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

FEBRUARY 17 1978

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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 Amendments Nos. 59, 59 and 56 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 and are in response to your request dated January 23, 1978.

These amendments revise the Oconee Nuclear Station's common Technical Specifications to allow Cycle 4 operation of Oconee Unit No. 1 past 100 effective full power days.

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. 59 to DPR-38
2. Amendment No. 59 to DPR-47
3. Amendment No. 56 to DPR-55
4. Safety Evaluation
5. Notice of Issuance

cc w/enclosures:
See next page

OFFICE	ORB#1	RS/OT	OELD	ORB#1	
x27433:tsb SURNAME	DNeighbors	RBaer		ASchwencer	
DATE	2/14/78	2/ /78	2/ /78	2/ /78	

NRC FORM 318 (9-76) NRCM 0240 ☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—626-624

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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. 59
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 January 23, 1978, 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, 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 a change 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. 59 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: February 17, 1978

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

DUKE POWER COMPANY

DOCKET NO. 50-247

OCONEE NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 59
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 January 23, 1978, 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 a change 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. 59 , 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: February 17, 1978

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. 56
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 January 23, 1978, 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 a change 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. 56, 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: February 17, 1978

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 59 TO DPR-38

AMENDMENT NO. 59 TO DPR-47

AMENDMENT NO. 56 TO DPR-55

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

Remove the following pages and insert revised identically numbered pages:

3.5-7
3.5-8
3.5-9
3.5-10
3.5-11
3.5-13
3.5-18a
3.5-21
3.5-23d
3.5-23e

Delete the following pages:

3.5-13a
3.5-18b
3.5-21a
3.5-21b

g. If within one (1) hour of determination of an inoperable rod, it is not determined that a 1%Δk/k hot shutdown margin exists combining the worth of the inoperable rod with each of the other rods, the reactor shall be brought to the hot standby condition until this margin is established.

h. Following the determination of an inoperable rod, all rods shall be exercised within 24 hours and exercised weekly until the rod problem is solved.

i. If a control rod in the regulating or safety rod groups is declared inoperable, power shall be reduced to 60 percent of the thermal power allowable for the reactor coolant pump combination.

j. If a control rod in the regulating or axial power shaping groups is declared inoperable, operation above 60 percent of rated power may continue provided the rods in the group are positioned such that the rod that was declared inoperable is maintained within allowable group average position limits of Specification 3.5.2.2.a and the withdrawal limits of Specification 3.5.2.5.c.

3.5.2.3 The worths of single inserted control rods during criticality are limited by the restrictions of Specification 3.1.3.5 and the control rod position limits defined in Specification 3.5.2.5.

3.5.2.4 Quadrant Power Tilt

a. Except for physics tests, if the maximum positive quadrant power tilt exceeds 3.41% Unit 1, either the quadrant power tilt shall
3.41% Unit 2
3.41% Unit 3
be reduced to less than 3.41% Unit 1 within two hours or the
3.41% Unit 2
3.41% Unit 3
following actions shall be taken:

(1) If four reactor coolant pumps are in operation, the allowable thermal power shall be reduced below the power level cutoff (as identified in specification 3.5.2.5) and further reduced by 2% of full power for each 1% tilt in excess of 3.41% Unit 1.
3.41% Unit 2
3.41% Unit 3

(2) If less than four reactor coolant pumps are in operation, the allowable thermal power for the reactor coolant pump combination shall be reduced by 2% of full power for each 1% tilt.

(3) Except as provided in specification 3.5.2.4.b, the reactor shall be brought to the hot shutdown condition within four hours if the quadrant power tilt is not reduced to less than
6.03% Unit 1 within 24 hours.
3.41% Unit 2
3.41% Unit 3

b. If the quadrant tilt exceeds 3.41% Unit 1 and there is simultaneous
3.41% Unit 2
3.41% Unit 3
indication of a misaligned control rod per Specification 3.5.2.2, reactor operation may continue provided power is reduced to 60% of the thermal power allowable for the reactor coolant pump combination.

c. Except for physics test, if quadrant tilt exceeds 9.44% Unit 1,
9.44% Unit 2
9.44% Unit 3
a controlled shutdown shall be initiated immediately, and the reactor shall be brought to the hot shutdown condition within four hours.

d. Whenever the reactor is brought to hot shutdown pursuant to 3.5.2.4.a(3) or 3.5.2.4.c above, subsequent reactor operation is permitted for the purpose of measurement, testing, and corrective action provided the thermal power and the power range high flux setpoint allowable for the reactor coolant pump combination are restricted by a reduction of 2 percent of full power for each 1 percent tilt for the maximum tilt observed prior to shutdown.

e. Quadrant power tilt shall be monitored on a minimum frequency of once every two hours during power operation above 15 percent of rated power.

