

June 12, 1984

*DLR 016*

Docket No. 50-346

Mr. Richard P. Crouse  
Vice President, Nuclear  
Toledo Edison Company  
Edison Plaza - Stop 712  
300 Madison Avenue  
Toledo, Ohio 43652

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Dear Mr. Crouse:

SUBJECT: AMENDMENT NO. 69 TO FACILITY OPERATING LICENSE NO. NPF-3;  
CYCLE 4 CORE REVISED OPERATING LIMITS

The Commission has issued the enclosed Amendment No. 69 to Facility Operating License NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1. This amendment modifies the Appendix A Technical Specifications in response to your application dated February 17, 1984 (No. 1027), as revised March 29, 1984 (No. 1040).

This amendment modifies regulating rod and axial power shaping rod (APSR) position limits and axial power imbalance limits to allow APSR withdrawal at  $200 \pm 10$  effective full power days (EFPDs). These modifications will accommodate extension of the present cycle length to approximately 280 EFPDs. The amendment also modifies Table 3.2-2 to incorporate revised quadrant power tilt limits for the symmetrical incore detector system.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Monthly Notice.

Sincerely,

Albert De Agazio, Project Manager  
Operating Reactors Branch No. 4  
Division of Licensing

Enclosures:

1. Amendment No. 69 to NPF-3
2. Safety Evaluation

ORB#4:DL  
RIgram  
06/4/84

ORB#4:DL  
ADeAgazio;ef  
06/5/84

ORB#4:DL  
GRivenbark  
06/5/84

AD:OR:DL  
GLainas  
06/11/84

OELD  
M. Rotuschild  
06/11/84

*no legal objection*

*But try to get  
Alternate State Contact before  
Issuing!*

*7/2/84 copy of amendment  
sent to Ohio State agency to find a way to find a way.*

Toledo Edison Company

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P. O. Box 825  
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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

THE TOLEDO EDISON COMPANY

AND

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 69  
License No. NPF-3

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by The Toledo Edison Company and The Cleveland Electric Illuminating Company (the licensees) dated February 17, 1984, as revised March 29, 1984, 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 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, Facility Operating License No. NPF-3 is hereby amended as indicated below and by changes to the Technical Specifications as indicated in the attachment to this license amendment:

Revise paragraph 2.C.(2) to read as follows:

8406230314 840612  
PDR ADOCK 05000346  
P PDR

Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 69, are hereby incorporated in the license. The Toledo Edison Company shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George W. Rivenbark, Acting Chief  
Operating Reactors Branch No. 4  
Division of Licensing

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: June 12, 1984

ATTACHMENT TO LICENSE AMENDMENT NO. 69

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following pages of the Appendix "A" Technical Specifications with the enclosed pages as indicated. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change. The corresponding overleaf pages are also provided to maintain document completeness.

Pages

3/4 1-26

3/4 1-28b

3/4 1-28c

3/4 1-28d

3/4 1-29b

3/4 1-29c

3/4 1-29d

3/4 1-34

3/4 1-37

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3/4 2-2b

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3/4 2-2d

3/4 2-3b

3/4 2-3c

3/4 2-3d

3/4 2-12

## REACTIVITY CONTROL SYSTEMS

### SAFETY ROD INSERTION LIMIT

#### LIMITING CONDITION FOR OPERATION

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3.1.3.5 All safety rods shall be fully withdrawn.

APPLICABILITY: 1\* and 2\*#.

ACTION:

With a maximum of one safety rod not fully withdrawn, except for surveillance testing pursuant to Specification 4.1.3.1.2, within one hour either:

- a. Fully withdraw the rod or
- b. Declare the rod to be inoperable and apply Specification 3.1.3.1.

#### SURVEILLANCE REQUIREMENTS

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4.1.3.5 Each safety rod shall be determined to be fully withdrawn:

- a. Within 15 minutes prior to withdrawal of any regulating rod during an approach to reactor criticality.
- b. At least once per 12 hours thereafter.

\*See Special Test Exception 3.10.1 and 3.10.2.

#With  $K_{eff} \geq 1.0$ .

## REACTIVITY CONTROL SYSTEMS

### REGULATING ROD INSERTION LIMITS

#### LIMITING CONDITION FOR OPERATION

3.1.3.6 The regulating rod groups shall be limited in physical insertion as shown on Figures 3.1-2a, -2b, and -2c and 3.1-3a, -3b, and -3c for the first  $200 \pm 10$  EFPD of operation. If the axial power shaping rods are completely withdrawn at  $200 \pm 10$  EFPD for extension of cycle length, then the regulating rod groups shall be limited in physical insertion as shown on Figures 3.1-2e and 3.1-3e for the remainder of the cycle. However, if the axial power shaping rods are not completely withdrawn at  $200 \pm 10$  EFPD, then the regulating rod groups shall be limited in physical insertion as shown on Figures 3.1-2d and 3.1-3d for the remainder of the cycle. A rod group overlap of  $25 \pm 5\%$  shall be maintained between sequential withdrawn groups 5, 6 and 7.

APPLICABILITY: MODES 1\* and 2\*#.

#### ACTION:

With the regulating rod groups inserted beyond the above insertion limits (in a region other than acceptable operation), or with any group sequence or overlap outside the specified limits, except for surveillance testing pursuant to Specification 4.1.3.1.2, either:

- a. Restore the regulating groups to within the limits within 2 hours, or
- b. Reduce THERMAL POWER to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the rod group position using the above figures within 2 hours, or
- c. Be in at least HOT STANDBY within 6 hours.

NOTE: If in unacceptable region, also see Section 3/4.1.1.1.

\*See Special Test Exceptions 3.10.1 and 3.10.2.

#With  $k_{eff} \geq 1.0$ .

Figure 3.1-2b. Regulating Group Position Limits,  $24 \pm 10$ ,  $-0$  to  $150 \pm 10$  EFPD, Four RC Pumps - Davis-Besse 1, Cycle 4

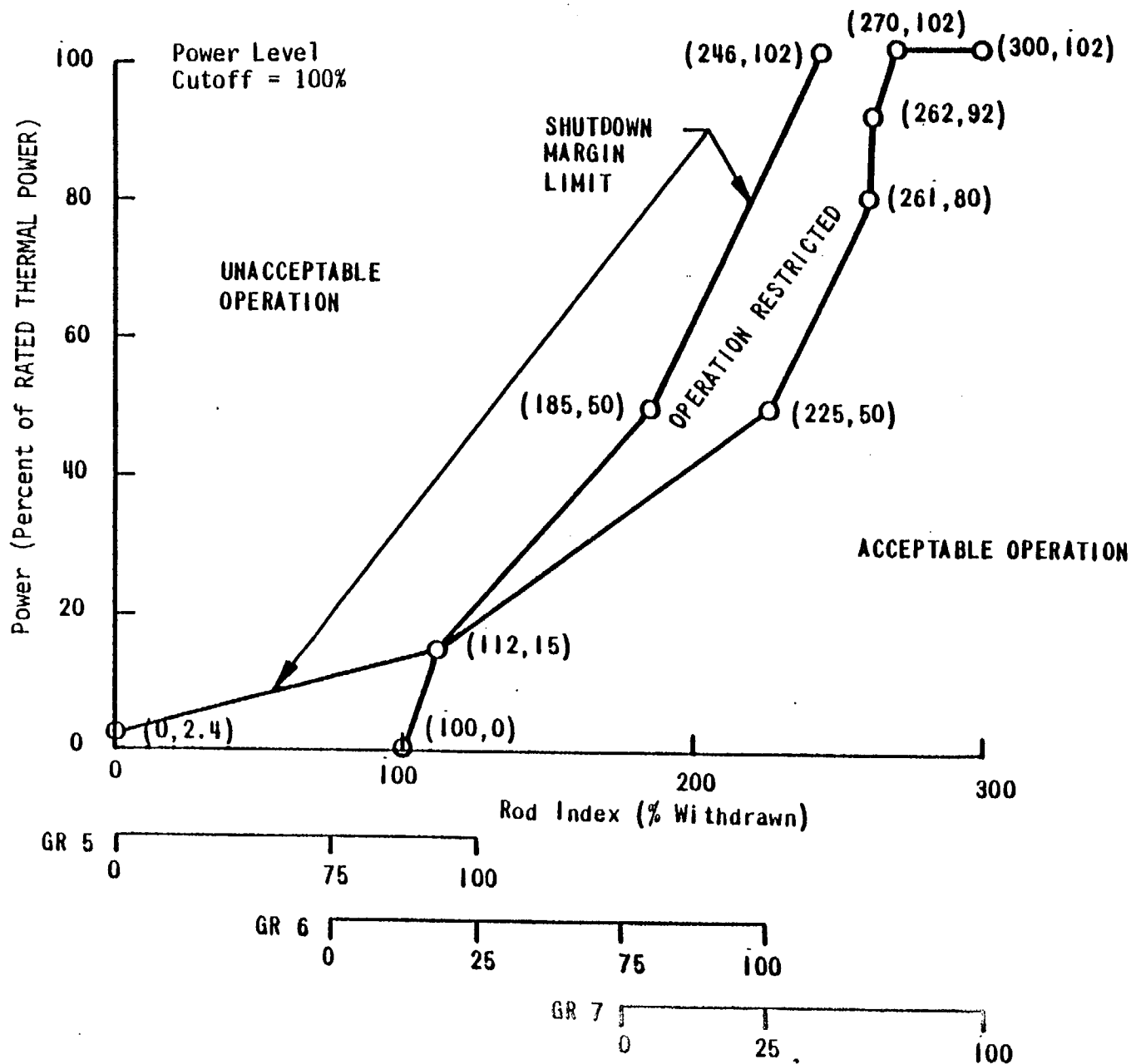




Figure 3.1-2c. Regulating Group Position Limits,  $150 \pm 10$  to  $200 \pm 10$  EFPD, Four RC pumps - Davis-Besse 1, Cycle 4

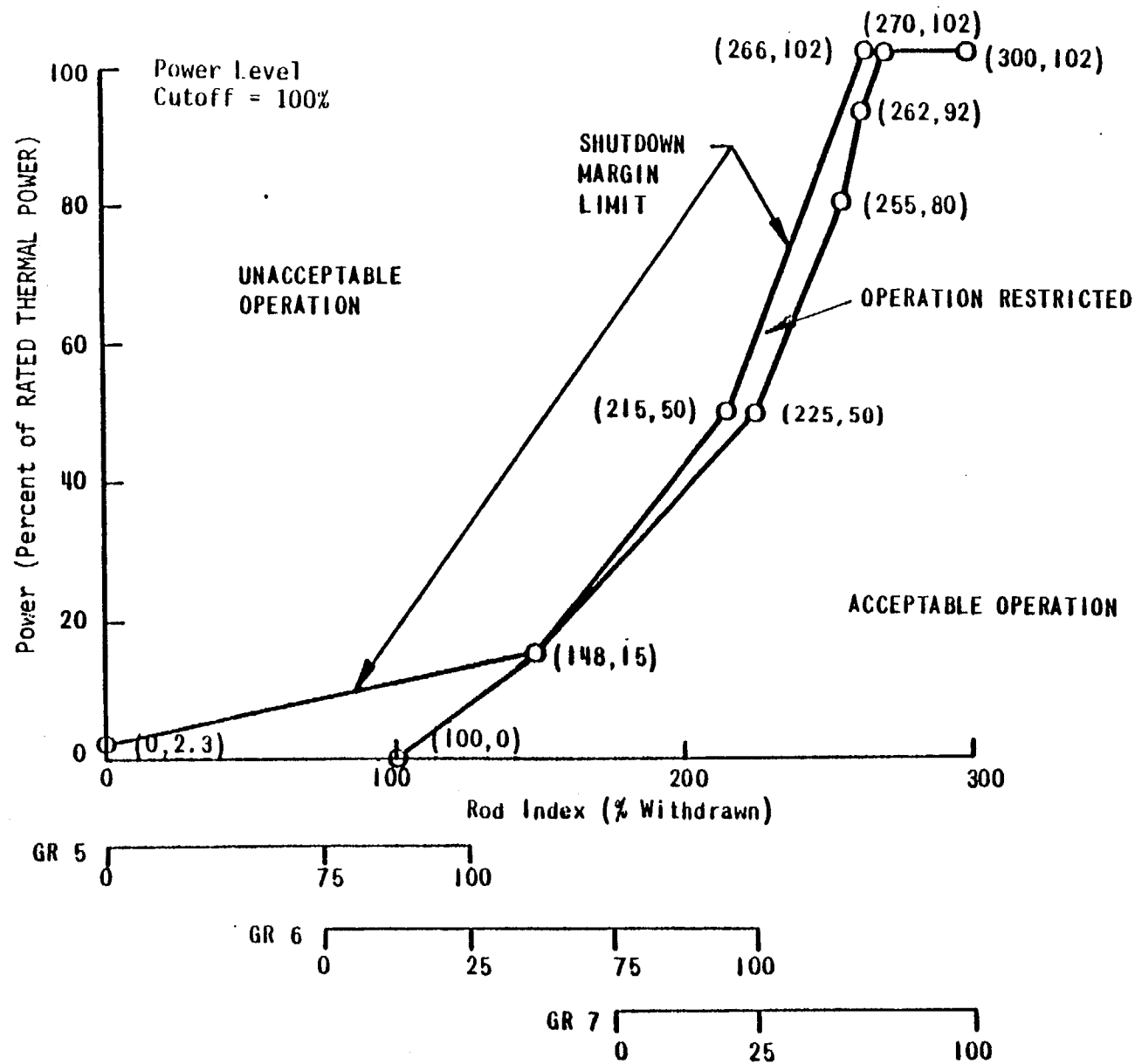


Figure 3.1-2d. Regulating Group Position Limits,  $200 \pm 10$  to  $240 \pm 10$  EFPD, Four RC Pumps -- Davis-Besse 1, Cycle 4

