

Attachment 1

Duke Power Company  
Oconee Nuclear Station

Proposed Technical Specification Revision  
Oconee 1 Cycle 8

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2.1-2  
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2.3-8  
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3.5-10  
3.5-15  
3.5-15a  
3.5-15b  
3.5-18  
3.5-18a  
3.5-18b  
3.5-18c  
3.5-18d  
3.5-18e  
3.5-21  
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3.5-24a  
3.5-24b

can be related to DNB through the use of the BAW-2 correlation (1). The BAW-2 correlation has been developed to predict DNB and the location of DNB for axially uniform and non-uniform heat flux distributions. The local DNB ratio (DNBR), defined as the ratio of the heat flux that would cause DNB at a particular core location to the actual heat flux, is indicative of the margin to DNB. The minimum value of the DNBR, during steady-state operation, normal operational transients, and anticipated transients is limited to 1.30. A DNBR of 1.30 corresponds to a 95 percent probability at a 95 percent confidence level that DNB will not occur; this is considered a conservative margin to DNB for all operating conditions. The difference between the actual core outlet pressure and the indicated reactor coolant system pressure has been considered in determining the core protection safety limits. The difference in these two pressures is nominally 45 psi; however, only a 30 psi drop was assumed in reducing the pressure trip setpoints to correspond to the elevated location where the pressure is actually measured.

The curve presented in Figure 2.1-1A represents the conditions at which a minimum DNBR of 1.30 is predicted for the maximum possible thermal power (112 percent) when four reactor coolant pumps are operating (minimum reactor coolant flow is 106.5 percent of  $131.3 \times 10^6$  lbs/hr). This curve is based on the combination of nuclear power peaking factors, with potential effects of fuel densification and rod bowing, which result in a more conservative DNBR than any other shape that exists during normal operation.

The curves of Figure 2.1-2A are based on the more restrictive of two thermal limits and include the effects of potential fuel densification and rod bowing:

1. The 1.30 DNBR limit produced by the combination of the radial peak, axial peak and position of the axial peak that yields no less than a 1.30 DNBR.
2. The combination of radial and axial peak that causes central fuel melting at the hot spot. The limit is 20.5 kw/ft for 8C, 9 and 10C Batches of fuel and 17.6 kw/ft for the 10A, 10B gadolinia fuel Batch for Unit 1.

Power peaking is not a directly observable quantity and therefore limits have been established on the bases of the reactor power imbalance produced by the power peaking.

The specified flow rates of Figure 2.1-3A correspond to the expected minimum flow rates with four pumps, three pumps, and one pump in each loop, respectively.

The curve of Figure 2.1-1A is the most restrictive of all possible reactor coolant pump-maximum thermal power combinations shown in Figure 2.1-3A.

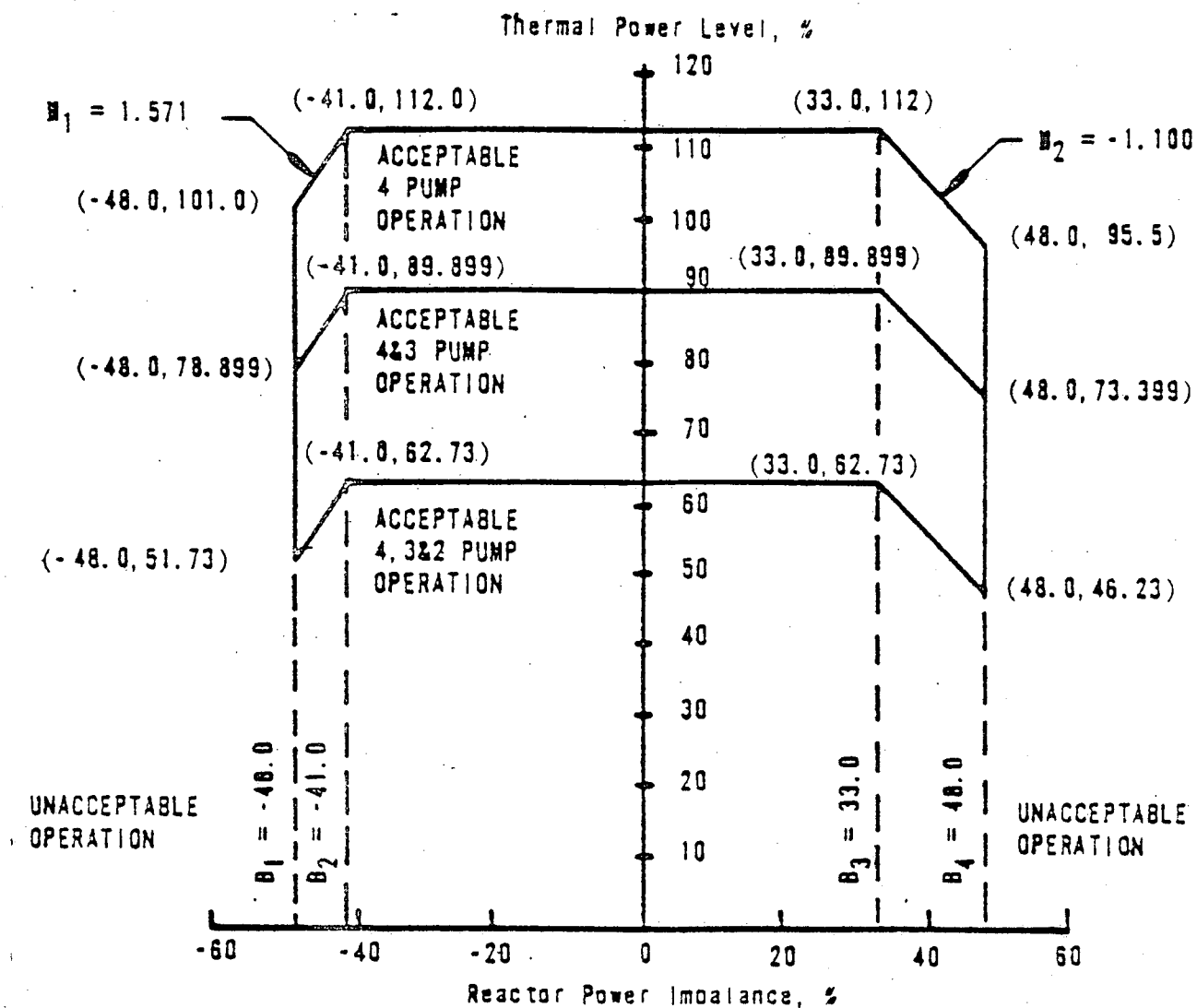
The magnitude of the rod bow penalty applied to each fuel cycle is equal to or greater than the necessary burnup dependent DNBR rod bow penalty for the applicable cycle minus a credit of 1% for the flow area reduction factor used in the hot channel analysis. All plant operating limits are based on a minimum DNBR criteria of 1.30 plus the amount necessary to offset the reduction in DNBR due to fuel rod bow. (3)

The maximum thermal power for three-pump operation is 89.899 percent due to a power level trip produced by the flux-flow ratio  $74.7 \text{ percent flow} \times 1.07 = 79.929 \text{ percent power}$  plus the maximum calibration and instrument error. The maximum thermal power for other coolant pump conditions is produced in a similar manner.

For each curve of Figure 2.1-3A a pressure-temperature point above and to the left of the curve would result in a DNBR greater than 1.30 or a local quality at the point of minimum DNBR less than 22 percent for that particular reactor coolant pump situation. The curve of Figure 2.1-1A is the most restrictive of all possible reactor coolant pump-maximum thermal power combinations shown in Figure 2.1-3A.

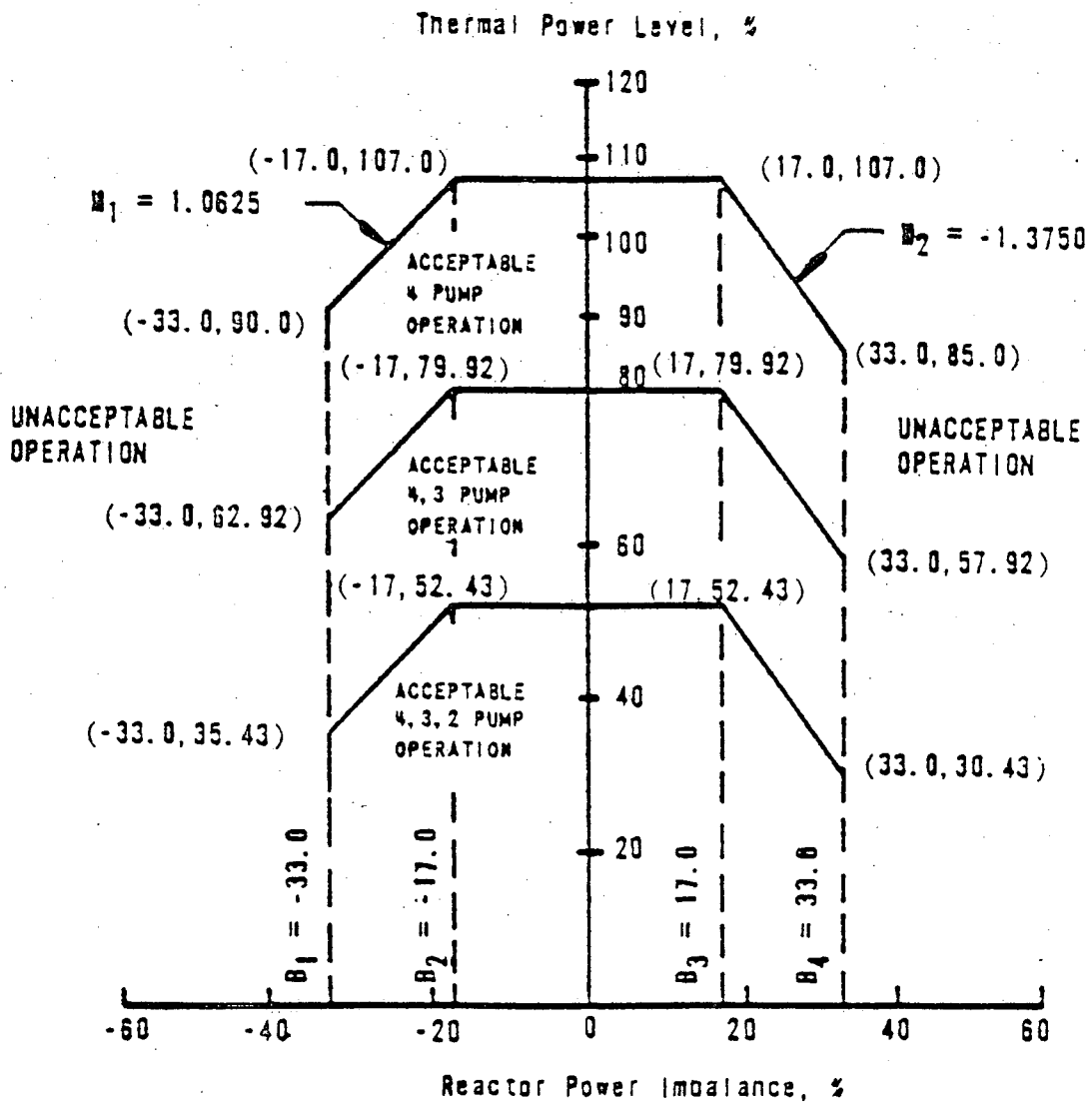
#### References

- (1) Correlation of Critical Heat Flux in a Bundle Cooled by Pressurized Water, BAW-10000, March, 1970.
- (2) Oconee 1, Cycle 4 - Reload Report - BAW-1447, March, 1977.
- (3) Oconee 1, Cycle 8 - Reload Report - BAW-1774, February, 1983.



CORE PROTECTION SAFETY  
LIMITS, UNIT 1  
OCONEE NUCLEAR STATION

Figure 2.1-2A



PROTECTIVE SYSTEM MAXIMUM  
 ALLOWABLE SETPOINTS, UNIT 1  
 OCONEE NUCLEAR STATION  
 Figure 2.3-2A

- 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, 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); figures 3.5.2-2C1, 3.5.2-2C2, and 3.5.2-2C3 (Unit 3) for three pump operation, and on figures 3.5.2-2A3 and 3.5.2-2A4, (Unit 1); 3.5.2-2B4, 3.5.2-2B5, and 3.5.2-2B6 (Unit 2); figures 3.5.2-2C4, 3.5.2-2C5, and 3.5.2-2C6 (Unit 3) for two 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

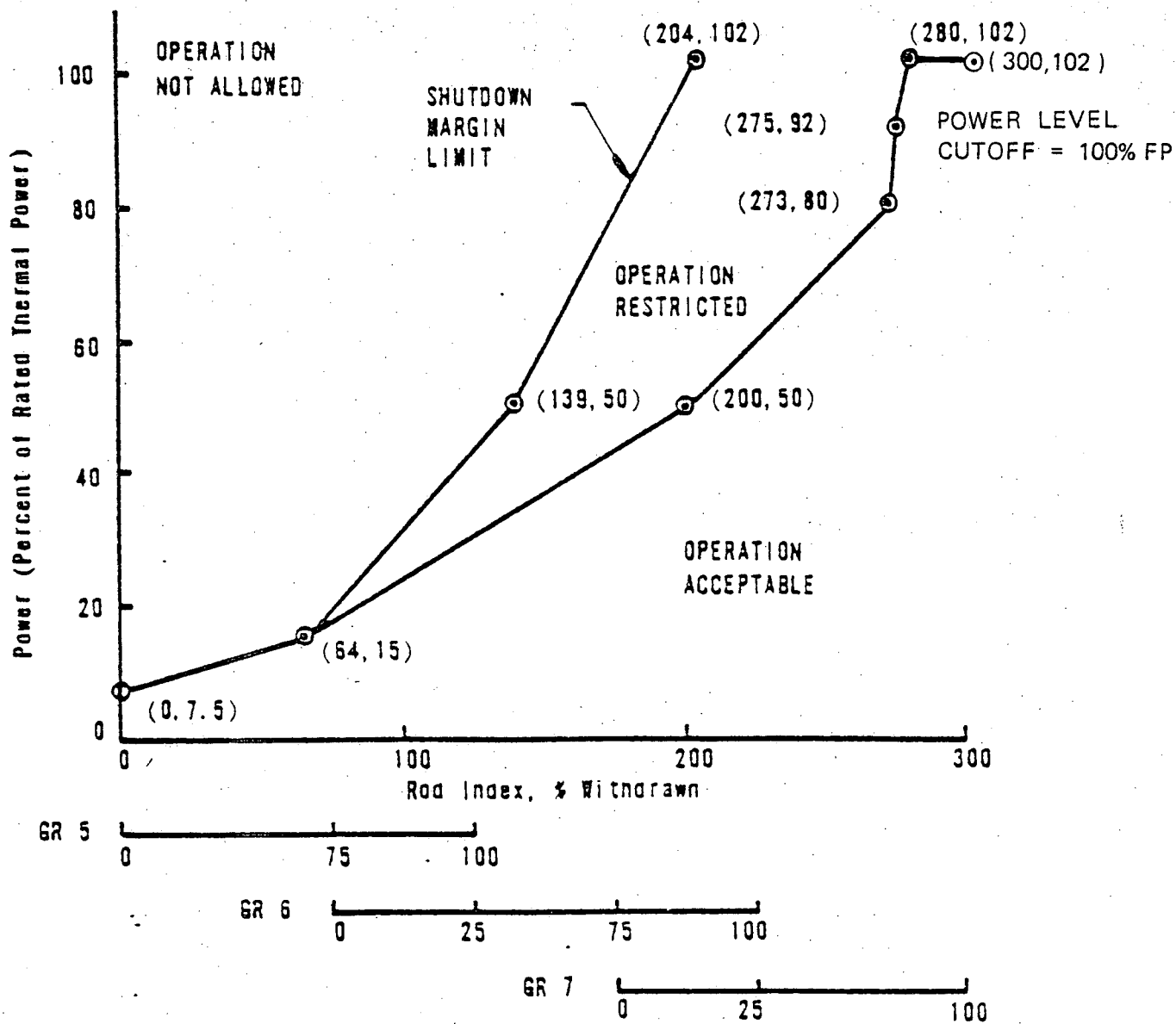
Except for physics tests, reactor power shall not be increased above the power-level-cutoff shown in Figures 3.5.2-1A1, 3.5.2-1A2, for Unit 1; Figures 3.5.2-1B1, 3.5.2-1B2, and 3.5.2-1B3, for Unit 2; and Figures 3.5.2-1C1, 3.5.2-1C2, and 3.5.2-1C3 for Unit 3 unless one of the following conditions is 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, 3.5.3-3B1, 3.5.3-3B2, 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.

3.5.2.9 The operational limit curves of Technical Specifications 3.5.2.5.c and 3.5.2.7 are valid for a nominal design cycle length, as defined in the Safety Evaluation Report for the appropriate unit and cycle. Operational beyond the nominal design cycle length is permitted provided that an evaluation is performed to verify that the operational limit curves are valid for extended operation. If the operational limit curves are not valid for the extended period of the operation, appropriate limits will be established and the Technical Specification curves will be modified as required.

