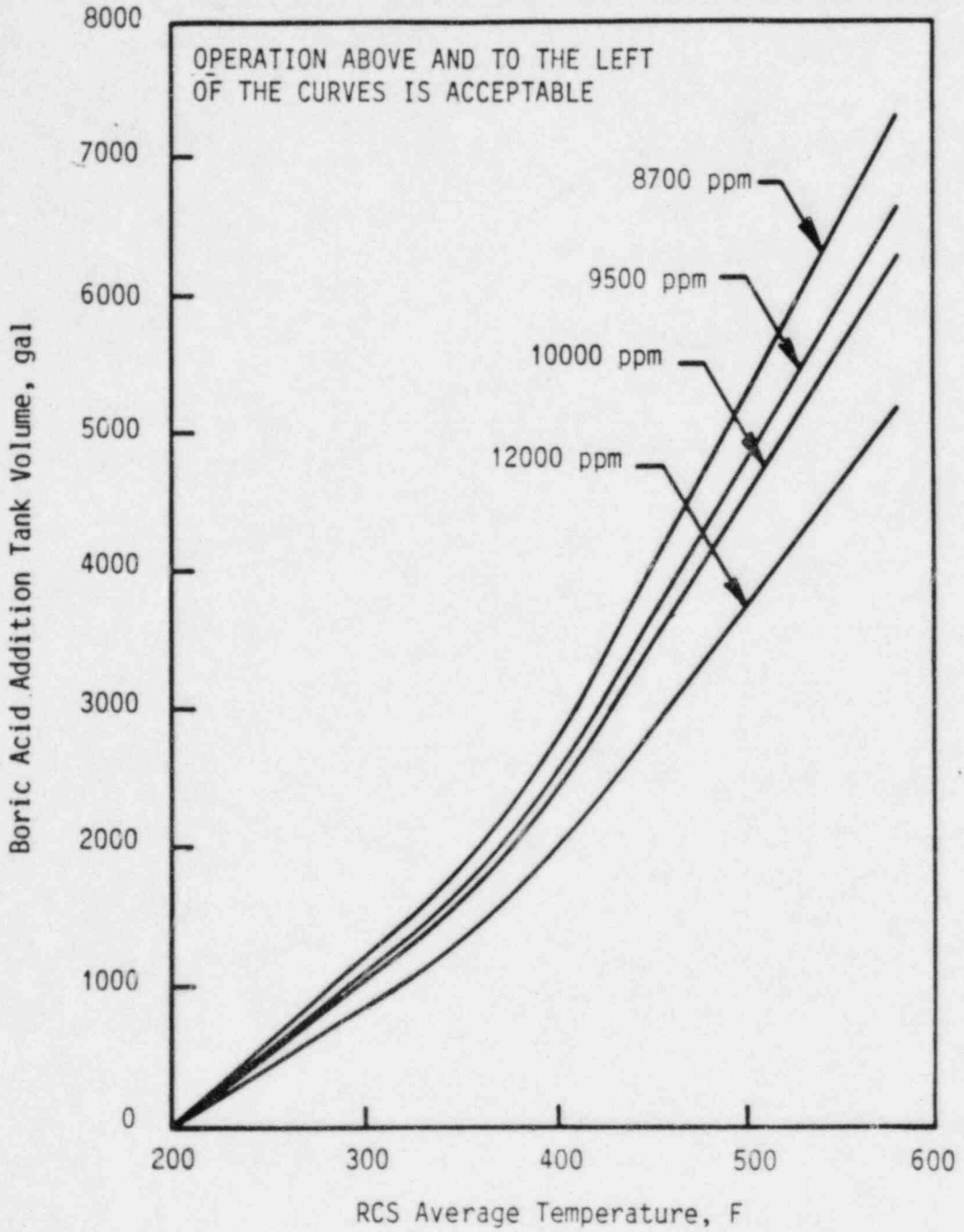
LIST OF FIGURES

Boric Acid Addition Tank Volume and Concentration Vs RCS Average Temperature -- ANO-1, Cycle 8
Figure 3.2-1



Temp., F	Required Volume, gal			
	8700 ppm	9500 ppm	10000 ppm	12000 ppm
579	7308	6657	6306	5200
532	6126	5580	5289	4355
500	5273	4802	4548	3749
400	2790	2543	2409	1984
300	1234	1129	1070	877
200	0	0	0	0

6. If a control rod in the regulating or axial power shaping groups is declared inoperable per Specification 4.7.1.2 operation above 60 percent of the thermal power allowable for the reactor coolant pump combination may continue provided the rods in the group are positioned such that the rod that was declared inoperable is contained within allowable group average position limits of Specification 4.7.1.2 and the withdrawal limits of Specification 3.5.2.5.3.

3.5.2.3 The worth 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 tilt:

1. Except for physics tests, if quadrant tilt exceeds 3.1%, reduce power so as not to exceed the allowable power level for the existing reactor coolant pump combination less at least 2% for each 1% tilt in excess of 3.1%.

2. Within a period of 4 hours, the quadrant power tilt shall be reduced to less than 3.1% except for physics tests, or the following adjustments in setpoints and limits shall be made:

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

   b. The control rod group and APSR withdrawal limits shall be reduced 2% in power for each 1% tilt in excess of 3.1%.

   c. The operational imbalance limits shall be reduced 2% in power for each 1% tilt in excess of 3.1%.

3. 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 3.5.2.4.1 above.

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

3. Except for physics tests or exercising control rods, (a) the control rod withdrawal limits are specified on Figures 3.5.2-1(A-D), 3.5.2-2(A-D), and 3.5.2-3(A-D) for 4, 3 and 2 pump operation respectively; and (b) the axial power shaping control rod withdrawal limits are specified on Figure 3.5.2-6(A-D). If any of these 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 4 hours.

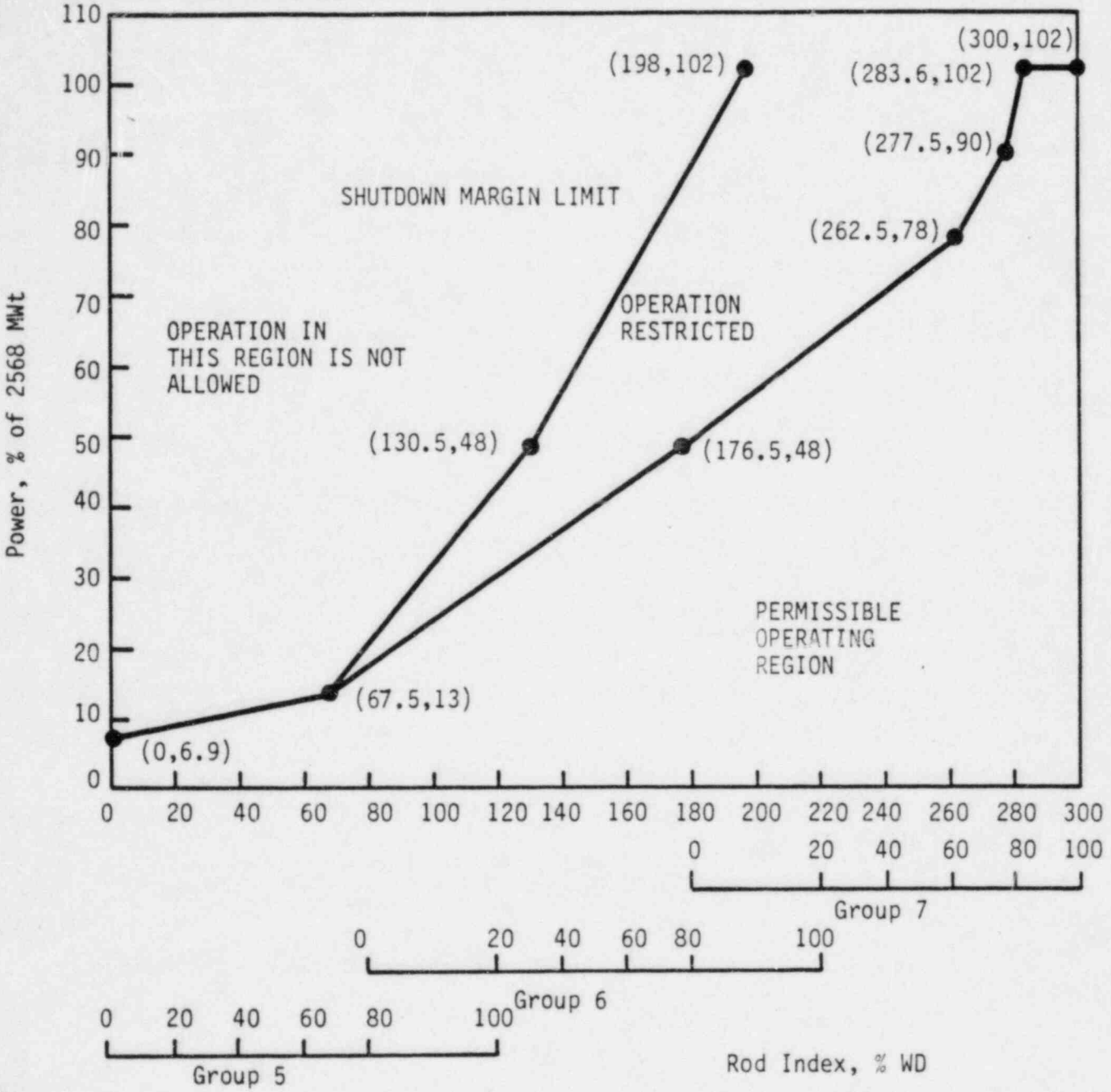
3.5.2.6 Reactor Power Imbalance shall be monitored on a frequency not to exceed 2 hours during power operation above 40% rated power. Except for physics tests, imbalance shall be maintained within the envelope defined by Figure 3.5.2-4(A-D). If the imbalance is not within the envelope defined by Figure 3.5.2-4(A-D), corrective measures shall be taken to achieve an acceptable imbalance. If an acceptable imbalance is not achieved within 4 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 Superintendent.

Bases

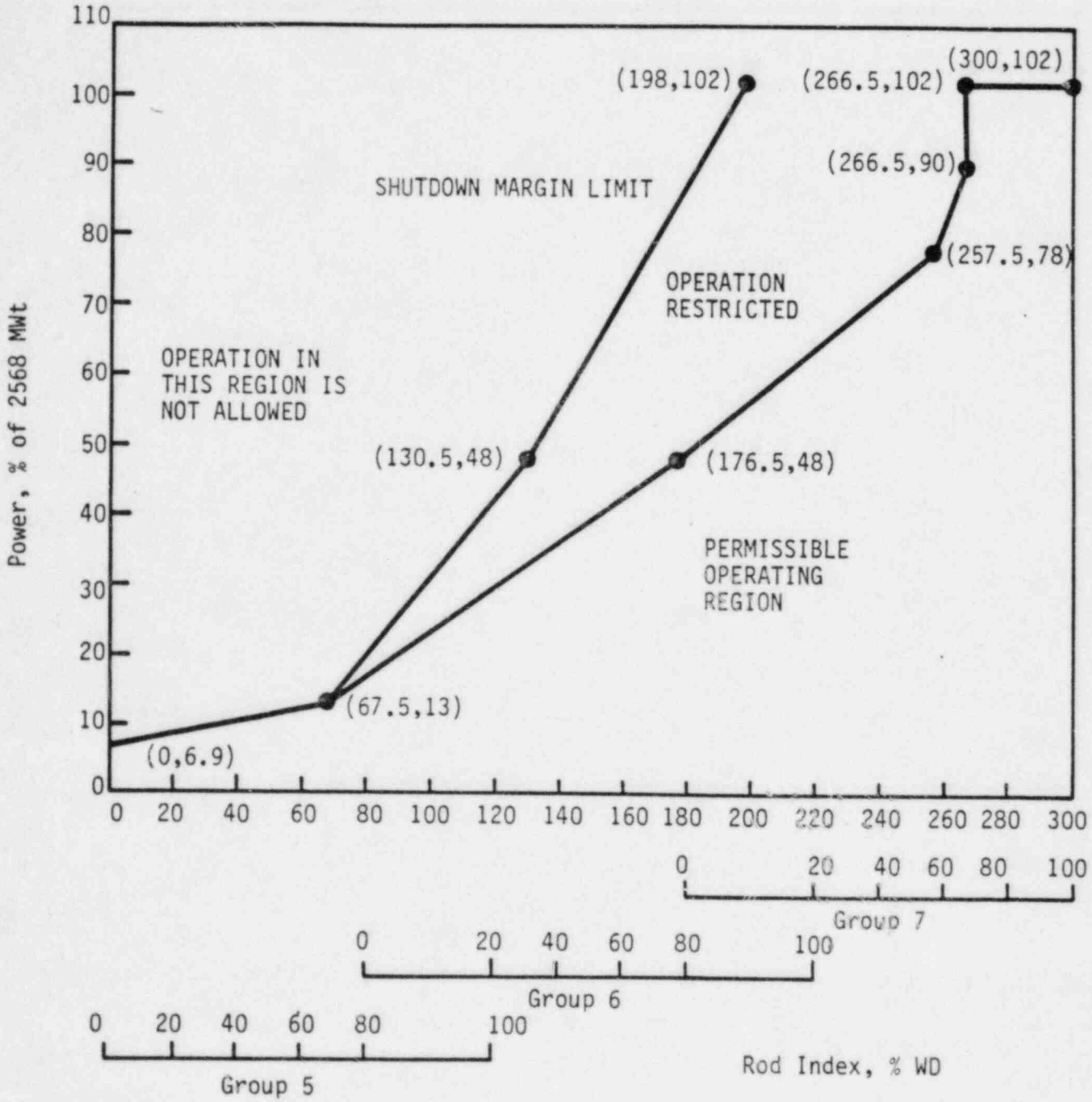
The power-imbalance envelope defined in Figure 3.5.2-4(A-D) is based on (1) LOCA analyses which have defined the maximum linear heat rate (see Figure 3.5.2-5), such that the maximum cladding temperature will not exceed the Final Acceptance Criteria and (2) the Protective System Maximum Allowable Setpoints (Figure 2.3-2). Corrective measures will be taken immediately should the indicated quadrant tilt, rod position, or imbalance be outside their specified boundaries. 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

Rod Position Setpoints for 4-Pump Operation
From 0 to 25+10/-0 EFPD -- ANO-1 Cycle 8
Figure 3.5.2-1A

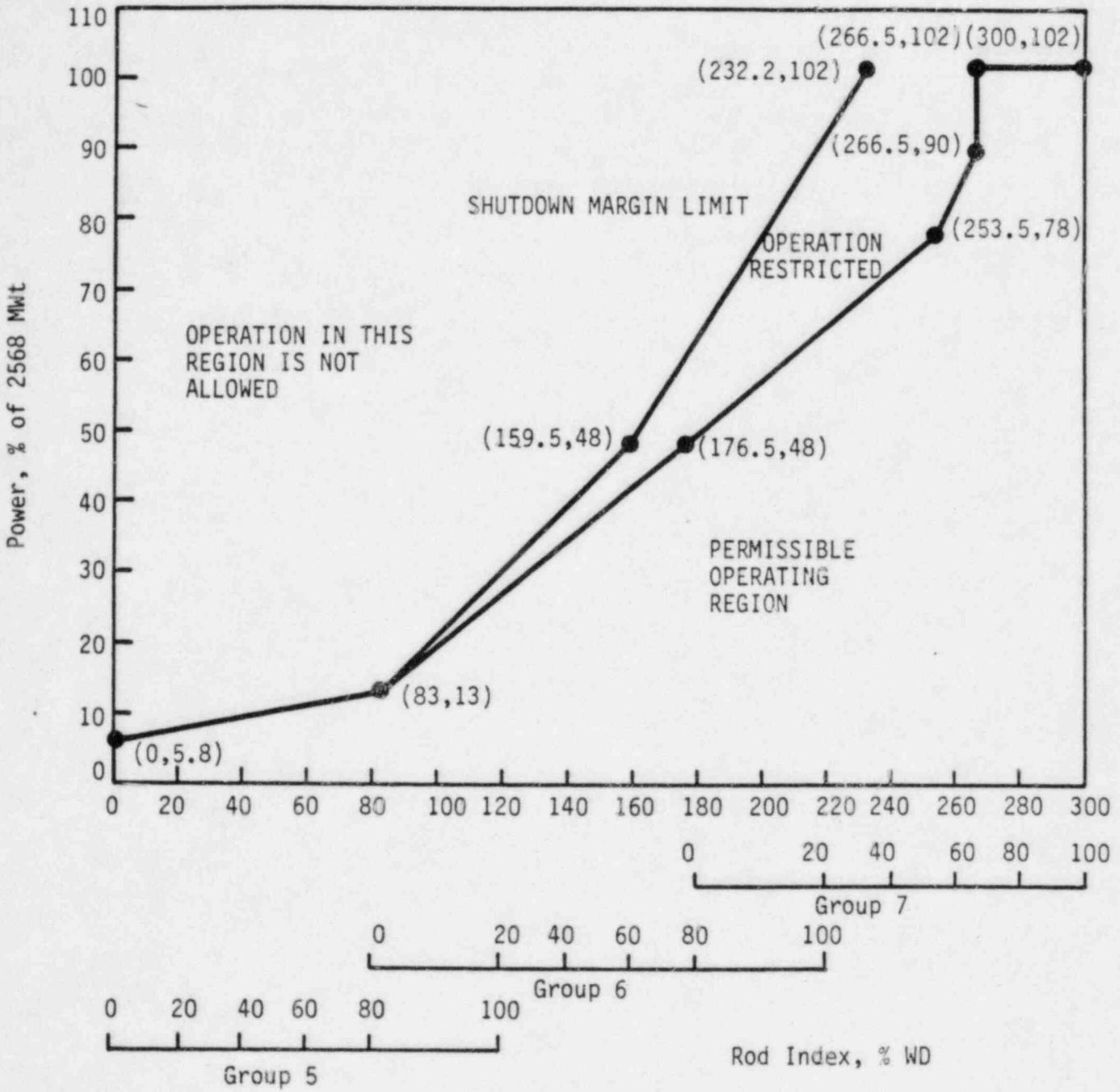


Rod Position Setpoints for 4-Pump Operation
From 25+10/-0 to 200± 10 EFPD ANO-1 Cycle 8

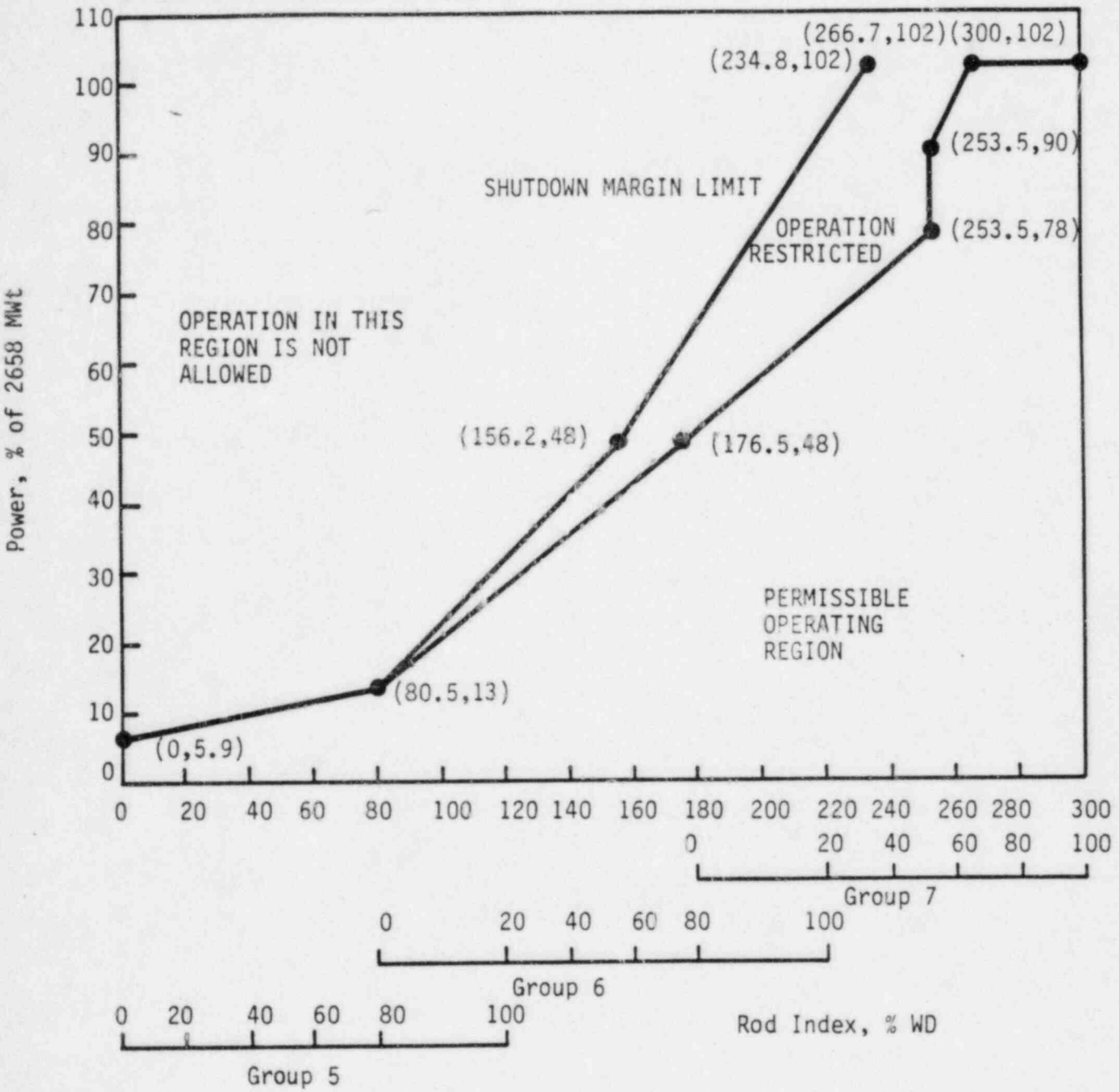
Figure 3.5.2-1B



Rod Position Setpoints for 4-Pump Operation
From 200±10 to 380±10 EFPD -- ANO-1 Cycle 8
Figure 3.5.2-1C

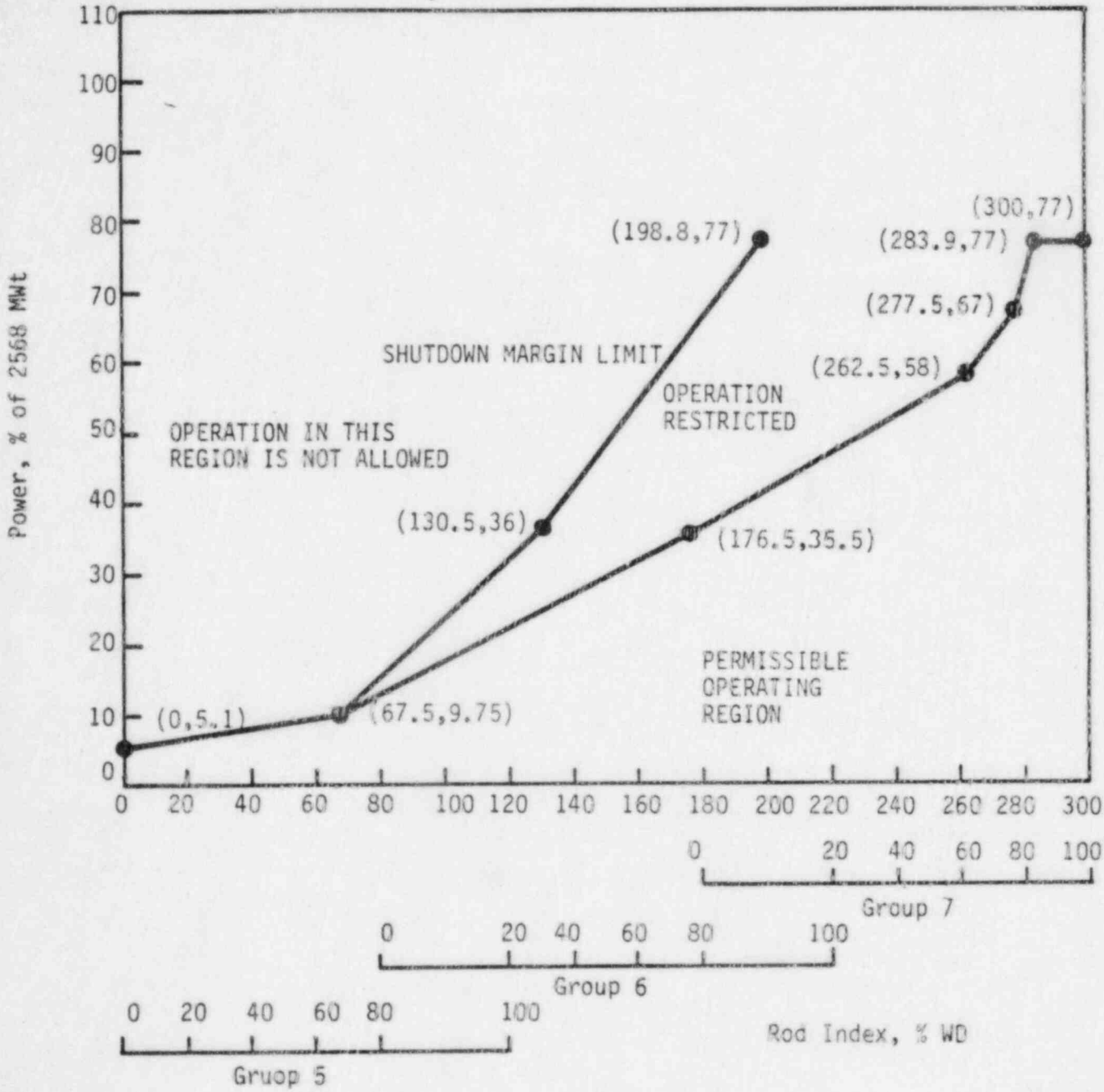


Rod Position Setpoints for 4-Pump Operation
After 380±10 EFPD -- ANO-1 Cycle 8
Figure 3.5.2-1D



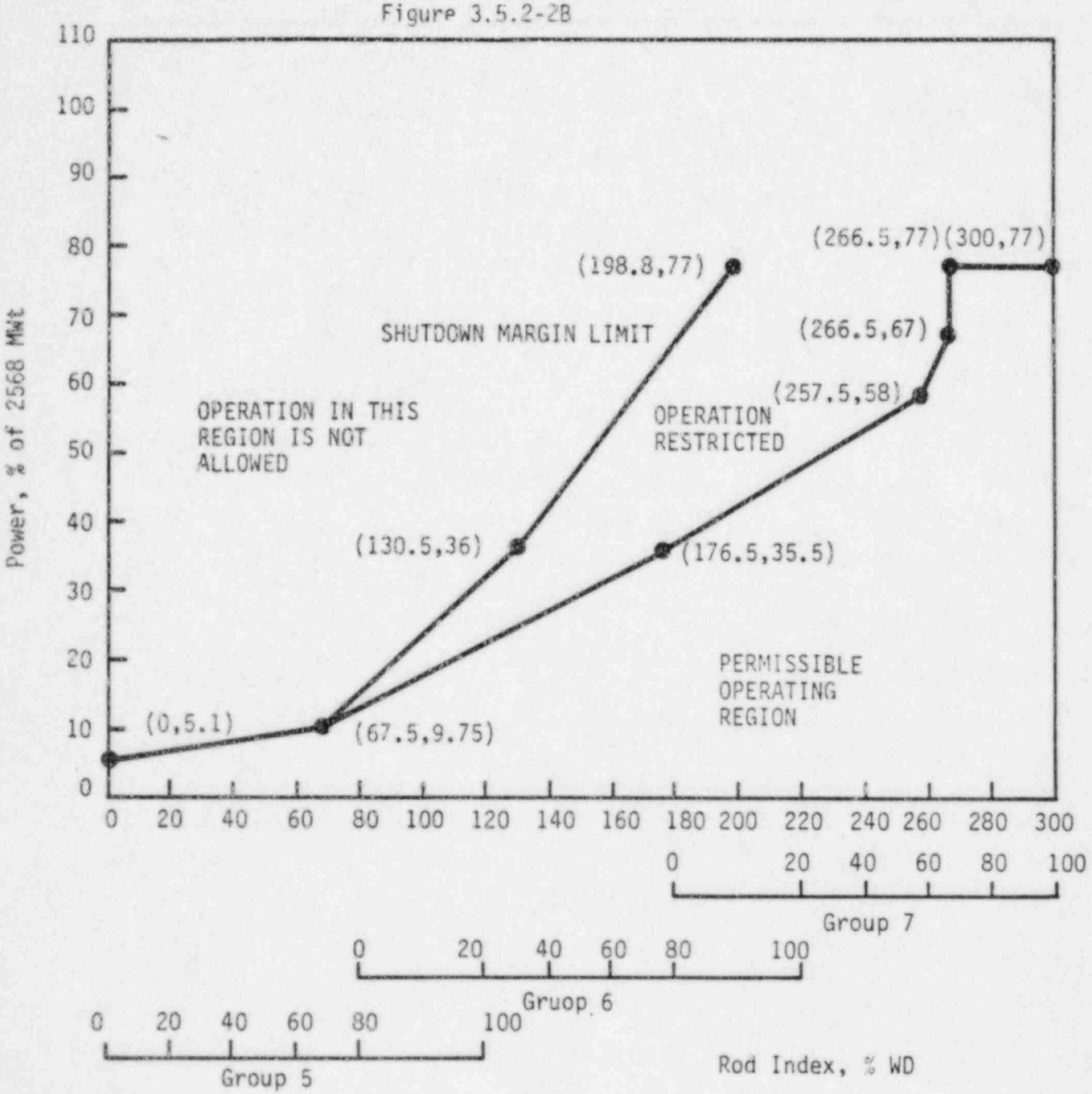
Rod Position Setpoints for 3-Pump Operation
From 0 to 25+10/-0 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-2A



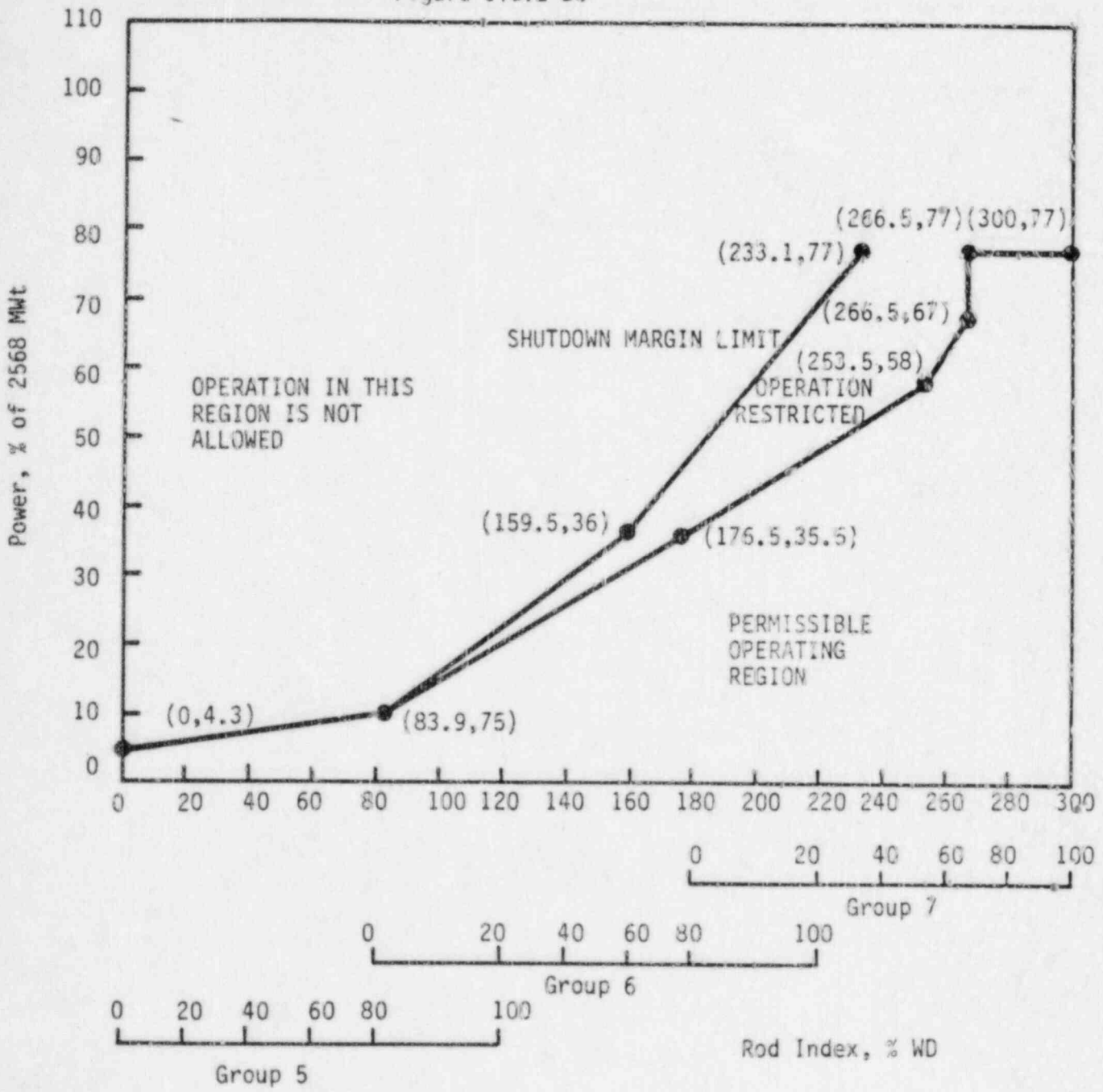
Rod Position Setpoints for 3-Pump Operation
From 25+10/-0 to 200±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-2B



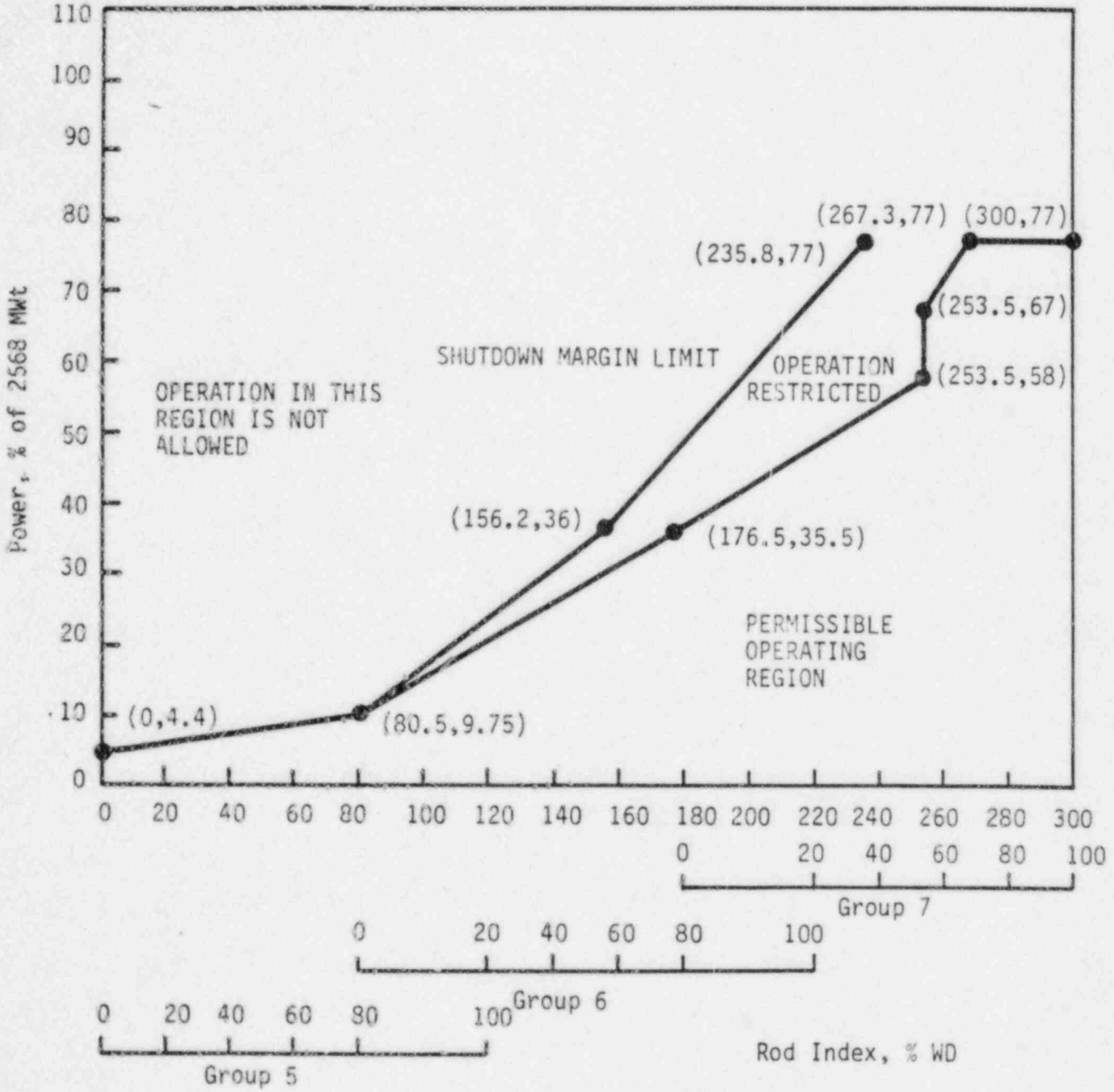
Rod Position Setpoints for 3-Pump Operation
From 200±10 to 380±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-2C



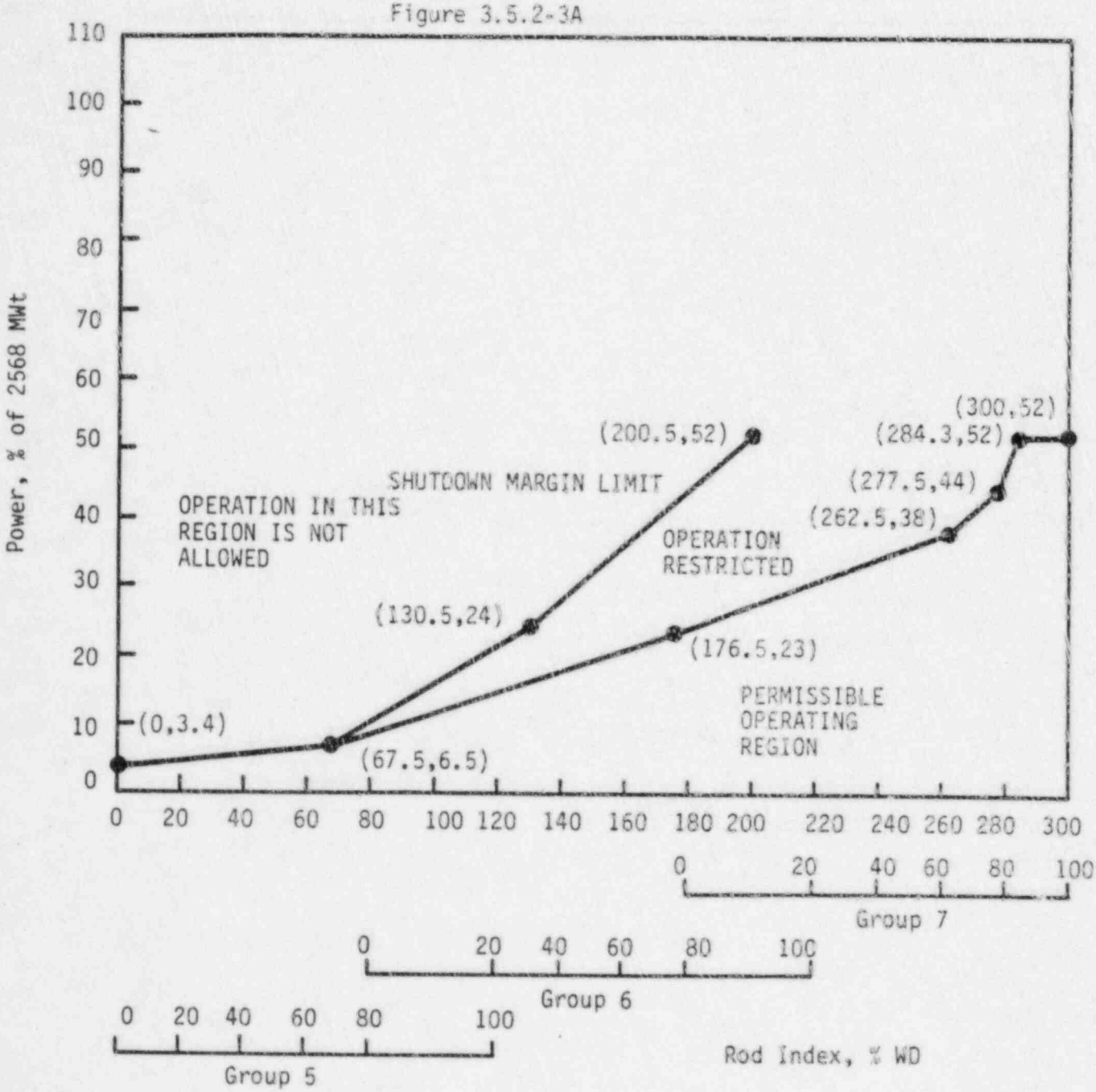
Rod Position Setpoints for 3-Pump Operation
After 380±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-2D



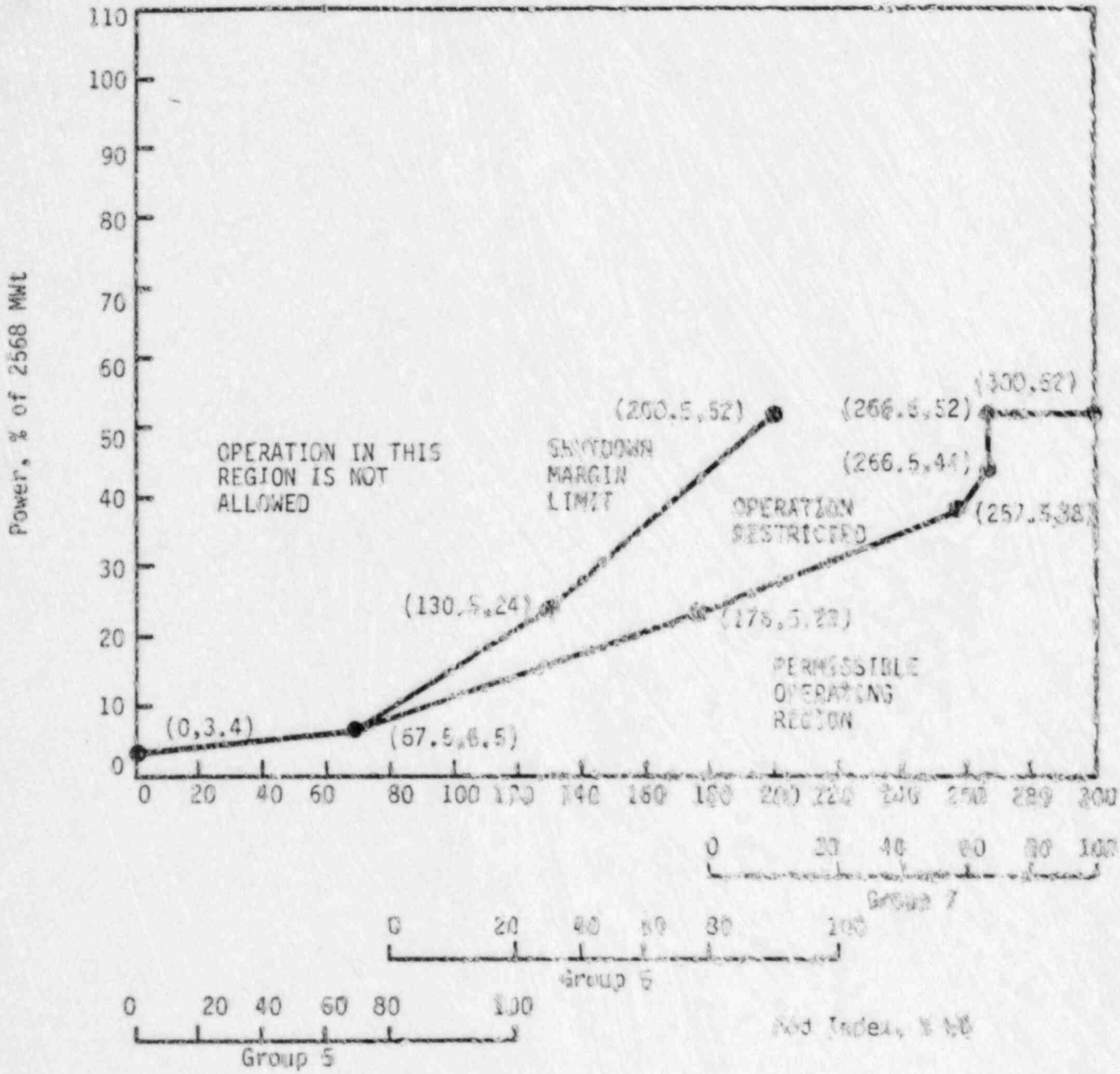
Rod Position Setpoints for 2-Pump Operation
From 0 to 25+10/-0 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-3A



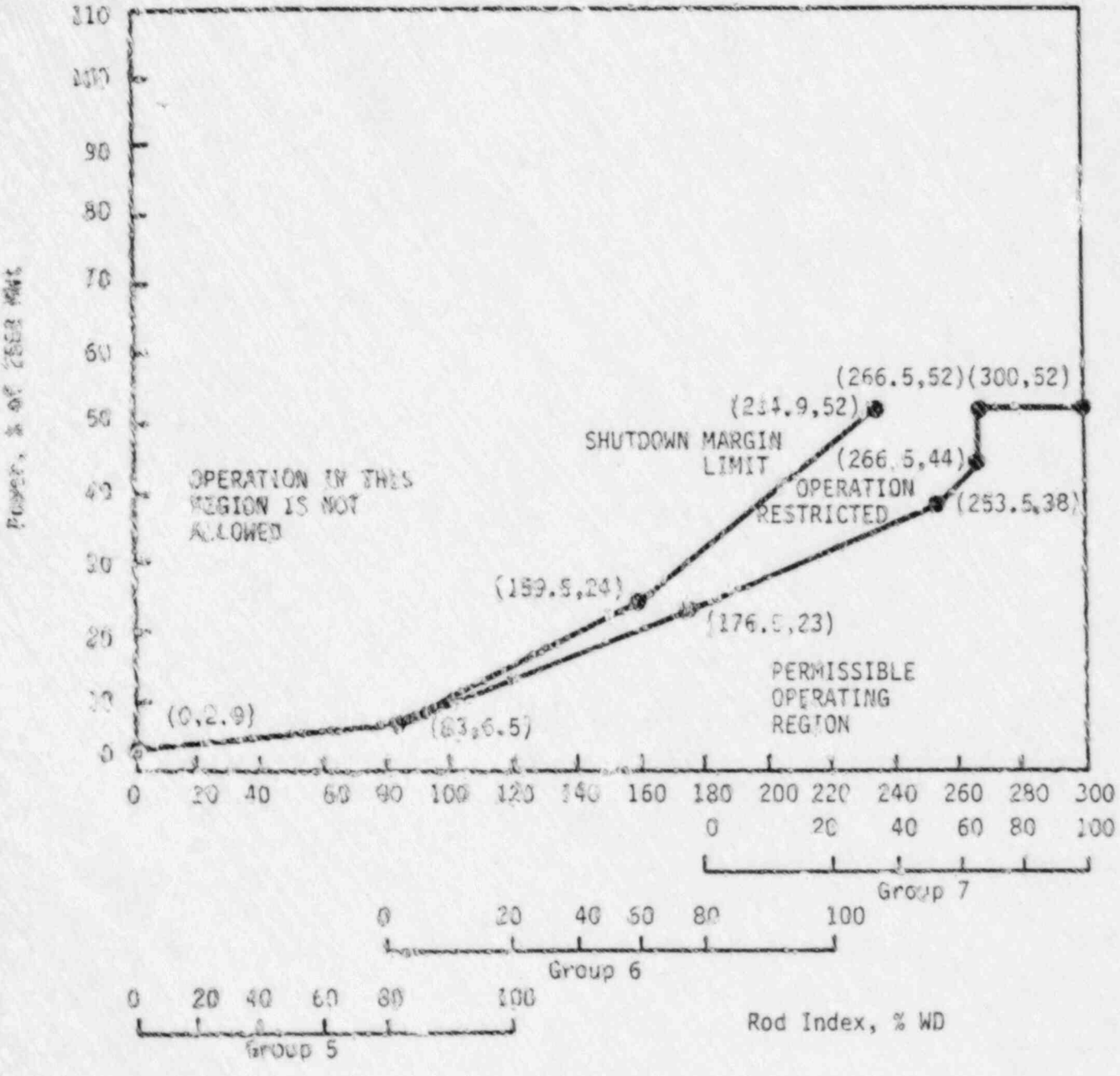
Rod Position Setpoints for 2-Pump Operation
From 25+10/-0 to 200±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-38



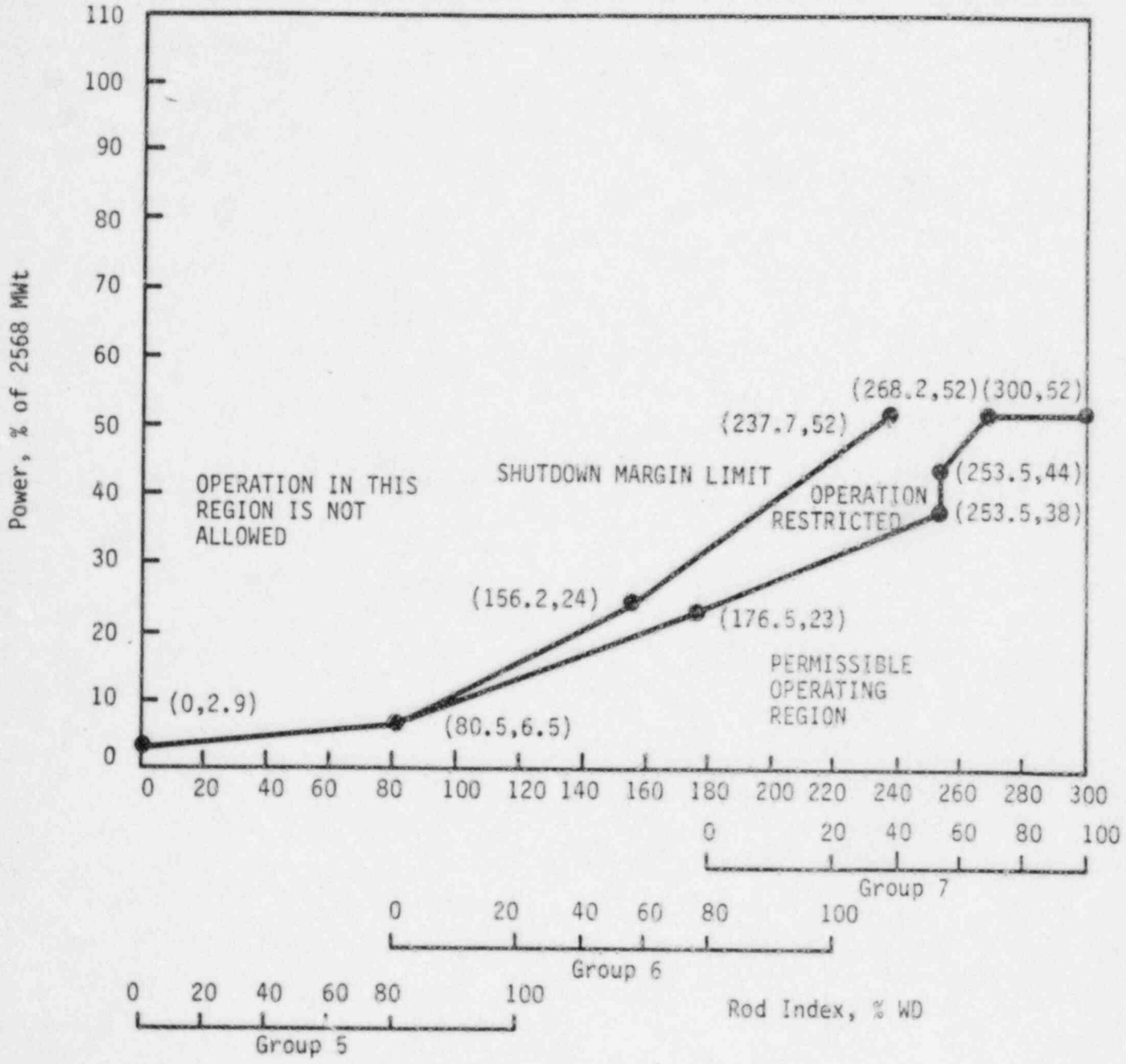
Rod Position Setpoints for 2-Pump Operation
From 200±10 to 380±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-3C



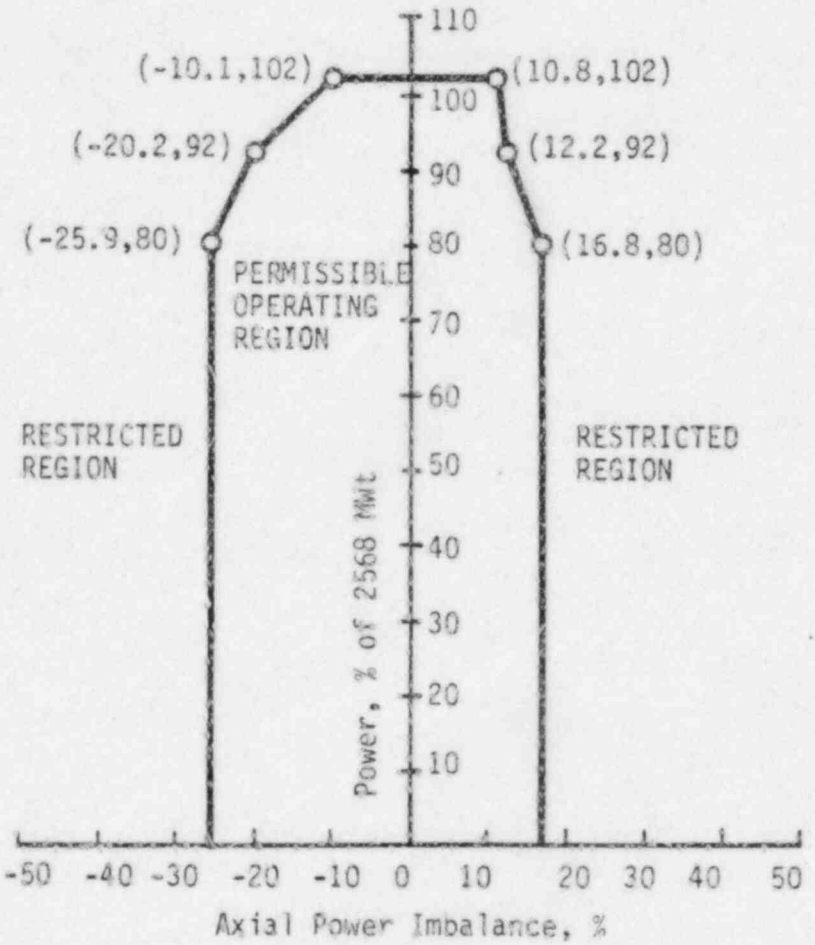
Rod Position Setpoints for 2-Pump Operation
After 380±10 EFPD -- ANO-1 Cycle 8

Figure 3.5.2-3D



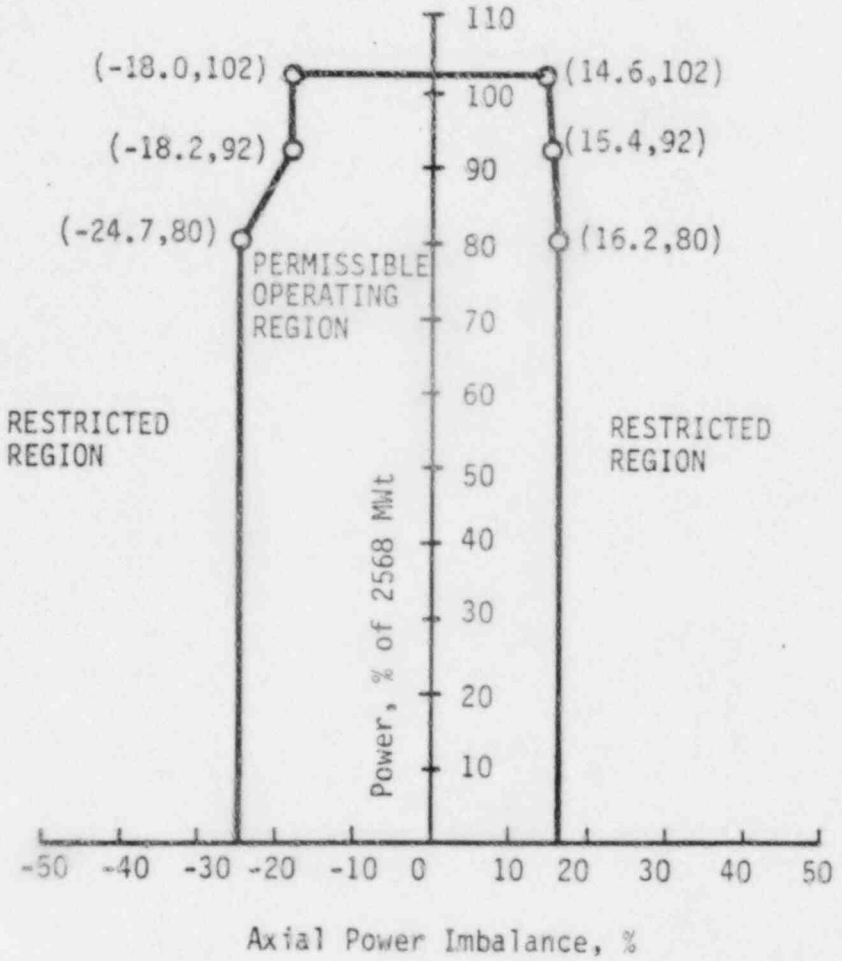
Operational Power Imbalance Setpoints for Operation
From 0 to 25+10/-0 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-4A



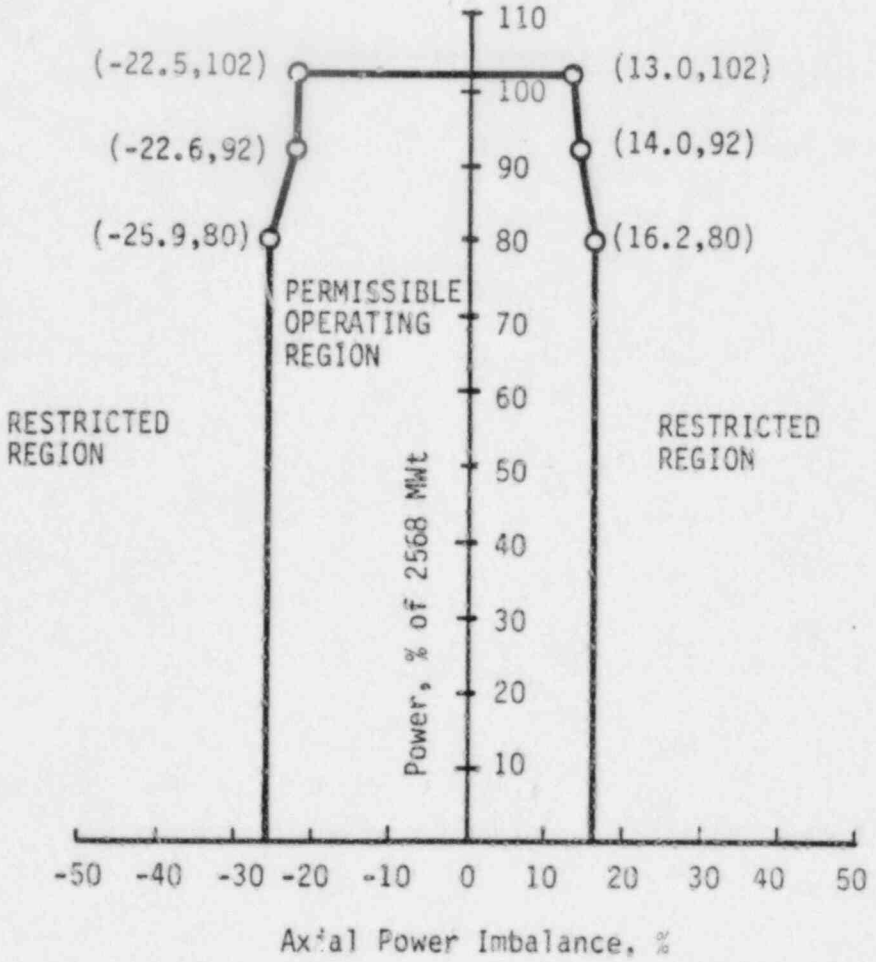
Operational Power Imbalance Setpoints for Operation From 25+10/-0 to 200±10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-48



