margin since that aspect of power distribution control is not based upon a 1.435 F_{xy} value at full power but rather is based on use of the $F_{\Delta H}$ value of 1.55 which is an existing Technical Specification limit. The $F_{\Delta H}$ (enthalpy rise hot channel factor) is the ratio of the maximum assembly integrated power to the average assembly integrated power.

Thus, use of both techniques will adequately monitor and control peaking factors under all conditions of unusual radial peaking factors. We therefore conclude that the proposed method of dealing with potentially large radial peaking factors maintains margins previously evaluated and is acceptable.

We have determined that the amendment does 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 amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental statement, negative declaration, or environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 13, 1976

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-261

CAROLINA POWER AND LIGHT COMPANY

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY
OPERATING LICENSE

Notice is hereby given that the U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 20 to Facility Operating License No. DPR-23 issued to Carolina Power and Light Company which revised Technical Specifications for operation of the H. B. Robinson Steam Electric Plant Unit No. 2, located in Darlington County, Hartsville, South Carolina. The amendment is effective as of its date of issuance.

The amendment changes the Technical Specifications to incorporate requirements for additional incore monitoring and control under certain conditions.

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. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the application for amendment dated January 14, 1976, (2) Amendment No. 20 to License No. DPR-23, 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. and the Hartsville Memorial Library, Home and Fifth Avenues, Hartsville, South Carolina.

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 Operating Reactors.

Dated at Bethesda, Maryland, this 13th day of April, 1976.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors