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DOC DATE: 09/25/78  
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DOCTYPE: LETTER NOTARIZED: YES

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LTR 3 ENCL 40

SUBJECT: FORWARDING SUPPLEMENT TO APPLICANT'S 09/18/78 PROPOSED LIC AMEND TO SUPPORT THE OPERATION OF UNIT 2 FOR CYCLE 4, CONSISTING OF PROPOSAL REVISING SPECIFICATION 3.5.2.2 PERTAINING TO CONTROL ROD GROUPS AND PWR DISTRIBUTION LIMITS, TO BE INCLUDED IN REVIEW

PLANT NAME: OCONEE - UNIT 1  
OCONEE - UNIT 2  
OCONEE - UNIT 3

REVIEWER INITIAL: XJM  
DISTRIBUTER INITIAL: *[Signature]*

\*\*\*\*\* DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS \*\*\*\*\*

NOTES:

- 1. M. CUNNINGHAM - ALL AMENDMENTS TO FSAR AND CHANGES TO TECH SPECS GENERAL DISTRIBUTION FOR AFTER ISSUANCE OF OPERATING LICENSE. (DISTRIBUTION CODE A001)

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DUKE POWER COMPANY REGULATORY DOCKET FILE COPY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.  
VICE PRESIDENT  
STEAM PRODUCTION

September 25, 1978

TELEPHONE: AREA 704  
373-4083

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Mr. R. Reid, Chief  
Operating Reactor Branch #4

Reference: Oconee Nuclear Station  
Docket Nos. 50-269, -270, -287

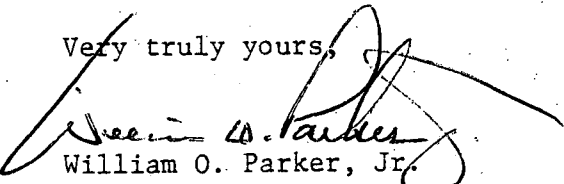
Dear Sir:

My letter of September 18, 1978 submitted a proposed license amendment to support the operation of Oconee Unit 2 for Cycle 4. A section of this proposal concerned Specification 3.5.2, Control Rod Groups and Power Distribution Limits. It is requested that the attached proposal, which also concerns a section of Specification 3.5.2, be included in the review of the September 18, 1978 submittal.

This additional proposal revises Specification 3.5.2.2 to clearly state the criteria by which the operability of control rods is determined. The specification in use has been rewritten, with several non-action statements removed from the specification and placed in the Bases. Certain actions have been added as well as time periods in which the action statements are required. It is considered that this revision of Specification 3.5.2 more clearly states the current requirements of operation with an inoperable rod. The Babcock and Wilcox Standard Technical Specifications have been utilized as a basis for the proposed specification.

This proposal has been determined to be a supplement to the proposed license amendment request of September 18, 1978. As such, no additional license fees are provided. Three signed and thirty-seven conformed copies of this submittal are provided.

Very truly yours,

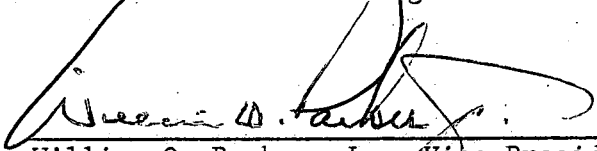
  
William O. Parker, Jr.

RLG:scs  
Attachment

781770067

Mr. Harold R. Denton, Director  
September 25, 1978  
Page Two

WILLIAM O. PARKER, JR., being duly sworn, states that he is Vice President of Duke Power Company; that he is authorized on the part of said Company to sign and file with the Nuclear Regulatory Commission this request; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

  
\_\_\_\_\_  
William O. Parker, Jr., Vice President

Subscribed and sworn to before me this 25th day of September, 1978.

  
\_\_\_\_\_  
Notary Public

My Commission Expires:  
  
February 15, 1982

### 3.5.2 Control Rod Group and Power Distribution Limits

#### Applicability

This specification applies to power distribution and operation of control rods during power operation.

#### Objective

To assure an acceptable core power distribution during power operation, to set a limit on potential reactivity insertion from a hypothetical control rod ejection, and to assure core subcriticality after a reactor trip.

#### Specification

##### 3.5.2.1 Shutdown Margin

- a. The available shutdown margin shall be greater than 1%  $\Delta k/k$  with the highest worth control rod fully withdrawn.
- b. If the shutdown margin is less than 1%  $\Delta k/k$ , then within 1 hour initiate and continue boration until the required shutdown margin is restored. The requirements of specification 3.5.2.5.c shall be met.

##### 3.5.2.2 Movable Control Assemblies

- a. All control (safety and regulating) rods shall be operable and positioned within nine (9) inches of their group average height.
- b. A control rod shall be declared inoperable if any of the following conditions exist for that rod:
  1. The control rod cannot be moved due to excessive friction or mechanical interference, or cannot perform its intended trip function.
  2. The control rod cannot be located by either absolute or relative position indication or by in or out limit lights.
  3. The control rod is misaligned with its group average by more than nine (9) inches.
  4. The control rod does not meet the exercise requirements of Specification 4.1.
  5. The control rod does not meet the rod trip insertion times of Specification 4.7.1.
  6. The control rod does not meet the rod program verification of Specification 4.7.2.