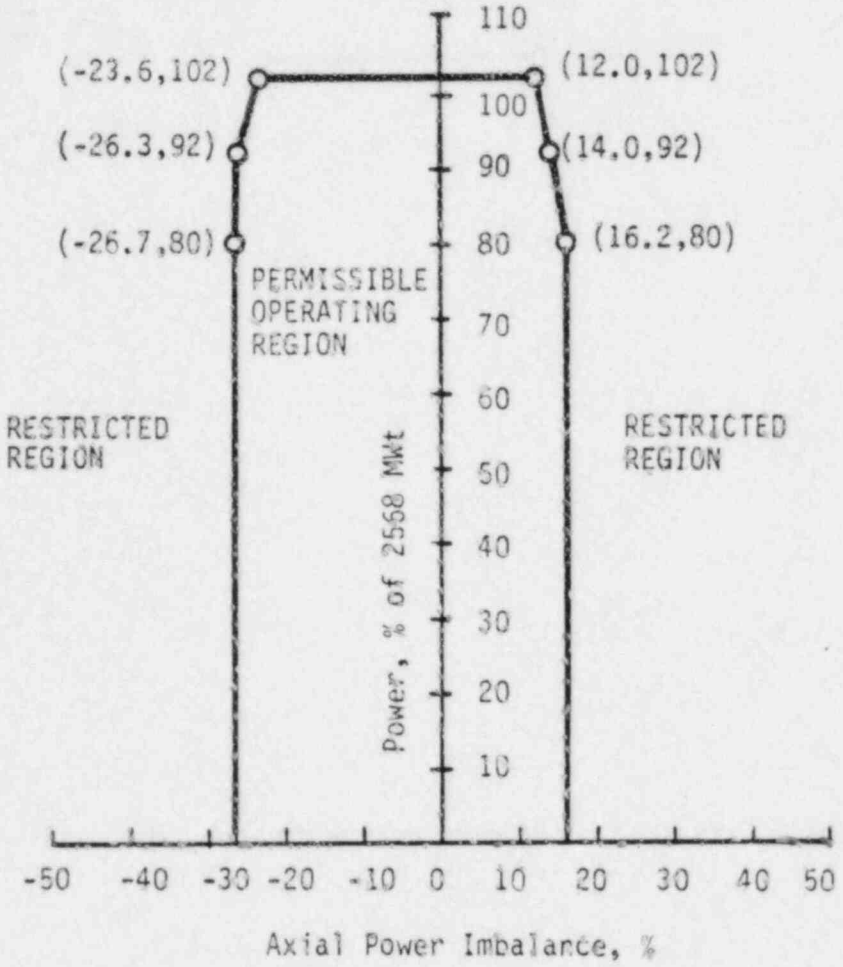
Operational Power Imbalance Setpoints for Operation From 200±10 to 380±10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-4C



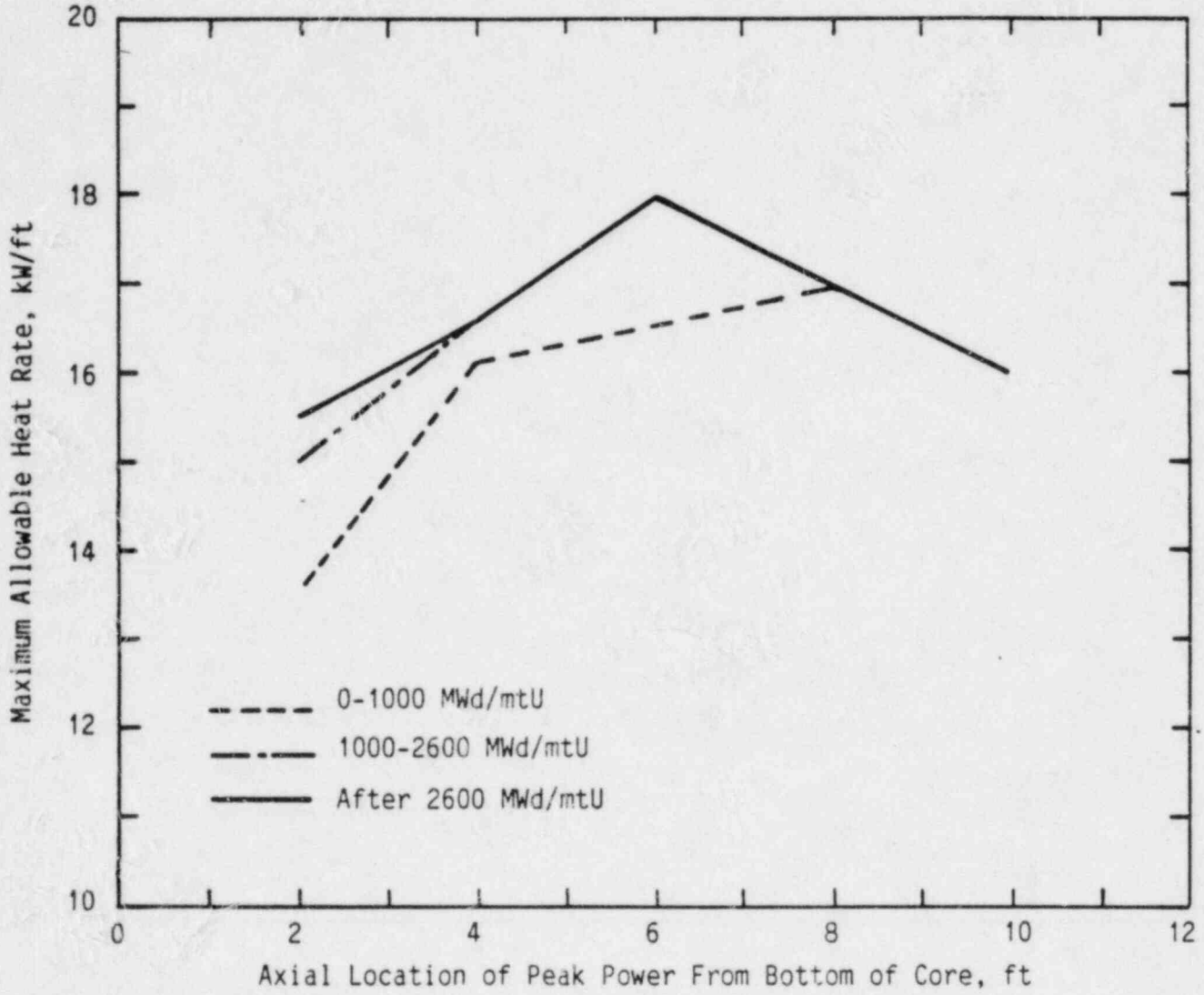
Operational Power Imbalance Setpoints for Operation After 380±10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-4D



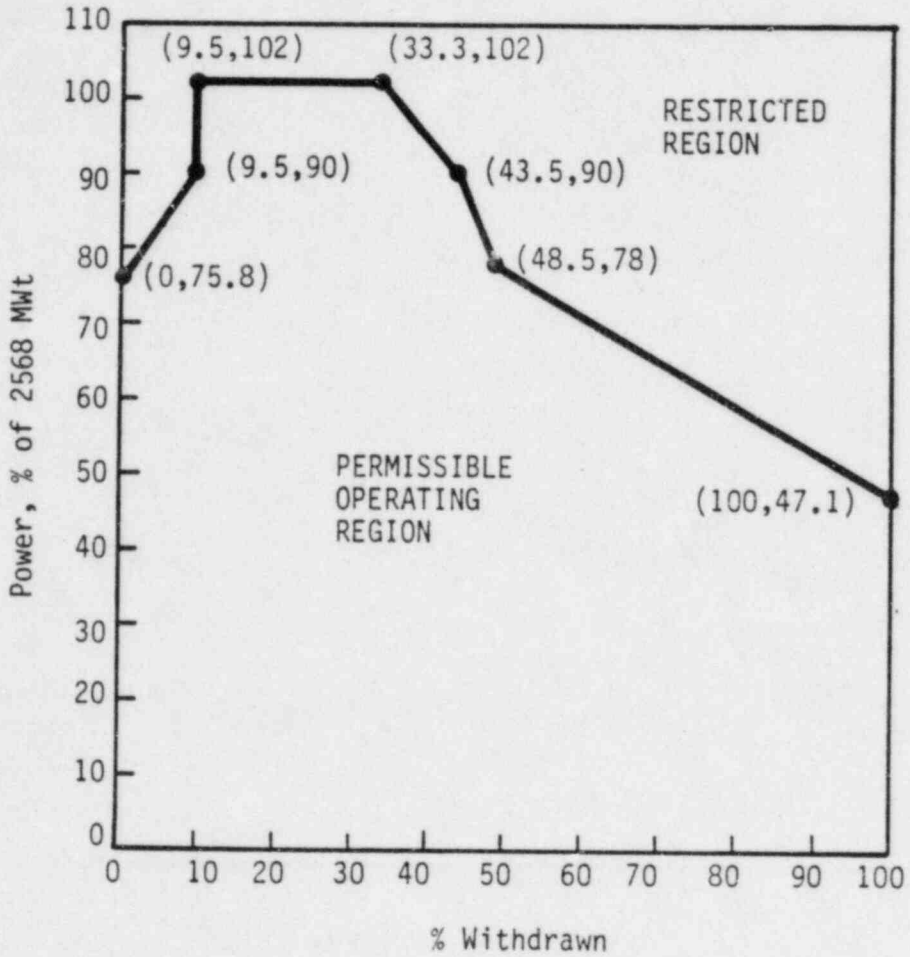
LOCA Limited Maximum Allowable
Linear Heat Rate

