AEC DISTRIBUTION FOR PART 50 DOCKET MATERIAL
(TEMPORARY FORM)

CONTROL NO: 8583

FILE:

FROM:	DATE OF DOC	DATE REC'D	LTR	MEMO	RPT	OTHER
Duke Power Company Charlotte, N. C. 28201 A. C. Thies	11-30-73	12-3-73	X			

TO:	ORIG	CC	OTHER	SENT AEC PDR	SENT LOCAL PDR
A. Giambusso	3 signed			X	X

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	XXX		XXX	42	50-269/270

DESCRIPTION:
Ltr notarzied 11-30-73, requesting change to Tech. Spec.....trans the following:

DO NOT REMOVE

PLANT NAME: Oconee Unit 1 & 2

ENCLOSURES:
Attachment 1-Info review of requested modifications to Tech Spec
Attachment 2- Proposed replacement pages for the Oconee Tech Spec

ACKNOWLEDGED
(3 Orig & 39 cys rec'd)

FOR ACTION/INFORMATION 12-7-73 GC

BUTLER(L)	✓SCHWENCER(L)	ZIEMANN(L)	REGAN(E)
W/ Copies	W/9 Copies	W/ Copies	W/ Copies
CLARK(L)	STOLZ(L)	DICKER(E)	
W/ Copies	W/ Copies	W/ Copies	W/ Copies
GOLLER(L)	VASSALLO(L)	KNIGHTON(E)	
W/ Copies	W/ Copies	W/ Copies	W/ Copies
KNIEL(L)	SCHEMEL(L)	YOUNGBLOOD(E)	
W/ Copies	W/ Copies	W/ Copies	W/ Copies

INTERNAL DISTRIBUTION

✓REG FILE	TECH REVIEW	DENTON		A/T IND
✓AEC PDR	HENDRIE	GRIMES	LIC ASST	BRAITMAN
✓OGC, ROOM P-506A	SCHROEDER	GAMMILL	DIGGS (L)	SALTZMAN
✓MUNTZING/STAFF	MACCARY	KASTNER	GEARIN (L)	B. HURT
CASE	KNIGHT	BALLARD	✓GOULBOURNE (L)	
GIAMBUSSO	PAWLICKI	SPANGLER	LEE (L)	PLANS
BOYD	SHAO		MAIGRET (L)	MCDONALD
MOORE (L)(BWR)	STELLO	ENVIRO	SERVICE (L)	✓DUBE
✓DEYOUNG(L)(PWR)	HOUSTON	MULLER	SHEPPARD (E)	
SKOVHOLT (L)	NOVAK	DICKER	SMITH (L)	INFO
P. COLLINS	ROSS	KNIGHTON	TEETS (L)	C. MILES
	IPPOLITO	YOUNGBLOOD	WADE (E)	✓A. Cabell (1tr)
✓REG OPR	TEDESCO	REGAN	WILLIAMS (E)	
FILE & REGION(3)	LONG	PROJECT LDR	WILSON (L)	
MORRIS	LAINAS			
STEELE	BENAROYA	HARLESS		
	VOLLMER			

EXTERNAL DISTRIBUTION

✓1 - LOCAL PDR Walhalla, S. C.
✓1 - DTIE(ABERNATHY)
✓1 - NSIC(BUCHANAN)
1 - ASLB(YORE/SAYRE/WOODARD/"H" ST.
✓16 - CYS ACRS XXXXXXX SENT TO LIC. ASST. 12-7-73 GOULBOURNE

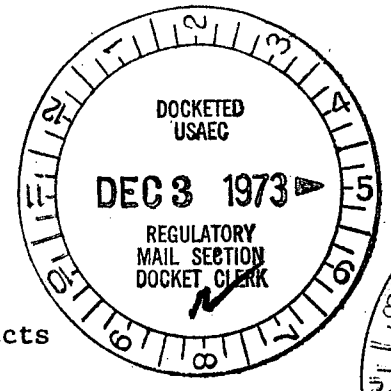
(1)(2)(10)-NATIONAL LAB'S
1-ASLBP(E/W Bldg,Rm 529)
1-W. PENNINGTON, Rm E-201 GT
1-CONSULTANT'S NEWMARK/BLUME/AGBABIAN
1-GERALD ULRIKSON...ORNL

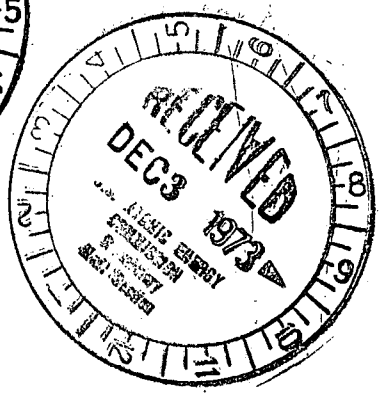
1-PDR-SAN/LA/NY
1-GERALD LELLOUCHE BROOKHAVEN NAT. LAB
1-AGMED(Ruth Gussman) RM-B-127, GT.
1-RD..MULLER..F-309 GT

DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28201

A. C. THIES
SENIOR VICE PRESIDENT
PRODUCTION AND TRANSMISSION

P. O. Box 2178





November 30, 1973

Mr. Angelo Giambusso
Deputy Director for Reactor Projects
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Re: Oconee Units 1 and 2
Docket Nos. 50-269 and 50-270

Dear Mr. Giambusso:

The Oconee Nuclear Station Technical Specifications, Appendix A to Facility Operating Licenses DPR-38 and DPR-47, require that the reactor be operated such that quadrant tilt is maintained within certain prescribed limits (Technical Specification 3.5.2.4), and specify certain limitations on control rod positions (Technical Specification 3.5.2.5). It is requested that these technical specifications be modified as follows:

1. If quadrant power tilt exceeds 4 percent, power will be reduced 2 percent for each 1 percent tilt. Furthermore, reactor protective setpoints and limits will be lowered if quadrant power tilt cannot be reduced to less than 4 percent within four hours.

2. A new set of control rod withdrawal limits are provided for Oconee Unit 1. Control rod withdrawal limits presently in the technical specifications will be specified for use for Oconee Unit 2.

3. If the control rod position limits are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. Acceptable control rod positions must be attained within four hours.

4. Except for physics tests, power will not be increased above 92 percent unless the xenon reactivity is within 90 percent of the equilibrium value for operation at rated power.

5. Provisions to permit physics testing outside the power-imbalance envelope is made.

Attachment 1 provides the required information for your review and approval of these requested modifications.

Attachment 2 is replacement pages for the Oconee Technical Specifications, showing the requested changes.

Very truly yours,

A. C. Thies

ACT:vr
Attachments

A. C. THIES, being duly sworn, states that he is Senior Vice President of Duke Power Company; that he is authorized on the part of said company to sign and file with the Atomic Energy Commission this request for amendment of the Oconee Nuclear Station Technical Specifications, Appendix A to Facility Operating Licenses DPR-38 and DPR-47; and that all statements and matters set forth therein are true and correct to the best of his knowledge.

A. C. Thies, Senior Vice President

ATTEST:

John C. Goodman, Jr.
Assistant Secretary

Subscribed and sworn to before me this 30th day of November, 1973.

Edna B. Farmer
Notary Public

My Commission Expires:

October 24, 1977

ATTACHMENT 1

INFORMATION FOR REVIEW OF REQUESTED MODIFICATIONS
TO TECHNICAL SPECIFICATIONS 3.2.5.4 AND 3.5.2.5

OCONEE 1 OPERATING LIMITS

Increased flexibility in power maneuvering has been provided Oconee 1 by the following modifications:

1. Reduction in quadrant tilt limit from 5% to 4% at rated power. The limits at reduced powers have been lowered from as high as 20% tilt at 80% power and 10% at 90% power to 4% at 92% power, by requiring a 2 to 1 power reduction for higher tilts. This reduction in quadrant tilt limits (tilts are unexpected) has allowed raising the threshold power.

2. The previous limits from BAW-10078 were established for Oconee 2 fuel densification peaking penalties. The revised limits are developed using Oconee 1 fuel densification peaking penalties. Oconee 1 fuel initial theoretical density is 93.5% compared to 92.5% for Oconee 2.

3. Oconee 1 operating power peaks are utilized which are ∿3.5% lower than Oconee 2 peaks during time of maximum peaking conditions (BOL power maneuvering).

The operating limits for Oconee Unit 1 are developed using the exact methods described in BAW-10078.

BASIC DIFFERENCES BETWEEN OCONEE 1
AND OCONEE 2 PEAKING PENALTIES

1. Nominal differences in average heat rate based on 93.5% theoretical density fuel in Oconee 1 and 92.5% theoretical density fuel in Oconee 2.

Oconee 1	5.74	Kw/ft
Oconee 2	5.77	Kw/ft

Credit 1.0052

2. Average difference in power spike factor resulting from fuel density difference. (Difference varies axially and is treated locally.)

$$\text{Credit} - \frac{1.149}{1.125} = 1.021$$

3. Difference in peaking resulting from reduction of quadrant tilt limit from 5% to 4%.

Credit = 1.0164

4. Difference in peaking in Oconee 2 between normal operation and axially dependent Kw/ft limit

Minimum Credit = 1.023
(at about 7', page 4-7
BAW-10078)

5. Difference in peaking (basic) as indicated in fuel densification reports for Oconee 1 and Oconee 2.

6. Basic difference in rod insertion figures for establishing lower power cut off level between Oconee 2 and Oconee 1. (The Oconee 2 figures contain a 2% power uncertainty.)

Credit = 1.02

ATTACHMENT 2

PROPOSED REPLACEMENT PAGES FOR THE
OCONEE NUCLEAR STATION TECHNICAL SPECIFICATIONS

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 The available shutdown margin shall be not less than 1% $\Delta k/k$ with the highest worth control rod fully withdrawn.

3.5.2.2 Operation with inoperable rods:

a. Operation with more than one inoperable rod, as defined in Specification 4.7.1 and 4.7.2.3, in the safety or regulating rod groups shall not be permitted.

b. If a control rod in the regulating or safety rod groups is declared inoperable in the withdrawn position as defined in Specification 4.7.1.1 and 4.7.1.3, an evaluation shall be initiated immediately to verify the existance of 1% $\Delta k/k$ hot shutdown margin. Boration may be initiated either to the worth of the inoperable rod or until the regulating and transient rod groups are fully withdrawn, whichever occurs first. Simultaneously a program of exercising the remaining regulating and safety rods shall be initiated to verify operability.

c. If within one (1) hour of determination of an inoperable rod as defined in Specification 4.7.1, it is not determined that a 1% $\Delta k/k$ 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.

d. Following the determination of an inoperable rod as defined in Specification 4.7.1, all rods shall be exercised within 24 hours and exercised weekly until the rod problem is solved.

e. If a control rod in the regulating or safety rod groups is declared inoperable per 4.7.1.2, power shall be reduced to 60% of the thermal power allowable for the reactor coolant pump combination.

f. If a control rod in the regulating or axial power shaping groups is declared inoperable per Specification 4.7.1.2, operation 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 4.7.1.2 and the withdrawal limits of Specification 3.5.2.5.c.

3.5.2.3 The worth of a single inserted control rod shall not exceed 0.5% $\Delta k/k$ at rated power or 1.0% $\Delta k/k$ at hot zero power except for physics testing when the requirements of Specification 3.1.9 shall apply.

3.5.2.4 Quadrant tilt:

a. If the quadrant power tilt exceeds 4%, except for physics tests, power shall be reduced 2% of the thermal power allowable for the reactor coolant pump combination for each 1% tilt.

b. Within a period of 4 hours, the quadrant power tilt shall be reduced to less than 4%, except for physics tests, or the following adjustments in setpoints and limits shall be made:

1. The protection system maximum allowable setpoints (Figure 2.3-2A-Unit 1) shall be reduced 2% in power for each 1% tilt.

2. The control rod group withdrawal limits (Figures 3.5.2-1A1, 3.5.2-1A2, 3.5.2-2A Unit 1; 3.5.2-1B, 3.5.2-1B2, 3.5.2-2B Unit 2) shall be reduced 2% in power for each 1% tilt in excess of 4%.

3. The operational imbalance limits (Figure 3.5.2-3A-Unit 1; 3.5.2-3B-Unit 2) shall be reduced 2% in power for each 1% tilt in excess of 4%.

c. If quadrant tilt is in excess of 25%, except for physics tests or diagnostic testing, the reactor will be placed in the hot shutdown condition. Diagnostic testing during power operation with a quadrant power tilt is permitted provided the thermal power allowable for the reactor coolant pump combination is restricted as stated in 3.5.2.4a above.

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

3.5.2.5 Control rod positions:

a. Technical Specification 3.1.3.3 (safety rod withdrawal) 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. Operating rod group overlap shall be 25% $\pm$ 5% between two sequential groups, except for physics tests.

c. Except for physics tests or exercising control rods, the control rod withdrawal limits are specified on Figures 3.5.2-1A1, 3.5.2-1B1, 3.5.2-1A2, and 3.5.2-1B2 for four pump operation and on Figure 3.5.2-2A and 3.5.2-2B for three or two pump operation. If the control rod position limits are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. Acceptable control rod positions shall be attained within four hours.

d. Except for physics tests, power shall not be increased into the control rod withdrawal window unless the xenon reactivity is within 90% of the equilibrium value at rated power and asymptotically

e. 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 Figure 3.5.2-3A and 3.5.2-3B. If the imbalance is not within the envelope defined by Figure 3.5.2-3A and 3.5.2-3B, corrective measures shall be taken to achieve an acceptable imbalance. If an acceptable imbalance is not achieved within four hours, reactor power shall be reduced until imbalance limits are met.

3.5.2.6 The control rod drive patch panels shall be locked at all times with limited access to be authorized by the superintendent.

Bases

The power-imbalance envelope defined in Figure 3.5.2-3A and 3.5.2-3B is based on LOCA analyses which have defined the maximum linear heat rate (see Figure 3.5.2-4) such that the maximum clad temperature will not exceed the interim 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 interim 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 effects
d. Hot rod manufacturing tolerance factors

The 30 percent 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:

---

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

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 minimum available rod worth provides for achieving hot shutdown by reactor trip at any time assuming the highest worth control rod remains in the full out position.(1)

Inserted rod groups during power operation will not contain single rod worths greater than 0.5% Δk/k. This value has been shown to be safe by the safety analysis of the hypothetical rod ejection accident.(2) A single inserted control rod worth of 1.0% Δk/k at beginning of life, hot, zero power would result in the same transient peak thermal power and therefore the same environmental consequences as a 0.5% Δk/k ejected rod worth at rated power.

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 within the thermal analysis design base using the definition of quadrant power tilt given in Technical Specifications, Section 1.6. These limits in conjunction with the control rod position limits in Specification 3.5.2.5c ensure that design peak heat rate criteria are not exceeded during normal operation when including the effects of potential fuel densification.

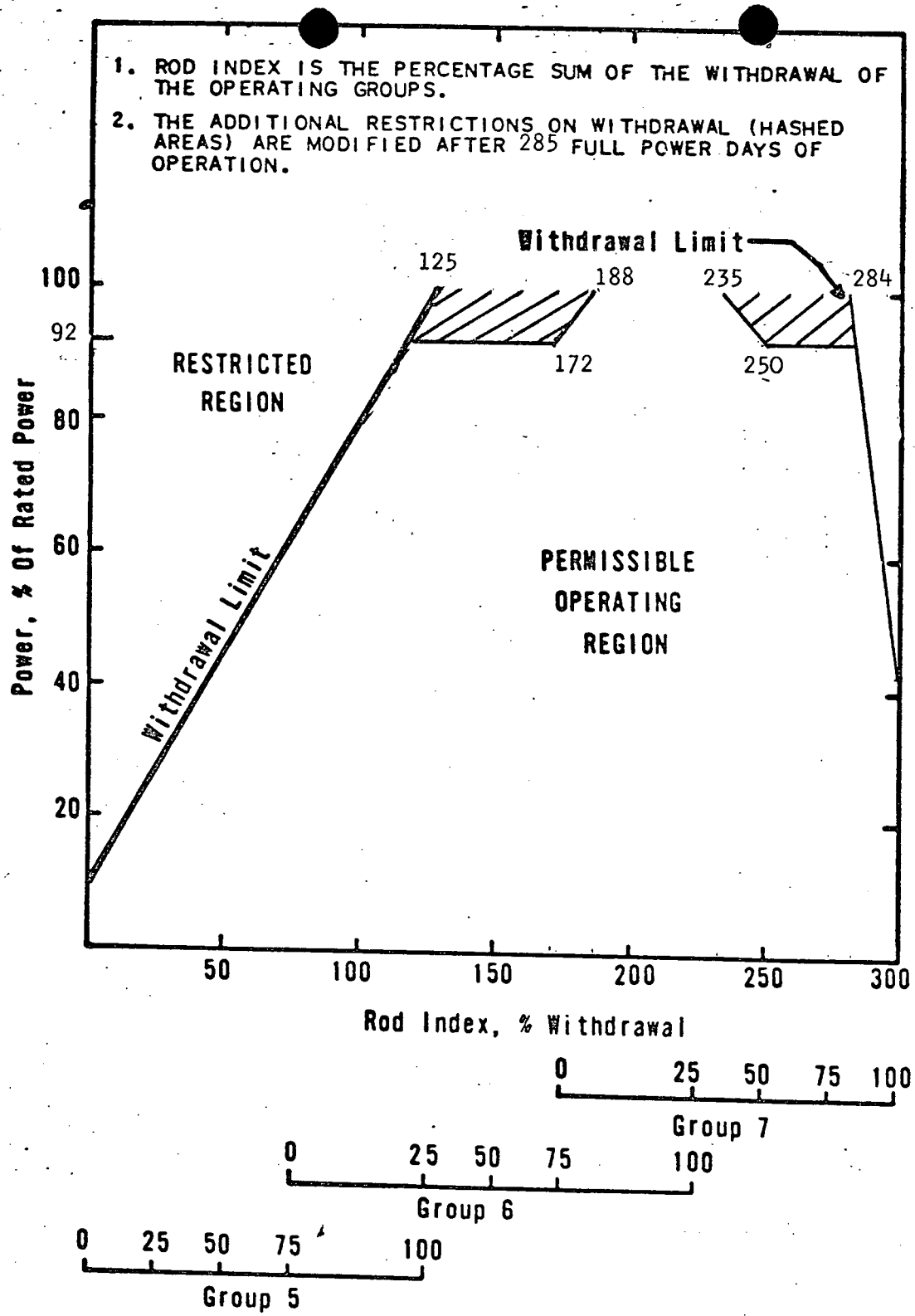
The quadrant tilt and axial imbalance monitoring in Specifications 3.5.2.4d and 3.5.2.5e respectively normally will be performed in the process computer. The two-hour frequency for monitoring these quantities will provide adequate surveillance when the computer is out of service.

The control rod withdrawal window is defined as the permissible operating region above 92 percent power for Unit 1 and 80 percent power for Unit 2 as shown in the control rod group withdrawal limits for four pump operation.

REFERENCES

[1] Section 3.2.2.1.2

[2] Section 14.2.2.2

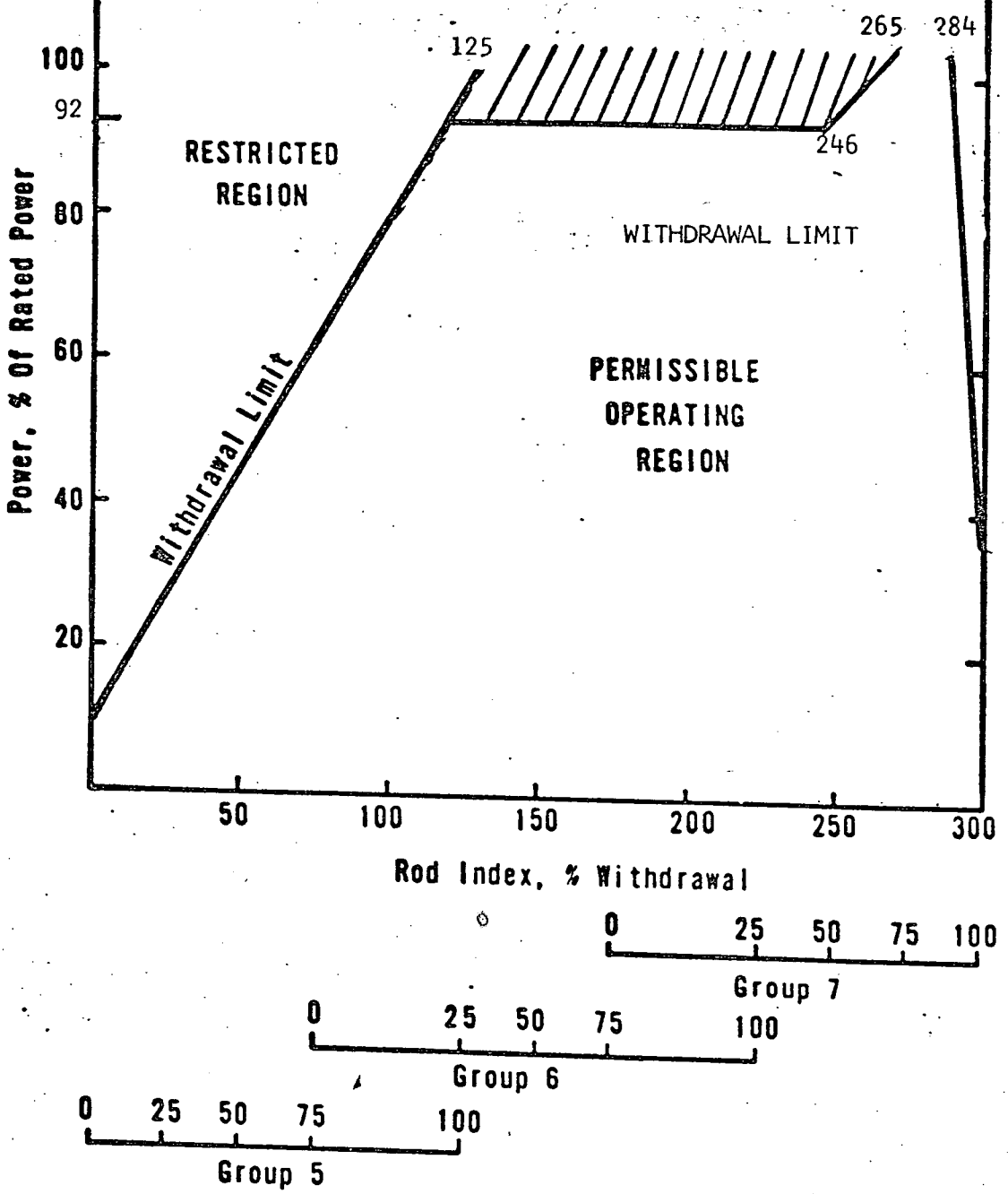


CONTROL ROD GROUP WITHDRAWAL LIMITS
FOR 4 PUMP OPERATION

UNIT 1
OCONEE NUCLEAR STATION
Figure 3.5.2-1A1

1. ROD INDEX IS THE PERCENTAGE SUM OF THE WITHDRAWAL OF THE OPERATING GROUPS.

2. THE ADDITIONAL RESTRICTIONS ON WITHDRAWAL (HASHED AREAS) ARE IN EFFECT AFTER 285 FULL POWER DAYS OF OPERATION.

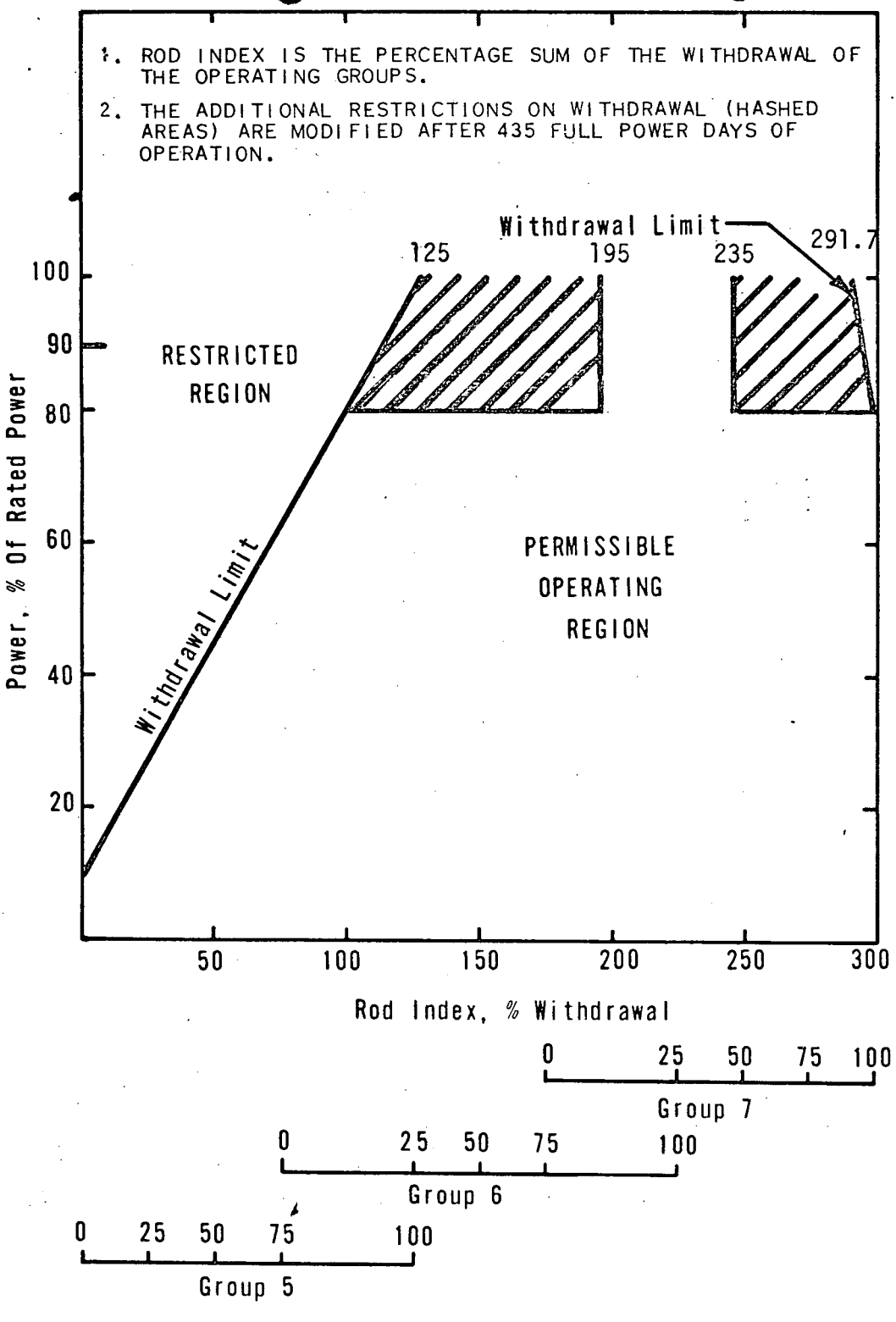


CONTROL ROD GROUP WITHDRAWAL LIMITS
FOR 4 PUMP OPERATION

UNIT 1

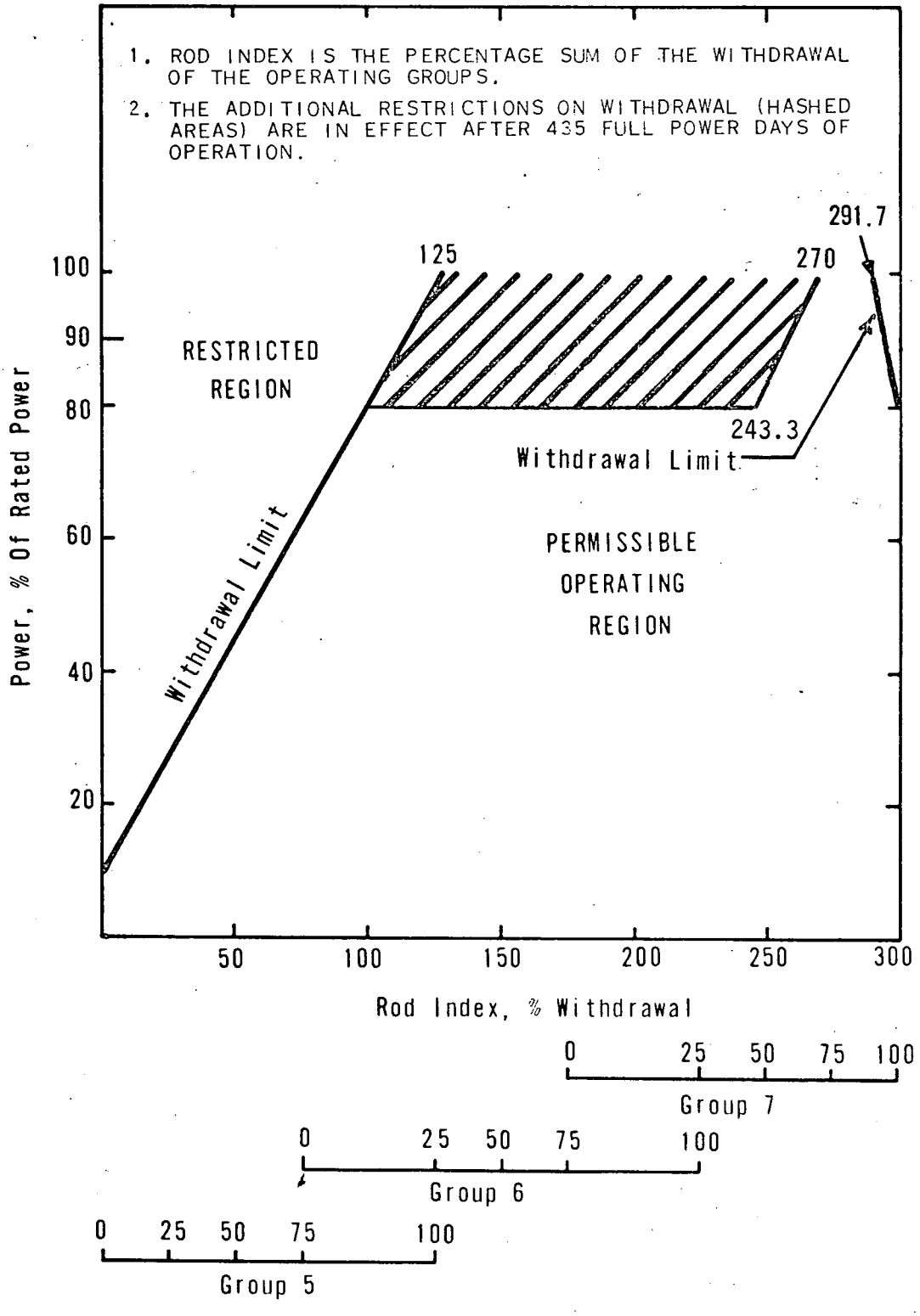
OCONEE NUCLEAR STATION

Figure 3.5.2-1A2

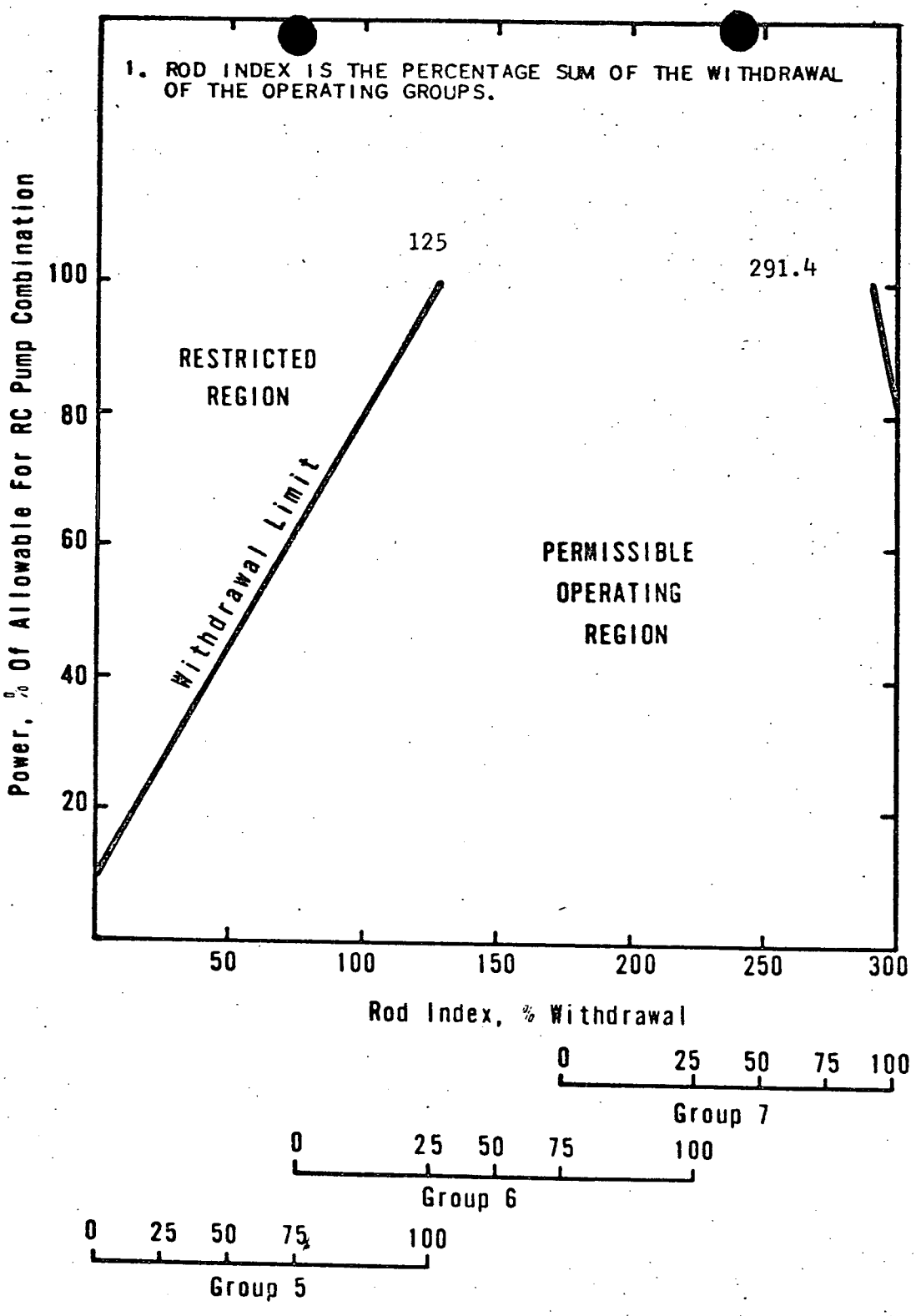


CONTROL ROD GROUP WITHDRAWAL LIMITS
FOR 4 PUMP OPERATION

UNIT 2
OCONEE NUCLEAR STATION
Figure 3.5.2-1B1

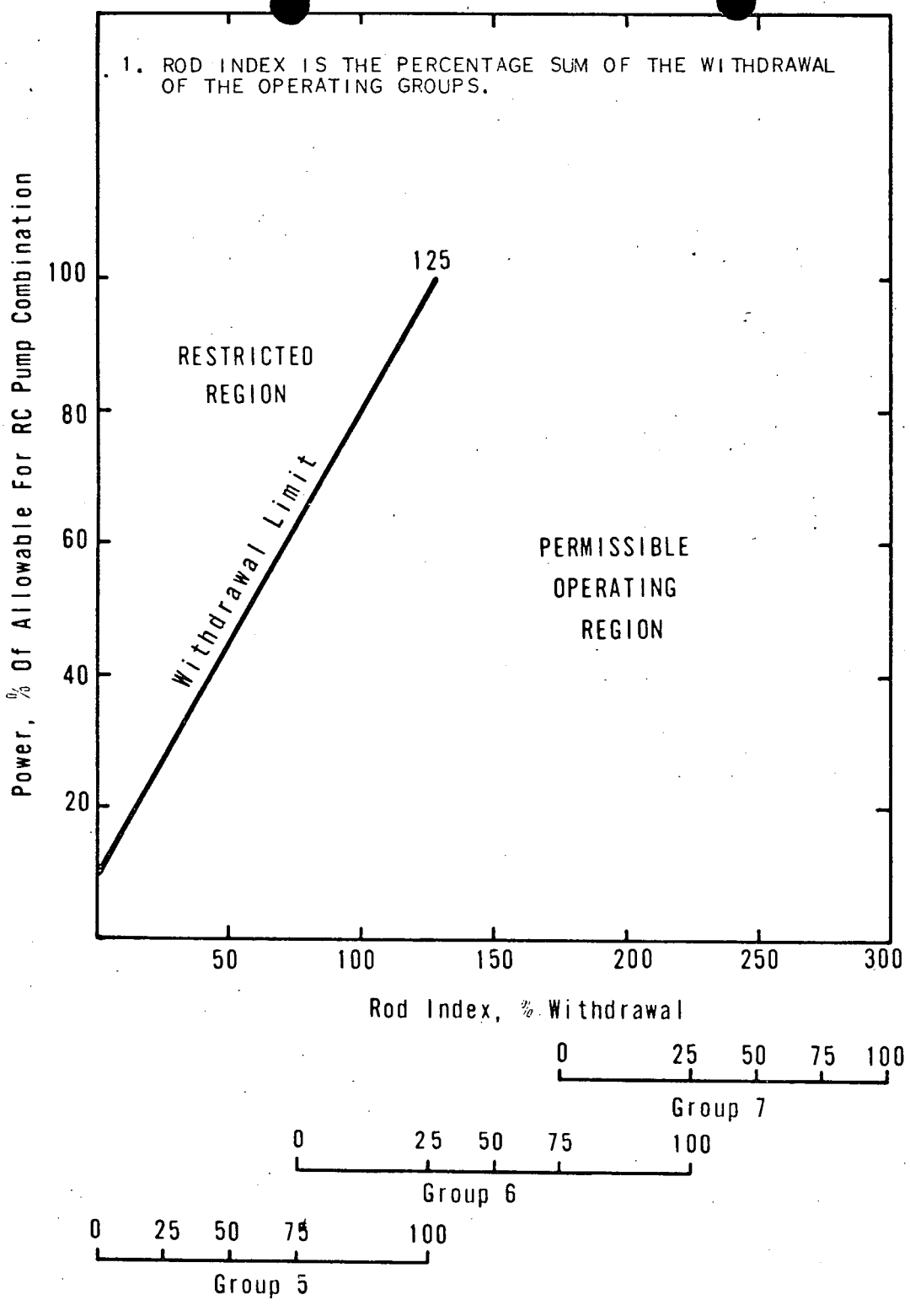


CONTROL ROD GROUP WITHDRAWAL LIMITS FOR 4 PUMP OPERATION



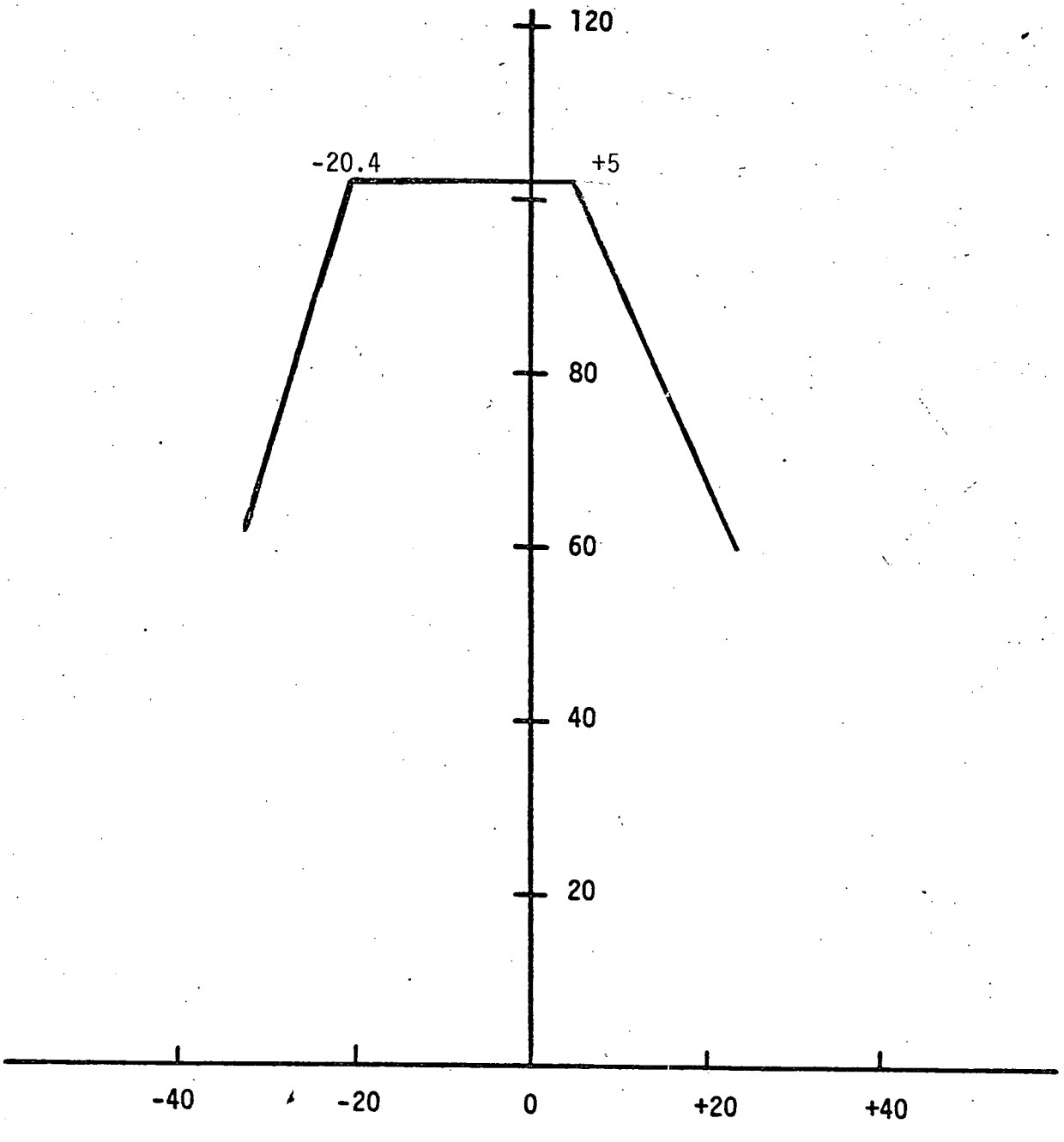
CONTROL ROD GROUP WITHDRAWAL LIMITS FOR 3 AND 2 PUMP OPERATION