- c. If a control rod is declared inoperable by being immovable due to excessive friction or mechanical interference or known to be un-trippable then:
  - 1. Within 1 hour verify that the shutdown margin requirement of Specification 3.5.2.1 is satisfied and,
  - 2. Within 12 hours place the reactor in the hot standby condition.
- d. If a control rod is declared inoperable due to causes other than addressed in 3.5.2.2.c above then:
  - 1. Within 1 hour either restore the rod to operable status or,
  - 2. Continue power operation with the control rod declared inoperable and
    - a. Within 1 hour verify the shutdown margin requirement of Specification 3.5.2.1 with an additional allowance for the withdrawn worth of the inoperable rod and,
    - b. Either reactor thermal power shall be reduced to less than 60% of the allowable power for the reactor coolant pump combination within 1 hour and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow/imbalance, shall be reduced within the next 4 hours to 65.5% of thermal power value allowable for the reactor coolant pump combination or,
    - c. Position the remaining rods in the affected group such that the inoperable rod is maintained within allowable group average limits of Specification 3.5.2.2.a and the withdrawal limits of Specification 3.5.2.5.c.
- e. If more than one control rod is inoperable or misaligned, the reactor shall be shut down to the hot standby condition within 12 hours.

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, the maximum positive quadrant power tilt shall not exceed the Steady State Limit of Table 3.5-1 during power operation above 15% full power.
- b. If the maximum positive quadrant power tilt exceeds the Steady State Limit but is less than or equal to the Transient Limit of Table 3.5-1, then:

1. Either the quadrant power tilt shall be reduced within 2 hours to within its Steady State Limit or
  2. The reactor thermal power shall be reduced below the power level cutoff (as specified in Specification 3.5.2.5) and further reduced 2% thermal power for each 1% of quadrant power tilt in excess of the Steady State Limit, and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within 4 hours by 2% thermal power for each 1% tilt in excess of the Steady State Limit. 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% for each 1% excess tilt.
- c. Quadrant power tilt shall be reduced within 24 hours to within its Steady State Limit or,
1. The reactor thermal power shall be reduced within the next 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 4 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.
- d. If the quadrant power tilt exceeds the Transient Limit but is less than the Maximum Limit of Table 3.5-1 and if there is a simultaneous indication of a misaligned control rod then:
1. Reactor thermal power shall be reduced within 30 minutes at least 2% for each 1% of the quadrant power tilt in excess of the Steady State Limit.
  2. Either quadrant power tilt shall be reduced within 2 hours to within its Transient Limit or,
  3. The reactor thermal power shall be reduced within the next 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 4 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.
- e. If the quadrant power tilt exceeds the Transient Limit but is less than the Maximum Limit of Table 3.5-1, due to causes other than simultaneous indication of a misaligned control rod then:
1. Reactor thermal power shall be reduced within 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 2 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.

- f. If the maximum positive quadrant power tilt exceeds the Maximum Limit of Table 3.5-1, the reactor shall be shut down within 4 hours. Subsequent reactor operation is permitted for the purpose of measurement, testing, and corrective action provided the thermal power and the Nuclear Overpower Trip Setpoints allowable for the reactor coolant pump combination are restricted by a reduction of 2% of thermal power for each 1% tilt for the maximum tilt observed prior to shutdown.
- g. Quadrant power tilt shall be monitored on a minimum frequency of once every 2 hours during power operation above 15% full 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  $25\% \pm 5\%$  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); 3.5.2-2B1, 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 or 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); 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 then be attained within two hours. The minimum shutdown margin required by Specification 3.5.2.1 shall be maintained at all times.

### 3.5.2.6 Xenon Reactivity

Except for physics tests, reactor power shall not be increased above the power-level-cutoff shown in Figures 3.5.2-1A1, and 3.5.2-1A2 for Unit 1; Figures 3.5.2-1B1, 3.5.2-1B2, and 3.5.2-1B3 for Unit 2; and Figures 3.5.2-1C1, 3.5.2-1C2, and 3.5.2-1C3 for Unit 3 unless one of the following conditions is satisfied:

1. Xenon reactivity did not deviate more than 10 percent from the equilibrium value for operation at steady state power.
2. Xenon reactivity deviated more than 10 percent but is now within 10 percent of the equilibrium value for operation at steady state rated power and has passed its final maximum or minimum peak during its approach to its equilibrium value for operation at the power level cutoff.
3. Except for xenon free startup (when 2. applies), the reactor has operated within a range of 87 to 92 percent of rated thermal power for a period exceeding 2 hours.

3.5.2.7 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, 3.5.2-3B1, 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.

3.5.2.8 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

Operation at power with an inoperable control rod is permitted within the limits provided. These limits assure that an acceptable power distribution is maintained and that the potential effects of rod misalignment on associated accident analyses are minimized. For a rod declared inoperable due to misalignment, the rod with the greatest misalignment shall be evaluated first. Additionally, the position of the rod declared inoperable due to misalignment shall not be included in computing the average position of the group for determining the operability of rods with lesser misalignments. When a control rod is declared inoperable, boration may be initiated to achieve the existence of 1%  $\Delta k/k$  hot shutdown margin.

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:

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

\*\*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.

Table 4.1-2  
MINIMUM EQUIPMENT TEST FREQUENCY

<u>Item</u>	<u>Test</u>	<u>Frequency</u>
1. Control Rod Movement (1)	Movement of Each Rod	Monthly
2. Pressurizer Safety Valves	Setpoint	50% Annually
3. Main Steam Safety Valves	Setpoint	25% Annually
4. Refueling System Interlocks	Functional	Prior to Refueling
5. Main Steam Stop Valves (1)	Movement of Each Stop Valve	Monthly
6. Reactor Coolant System Leakage (2)	Evaluate	Daily
7. Condenser Cooling Water System Gravity Flow Test	Functional	Annually
8. High Pressure Service Water Pumps and Power Supplies	Functional	Monthly
9. Spent Fuel Cooling System	Functional	Prior to Refueling
10. High Pressure and Low (3)	Pressure Injection System	and Prior To Testing

(1) Applicable only when the reactor is critical

(2) Applicable only when the reactor coolant is above 200°F and at a steady-state temperature and pressure.

(3) Operating pumps excluded.