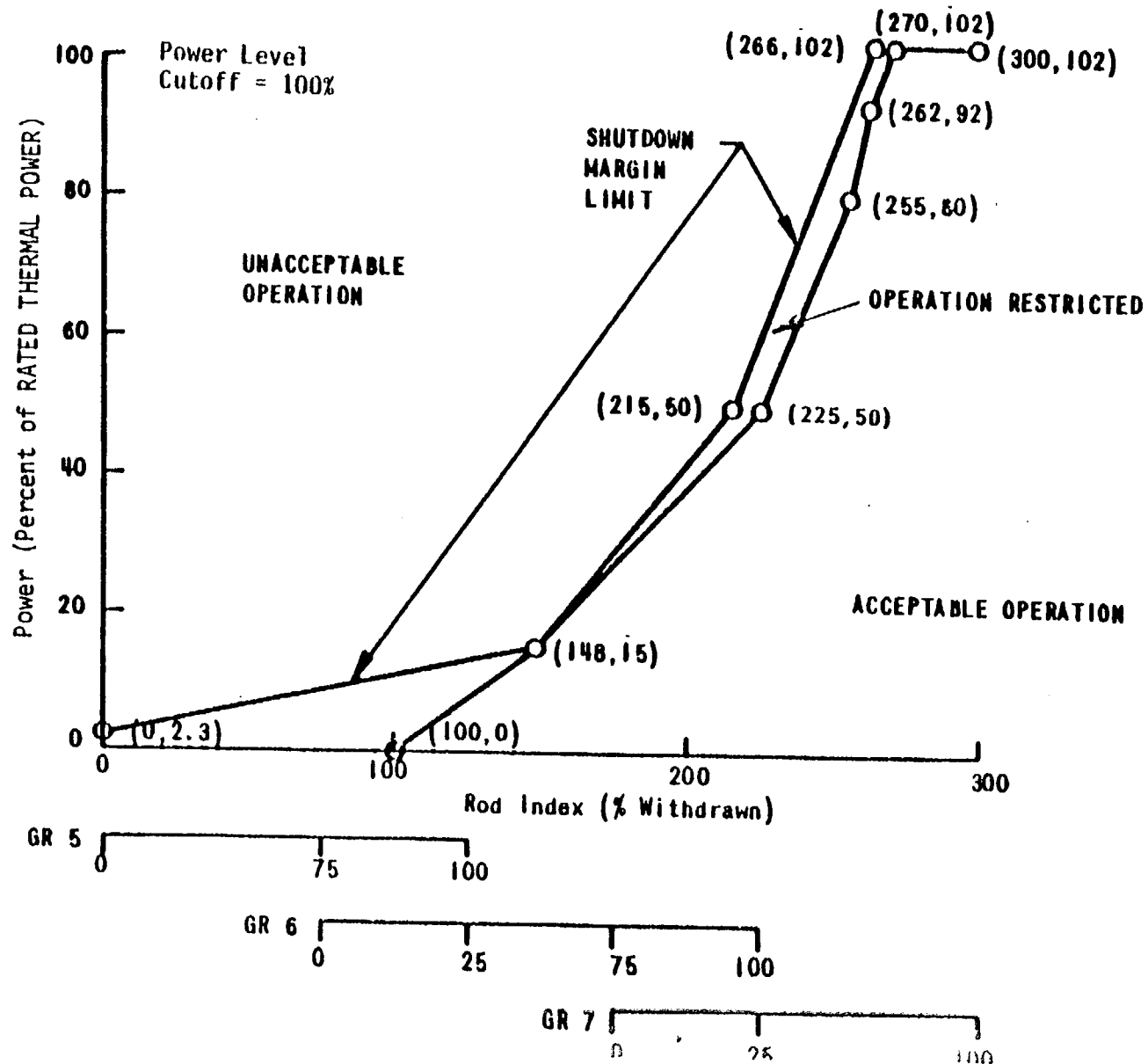


Figure 3.1-2e. Regulating Group Position Limits,  $200 \pm 10$  to  $280 \pm 10$  EFPD, Four RC Pumps, APSRs, Withdrawn — Davis-Besse 1, Cycle 4

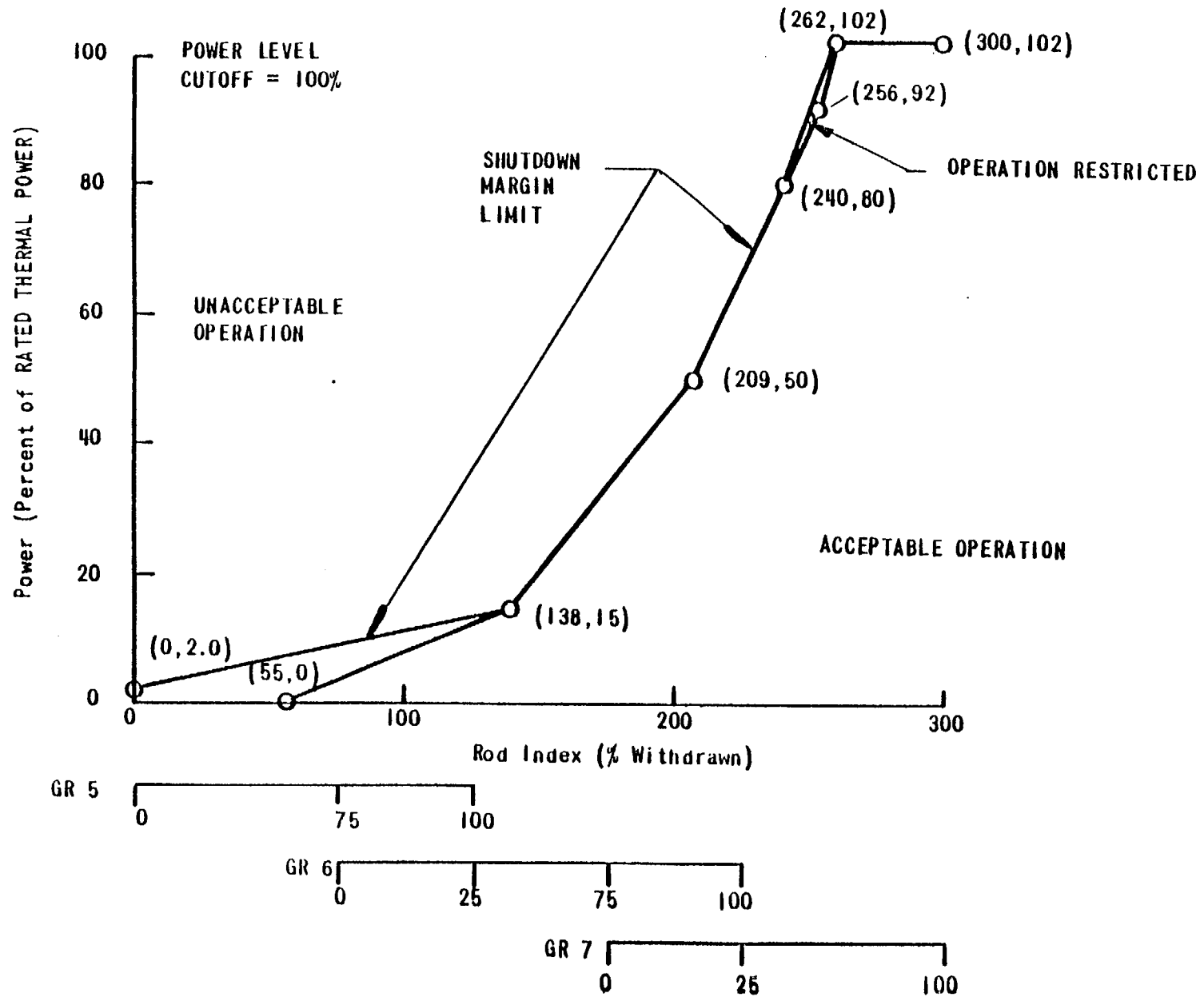


Figure 3.1-3c. Regulating Group Position Limits,  $150 \pm 10$  to  $200 \pm 10$  EFPD, Three RC Pumps - Davis-Besse 1, Cycle 4

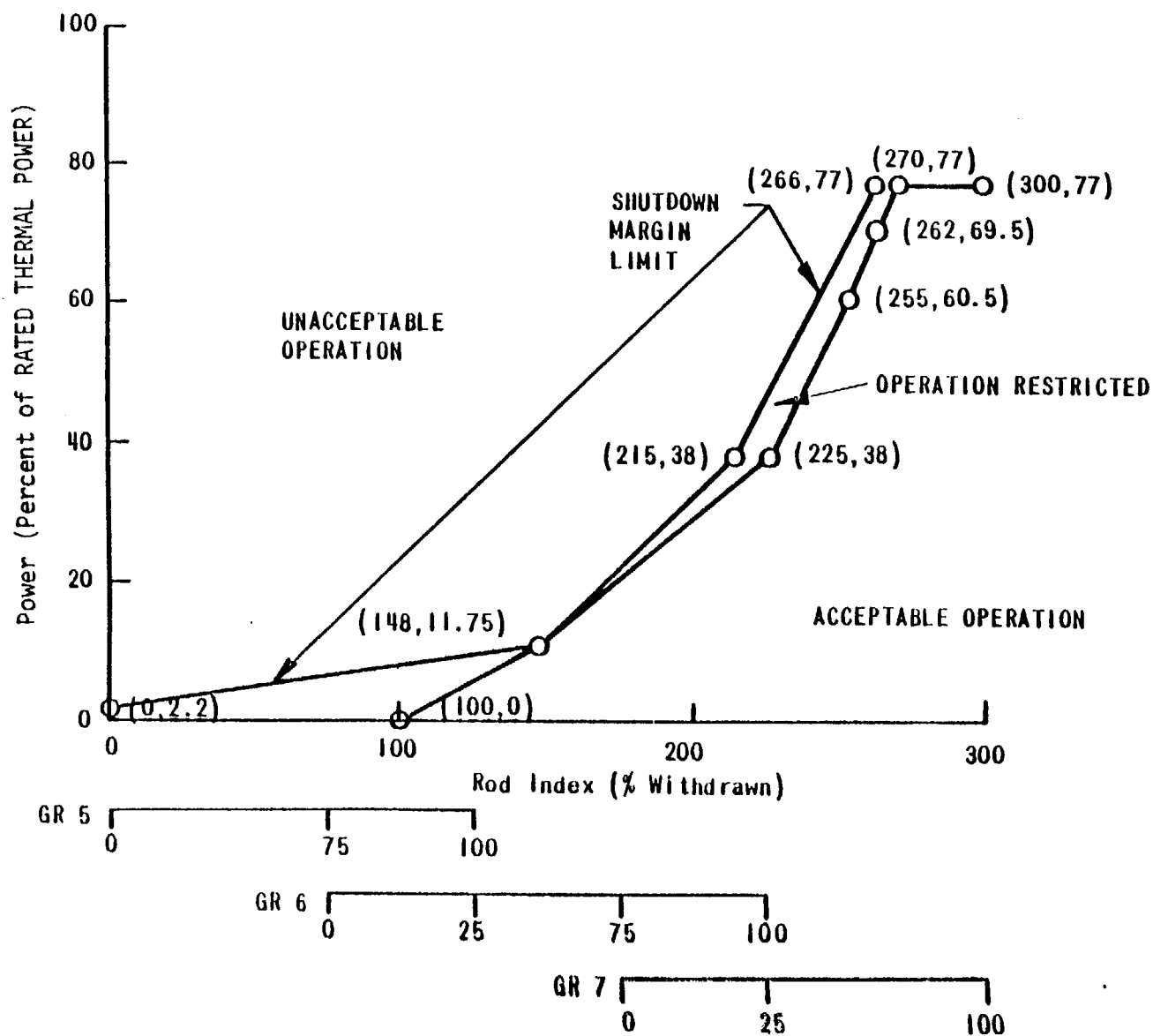


Figure 3.1-3d. Regulating Group Position Limits,  $200 \pm 10$  to  $240 \pm 10$  EFPD, Three RC Pumps - Davis-Besse 1 Cycle 4

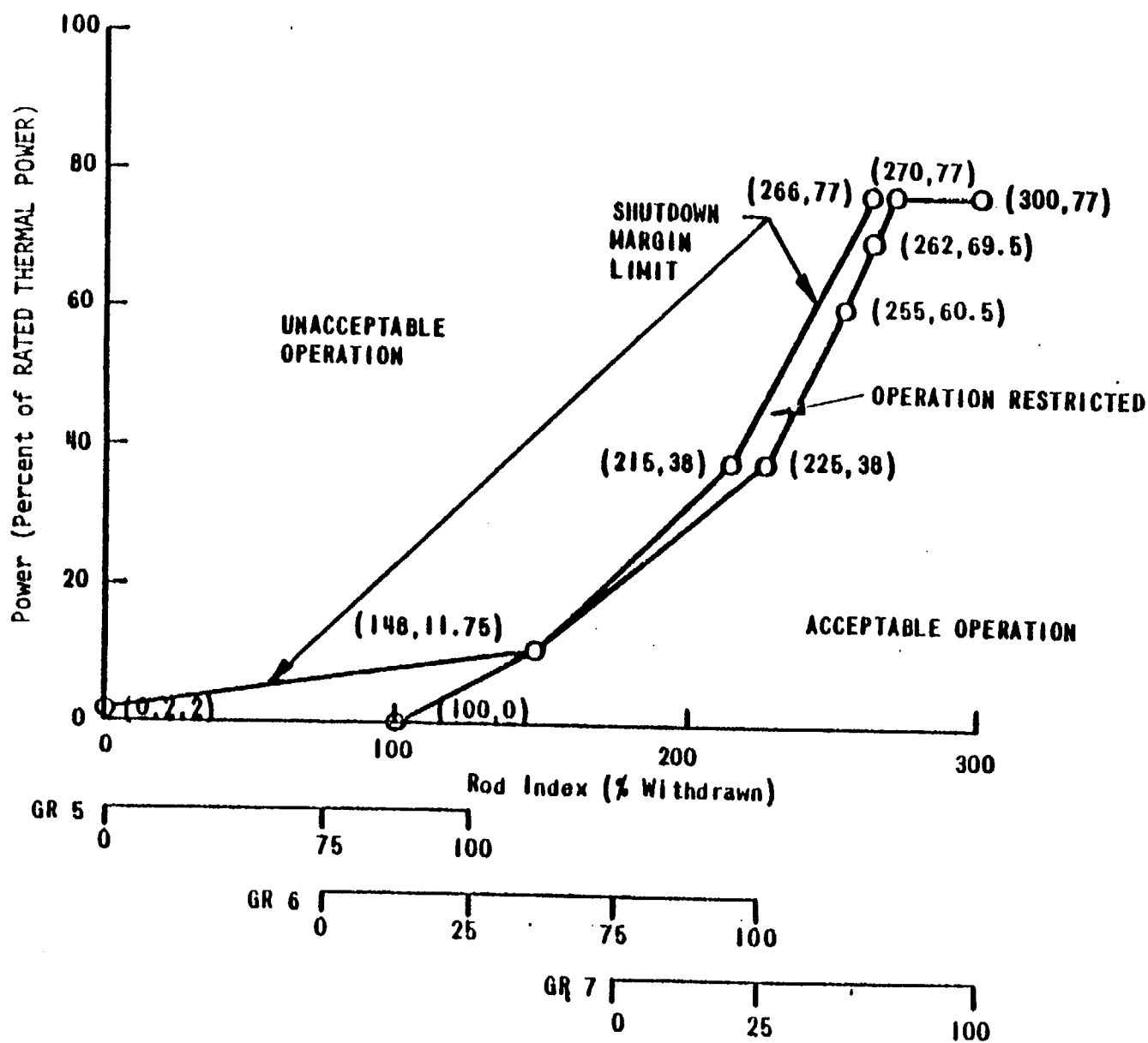
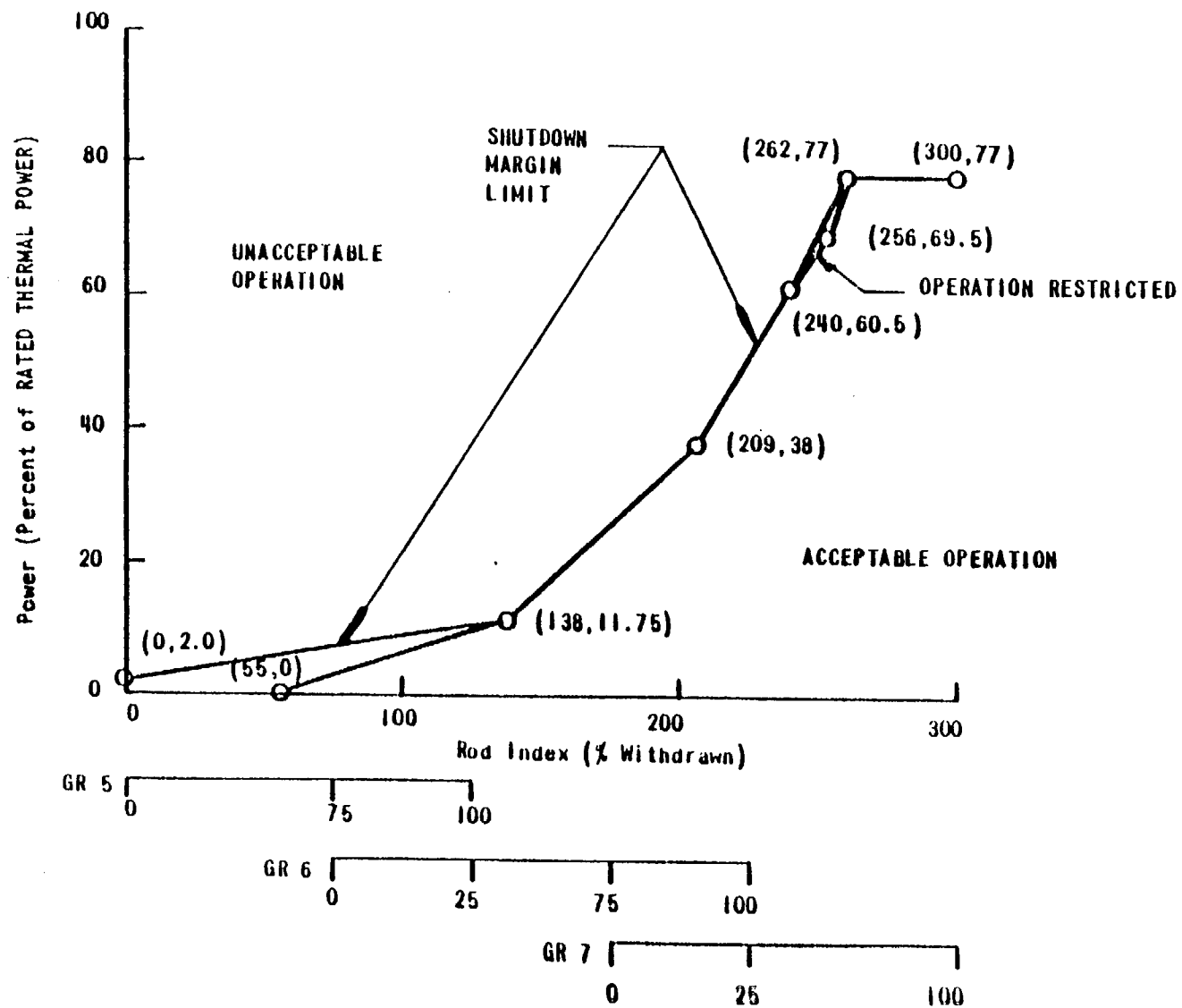


Figure 3.1-3e. Regulating Group Position Limits,  $200 \pm 10$  to  $280 \pm 10$  EFPD, Three RC Pumps, APSRs Withdrawn - Davis-Besse 1, Cycle 4



## REACTIVITY CONTROL SYSTEMS

### ROD PROGRAM

#### LIMITING CONDITION FOR OPERATION

3.1.3.7 Each control rod (safety, regulating and APSR) shall be programmed to operate in the core position and rod group specified in Figure 3.1-4.

APPLICABILITY: MODES 1\* and 2\*.

#### ACTION:

With any control rod not programmed to operate as specified above, be in HOT STANDBY within 1 hour.

#### SURVEILLANCE REQUIREMENTS

##### 4.1.3.7

- a. Each control rod shall be demonstrated to be programmed to operate in the specified core position and rod group by:
  1. Selection and actuation from the control room and verification of movement of the proper rod as indicated by both the absolute and relative position indicators:
    - a) For all control rods, after the control rod drive patches are locked subsequent to test, reprogramming or maintenance within the panels.
    - b) For specifically affected individual rods, following maintenance, test, reconnection or modification of power or instrumentation cables from the control rod drive control system to the control rod drive.
  2. Verifying that each cable that has been disconnected has been properly matched and reconnected to the specified control rod drive.
- b. At least once each 7 days, verify that the control rod drive patch panels are locked.

\*See Special Test Exceptions 3.10.1 and 3.10.2.

## REACTIVITY CONTROL SYSTEMS

### XENON REACTIVITY

#### LIMITING CONDITION FOR OPERATION

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3.1.3.8 THERMAL POWER shall not be increased above the power level cutoff specified in Figure 3.1-2 unless one of the following conditions is satisfied:

- a. Xenon reactivity is within 10 percent of the equilibrium value for RATED THERMAL POWER and is approaching stability, or
- b. THERMAL POWER has been within a range of 87 to 92 percent of RATED THERMAL POWER for a period exceeding 2 hours in the soluble poison control mode, excluding xenon free start-ups.

APPLICABILITY: MODE 1.

#### ACTION:

With the requirements of the above specification not satisfied, reduce THERMAL POWER to less than or equal to the power level cutoff within 15 minutes.

#### SURVEILLANCE REQUIREMENTS

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4.1.3.8 Xenon reactivity shall be determined to be within 10% of the equilibrium value for RATED THERMAL POWER and to be approaching stability or it shall be determined that the THERMAL POWER has been in the range of 87 to 92% of RATED THERMAL POWER for  $\geq$  2 hours, prior to increasing THERMAL POWER above the power level cutoff.



## REACTIVITY CONTROL SYSTEMS

### AXIAL POWER SHAPING ROD INSERTION LIMITS

#### LIMITING CONDITION FOR OPERATION

3.1.3.9 The axial power shaping rod group shall be limited in physical insertion as shown on Figures 3.1-5a, -5b, -5c, -5f, -5g and -5h for the first  $200 \pm 10$  EFPD of operation. If this rod group is completely withdrawn at  $200 \pm 10$  EFPD for extension of cycle length, it shall not be reinserted in the core for remainder of the cycle and the limits of Figure 3.1-5e shall be applicable. However, if the rod group is not completely withdrawn at  $200 \pm 10$  EFPD, the group shall be limited in physical insertion as shown on Figures 3.1-5d and -5i for the remainder of the cycle.

APPLICABILITY: MODES 1 and 2\*.

#### ACTION:

With the axial power shaping rod group outside the above insertion limits, either:

- a. Restore the axial power shaping rod group to within the limits within 2 hours, or
- b. Reduce THERMAL POWER to less than or equal to that fraction of RATED THERMAL POWER which is allowed by the rod group position using the above figures within 2 hours, or
- c. Be in at least HOT STANDBY within 6 hours.

#### SURVEILLANCE REQUIREMENTS

4.1.3.9 The position of the axial power shaping rod group shall be determined to be within the insertion limits at least once every 12 hours except when the axial power shaping rod insertion limit alarm is inoperable, then verify the group to be within the insertion limit at least once every 4 hours.

\*With  $k_{eff} \geq 1.0$ .

Figure 3.1-5c. APSR Position Limits,  $150 \pm 10$  to  $200 \pm 10$   
EFPD, Four RC Pumps - Davis-Besse 1, Cycle 4

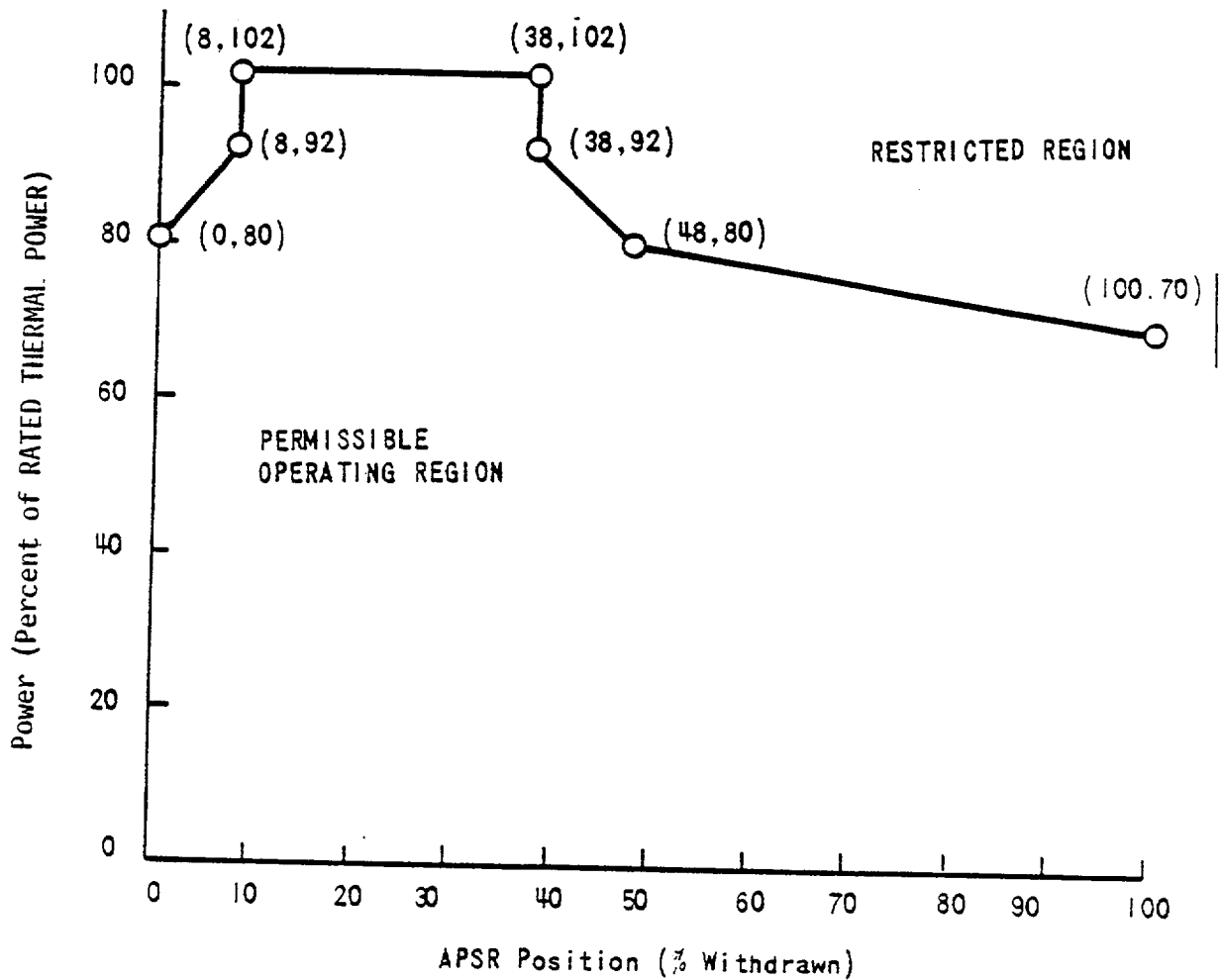


Figure 3.1-5d. APSR Position Limits,  $200 \pm 10$  to  $240 \pm 10$   
EFPD, Four RC Pumps - Davis-Besse 1, Cycle 4

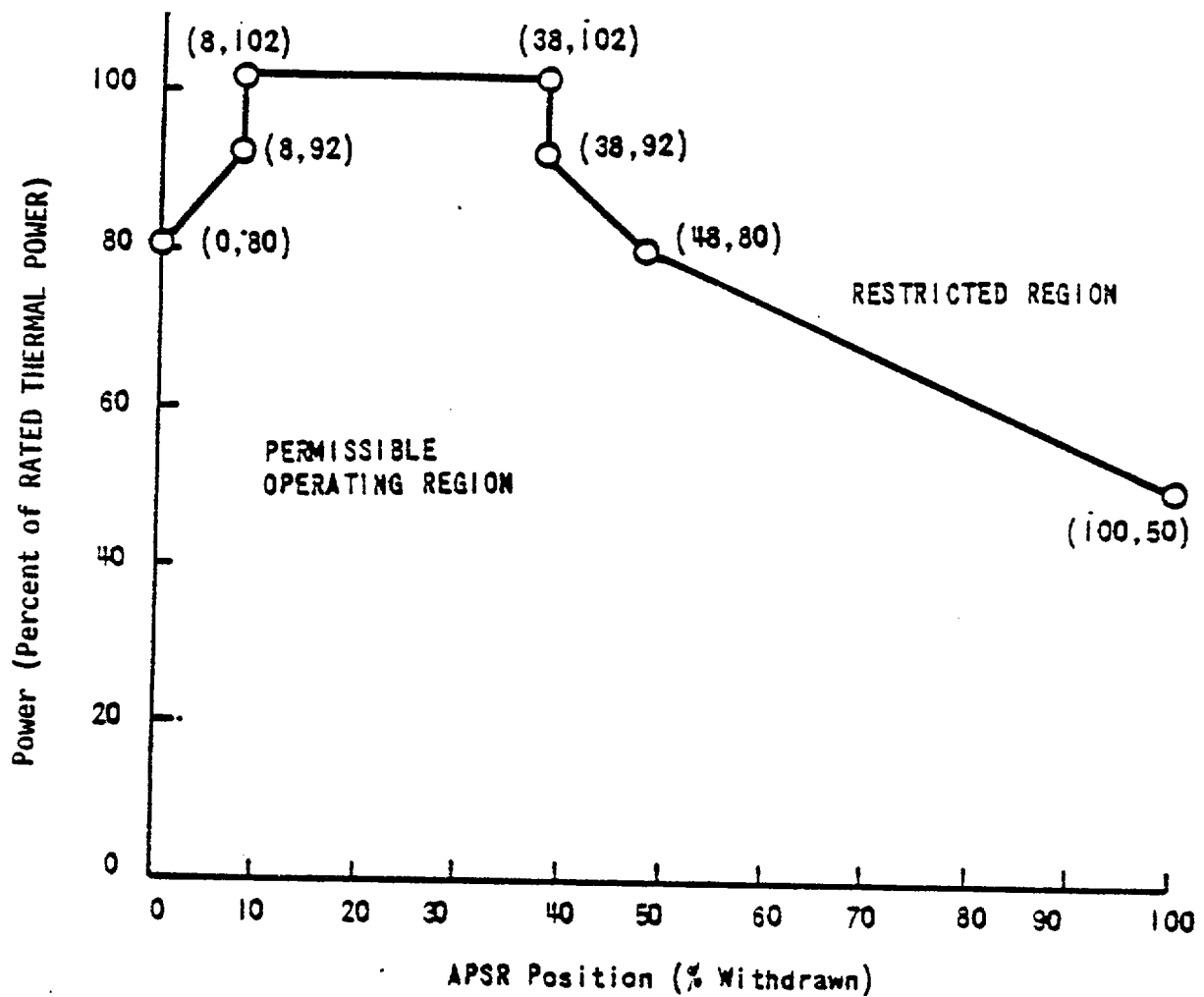


Figure 3.1-5e. APSR Position Limits,  $200 \pm 10$  to  $280 \pm 10$  EFPD,  
Three or Four RC Pumps, APSRs Withdrawn —  
Davis-Besse 1, Cycle 4

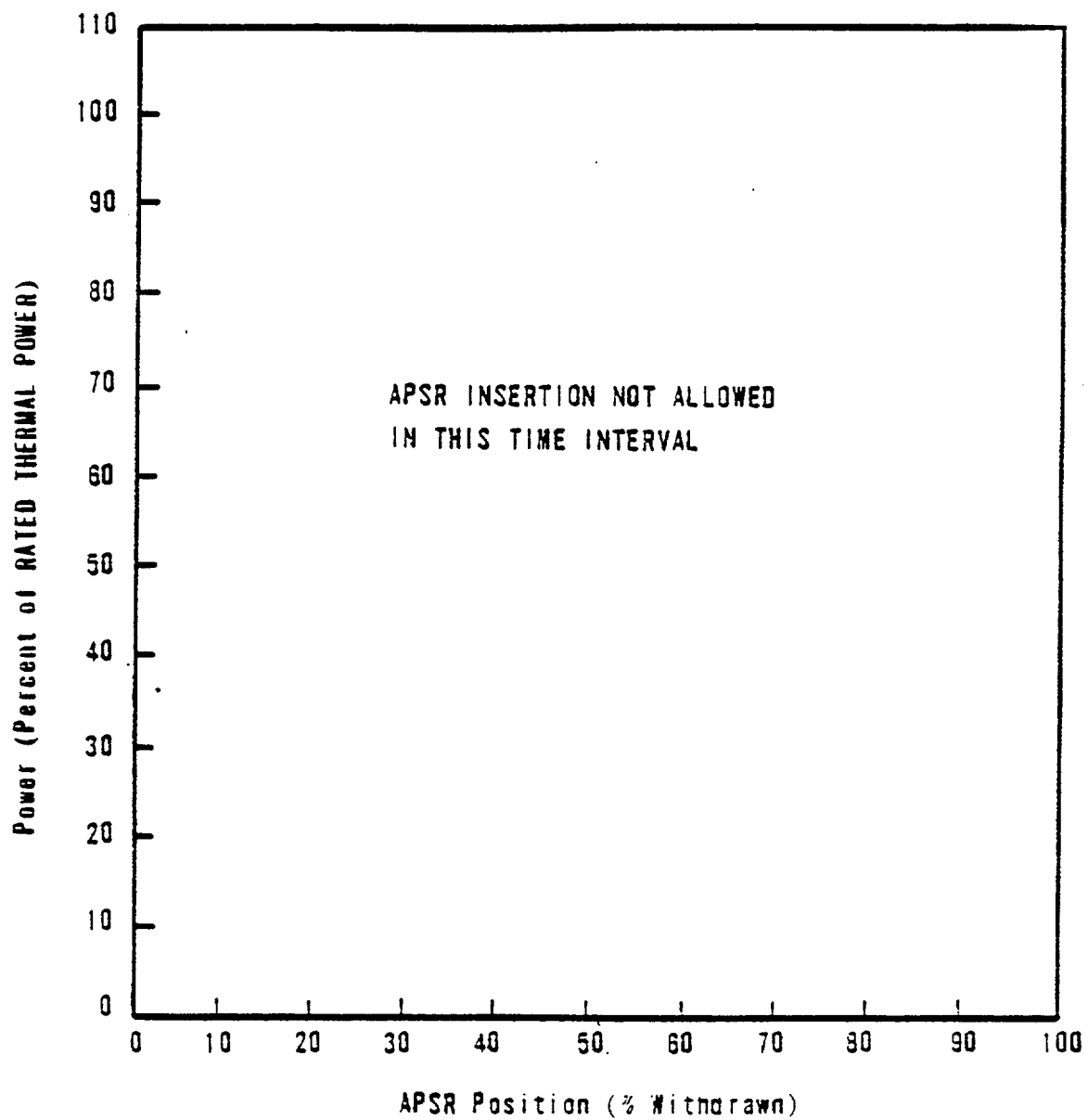


Figure 3.1-5f. APSR Position Limits, 0 to 24+10/-0 EFPD,  
Three RC Pumps - Davis-Besse 1, Cycle 4

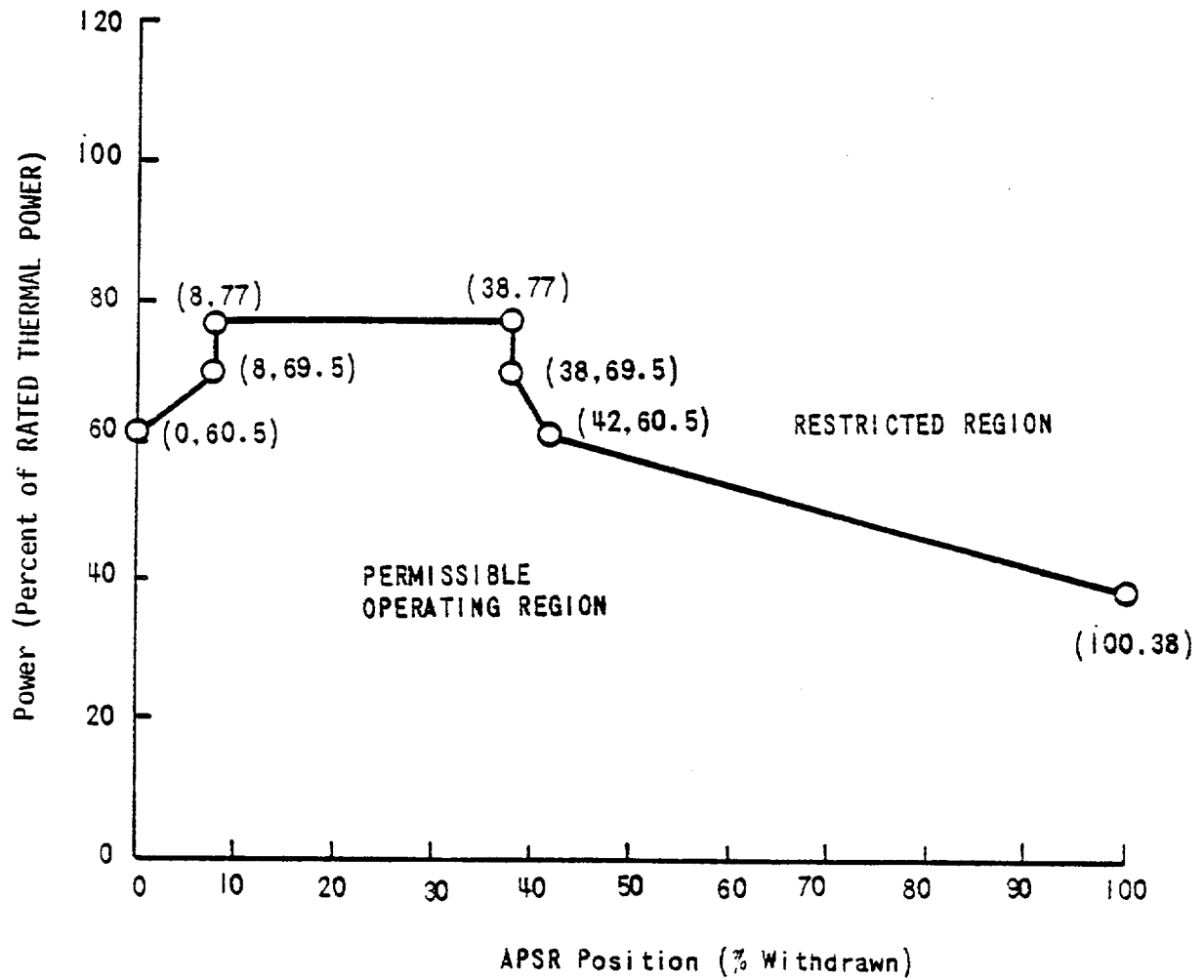


Figure 3.1-5g. APSR Position Limits,  $24 \pm 10/-0$  to  $150 \pm 10$  EFPD,  
Three RC Pumps - Davis-Besse 1, Cycle 4

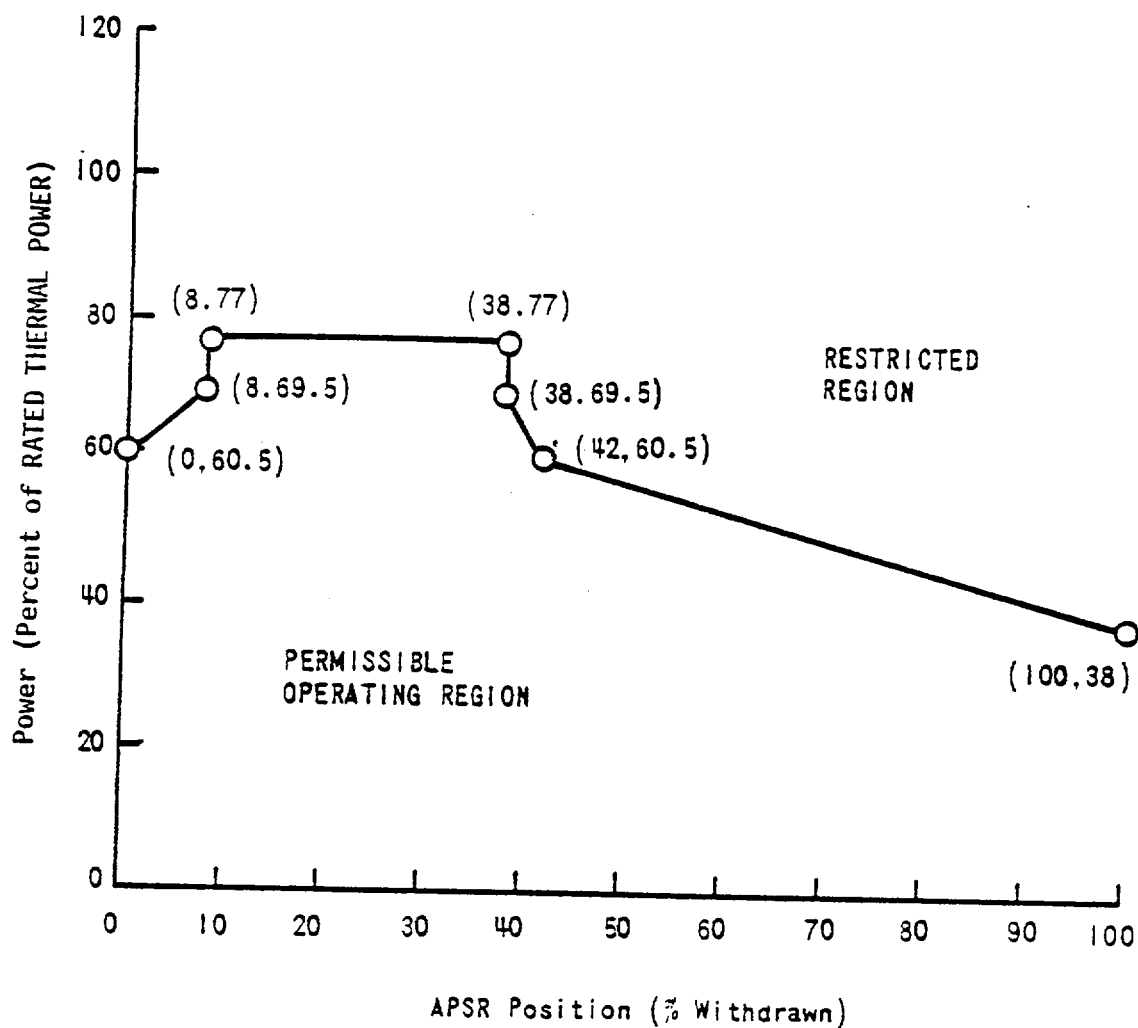


Figure 3.1-5h. APSR Position Limits,  $150 \pm 10$  to  $200 \pm 10$   
EFPD, Three RC Pumps - Davis-Besse 1, Cycle 4

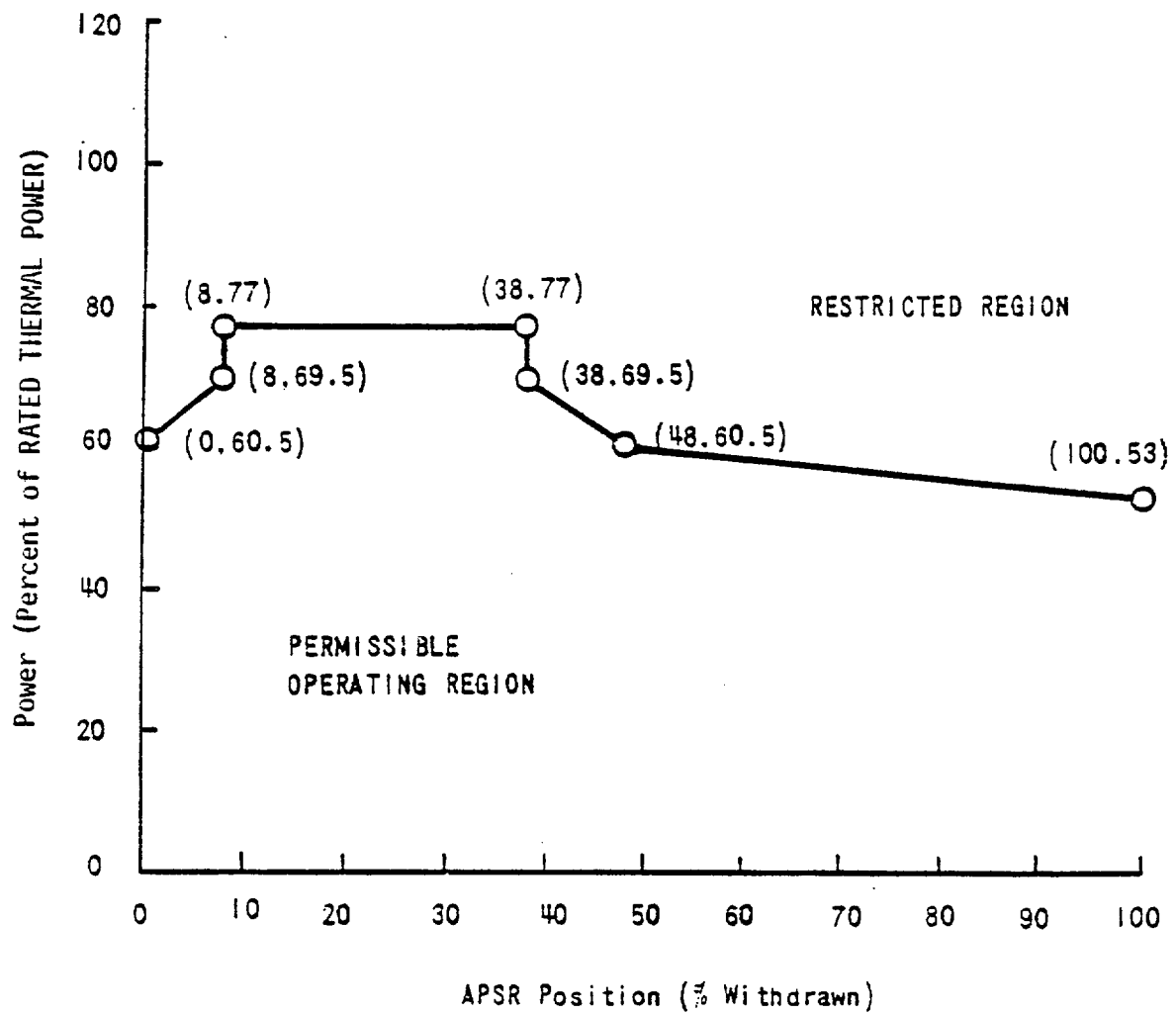
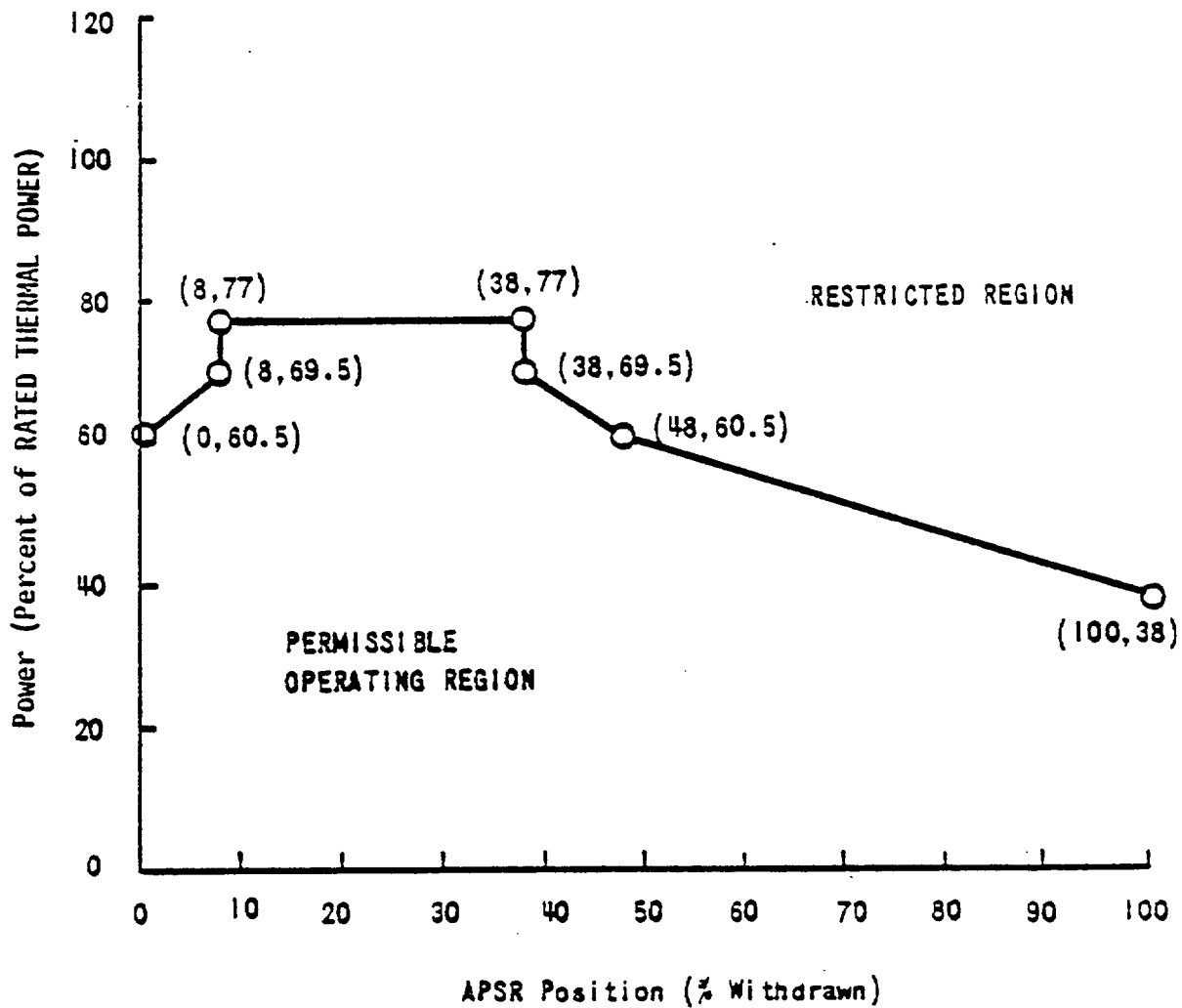


Figure 3.1-5i. APSR Position Limits,  $200 \pm 10$  to  $240 \pm 10$   
EFPD, Three RC Pumps — Davis-Besse 1, Cycle 4





### 3/4.2. POWER DISTRIBUTION LIMITS

#### AXIAL POWER IMBALANCE

#### LIMITING CONDITION FOR OPERATION

3.2.1 AXIAL POWER IMBALANCE shall be maintained within the limits shown on Figures 3.2-1a, -1b and -1c and 3.2-2a, -2b and -2c for the first 200  $\pm$ 10 EFPD of operation. If the axial power shaping rods are completely withdrawn at 200  $\pm$ 10 EFPD for extension of cycle length, then the AXIAL POWER IMBALANCE shall be maintained within the limits shown on Figures 3.2-1e and 3.2-2e for the remainder of the cycle. However, if the axial power shaping rods are not completely withdrawn at 200  $\pm$ 10 EFPD, then the AXIAL POWER IMBALANCE shall be maintained within the limits shown on Figures 3.2-1d and 3.2-2d for the remainder of the cycle.

APPLICABILITY: MODE 1 above 40% of RATED THERMAL POWER.\*

#### ACTION:

With AXIAL POWER IMBALANCE exceeding the limits specified above, either:

- a. Restore the AXIAL POWER IMBALANCE to within its limits within 15 minutes, or
- b. Within one hour reduce power until imbalance limits are met or to 40% of RATED THERMAL POWER or less.

#### SURVEILLANCE REQUIREMENTS

4.2.1. The AXIAL POWER IMBALANCE shall be determined to be within limits at least once every 12 hours when above 40% of RATED THERMAL POWER except when the AXIAL POWER IMBALANCE alarm is inoperable, then calculate the AXIAL POWER IMBALANCE at least once per hour.

\*See Special Test Exception 3.10.1.

Figure 3.2-1a. Axial Power Imbalance Limits, 0 to 24+10, -0  
EFPD, Four RC Pumps - Davis-Besse 1, Cycle  
4

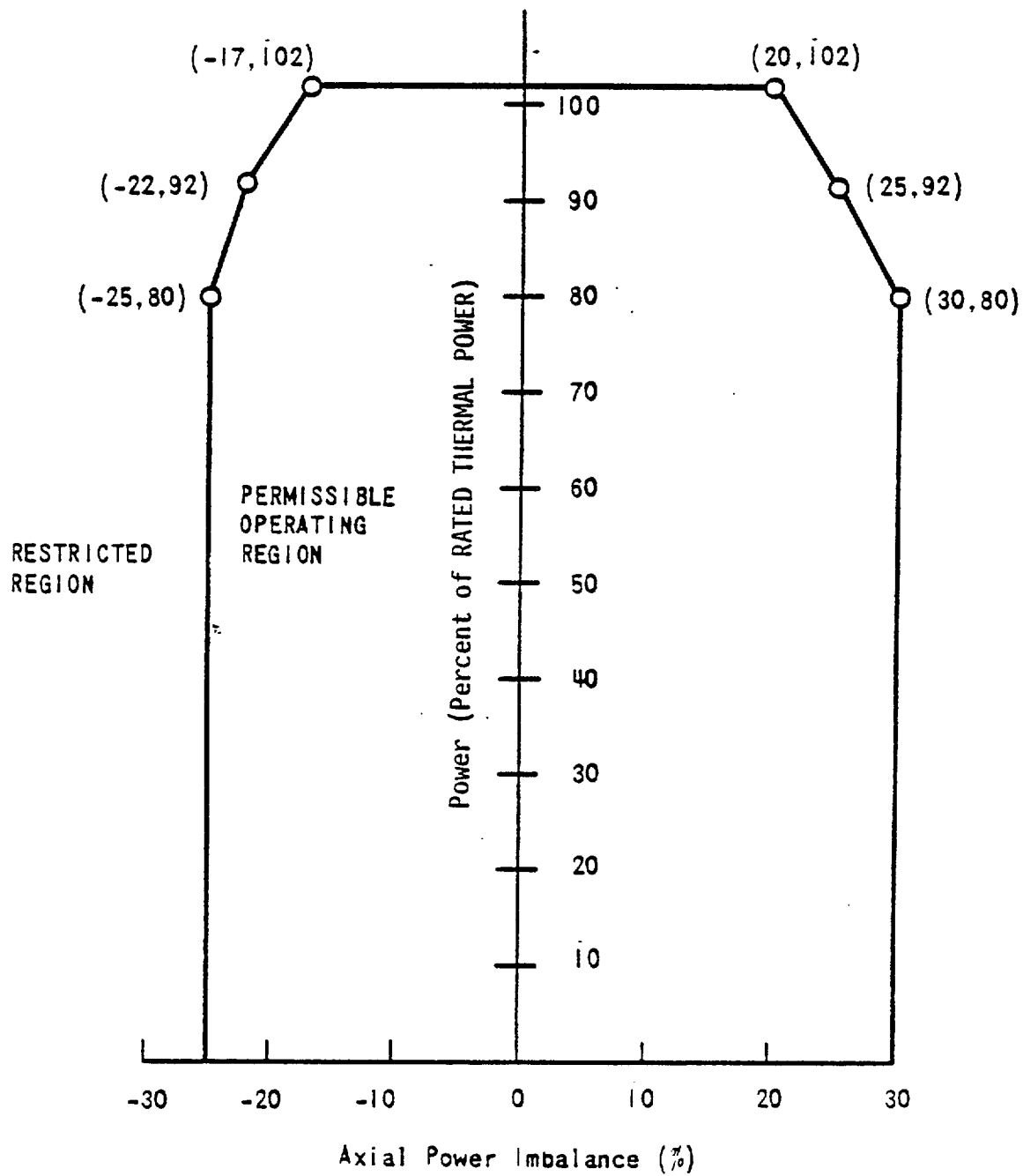


Figure 3.2-1b. Axial Power Imbalance Limits,  $24 \pm 10$ ,  $-0$  to  $150 \pm 10$  EFPD, Four RC Pumps - Davis-Besse 1, Cycle 4

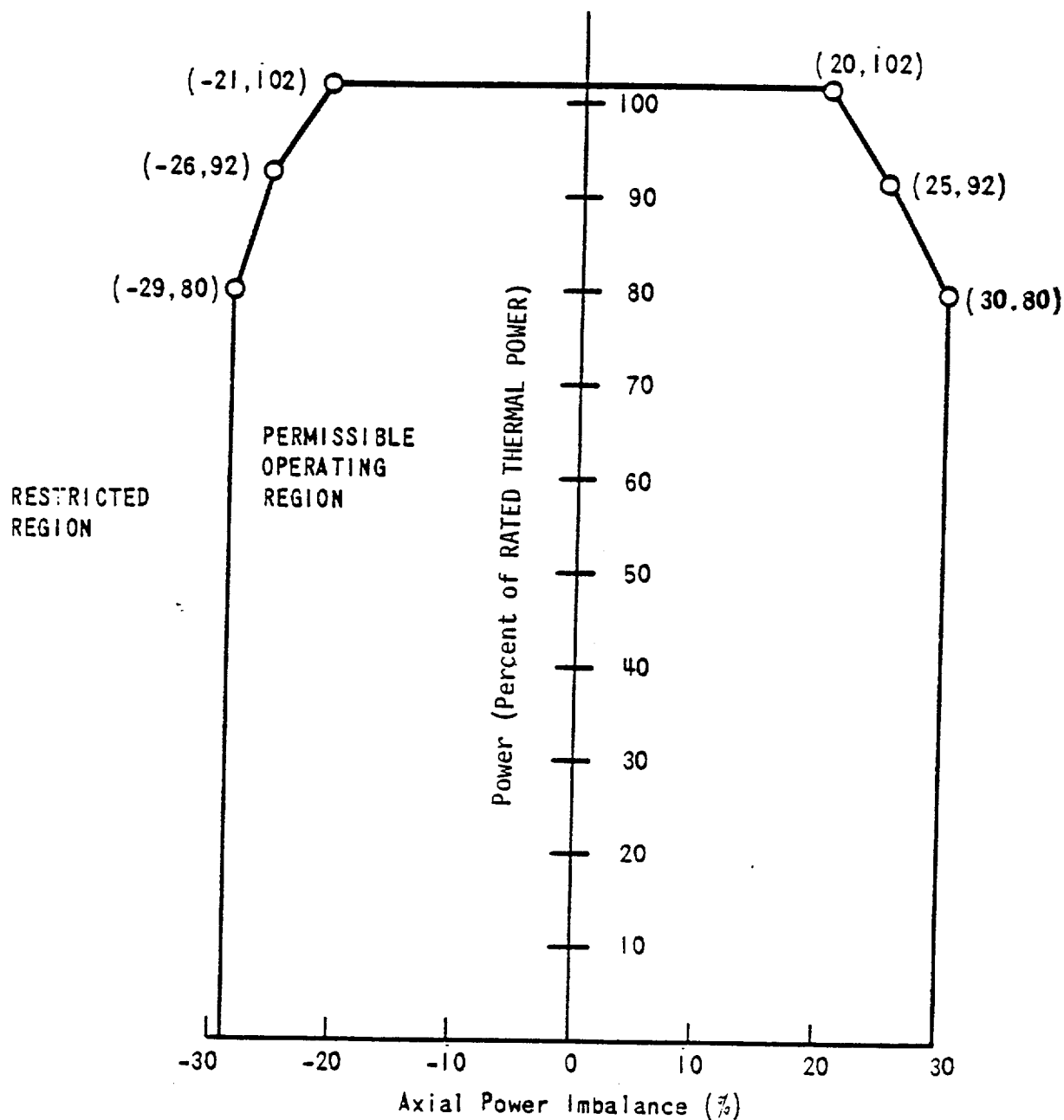


Figure 3.2-1c. Axial Power Imbalance,  $150 \pm 10$  to  $200 \pm 10$  EFPD, Four RC Pumps - Davis-Besse 1, Cycle 4

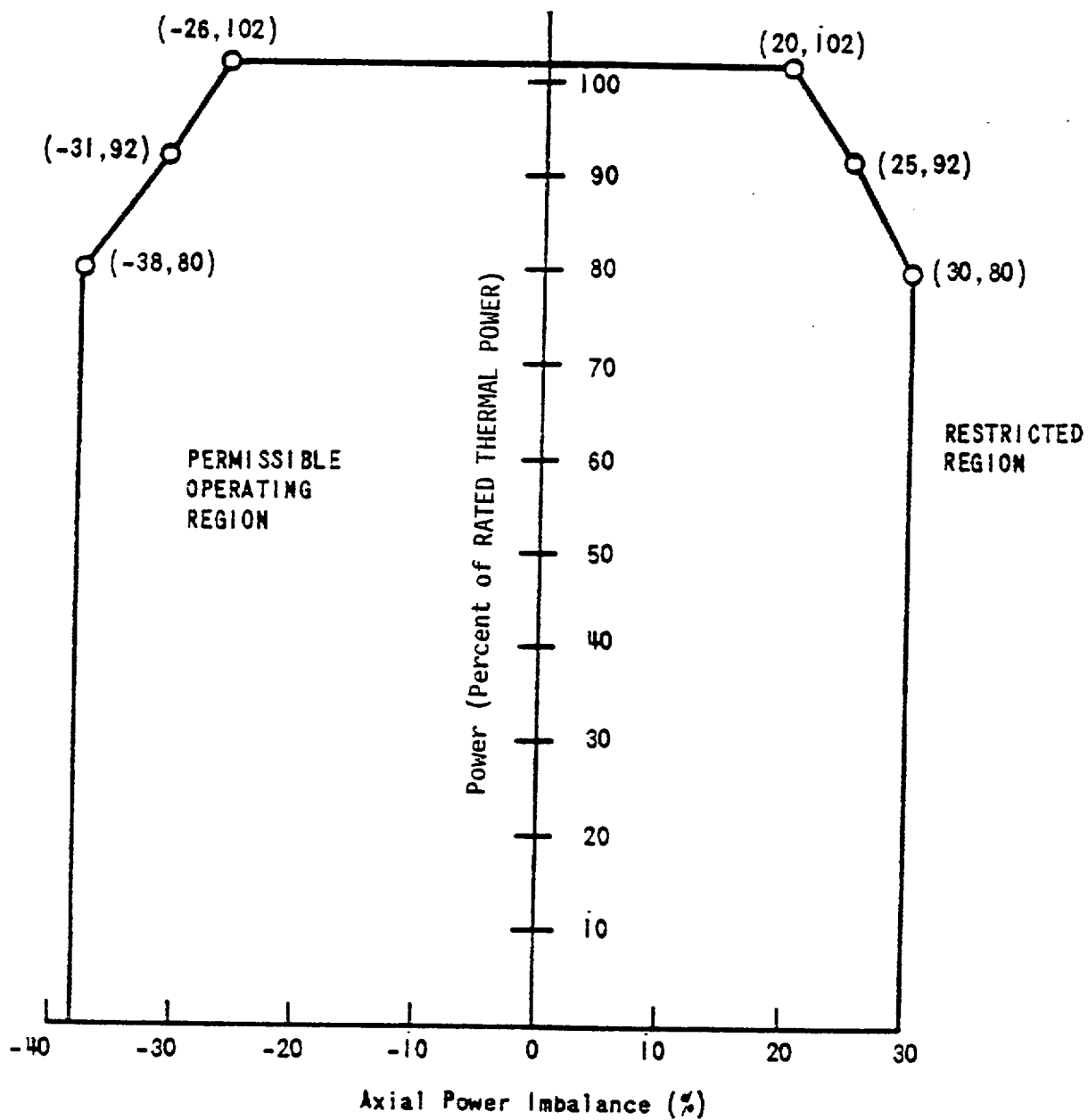


Figure 3.2-1d. Axial Power Imbalance Limits,  $200 \pm 10$  to  $240 \pm 10$  EFPD, Four RC Pumps — Davis-Besse 1, Cycle 4

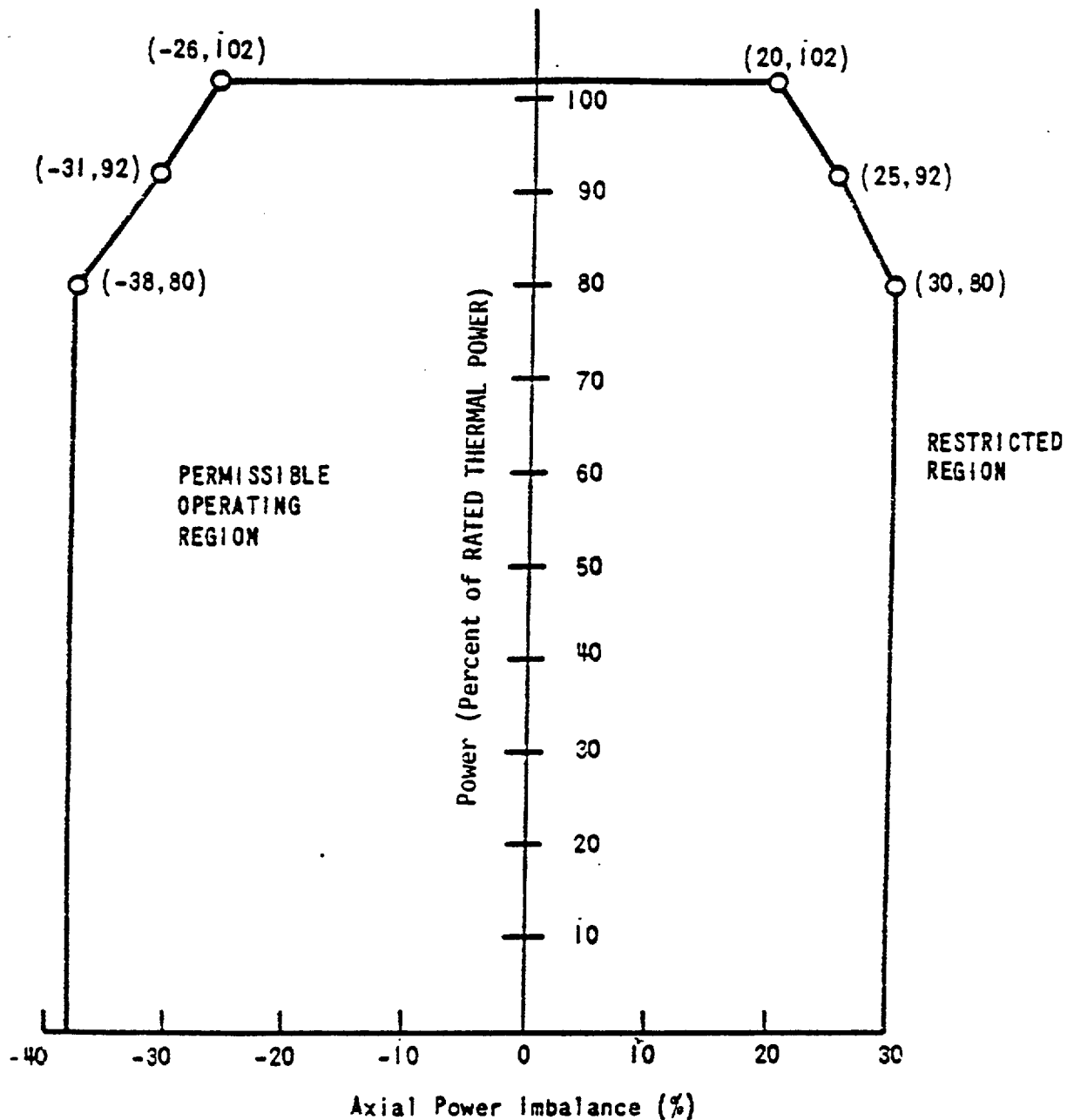


Figure 3.2-1e. Axial Power Imbalance Limits,  $200 \pm 10$  to  $280 \pm 10$  EFPD, Four RC Pumps, APSRs Withdrawn - Davis-Besse 1, Cycle 4

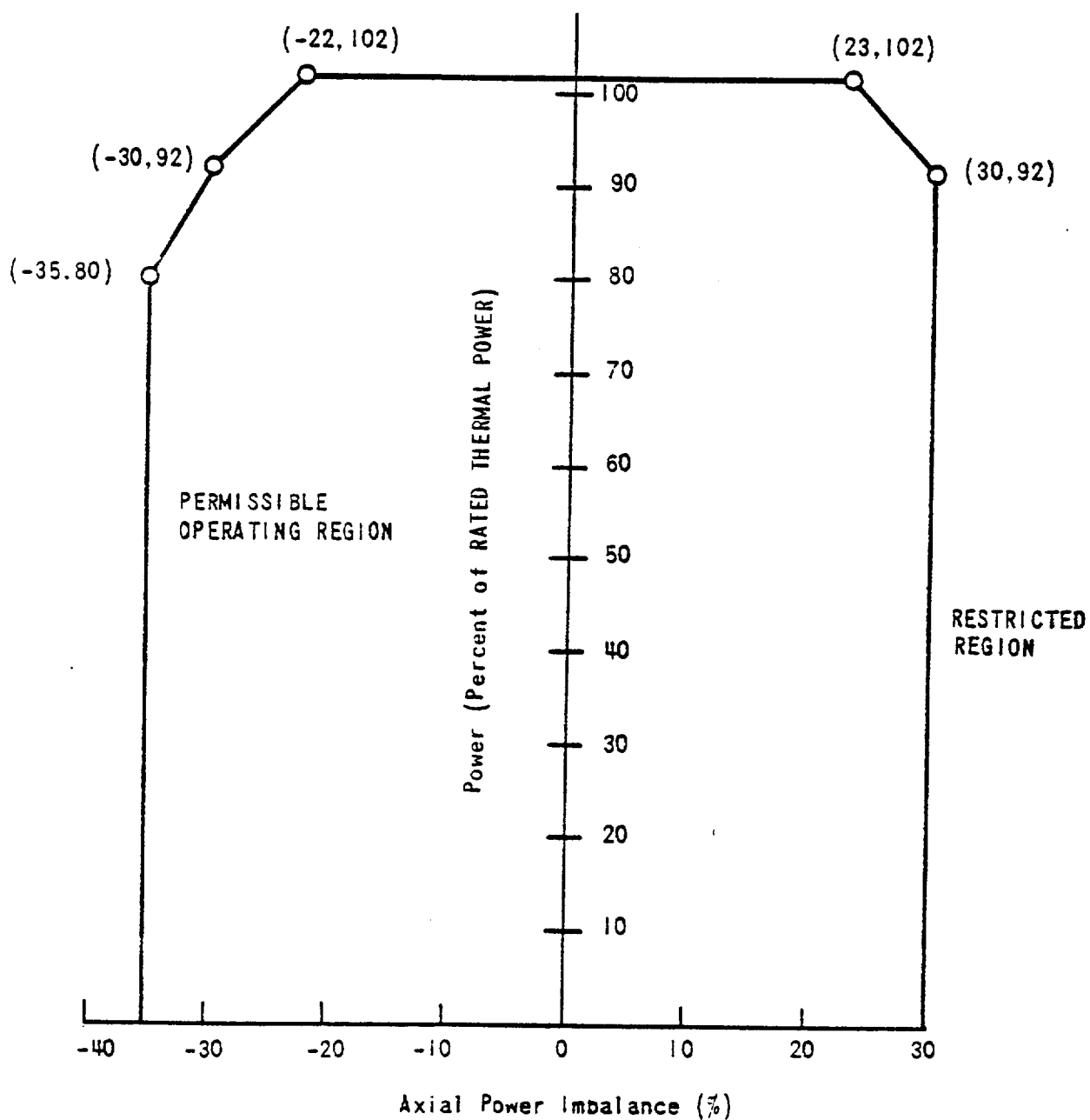


Figure 3.2-2c. Axial Power Imbalance Limits,  $150 \pm 10$  to  $200 \pm 10$  EFPD, Three RC Pumps — Davis-Besse 1, Cycle 4

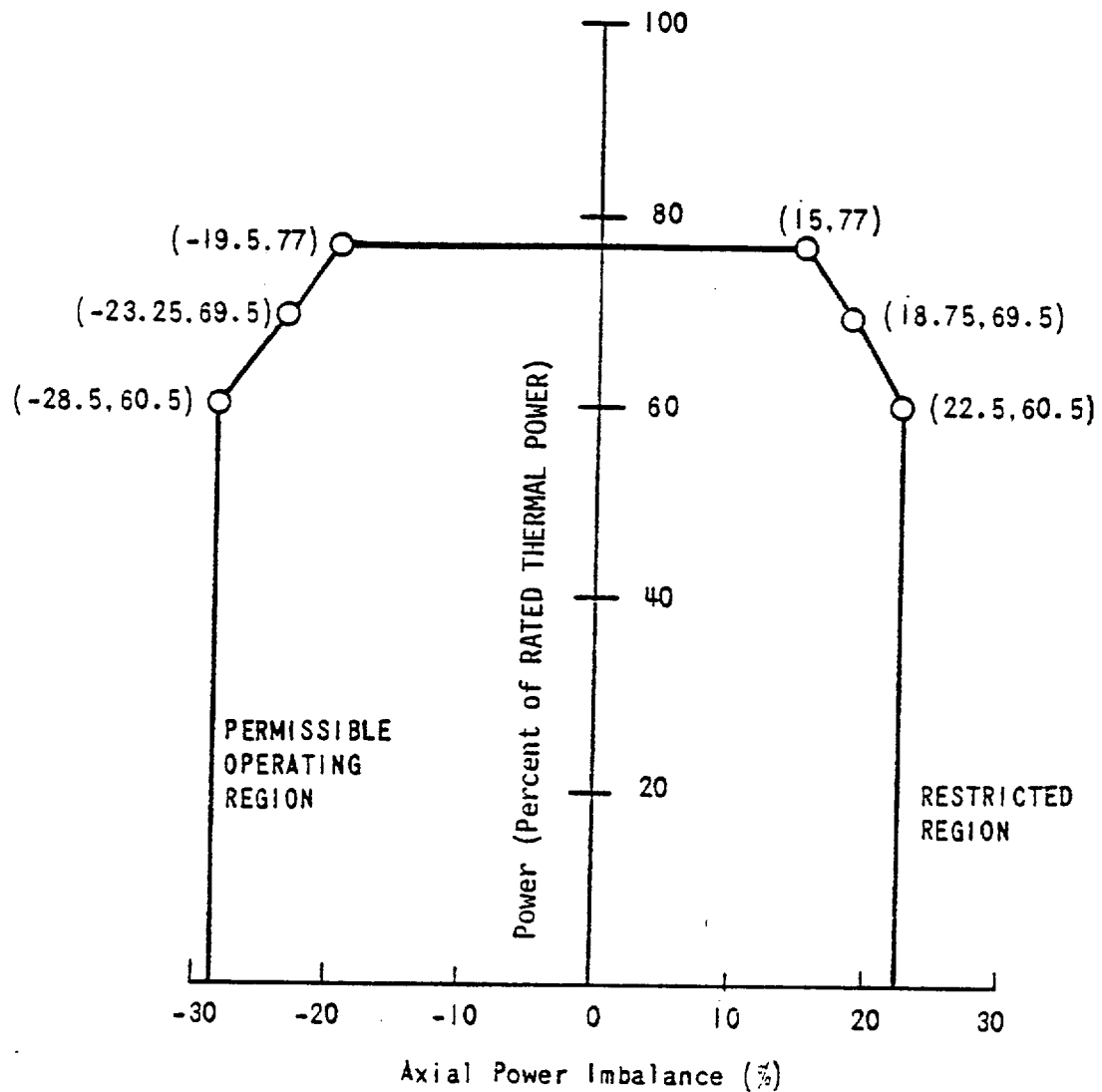


Figure 3.2-2d. Axial Power Imbalance Limits,  $200 \pm 10$  to  $240 \pm 10$  EFPD, Three RC Pumps - Davis-Besse 1, Cycle 4