UNIT 1
OCONEE NUCLEAR STATION
FIGURE 3.5.2-2A



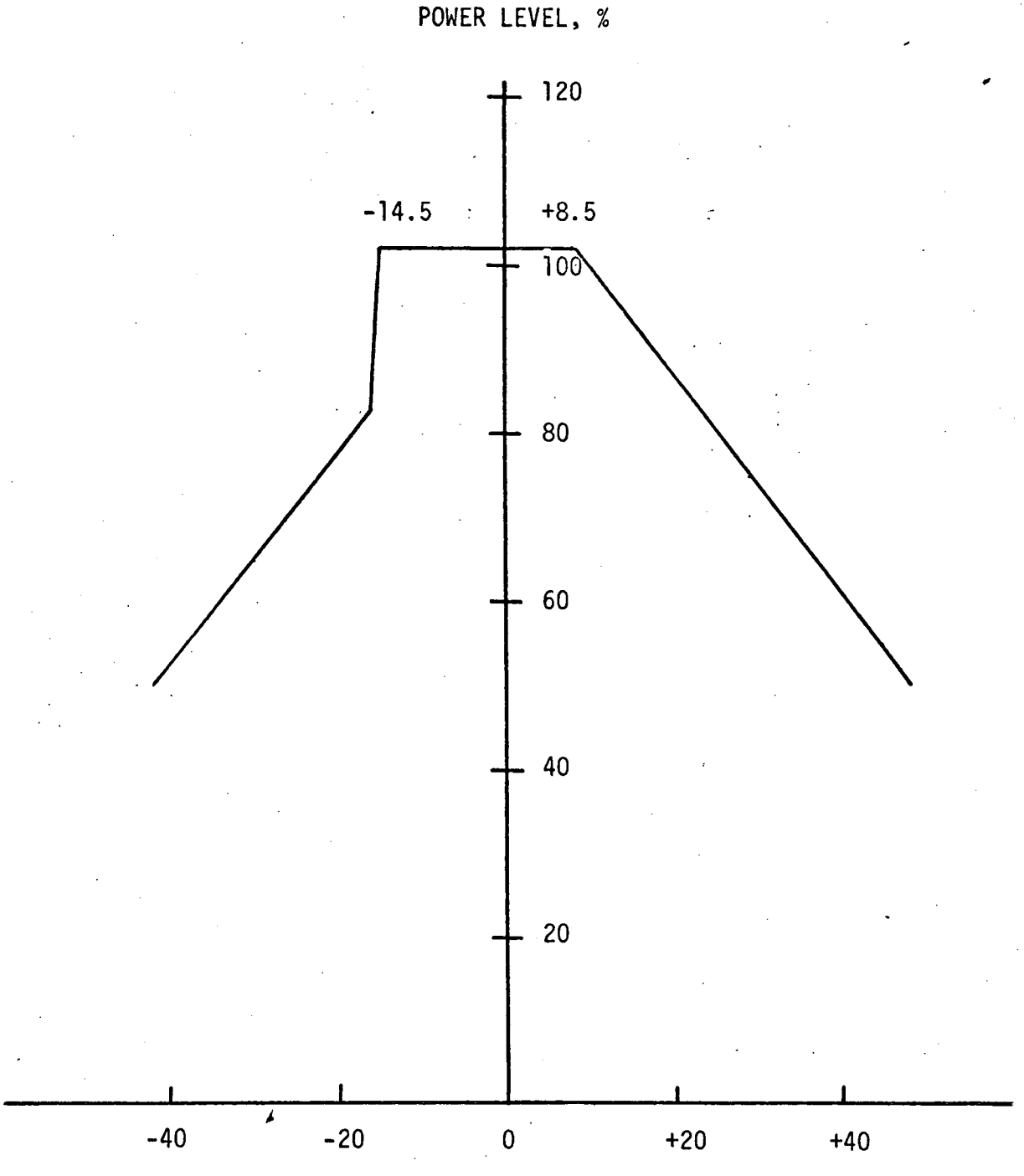
CONTROL ROD GROUP WITHDRAWAL
LIMITS FOR 3 AND 2 PUMP OPERATION

UNIT 2
OCONEE NUCLEAR STATION
Figure 3.5.2 - 2B



POWER-IMBALANCE ENVELOPE

UNIT 1
OCONEE NUCLEAR STATION
Figure 3.5.2 - 3 A

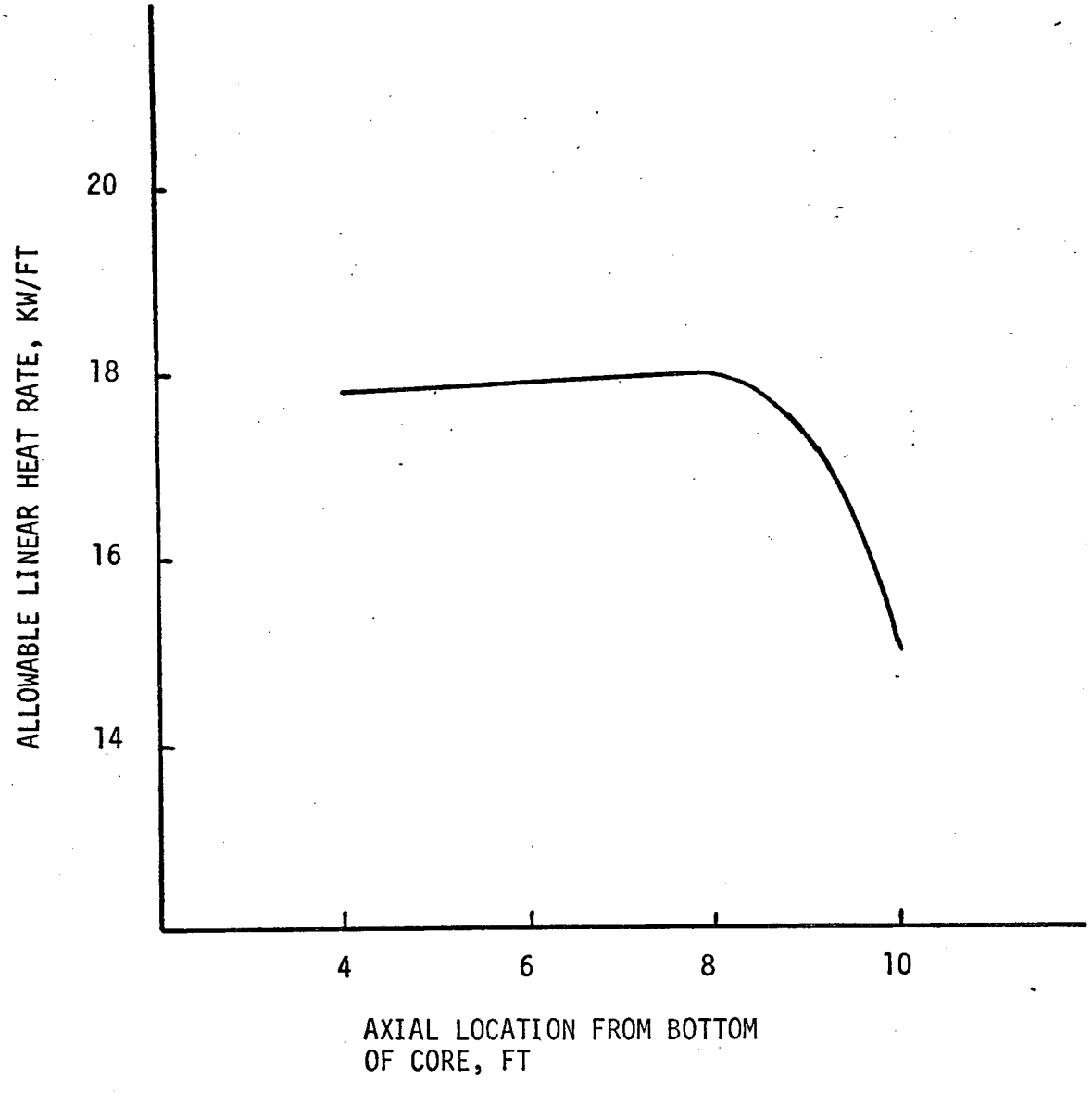


UNIT 2

POWER-IMBALANCE ENVELOPE

OCONEE NUCLEAR STATION

Figure 3.5.2 - 3B



MAXIMUM ALLOWABLE LINEAR HEAT RATE
PER INTERIM ACCEPTANCE CRITERIA

OCONEE NUCLEAR STATION
Figure 3.5.2-4