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OCT 3 1 1977

Docket Nos. 50-269
50-270
and 50-287

Duke Power Company
ATTN: Mr. William O. Parker, Jr.
Vice President - Steam Production
Post Office Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Gentlemen:

The Commission has issued the enclosed Amendment Nos. 49, 49 and 46 for License Nos. DPR-38, DPR-47 and DPR-55, for the Oconee Nuclear Station, Unit Nos. 1, 2 and 3. These amendments consist of changes to the station's common Technical Specifications in response to your request dated October 26, 1977.

These amendments revise the Technical Specifications to allow operation of Oconee Unit 1, Cycle 4 with a quadrant flux tilt in excess of 3.41%, provided power is restricted to 75% rated power for operation with flux tilt in excess of 3.41% and provided that flux tilt does not exceed 6.03%.

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

Sincerely,

Original Signed By

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. 49 DPR-38
2. Amendment No. 49 DPR-47
3. Amendment No. 46 to DPR-55
4. Safety Evaluation
5. Notice of Issuance

cc w/enclosures:
See next page

FOR PREVIOUS CONCURRENCES SEE ATTACHED YELLOW

OFFICE	ORB#1					
SURNAME	ASchwencer					
DATE	11/1/77					

x27433:tsb

NRC FORM 318 (9-76) NRCM 0240

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Docket Nos. 50-269
50-270
and 50-287

Duke Power Company
ATTN: Mr. William O. Parker, Jr.
Vice President - Steam Production
Post Office Box 2178
422 South Church Street
Charlotte, North Carolina 28242

Gentlemen:

The Commission has issued the enclosed Amendment Nos. , and for License Nos. DPR-38, DPR-47 and DPR-55, for the Oconee Nuclear Station, Unit Nos. 1, 2 and 3. These amendments consist of changes to the station's common Technical Specifications in response to your request dated October 26, 1977.

These amendments revise the Technical Specifications to allow operation of Oconee Unit 1, Cycle 4 for 25 effective full power days with a quadrant flux tilt of 6.03% at 75% power or less.

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

Sincerely,

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Amendment No. to DPR-38
2. Amendment No. to DPR-47
3. Amendment No. to DPR-55
4. Safety Evaluation
5. Notice of Issuance

cc w/enclosures:
See next page

RSB RBaer 10/31/77

OFFICE	ORB#1	OELD	ORB#1			
x27433:tsb						
SURNAME	DNeighbors	DEisenhut	ASchwencer			
DATE	10/28/77	10/31/77	10/31/77			

NRC FORM 318 (9-76) NRCM 0240

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cc: Mr. William L. Porter
Duke Power Company
P. O. Box 2178
422 South Church Street
Charlotte, North Carolina 28242

J. Micheal McGarry, III, Esquire
DeBevoise & Liberman
700 Shoreham Building
806-15th Street, NW.,
Washington, D.C. 20005

Oconee Public Library
201 South Spring Street
Walhalla, South Carolina 29691

Honorable James M. Phinney
County Supervisor of Oconee County
Walhalla, South Carolina 29621

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

Chief, Energy Systems
Analyses Branch (AW-459)
Office of Radiation Programs
U. S. Environmental Protection Agency
Room 645, East Tower
401 M Street, S. W.
Washington, D. C. 20460

U. S. Environmental Protection Agency
Region IV Office
ATTN: EIS COORDINATOR
345 Coutland Street, N. E.
Atlanta, Georgia 30308

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

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 49
License No. DPR-38

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Duke Power Company (the licensee) dated October 26, 1977, 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 3.B of Facility License No. DPR-38 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 49 , 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

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 31, 1977

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

DUKE POWER COMPANY

DOCKET NO. 50 270

OCONEE NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 49
License No. DPR-47

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Duke Power Company (the licensee) dated October 26, 1977, 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 3.B of Facility License No. DPR-47 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 49 , 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

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 31, 1977

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

DUKE POWER COMPANY

DOCKET NO. 50- 287

OCONEE NUCLEAR STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 46
License No. DPR- 55

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Duke Power Company (the licensee) dated October 26, 1977, 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 3.B of Facility License No. DPR-55 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 46 , 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

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 31, 1977

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 49 TO DPR-38

AMENDMENT NO. 49 TO DPR-47

AMENDMENT NO. 46 TO DPR-55

DOCKET NOS. 50-269, 50-270 AND 50-287

Revise Appendix A as follows:

Remove the following page and replace with identically numbered page.

3.5-9

Add the following new page.