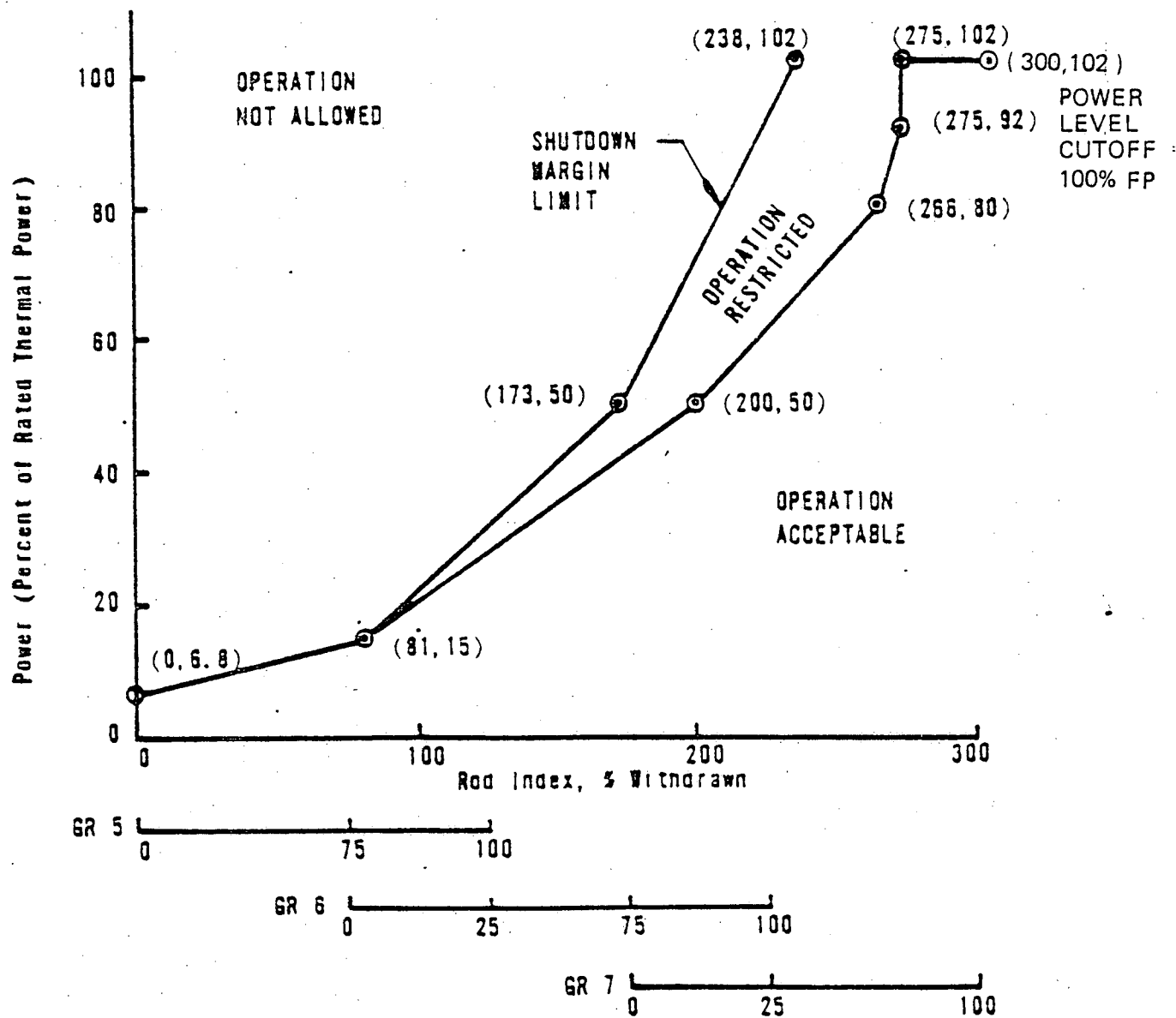


ROD POSITION LIMITS FOR  
FOUR PUMP OPERATION FROM  
0 TO 50 (+10, -0) EFPD, UNIT 1  
OCONEE NUCLEAR STATION



Figure 3.5.2-1A1



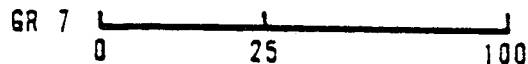
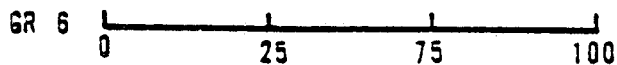
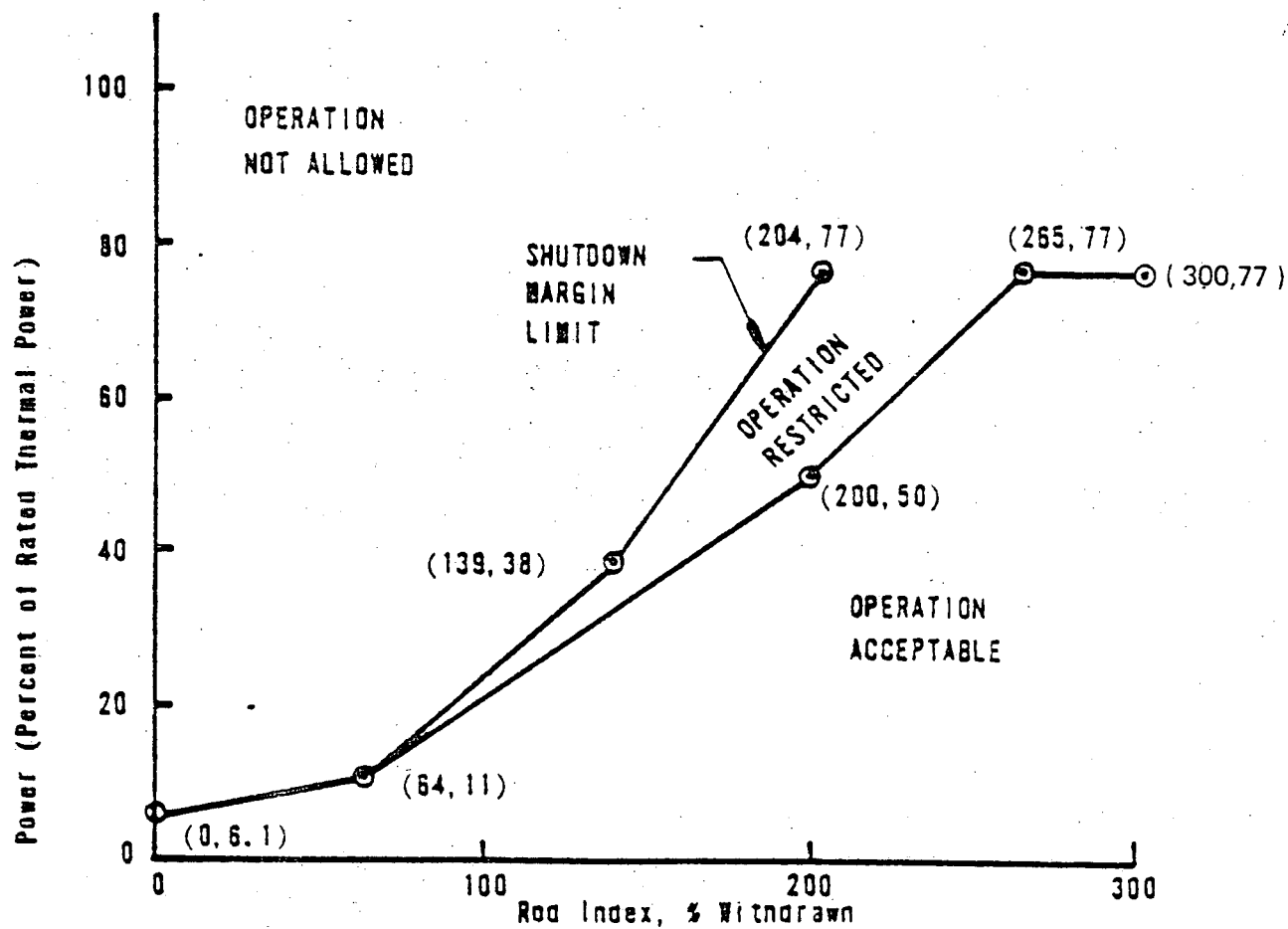


ROD POSITION LIMITS FOR  
FOUR PUMP OPERATION AFTER 50  
(+10, -0) EFPD, UNIT 1

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Figure 3.5.2-1A2



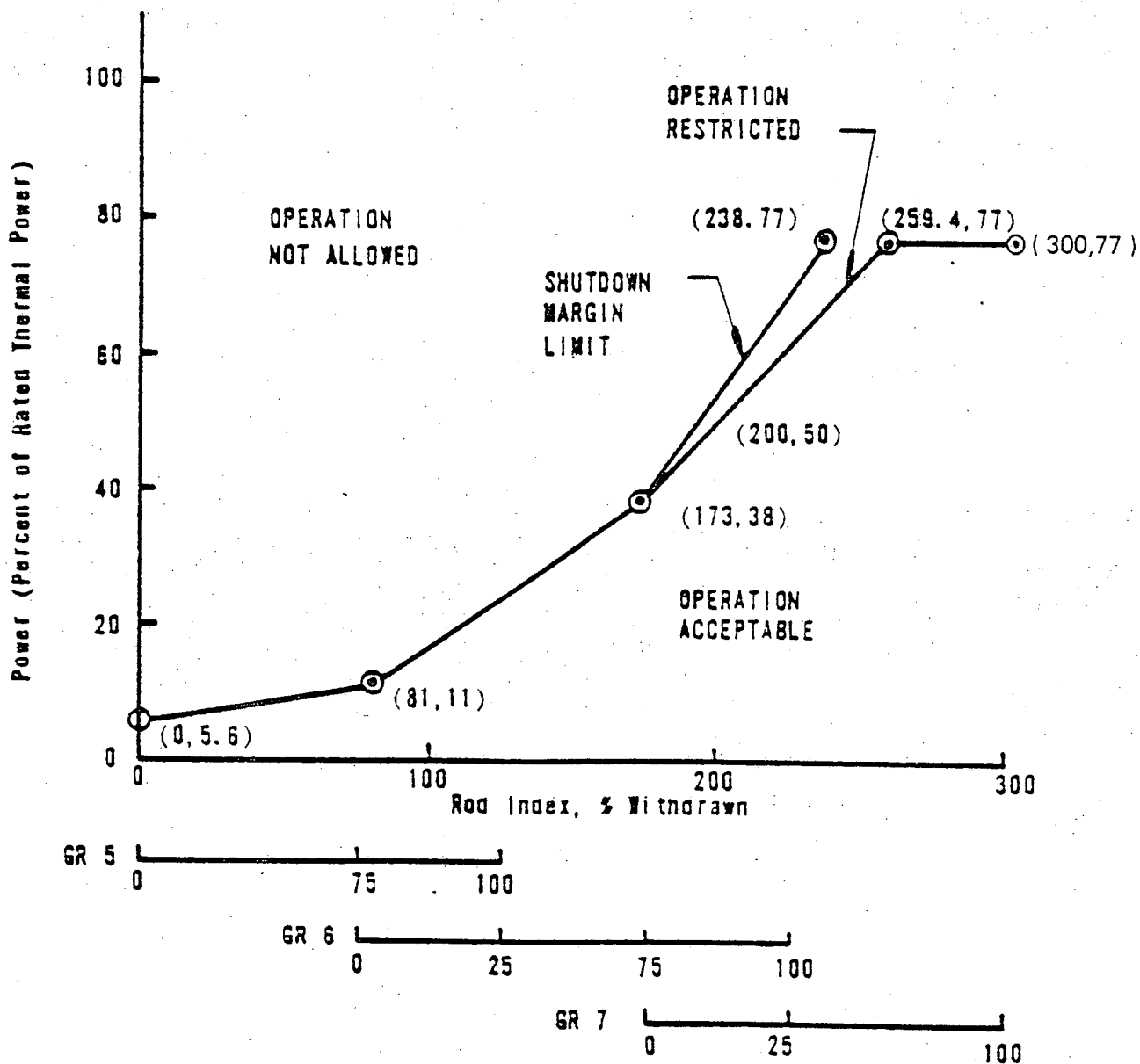


ROD POSITION LIMITS FOR  
THREE PUMP OPERATION FROM 0 TO 50  
(+10, -0) EFPD, UNIT 1



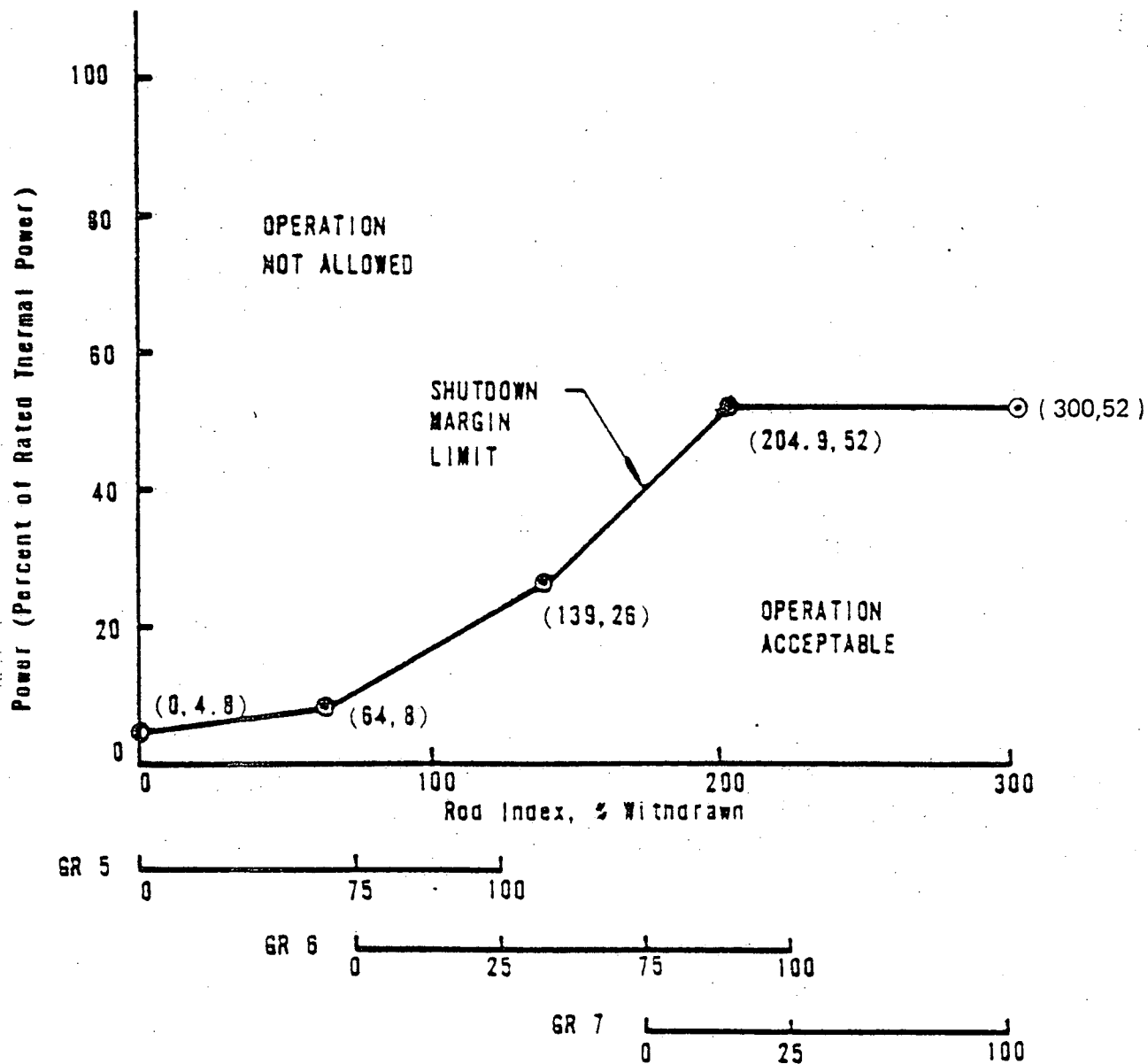
OCONEE NUCLEAR STATION

Figure 3.5.2-2A1



ROD POSITION LIMITS FOR  
THREE PUMP OPERATION AFTER  
50 (+10, -0) EFPD, UNIT 1  
OCONEE NUCLEAR STATION  
Figure 3.5.2-2A2

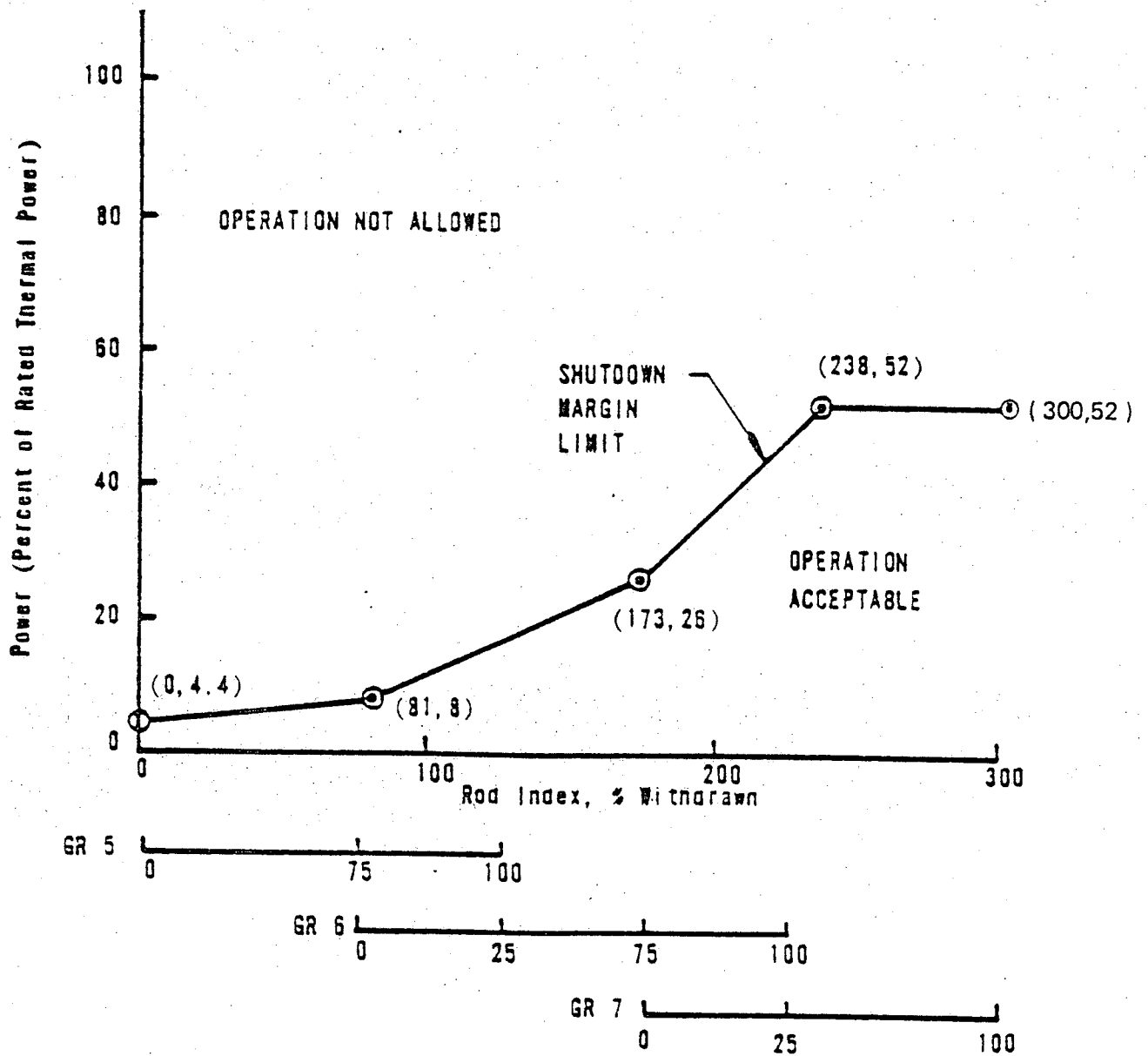




ROD POSITION LIMITS FOR  
TWO PUMP OPERATION FROM  
0 TO 50 (+10, -0) EFPD, UNIT 1  
OCONEE NUCLEAR STATION



Figure 3.5.2-2A3



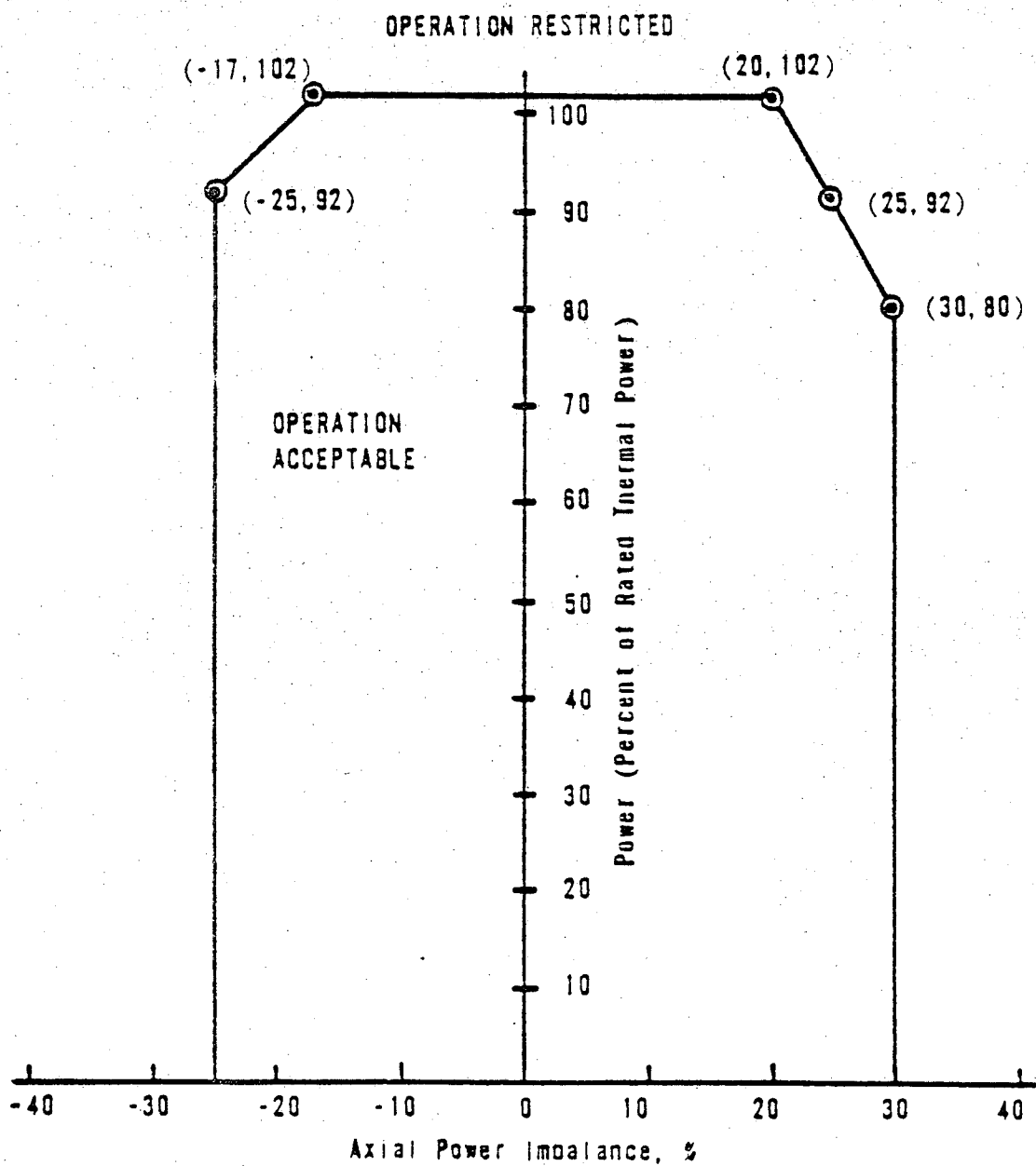
ROD POSITION LIMITS FOR TWO  
PUMP OPERATION AFTER 50  
(+10, -0) EFPD, UNIT 1

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Figure 3.5.2 A4

3.5-18c

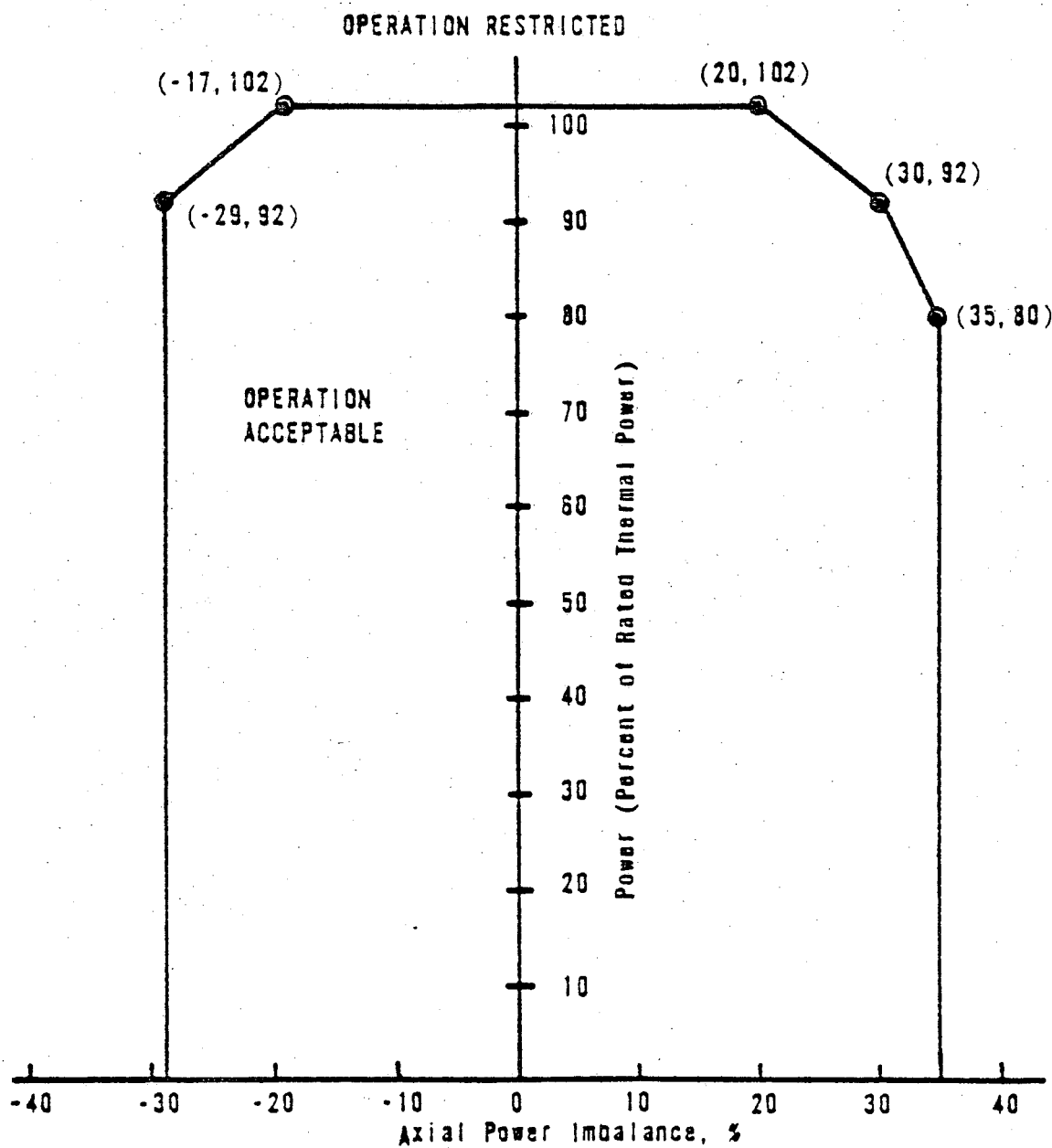




POWER IMBALANCE LIMITS FOR  
OPERATION FROM 0 TO 50 (+10, -0)  
EFPD, UNIT 1  
OCONEE NUCLEAR STATION



Figure 3.5.2-3A1



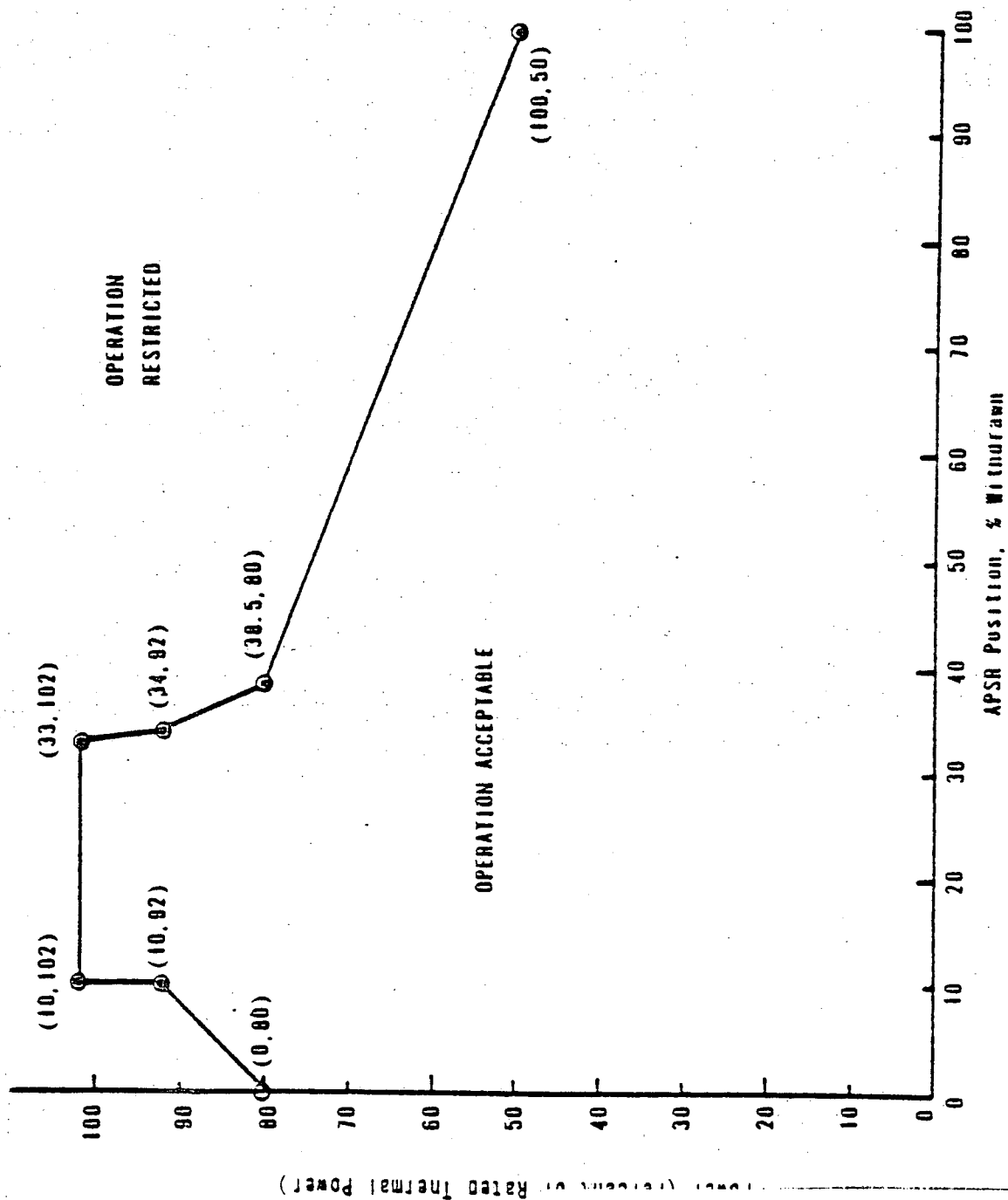
POWER IMBALANCE LIMITS FOR  
OPERATION AFTER 50 (+10, -0)  
EFPD, UNIT 1

OCONEE NUCLEAR STATION

Figure 3.5.2-3A2

3.5-21a



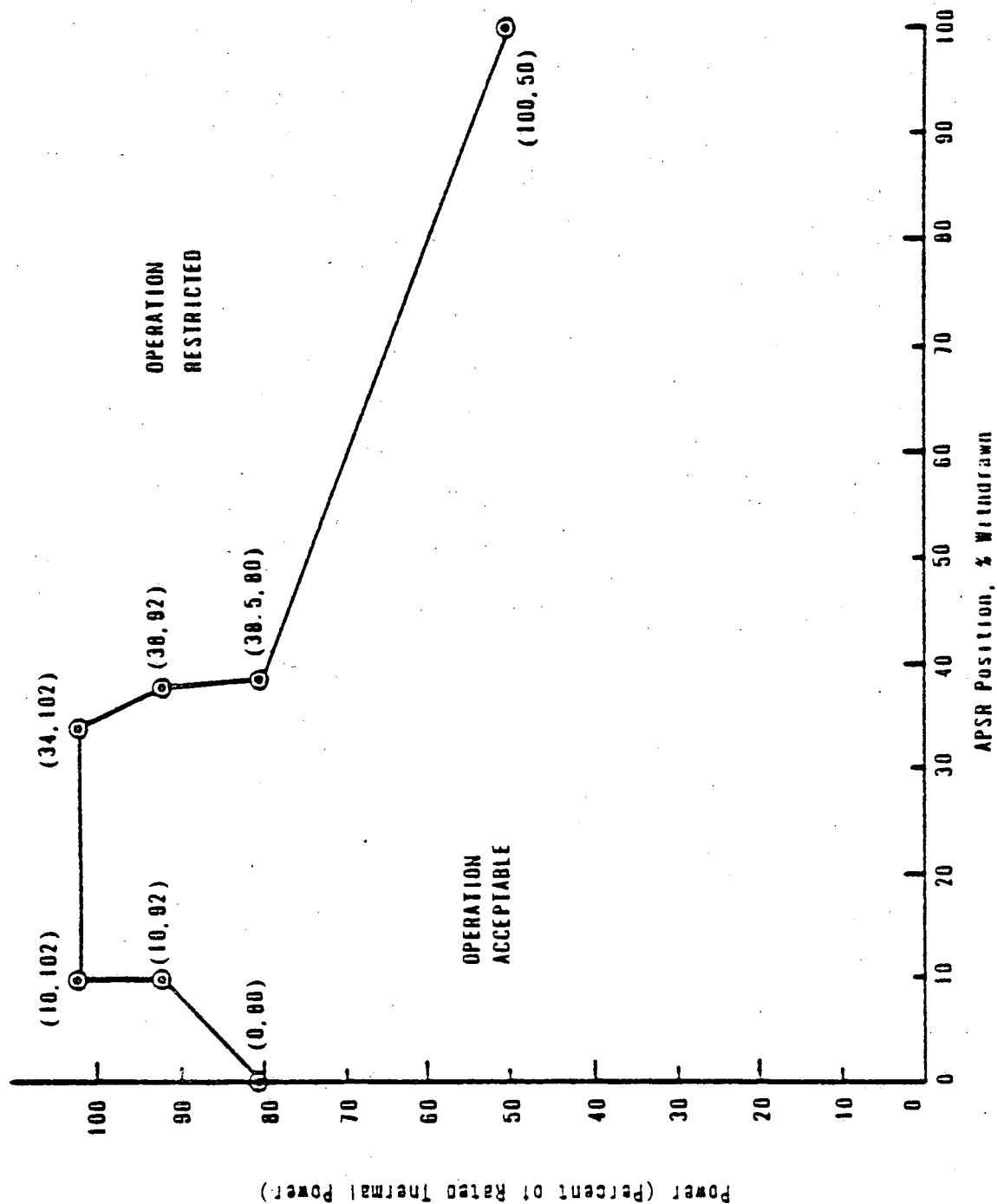


3.5-24



APSR POSITION LIMITS FOR  
OPERATION FROM 0 TO 50  
(+10, -0) EFPD, UNIT 1  
OCONEE NUCLEAR STATION  
Figure 3.5.2-4A1





APSR POSITION LIMITS FOR  
OPERATION AFTER 50 (+10, -0)  
EFPD, UNIT 1  
OCONEE NUCLEAR STATION



3.5-24a

Figure 3.5.2-4A2