3.5.2.5 Control Rod Positions

a. Technical Specification 3.1.3.5 does not prohibit the exercising of individual safety rods as required by Table 4.1-2 or apply to inoperable safety rod limits in Technical Specification 3.5.2.2.

b. Except for physics tests, operating rod group overlap shall be 25% + 5% between two sequential groups. If this limit is exceeded, corrective measures shall be taken immediately to achieve an acceptable overlap. Acceptable overlap shall be attained within two hours or the reactor shall be placed in a hot shutdown condition within an additional 12 hours.

c. Position limits are specified for regulating and axial power shaping control rods. Except for physics tests or exercising control rods, the regulating control rod insertion/withdrawal limits are specified on figures 3.5.2-1A1 and 3.5.2-1A2 (Unit 1); 3.5.2-1B1, 3.5.2-1B2 and 3.5.2-1B3 (Unit 2); 3.5.2-1C1, 3.5.2-1C2 and 3.5.2-1C3 (Unit 3) for four pump operation, and on figures 3.5.2-2A1 and 3.5.2-2A2 (Unit 1); 3.5.3-2B1, 3.5.2-2B2 and 3.5.2-2B3 (Unit 2); 3.5.2-2C1, 3.5.2-2C2 and 3.5.2-2C3 (Unit 3) for two or three

pump operation. Also, excepting physics tests exercising control rods, the axial power shaping control rod insertion/ withdrawal limits are specified on figures 3.5.2-4A1, and 3.5.2-4A2 (Unit 1); 3.5.2-4B1, 3.5.2-4B2, and 3.5.2-4B3 (Unit 2), and 3.5.2-4C1, 3.5.2-4C2, and 3.5.2-4C3 (Unit 3). 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 than 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, and 3.5.2-1A2 (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, 3.5.2-3B1, 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.

Bases

The power-imbalance envelope defined in Figures 3.5.2-3A1, 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 is based on LOCA analyses which have defined the maximum linear heat rate (see Figure 3.5.2-5) such that the maximum clad temperature will not exceed the Final Acceptance Criteria. Corrective measures will be taken immediately should the indicated quadrant tilt, rod position, or imbalance be outside their specified boundary. Operation in a situation that would cause the Final Acceptance Criteria to be approached should a LOCA occur is highly improbable because all of the power distribution parameters (quadrant tilt, rod position, and imbalance) must be at their limits while simultaneously all other engineering and uncertainty factors are also at their limits.** Conservatism is introduced by application of:

a. Nuclear uncertainty factors
b. Thermal calibration
c. Fuel densification power spike factors (Units 1 and 2 only)
d. Hot rod manufacturing tolerance factors
e. Fuel rod bowing power spike factors

The 25% $\pm$ 5% overlap between successive control rod groups is allowed since the worth of a rod is lower at the upper and lower part of the stroke. Control rods are arranged in groups or banks defined as follows:

Group	Function
1	Safety
2	Safety
3	Safety
4	Safety
5	Regulating
6	Regulating
7	Xenon transient override
8	APSR (axial power shaping bank)

The rod position limits are based on the most limiting of the following three criteria: ECCS power peaking, shutdown margin, and potential ejected rod worth. Therefore, compliance with the ECCS power peaking criterion is ensured by the rod position limits. The minimum available rod worth, consistent with the rod position limits, provides for achieving hot shutdown by reactor trip at any time, assuming the highest worth control rod that is withdrawn remains in the full out position (1). The rod position limits also ensure that inserted rod groups will not contain single rod worths greater than 0.65% $\Delta k/k$ at rated power. These values have been shown to be safe by the safety analysis (2,3,4,5) of hypothetical rod ejection accident. A maximum single inserted control rod worth of 1.0%$\Delta k/k$ is allowed by the rod position limits at hot zero power. A single inserted control rod worth of 1.0% $\Delta k/k$ at beginning-of-life, hot zero power would result in a lower transient peak thermal power and, therefore, less severe environmental consequences than a 0.65% $\Delta k/k$ ejected rod worth at rated power.

** Actual operating limits depend on whether or not incore or excore detectors are used and their respective instrument calibration errors. The method used to define the operating limits is defined in plant operating procedures.

Control rod groups are withdrawn in sequence beginning with Group 1. Groups 5, 6, and 7 are overlapped 25 percent. The normal position at power is for Groups 6 and 7 to be partially inserted.