3.5-24a

pump operati Also, excepting physics tes or exercising control rods, the axial power shaping control rod insertion/withdrawal limits are specified on figures 3.5.2-4A1, 3.5.2-4A2 and 3.5.2-4A3 (Unit 1); 3.5.2-4B1, 3.5.2-4B2, and 3.5.2-4B3 (Unit 2). If the control rod position limits are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. An acceptable control rod position shall then be attained within two hours. The minimum shutdown margin required by Specification 3.5.2.1 shall be maintained at all times.

d. Except for physics tests, power shall not be increased above the power level cutoff as shown on Figures 3.5.2-1A1, 3.5.2-1A2 and 3.5.2-1A3 (Unit 1), 3.5.2-1B1, 3.5.2-1B2, and 3.5.2-1B3 (Unit 2), and 3.5.2-1C1, 3.5.2-1C2, 3.5.2-1C3 (Unit 3), unless the following requirements are met.

   (1) The xenon reactivity shall be within 10 percent of the value for operation at steady-state rated power.

   (2) The xenon reactivity worth has passed its final maximum or minimum peak during its approach to its equilibrium valve for operation at the power level cutoff.

3.5.2.6 Reactor power imbalance shall be monitored on a frequency not to exceed two hours during power operation above 40 percent rated power. Except for physics tests, imbalance shall be maintained within the envelope defined by Figures 3.5.2-3A1, 3.5.2-3A2, 3.5.2-3A3, 3.5.2-3B1, 3.5.2-3B2, 3.5.2-3B3, 3.5.2-3C1, 3.5.2-3C2, and 3.5.2-3C3. If the imbalance is not within the envelope defined by these figures, corrective measures shall be taken to achieve an acceptable imbalance. If an acceptable imbalance is not achieved within two hours, reactor power shall be reduced until imbalance limits are met.

3.5.2.7 The control rod drive patch panels shall be locked at all times with limited access to be authorized by the manager or his designated alternate.

3.5.2.8 For Oconee Unit 1, in the event Specifications 3.5.2.4.a or 3.5.2.5.c are not met, operation shall be restricted as follows:

a. The core thermal power shall be limited to 75 percent full power.

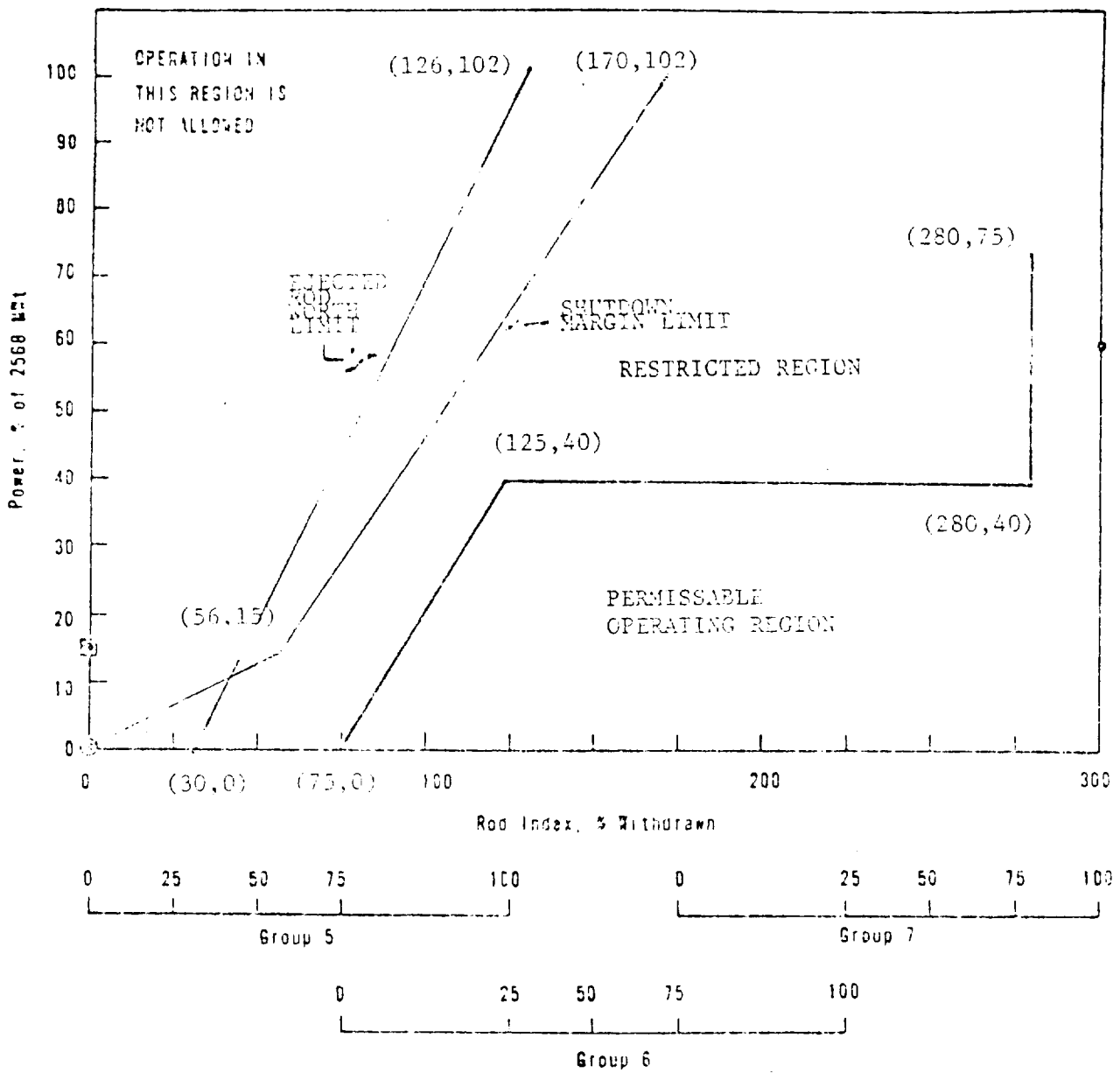
b. The nuclear power maximum setpoint shall be 84 percent full power.