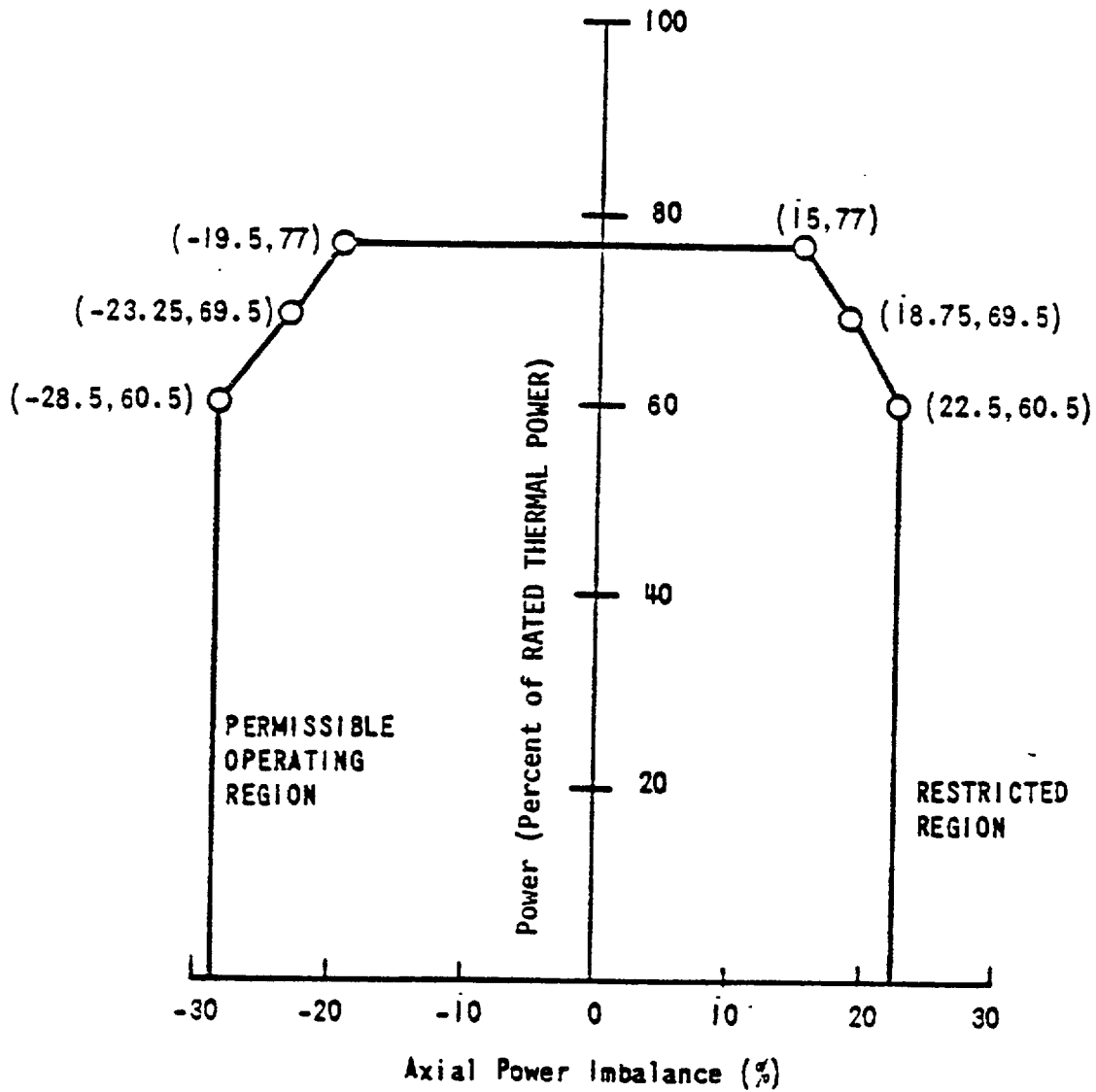
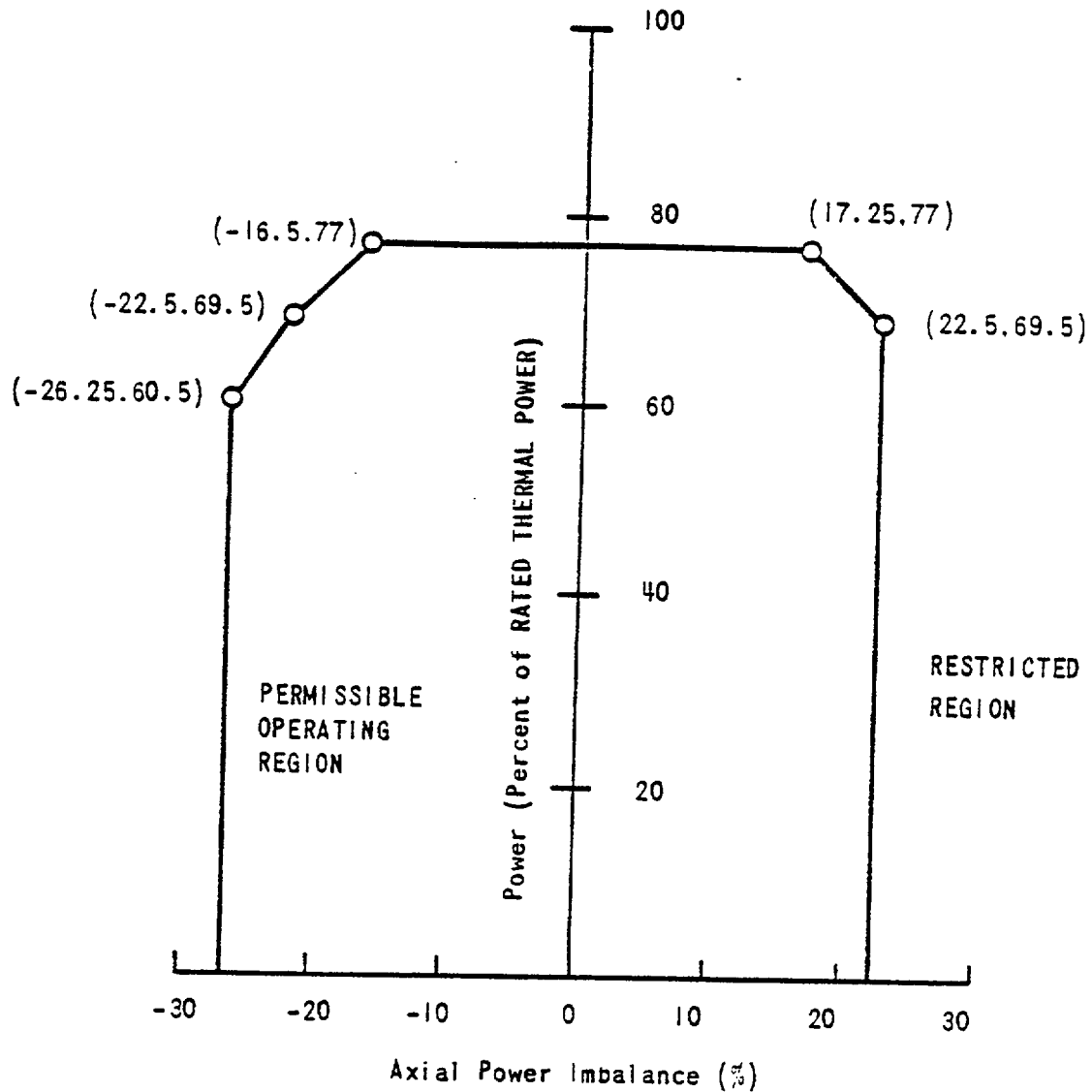




Figure 3.2-2e. Axial Power Imbalance Limits,  $200 \pm 10$  to  $280 \pm 10$  EFPD, Three RC Pumps, APSRs Withdrawn - Davis-Besse 1, Cycle 4



## POWER DISTRIBUTION LIMITS

### LIMITING CONDITION FOR OPERATION (Continued)

#### ACTION: (Continued)

- d. With the QUADRANT POWER TILT determined to exceed the Maximum Limit of Table 3.2-2, reduce THERMAL POWER to  $\leq 15\%$  of RATED THERMAL POWER within 2 hours.

### SURVEILLANCE REQUIREMENTS

4.2.4 The QUADRANT POWER TILT shall be determined to be within the limits at least once every 7 days during operation above 15% of RATED THERMAL POWER except when the QUADRANT POWER TILT alarm is inoperable, then the QUADRANT POWER TILT shall be calculated at least once per 12 hours.

Table 3.2-2 Quadrant Power Tilt Limits  
(Tech. Spec. Table 3.2.2)

	<u>Steady state limit</u>	<u>Transient limit</u>	<u>Maximum limit</u>
Measurement independent QUADRANT POWER TILT	4.92	11.07	20.0
QUADRANT POWER TILT as measured by:			
Symmetrical incore detector system	3.43	8.93	20.0
Power range channels	1.96	6.96	20.0
Minimum incore detector system	1.90	4.40	20.0



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO.69 TO FACILITY OPERATING LICENSE NO. NPF-3

TOLEDO EDISON COMPANY

AND

CLEVELAND ELECTRIC ILLUMINATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

DOCKET NO. 50-346

1. INTRODUCTION

By letter dated February 17, 1984, as revised March 29, 1984, Toledo Edison Company (the licensee) made application to amend Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit No. 1, to allow coastdown operation at the end of Cycle 4. In support of this operation, the licensee provided Reload Report BAW-1783, Revision 1 (October 1983), and a Safety Evaluation and Significant Hazard Consideration. The original version of BAW-1783 (May 1983) was approved and is the basis for Cycle 4 operation up to this point in time.

2. EVALUATION

The amendment request which is the subject of this evaluation provides for an alternate Cycle 4 design of 280 effective full power days (EFPDs). The original approved design life of Cycle 4 was 240 EFPDs. The additional core life is obtained by withdrawal of the axial power shaping rods (APSRs) from the core at 200 EFPDs and power coastdown. Coastdown operation was approved as part of the Davis-Besse Cycle 3 design, as well as an alternate in many B&W reactor cycle designs. In Davis-Besse Cycle 3, the APSR pull at 200 EFPDs coupled with a power coastdown resulted in a cycle length of approximately 268 EFPDs.

The fuel cladding creep collapse analysis predicts a collapse time longer than 35,000 effective full power hours (EFPHs). The expected alternate Cycle 4 residence time is 22,800 EFPHs, so that creep collapse is not predicted to occur. No other fuel effects need to be considered for the extension of Cycle 4 life.

The licensee provided a comparison of core physics parameters from Cycle 3 with those of both the (approved) base and alternate designs for Cycle 4. These values were generated using approved methods for all three designs. The thermal-hydraulic design results in the alternate Cycle 4 do not differ significantly from that in Cycle 3. The moderator and Doppler coefficients remain negative for the alternate Cycle 4. The moderator coefficient is less negative than the Final Safety Analysis Report (FSAR) value so that the FSAR value is bounding for main steam line break or any overcooling transients. The maximum drop rod worth is less than the FSAR value which

compensates for the slightly more negative Doppler coefficient at Beginning of Cycle (BOC) 4. The ejected rod worth is also smaller than the FSAR value. The boron reactivity worth is also bounded by the FSAR value for the moderator dilution accident. The FSAR accidents have been examined by B&W with respect to the alternate Cycle 4 parameters to ensure that the thermal performance during the hypothetical transients has not been degraded. Thus, the values of the alternate Cycle 4 parameters are such that the transient evaluation is bounded by the previously accepted analyses.

Technical Specification modifications were proposed in BAW-1783, Revision 1, to allow withdrawal of the APSRs and power coastdown. The Specifications affected are 3.1.3.6, 3.1.3.9, and 3.2.1. There are also changes to Figures 8-5, 8-5a, 8-5b, 8-8, 8-8a, 8-8b, 8-11, 8-11a, 8-11b, 8-12, 8-13, 8-14, 8-14a, 8-17, 8-17a, 8-17b, 8-20, 8-20a, 8-20b. These table and figure numbers are those contained in BAW-1783, Revision 1. The Technical Specification numbers are referenced on each of the above tables and figures.

These modifications appropriately account for changes in power peaking, control rod worths, and APSR withdrawal. Additionally, a modification to Table 8-2, Quadrant Power Tilt Limits (Technical Specification Table 3.2.2), incorporates new cycle dependent steady state and transient tilt limits for the symmetrical incore detector system with the values changing from 3.03 to 3.43 and 8.53 to 8.93 respectively. These limits should have been changed in the original Reload Report. The limits have been relaxed slightly because of the replacement of some of the incore detectors for Cycle 4. The new detectors provide an improved overall system accuracy. The safety analysis was performed with the relaxed limits.

The proposed changes to the axial power imbalance limits will maintain the peak linear heat rate during normal operation of the power plant within the bounds assumed as input to the loss of coolant accident analysis.

Our review of the licensee's submittal indicates that the fuel design, physics, thermal-hydraulic and transient information and Technical Specification changes were calculated with approved models and appropriately revised and evaluated to allow the alternate Cycle 4 design. We find all of the proposed changes appropriate and acceptable.

### 3. ENVIRONMENTAL CONSIDERATION

We have determined that the amendment does 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 amendment involves 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 this amendment.

4. CONCLUSION

We have concluded, based on the considerations discussed above, that:  
(1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and  
(2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: June 12, 1984

This Safety Evaluation was prepared by M. Dunenfeld