The quadrant power tilt limits set forth in Specification 3.5.2.4 have been established to prevent the linear heat rate peaking increase associated with a positive quadrant power tilt during normal power operation from exceeding
5.10% for Unit 1. The limits shown in Specification 3.5.2.4
5.10% for Unit 2
5.10% for Unit 3
are measurement system independent. The actual operating limits, with the appropriate allowance for observability and instrumentation errors, for each measurement system are defined in the station operating procedures.

The quadrant tilt and axial imbalance monitoring in Specification 3.5.2.4 and 3.5.2.6, respectively, normally will be performed in the process computer. The two-hour frequency for monitoring these quantities will provide adequate surveillance when the computer is out of service.

Allowance is provided for withdrawal limits and reactor power imbalance limits to be exceeded for a period of two hours without specification violation. Acceptable rod positions and imbalance must be achieved within the two-hour time period or appropriate action such as a reduction of power taken.

Operating restrictions are included in Technical Specification 3.5.2.5d to prevent excessive power peaking by transient xenon. The xenon reactivity must be beyond its final maximum or minimum peak and approaching its equilibrium value at the power level cutoff.

REFERENCES

[1]FSAR, Section 3.2.2.1.2

[2]FSAR, Section 14.2.2.2

[3]FSAR, SUPPLEMENT 9

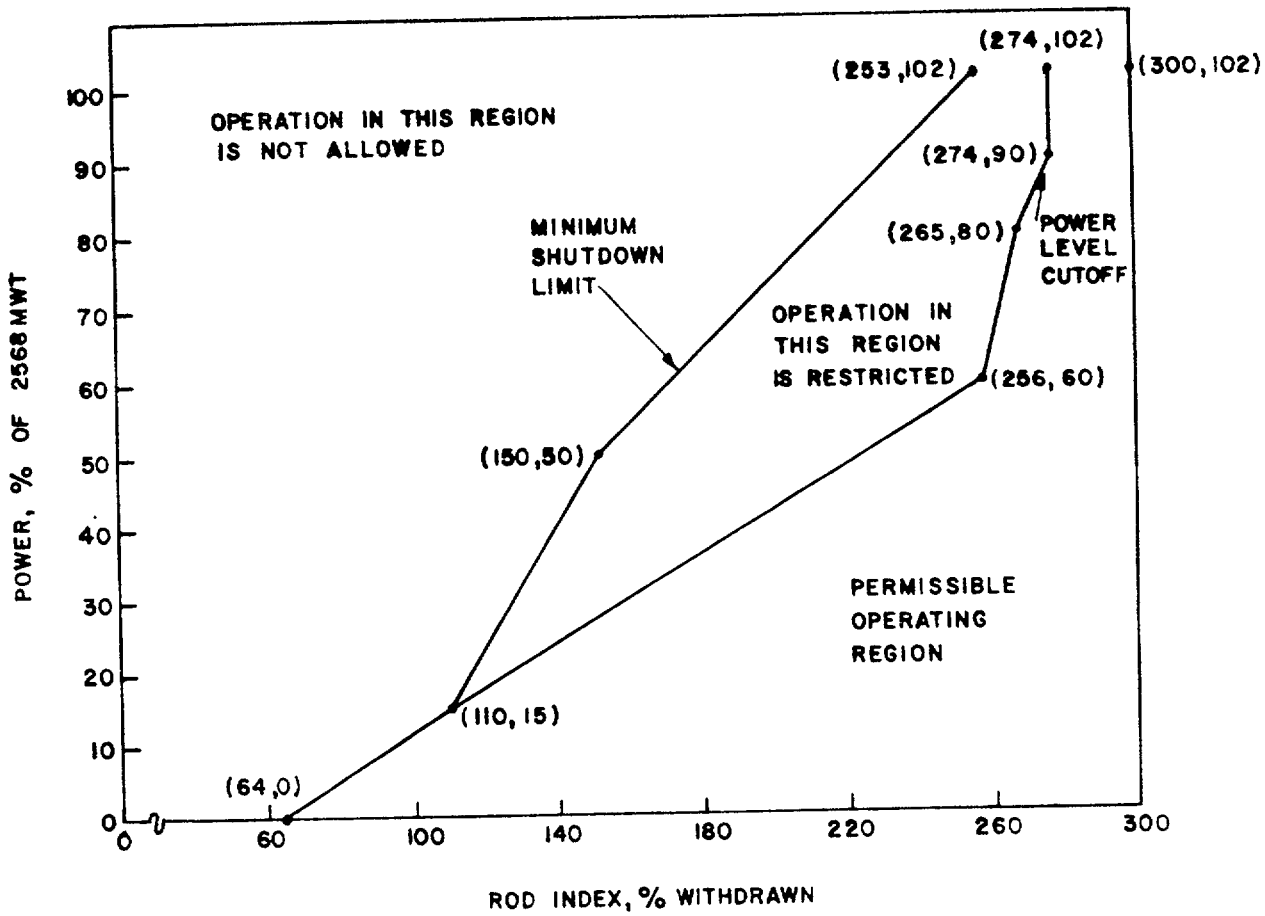
[4]B&W FUEL DENSIFICATION REPORT

BAW-1409 (UNIT 1)

BAW-1396 (UNIT 2)

BAW-1400 (UNIT 3)

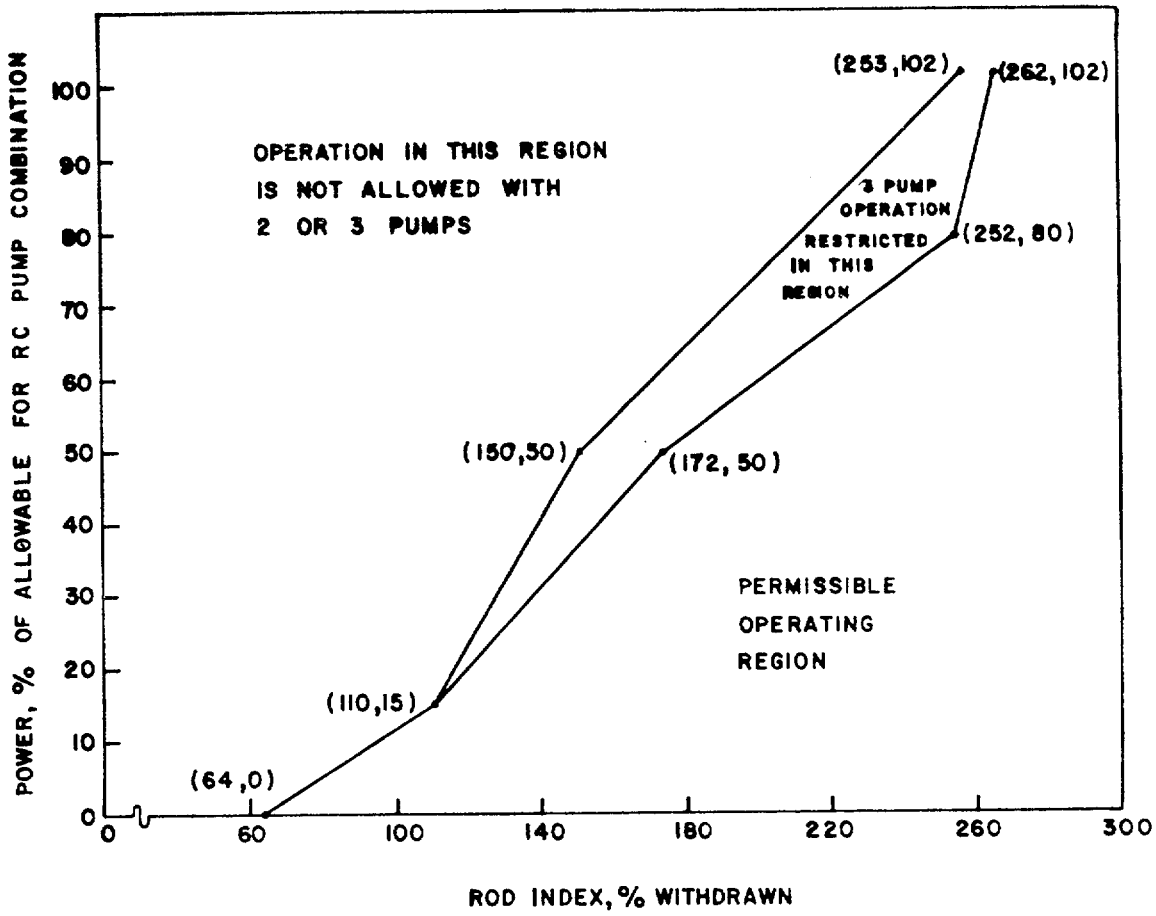
[5]Oconee 1, Cycle 4 - Reload Report - BAW-1447, March 1977, Section 7.11.



OCONEE 1 CYCLE 4 ROD POSITION
LIMITS FOR FOUR PUMP OPERATION
AFTER 100 ± 10 EFPD

OCONEE NUCLEAR STATION

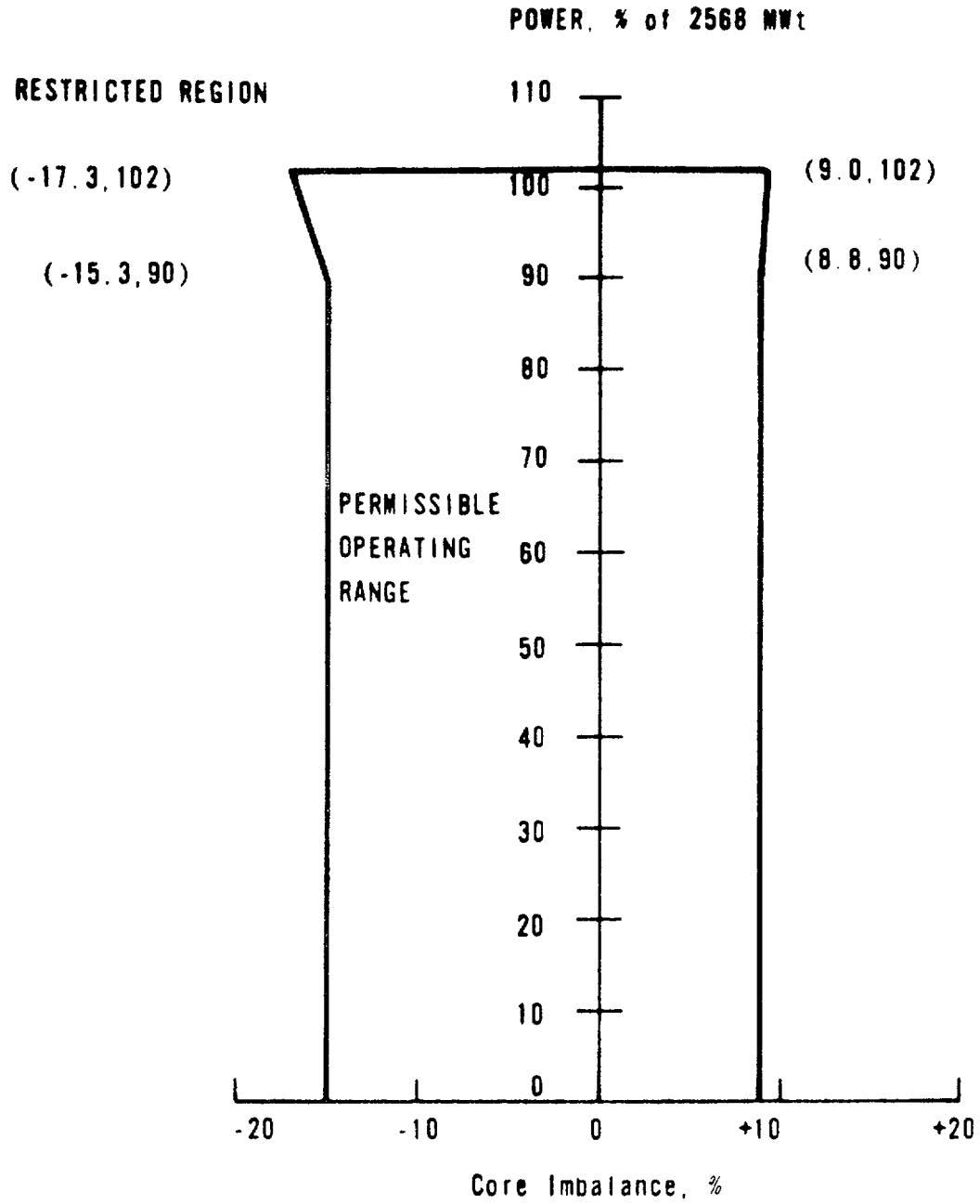
Figure 3.5.2-1A2



OCONEE 1 CYCLE 4 ROD POSITION LIMITS FOR TWO AND THREE PUMP OPERATION AFTER 100 ± 10 EFPD

OCONEE NUCLEAR STATION

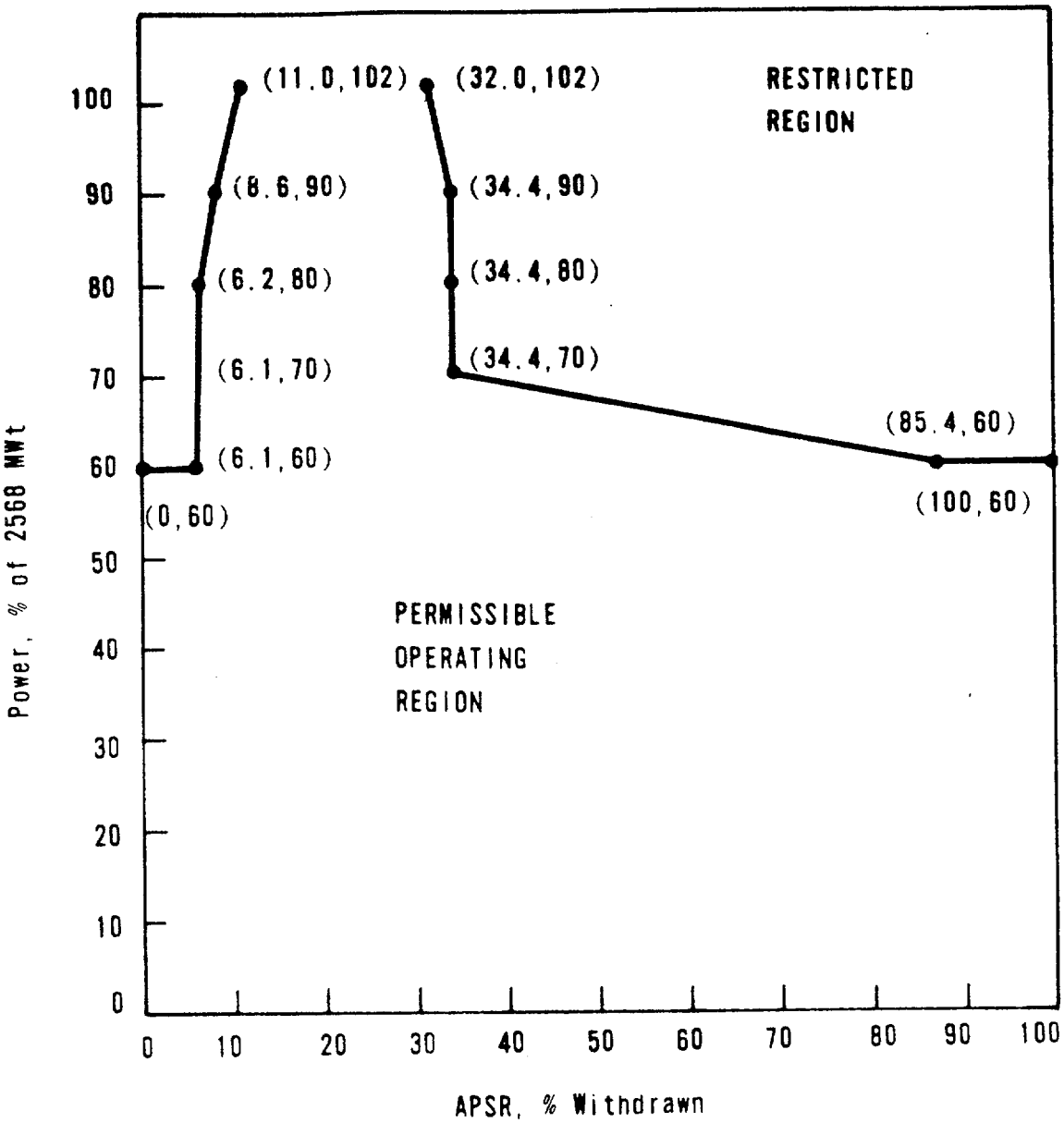
Figure 3.5.2-2A2



OPERATIONAL POWER IMBALANCE ENVELOPE, Unit 1

OCONEE NUCLEAR STATION

Figure 3.5.2-3A1



APSR POSITION LIMITS FOR
OPERATION AFTER 100 (±10)
EFPD, UNIT 1

OCONEE NUCLEAR STATION
Figure 3.5.2-4A2

Amendment Nos. 59, 59 & 56

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 59 TO FACILITY LICENSE NO. DPR-38

AMENDMENT NO. 59 TO FACILITY LICENSE NO. DPR-47

AMENDMENT NO. 56 TO FACILITY LICENSE NO. DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNIT NOS. 1, 2 AND 3

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

Introduction

By letter dated January 23, 1978, Duke Power Company (licensee) proposed changes to the Oconee Nuclear Station Technical Specifications.(1) These proposed changes are to the control rod position and axial imbalance limits for operation of Oconee Unit 1 Cycle 4 after 100 ± effective full power days (EFPD) to the end of Cycle 4 (EOC).

Discussion

During startup tests for Oconee Unit 1 Cycle 4 in October 1977, the ejected rod worth of the rod with the greatest predicted worth was outside the acceptance criterion. The worths of the symmetrical rods in each of the other three quadrants were measured. These worths were within the acceptance criterion.

As a result of the ejected rod worth tests, the licensee checked control rod assembly (CRA) patching (electrical alignment) and verified core loading. All other measured physics parameters were within limits and the rod worths were conservatively low and startup tests were continued. During the normal startup test during power escalation, quadrant neutron flux tilts were observed and continuously monitored.

In the Oconee reactors there are four symmetrical strings of detectors in each quadrant which are used to measure tilt. Each of these strings has seven detectors equally spaced axially. These detector indications are averaged. The average power indication for the four strings in a given quadrant is then divided by the average for the 16 symmetrical strings to determine the tilt for that quadrant.

At 40% rated power, which was a startup test power plateau, a tilt of approximately 4% was measured. The tilt had an axial variation from approximately 3% at the top and bottom of the core to approximately 5% in the middle of the core. At this point, the licensee reduced power to 30% of rated power and tested for broken CRA fingers.

In late October, a meeting was held with the licensee and the fuel manufacturer (Babcock & Wilcox). A list of potential causes was presented. At that time none of these potential causes could be positively identified as causing the flux tilt.

So that the tilt anomaly would not cause operational restrictions, the licensee proposed a new tilt Technical Specification limit of 6.03%. Along with this increased tilt limit, the licensee proposed restriction of power to $\leq$75% of rated power and changes to rod position limits and high flux scram level. These changes were approved on October 31, 1977.

At 75% power the tilt decreased slightly but was still greater than the original 3.41% (2.66% plus uncertainty on incore instrumentation) Technical Specification value. The 2.66% measurement assures that the Technical Specification limit of 3.41% tilt is not exceeded. As of 11/2/77 the tilt was measured at 2.79%. In November, an amendment was issued which changed the Technical Specification to allow for unrodded operation up to 100% power with the increased tilt limit for 100 EFPD. Unrodded operations had been shown by analyses submitted by the licensee to result in peaking factors that are lower than during rodded operation. Therefore, unrodded operation at 100% power was found acceptable by the staff.(2).

The flux tilt has since decreased to below the original Technical Specification limit of 3.41%. The current measured flux tilt is 1.22% as of February 7, 1978.

In early December the licensee informed NRC that it believed the cause to be a combination of a previously unconsidered tilt anomaly (<2%) in Cycle 3 and the cross core reload shuffling pattern for Cycle 4. The fuel manufacturer has performed calculations using an estimated tilt for Cycle 3. From these calculations, the fuel manufacturer has stated that the measured tilts of Cycle 4 could be caused by the Cycle 3 tilt as reinforced by the cross core shuffling pattern. The tilt during Cycle 3 had not previously been reported since it was below the Technical Specification limit.

By letter dated January 23, 1978, the licensee proposed revised control rod position and axial power imbalance Technical Specifications limits for the period from 100 EFPD to end-of-cycle (EOC). These revised limits considered actual core performance with the tilt. The licensee also presented a discussion and calculation on the possibility that the observed tilt in Cycle 4 could have been caused by a small tilt in Cycle 3 and the cross-core shuffling of once and twice burned fuel for the Cycle 4 design.

Evaluation

The staff has previously reviewed and found acceptable 100% rated power operation in the unrodded mode for Oconee Unit 1 up to 100 EFPD.(2) The proposed changes are simply an extension of the 0 to 100 EFPD Technical Specifications. The licensee's analysis in support of the proposed

Technical Specifications is for the period after 100 effective full power days (EFPD) of operation to EOC. The proposed Technical Specifications have been established with the same calculation models and methods as previously reviewed and found acceptable by us for Oconee 1 Cycle 4. The proposed Technical Specifications would allow continued operation in an unrodded mode (change in rod position limits) with a maximum quadrant tilt of 6.03% (not a change).

The rod position limits are based on the most limiting of the following three criteria: power peaking, ejected rod worth, and shutdown margin. The quadrant tilt limits are established to prevent the linear heat generation rate peaking beyond analyzed conditions. A discussion of these considerations follows.

The power peaking analysis for Oconee 1 Cycle 4 operation from 100 ($\pm$10) EFPD to EOC in the unrodded mode was performed assuming the existence of a 6% quadrant tilt at all power levels. This tilt was determined to cause $\leq$9% increase in local peaking. This increase in local peaking has been established from a conservative relationship between peaking and tilt established by many full-core PDQ and FLAME calculations with tilt induced by various means. The comparison of calculated and measured power distributions at full power at 56.6 EFPD shows that a factor of 1.09, in conjunction with the standard total and radial nuclear uncertainty factors would be conservative for a case where the tilt is 1.67%. No data is presented for larger tilts, although analysis of the power peaking has shown conservatism above 1.67% up to 6.03%. All other peaking penalties normally included in the generation of Technical Specifications operating limits were included in this analysis. Operation in the unrodded mode was found to provide reduced peaks during the fuel cycle at all times after 4 EFPD compared to rodded operation. The peaking for the unrodded core is lower than for the rodded core for normal operation after 100 EFPD.

The ejected rod worth insertion limits were determined in an extremely conservative fashion. The Hot Full Power (HFP) ejected rod worth limits were based on projected EOC data and were still found to be less limiting than the shutdown margin insertion limits. At Hot Zero Power (HZP) the 0-100 EFPD rod insertion limits were adjusted based on a projected slight increase in the maximum ejected rod worth at EOC. The resulting rod insertion limits were less limiting than shutdown margin criteria at all power levels above zero power. Thus only the zero power limit (64% withdrawn) is based on ejected rod criteria.

The shutdown rod insertion limits were determined using standard techniques based on symmetric conditions and adjusting these calculations to account for the tilt. The calculated stuck rod worths were increased 10%.

The net effect of all these conservatisms is that the core will be restricted in operating flexibility but allowed to operate at full power in a safe manner. The APSR position limits, Technical Specification Figure 3.5.2 - 4A3, originally approved for operation after 235 ±10 EFPD should be observed after 100 ± 10 EFPD. The imbalance limits that are currently in force for 0 to 100 EFPD are more restrictive than necessary for the proposed mode of rods-out operation from 100 EFPD to EOC, and can thus be retained. This represents another conservatism in the analysis. The rod position limits were determined based on the super-position of the most conservative calculated and measured data. On these bases, the staff finds the proposed changes to the Oconee Unit 1 Technical Specifications to be acceptable.

The actual tilt has decreased to below the previous Technical Specification value (approximately 1% below), and the continued use of the increased tilt specification is not required. In previous staff safety evaluations [2,3] an increased tilt was found acceptable based on compensations in rod position limits and nuclear power trip setpoint. This increased tilt limit is no longer required to provide margin during normal operation. This increased tilt limit would also allow a substantial increase in tilt from the current value before corrective action is required. Although increased tilts have been observed during cycle startups and when there have been control rod misalignments, to our knowledge there have never been any unexplained increases in quadrant tilt in mid-cycle. Because of the potential for a major change in the nuclear plant's characteristics without corrective action or explanation, we consider it prudent at this time to limit the flux tilt to its previous value except for Technical Specification 3.5.2.4.a(3). The excepted specification is for a shutdown requirement in case of tilts greater than analyzed. The shutdown requirement exception would allow operation at restricted power between tilts of 3.41% and 6.03%. The staff finds that the power restriction plus the licensees commitment for a 24 hour notification to the staff in case of exceeding the 3.41% is sufficient to ensure appropriate action by the licensee and staff. This change is acceptable in that it assures corrective action in case of tilts beyond the previous limit. On this basis, we are reducing the current tilt specification (except for 3.5.2.4.a(3)) of 6.03% to its previous value of 3.41%. We are continuing our review of the 6.03% limit and are awaiting additional information from the licensee.

Based on our evaluation, operation in the proposed manner does not reduce the safety margins of the current Technical Specification limits. We conclude that the probability or 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 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 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.

Dated: February 17, 1978

References

1. Letter from W. O. Parker, Jr. (Duke Power Company) to E. G. Case (U.S. Nuclear Regulatory Commission), dated January 23, 1978.

2. Letter from A. Schwencer (U.S. Nuclear Regulatory Commission) to W. O. Parker, Jr., (Duke Power Company), dated November 23, 1977.

3. Letter from A. Schwencer (U.S. Nuclear Regulatory Commission) to W. O. Parker, Jr., (Duke Power Company), dated 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. 59, 59 and 56 to Facility Operating License Nos. DPR-38, DPR-47 and DPR-55, respectively, issued to Duke Power Company 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 the date of issuance.

During startup tests of Cycle 4 of the Oconee Unit No. 1 reactor a core flux tilt, not predicted nor understood at that time, was observed. NRC issued a license amendment in November 1977 restricting core operations to 100 effective full power days in order for the licensee to gain an understanding of the reasons for the tilt. The tilt has since decreased and the licensee made a submittal on January 23, 1978 with an acceptable explanation of the phenomenon. These amendments revise the Oconee Nuclear Station's common Technical Specifications to allow Cycle 4 operation of Oconee Unit No. 1 past 100 effective full power days.

The application for the 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 or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of these amendments.

For further details with respect to this action, see (1) the application for amendments dated January 23, 1978, (2) Amendment Nos.59, 59 and 56 to License 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. and at the Oconee County Library, 201 South Spring Street, 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 17th day of February 1978.

FOR THE NUCLEAR REGULATORY COMMISSION

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