c. The quadrant tilt shall not exceed 6.03 percent.

d. The regulating control rod insertion/withdrawal limits are specified on Figure 3.5.2-6A1

If any of the above provisions are not met within two hours, the reactor shall be in the hot shutdown condition within an additional 4 hours.

Within 25 EFPD of the date of issuance of this Specification, provide a report and analysis of the quadrant flux tilt observed and projections for the next 25 EFPD. Operation above 75% is not authorized if flux tilt is above 3.41% unless an amendment request is submitted accompanied by detailed evaluation and justification



Rod index is the percentage sum of the withdrawal of Groups 5,6 and 7

ROD POSITION LIMITS FOR
FOUR-PUMP OPERATION FROM 0
TO 100 (±10) EFPD, UNIT 1
OCONEE NUCLEAR STATION

FIGURE 3.5.2-6A1

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 49 TO LICENSE NO. DPR-38

AMENDMENT NO. 49 TO LICENSE NO. DPR-47

AMENDMENT NO. 46 TO LICENSE NO. DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3

DOCKET NOS. 50-269, 50-270 AND 50-287

Introduction

By letter dated October 26, 1977, Duke Power Company (the licensee) requested changes to the Technical Specifications appended to the Oconee Unit 1 operating license. These changes provide for operation with a flux tilt greater than 3.41%. For operation with a flux tilt in excess of 3.41% but below 6.03%, operation would not exceed 75% rated power. Operation with a flux tilt greater than 6.03% is not authorized.

Evaluation

During the Cycle 4 physics startup test program at Oconee 1, a quadrant flux tilt, defined as (100 ((Quadrant Power/Average Power of All Quadrants)-1)), was discovered to be greater than current Technical Specifications limits. This condition is allowed during physics teating. This anomaly was first observed as low ejected rod worth measurements at hot zero power, critical boron conditions. Since all other parameters were within acceptance criteria and the ejected rod worth measurements were more conservative than predicted, continued physics testing to evaluate low ejected rod worth was initiated.

The next physics tests were conducted at 15% power. The incore instrument power distribution measurement showed quadrant flux tilts of +10% and -12%. The positive tilt quadrant contains the rod of maximum ejected rod worth as would be expected. In order to obtain a more accurate power distribution measurement, additional physics tests were performed at 40% of full power. The results of the power distribution measurements confirmed the presence of the tilt and showed that the magnitude decreased with power level.

physics test power, was performed. The results of the power distribution measurements confirmed the presence of the tilt and showed that the magnitude decreased with power level.

The licensee and fuel manufacturer (Babcock and Wilcox) have performed numerous analyses, tests and administrative reviews to identify the cause of the quadrant flux tilt. They have considered the following potential causes:

1. Uncoupled control rod assembly (CRA)
2. Broken CRA fingers in controlled assembly
3. Broken CRA fingers in non-controlled assembly
4. Misloaded fuel assembly
5. Flow blockage
6. Abnormal enrichment
7. Cycle 3 operational anomolies
8. New axial power shaping rod (APSR)
9. Patching of CRA may be incorrect
10. Shuffling of unborated poison assembly
11. Cycle 1 assemblies
12. Cycle 3 misloading

Testing has been performed to detect uncoupled control rods and/or missing control rod poison pins. The integrity of the control rods has been verified by the absense of silver in the reactor coolant. Reviews of manufacturing and design records have been conducted with no evidence of misloading. These previously enumerated items have been extensively evaluated and currently none have been identified as the cause.