Figure 3.5.2-5



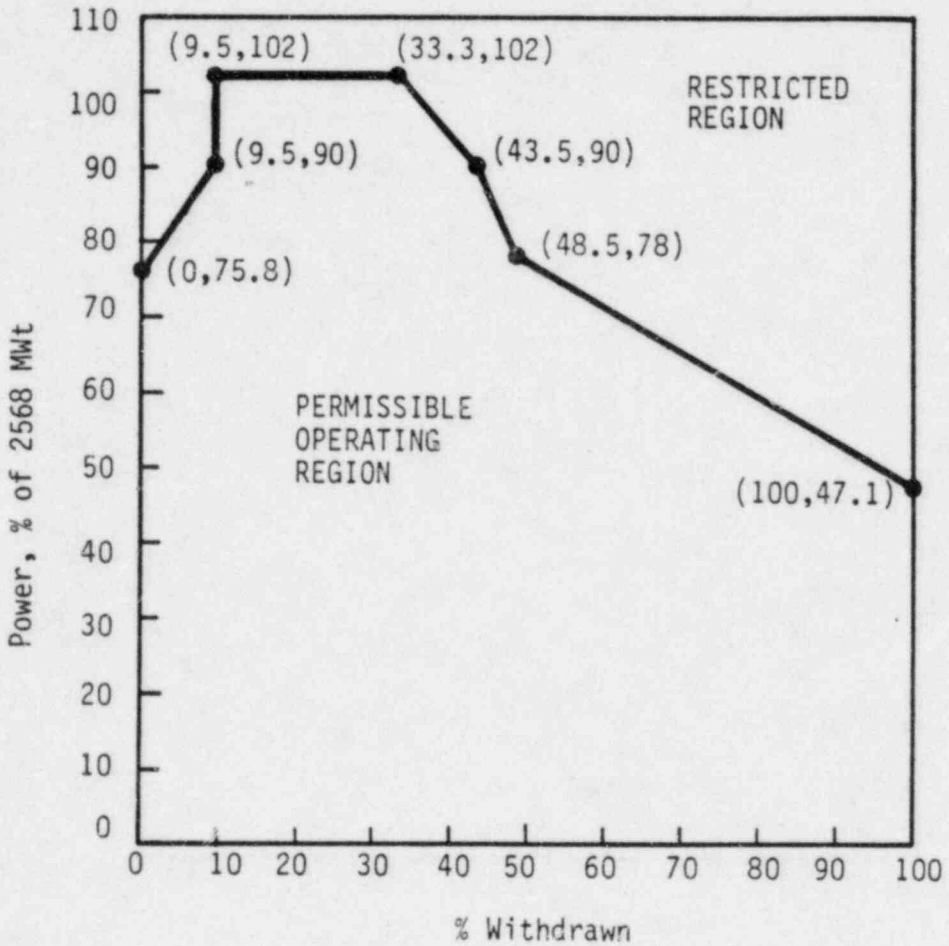
APSR Position Setpoints for Operation
From 0 to 25+10/-0 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-6A



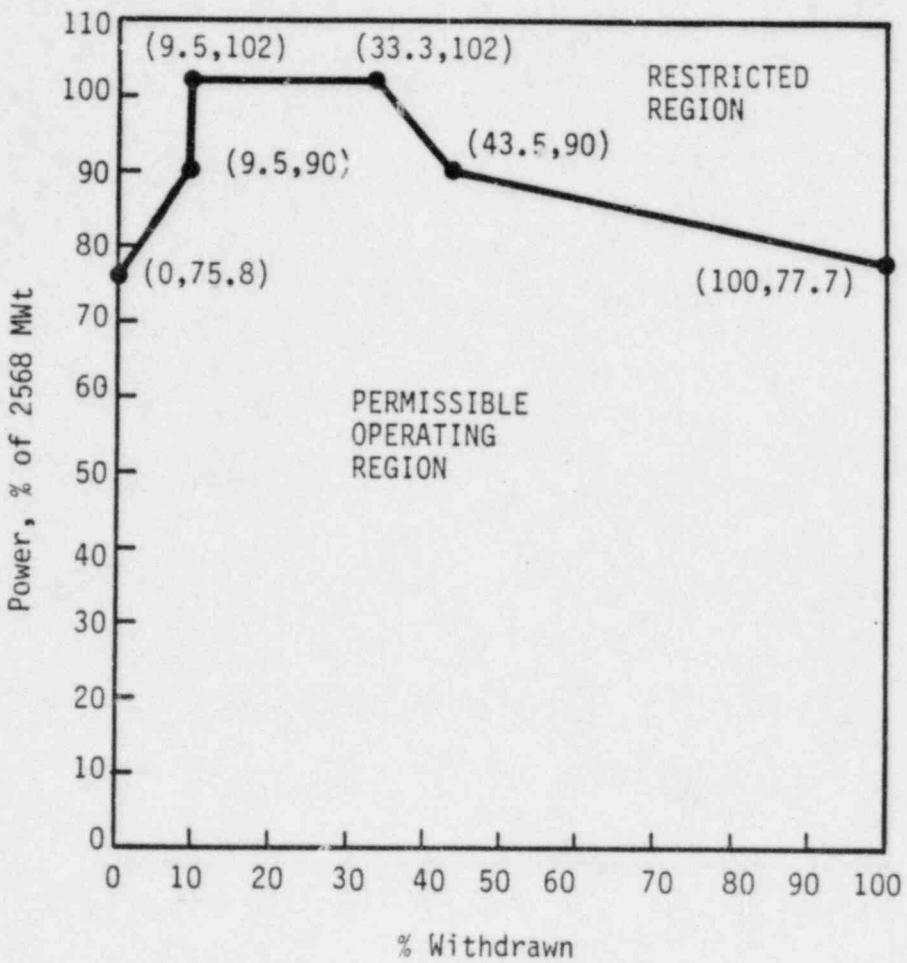
APSR Position Setpoints for Operation
From 25+10/-0 to 200±10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-6B



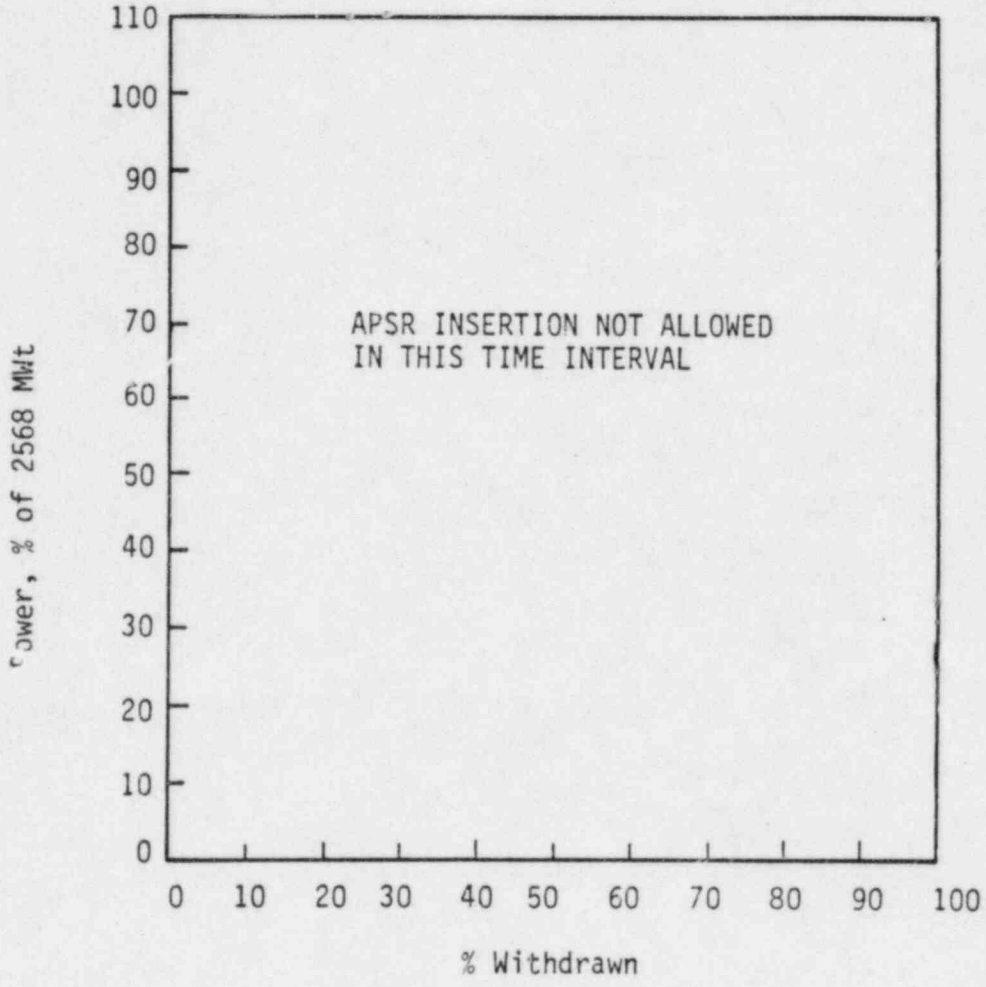
APSR Position Setpoints For Operation
From 200±10 to 380±10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-6C



APSR Position Setpoints for Operation After
380 ± 10 EFPD -- ANO-1, Cycle 8

Figure 3.5.2-6D



4.7 REACTOR CONTROL ROD SYSTEM TESTS

4.7.1 Control Rod Drive System Functional Tests

Applicability

Applies to the surveillance of the control rod system.

Objective

To assure operability of the control rod system.

Specification

4.7.1.1 The control rod trip insertion time shall be measured for each control rod at either full flow or no flow conditions following each refueling outage prior to return to power. The maximum control rod trip insertion time for an operable control rod drive mechanism, except for the Axial Power Shaping Rods (APSRs), from the fully withdrawn position to 3/4 insertion (104 inches travel) shall not exceed 1.66 seconds at reactor coolant full flow conditions or 1.20 seconds for no flow conditions. For the APSRs it shall be demonstrated that loss of power will not cause rod movement. If the trip insertion time above is not met, the rod shall be declared inoperable.

4.7.1.2 If a control rod is misaligned with its group average by more than an indicated nine (9) inches, the rod shall be declared inoperable and the limits of Specification 3.5.2.2 shall apply. The rod with the greatest misalignment shall be evaluated first. The position of a 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.

4.7.1.3 If a control rod cannot be exercised, or if it cannot be located with absolute or relative position indications or in or out limit lights, the rod shall be declared to be inoperable.

Bases

The control rod trip insertion time is the total elapsed time from power interruption at the control rod drive breakers until the control rod has completed 104 inches of travel from the fully withdrawn position. The specified trip time is based upon the safety analysis in FSAR, Section 14.

Each control rod drive mechanism shall be exercised by a movement approximately two (2) inches of travel every two (2) weeks. This requirement shall apply to either a partial or fully withdrawn control rod at reactor operating conditions. Exercising the drive mechanisms in this manner provides assurance of reliability of the mechanisms.

A rod is considered inoperable if it cannot be exercised, if the trip insertion time is greater than the specified allowable time, or if the rod