The licensee has proposed to continue physics testing at the next planned test sequence for 75% of full power. The licensee shall perform a three dimensional, power distribution measurements at equilibrium xenon conditions. This power distribution measurement will be used to observe the effect of increased power on the tilt. The licensee has also proposed a change to the Oconee 1 Technical Specifications to provide additional safety margin for this power level. The change would allow operation with flux tilt greater than 3.41% under the following conditions: (1) restrict power operation to 75%, (2) reduce the overpower trip set point to 84%, (3) limit the quadrant tilt to 6.03% and (4) establish new rod position limits.

The high power, reactor trip is provided to prevent damage to the fuel cladding from reactivity excursions too rapid to be detected by pressure and temperature measurements. During normal plant operation with all reactor coolant pumps operating reactor trip is initiated when reactor power level reaches 105.5% of rated power. The safety analysis for these

rapid reactivity excursions is performed conservatively with consideration of calibration and instrument errors. Therefore, the reduction of this trip function to 84% of full power with flux tilt in excess of 3.41% will provide substantial additional safety margin. The quadrant power tilt limit is to prevent peaking increase in the linear heat generation rate (LHGR).

The analyses which established the current quadrant tilt limit was based on a 3.4% tilt which results in a 5.1% power peaking increase. The proposed 6.03% tilt would produce a maximum power peaking increase of 9%. The power restriction to 75% power or below ensures that the proposed specification on tilt maintains a substantial margin (25% power reduction as compared to ≈4% power peaking increase) for LHGR limits. The licensee has stated that the observed tilt is not a localized effect, i.e., within a region. Because of this non-localized characteristic of the tilt and the potential power peaking increase, the proposed quadrant tilt limit is acceptable.

The rod position limits are based on the most limiting of the following criteria: Emergency core cooling system (ECCS) power peaking, shutdown margin, and potential ejected rod worth. The proposed rod position limits are more conservative than those currently in the Oconee Unit 1 Technical Specifications. The licensee has stated that based on maintaining the current power imbalance Specification 3.5.2.6 with the 75% power restriction and the proposed rod position limits, the maximum cladding temperature in the event of a LOCA will not exceed the Final Acceptance Criteria. These proposed rod position limits also ensure the shutdown margin and ejected rod worth criteria are met. The measured and predicted hot zero power values of rod worths were compared and the most restrictive value was used to determine the proposed rod insertion limits. Based on these considerations the proposed rod position limit is acceptable.

We consider operation at 75% power or below acceptable provided tilt does not exceed 6.03% and maximum power peaking increases does not exceed 9%. Nevertheless, we believe that the investigation of the quadrant tilt observed should be continued and resolved promptly. Consequently, we have required that within 25 EFPD the licensee provide a report and analysis of the quadrant flux tilt observed and projections for the next 25 EFPD. Operation above 75% is not authorized if flux tilt is above 3.41% unless an amendment request is submitted accompanied by detailed evaluation and justification.

Based on our evaluation, operation in the proposed manner does not reduce the safety margins of the current Technical Specification limits. Operation with a higher flux tilt has been compensated with (1) a restriction to operate at a lower power level, (2) a restriction to the overpower setpoint by lowering the setpoint and (3) a more restrictive control rod position specification. These restrictions will assure that neither the probability nor consequences of any transients and accidents considered in the FSAR are not increased and that the safety margins are not reduced. Thus we conclude that these changes do not involve a significant hazards consideration.

Environmental Consideration

We have determined that these 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 these 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, negative declaration, or environmental impact appraisal need not be prepared in connection with the issuance of these 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 these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Date: October 31, 1977

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-269, 50-270 AND 50-287

DUKE POWER COMPANY

NOTICE OF ISSUANCE OF AMENDMENTS TO FACILITY OPERATING LICENSES

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment Nos. 49, 49 and 46 to Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55, respectively, issued to Duke Power Company which revised Technical Specifications for operation of the Oconee Nuclear Station Unit Nos. 1, 2 and 3, located in Oconee County, South Carolina. The amendments are effective as of their date of issuance.

These amendments revise the Technical Specifications to allow operation of Oconee Unit 1, Cycle 4 with a quadrant flux tilt in excess of 3.41%, provided power is restricted to 75% rated power for operation with flux tilt in excess of 3.41% and provided that flux tilt does not exceed 6.03%.

The application for these amendments 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 amendments. Prior public notice of these amendments was not required since the amendments do not involve a significant hazards consideration.

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

For further details with respect to this action, see (1) the application for amendments dated June 6, 1977, (2) Amendment Nos. 49, 49 and 46 to Licenses Nos. DPR-38, DPR-47 and DPR-55, respectively, 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 Oconee County Library, 201 South Spring, Walhalla, South Carolina 29691. 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 31st day of October 1977.

FOR THE NUCLEAR REGULATORY COMMISSION

A. Schwencer

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors