



W. R. McCollum, Jr.  
Vice President

**Duke Energy**

Oconee Nuclear Station  
7800 Rochester Highway  
Seneca, SC 29672  
(864) 885-3107 OFFICE  
(864) 885-3564 FAX

April 1, 2002

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Subject: Oconee Nuclear Site Docket No. 50-269  
Core Operating Limits Report (COLR)

Gentlemen:

Attached, pursuant to Oconee Technical Specifications 5.6.5, is an information copy of a revision to the Core Operating Limits Report for Oconee Unit 1, Cycle 21, Rev. 17.

Very truly yours,

A handwritten signature in cursive script, reading 'W. R. McCollum, Jr.'.

W. R. McCollum, Site Vice President  
Oconee Nuclear Site

Attachment

ADD01

NRC Document Control Desk

April 1, 2002

Page 2

xc w/att: Mr. L. A. Reyes, Regional Administrator  
U. S. Nuclear Regulatory Commission, Region II

Mr. L. N. Olshan, Project Manager  
Office of Nuclear Reactor Regulation

Mr. Scott Freeman  
Acting Senior Resident Inspector  
Oconee Nuclear Site

PRIORITY **SuperRush**

DISPOSITION OF THE ORIGINAL DOCUMENT WILL BE TO  
THE TRANSMITTAL SIGNATURE UNLESS RECIPIENT IS  
OTHERWISE IDENTIFIED BELOW

- 1) 00813 DOC MGMT EC03C ORIGINAL
- 2) 06358 ONS REGUL COMPLIANCE ON03RC
- 3) 06700 ONS MANUAL MASTER FILE ON03DM

**Duke Power Company**  
**DOCUMENT TRANSMITTAL FORM**

**REFERENCE**

NUCLEAR GENERAL OFFICE  
OCONEE NUCLEAR STATION  
EXEMPTION CODE: M-5  
RESP GROUP: N/E  
CORE OPERATING LIMITS REPORT

Page 1 of 1

Date: **03/12/02**

Document Transmittal #: **DUK020710040**

QA CONDITION

☒ Yes ☐ No

OTHER ACKNOWLEDGEMENT REQUIRED ☐ Yes

IF QA OR OTHER ACKNOWLEDGEMENT REQUIRED, PLEASE  
ACKNOWLEDGE RECEIPT BY RETURNING THIS FORM TO:

Duke Power Company  
P.O. Box 1006  
Energy Center  
EC03C  
Charlotte, N.C.

Rec'd By \_\_\_\_\_

Date \_\_\_\_\_

| DOCUMENT NO          | QA COND | REV #/ DATE  | DISTR CODE | 1 | 2  | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | TOTAL |
|----------------------|---------|--------------|------------|---|----|----|---|---|---|---|---|---|----|----|----|----|----|----|-------|
| ONEI-0400-050        | 1       | 017 03/12/02 | NOMD-27    | X | V1 | V1 |   |   |   |   |   |   |    |    |    |    |    |    | 2     |
| FOR INFORMATION ONLY |         |              |            |   |    |    |   |   |   |   |   |   |    |    |    |    |    |    |       |

REMARKS: DUKE  
DOCUMENT RELEASE EXEMPT FROM (NUCLEAR) MODIFICATIONS PROGRAM

K S CANADY  
MANAGER  
NUCLEAR ENGINEERING

BY:

J W SIMMONS JWS/AYB EC08H **SBC**

Duke Power Company

Oconee 1 Cycle 21

FOR INFORMATION ONLY

Core Operating Limits Report

REVIEWED AND APPROVED BY CFAM 3.13

QA Condition 1

REVIEWED AND APPROVED BY CFAM 3.13

~~Not Reviewed or Approved by CFAM 3.13~~

Prepared By : J. D. Forster Joy D. Forster

Date : 12 MAR 2002

Checked By : L. D. McClain L. D. McClain

Date : 12 Mar 2002

CDR By : R. Q. Huynh R. Q. Huynh

Date : 12 Mar 2002

Approved By : R. R. St. Clair R. R. St. Clair

Date : 12 Mar 2002

# Oconee 1 Cycle 21

## Core Operating Limits Report

### Insertion Sheet for Revision 17

This revision is not valid until the end of operation for Oconee 1 Cycle 20.

Remove these revision 15 and 16 pages

Insert these revision 17 pages

1 - 31

1 - 32

### Revision Log

| Revision                          | Effective Date | Pages Revised | Pages Added | Pages Deleted | Total Effective Pages |
|-----------------------------------|----------------|---------------|-------------|---------------|-----------------------|
| Oconee 1 Cycle 21 revisions below |                |               |             |               |                       |
| 17                                | Mar-02         | 1 - 31        | 32          | -             | 32                    |

|                                   |        |      |   |   |    |
|-----------------------------------|--------|------|---|---|----|
| Oconee 1 Cycle 20 revisions below |        |      |   |   |    |
| 16                                | May-01 | 1-4  | - | - | 31 |
| 15                                | Nov-00 | 1-31 | - | - | 31 |

|                                   |        |                           |   |   |    |
|-----------------------------------|--------|---------------------------|---|---|----|
| Oconee 1 Cycle 19 revisions below |        |                           |   |   |    |
| 14                                | Oct-00 | 1,2,3,5                   | - | - | 31 |
| 13                                | Feb-00 | 1,2,3,4                   | - | - | 31 |
| 12                                | Jul-99 | 1, 2, 3, 8,<br>10, 13, 31 | - | - | 31 |
| 11                                | May-99 | 1 - 31                    | - | - | 31 |

|                                   |        |                            |    |       |    |
|-----------------------------------|--------|----------------------------|----|-------|----|
| Oconee 1 Cycle 18 revisions below |        |                            |    |       |    |
| 10                                | Mar-99 | 1 - 31                     | -  | 32-38 | 31 |
| 9                                 | Feb-98 | 1,2,3,5,13,<br>16,17,32,36 | -  | -     | 38 |
| 8                                 | Nov-97 | 1,2,3,5,10,<br>32          | 37 | -     | 38 |
| 7                                 | Aug-97 | 1 - 38                     | -  | -     | 38 |

## Oconee 1 Cycle 21

### 1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O1C21 has been prepared in accordance with the requirements of ITS 5.6.5. The core operating limits within this report have been developed using NRC approved methodology identified in references 1 through 10. The RPS protective limits and maximum allowable setpoints are documented in references 11 through 13. These limits are validated for use in O1C21 by references 14 through 16. The O1C21 analyses assume a design flow of 107.5% of 88,000 gpm per RCS pump, radial local peaking ( $F_{\Delta h}$ ) of 1.714, and axial peaking factor ( $F_z$ ) of 1.5, and an EOC ( $< 100$  ppmB) Tav<sub>g</sub> reduction of up to 10 °F provided 4 RCPs are in operation and Tav<sub>g</sub> does not decrease below 569 °F.

The error adjusted core operating limits included in section 1 of the report incorporate all necessary uncertainties and margins required for operation of the O1C21 reload core.

### 1.1 References

1. Nuclear Design Methodology Using CASMO-3 / SIMULATE-3P, DPC-NE-1004P-A, Revision 0, SER dated November 23, 1992.
2. Oconee Nuclear Station Reload Design Methodology II, DPC-NE-1002A, Revision 1, SER dated October 1, 1985.
3. Oconee Nuclear Station Reload Design Methodology, NFS-1001A, Revision 4, SER dated July 29, 1981.
4. ONS Core Thermal Hydraulic Methodology Using VIPRE-01, DPC-NE-2003P-A, SER dated July 19, 1989.
5. Thermal Hydraulic Statistical Core Design Methodology, DPC-NE-2005P-A, Revision 2, SER dated June 8, 1999.
6. Fuel Mechanical Reload Analysis Methodology Using TACO3, DPC-NE-2008P-A, SER dated April 3, 1995.
7. UFSAR Chapter 15 Transient Analysis Methodology, DPC-NE-3005-PA, Revision 1, SER dated May 25, 1999.
8. DPC-NE-3000P-A, Thermal Hydraulic Transient Analysis Methodology, Rev. 2, SER dated October 14, 1998.
9. BAW-10192-PA, BWNT LOCA - BWNT Loss of Coolant Accident Evaluation Model for Once-Through Steam Generator Plants, SER dated February 18, 1997.
10. BAW-10227-PA, Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel, SER dated February 4, 2000.
11. Variable Low Pressure Safety Limit, OSC-4048, Revision 3, July 1998.
12. Power Imbalance Safety Limits and Tech Spec Setpoints Using Error Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 1, November 1998.
13.  $\Delta T_c$  and EOC Reduced Tav<sub>g</sub> Operation, OSC-7265, Rev. 0, Duke Power Co., April 2001.
14. O1C21 Maneuvering Analysis, OSC-7940, Revision 1, March 2002.
15. O1C21 Specific DNB Analysis, OSC-7945, Revision 0, October 2001.
16. O1C21 Reload Safety Evaluation, OSC-8046, Revision 0, March 2002.

## Oconee 1 Cycle 21

### Miscellaneous Setpoints

BWST boron concentration shall be greater than 2220 ppm and less than 3000 ppm.  
Referred to by ITS 3.5.4.

Spent fuel pool boron concentration shall be greater than 2220 ppm and less than 3000 ppm.  
Referred to by ITS 3.7.12.

The equivalent of at least 1100 cubic feet of 11,000 ppm boron shall be maintained in the CBAST.  
Referred to by ITS SLC 16.5.13.

CFT boron concentration shall be greater than 1835 ppm. The average boron concentration in the CFT's shall be less than 4000 ppm. Referred to by ITS 3.5.1.

RCS and Refueling canal boron concentration shall be greater than 2220 ppm.  
Referred to by ITS 3.9.1.

Shutdown Margin (SDM) shall be greater than 1%  $\Delta k/k$ .  
Referred to by ITS 3.1.1.

|   |                        |      |
|---|------------------------|------|
| Moderator Temperature Coefficient (MTC) shall be less than: | MTC x 10 <sup>-4</sup> | % FP |
| Linear interpolation is valid within the table provided.    | $\Delta p / ^\circ F$  |      |
| Referred to by ITS 3.1.3.                                   | +0.70                  | 0    |
|   | +0.40                  | 15   |
|   | 0.00                   | 80   |
|   | -0.125                 | 100  |
|   | -0.25                  | 120  |

Departure from Nucleate Boiling (DNB) parameter for RCS loop pressure shall be  
Referred to by ITS 3.4.1.

|        |  |
|--------|--|
| 4 RCP: | measured hot leg pressure $\geq$ 2125 psig |
| 3 RCP: | measured hot leg pressure $\geq$ 2125 psig |

|  |  |          |          |
|--|--|----------|----------|
| DNB parameter for RCS loop average temperature shall be: | Max Loop Tav <sub>g</sub> (Incl 2°F unc) |          |          |
| Referred to by ITS 3.4.1.                                | $\Delta T_c, ^\circ F$                   | 4 RCP Op | 3 RCP Op |
|  | 0  | 581.0    | 581.0 *  |
|  | 1  | 581.4    | 581.2    |
|  | 2  | 581.8    | 581.4    |
|  | 3  | 582.1    | 581.7    |
|  | 4  | 582.5    | 581.9    |
|  | 5  | 582.9    | 582.1    |

The measured Tav<sub>g</sub> must be less than COLR limits minus instrument uncertainty.  $\Delta T_c$  is the setpoint value selected by the operators. Values are expanded by linear interpolation on page 32 of this document **without** instrument uncertainty.

\* This limit is applied to the loop with the lowest loop average temperature consistent with the NOTE in SR 3.4.1.2. All other temperature limits apply to the maximum loop Tav<sub>g</sub>.

DNB parameter for RCS loop total flow shall be:

|        |  |
|--------|--|
| 4 RCP: | Measured $\geq$ 107.5 %df                |
| 3 RCP: | Measured $\geq$ 74.7 % of 4 RCP min flow |

Referred to by ITS 3.4.1.

Regulating rod groups shall be withdrawn in sequence starting with group 5, group 6, and finally group 7.  
Referred to by ITS 3.2.1.

Regulating rod group overlap shall be 25%  $\pm$  5% between two sequential groups.  
Referred to by ITS 3.2.1.

## Oconee 1 Cycle 21

### Steady State Operating Band

| EFPD       | Rod Index |     | APSR %WD |     |
|------------|-----------|-----|----------|-----|
|            | Min       | Max | Min      | Max |
| 0 to 440   | 292 ± 5   | 300 | 30       | 40  |
| 440 to EOC | 292 ± 5   | 300 | 100      | 100 |

### Quadrant Power Tilt Setpoints

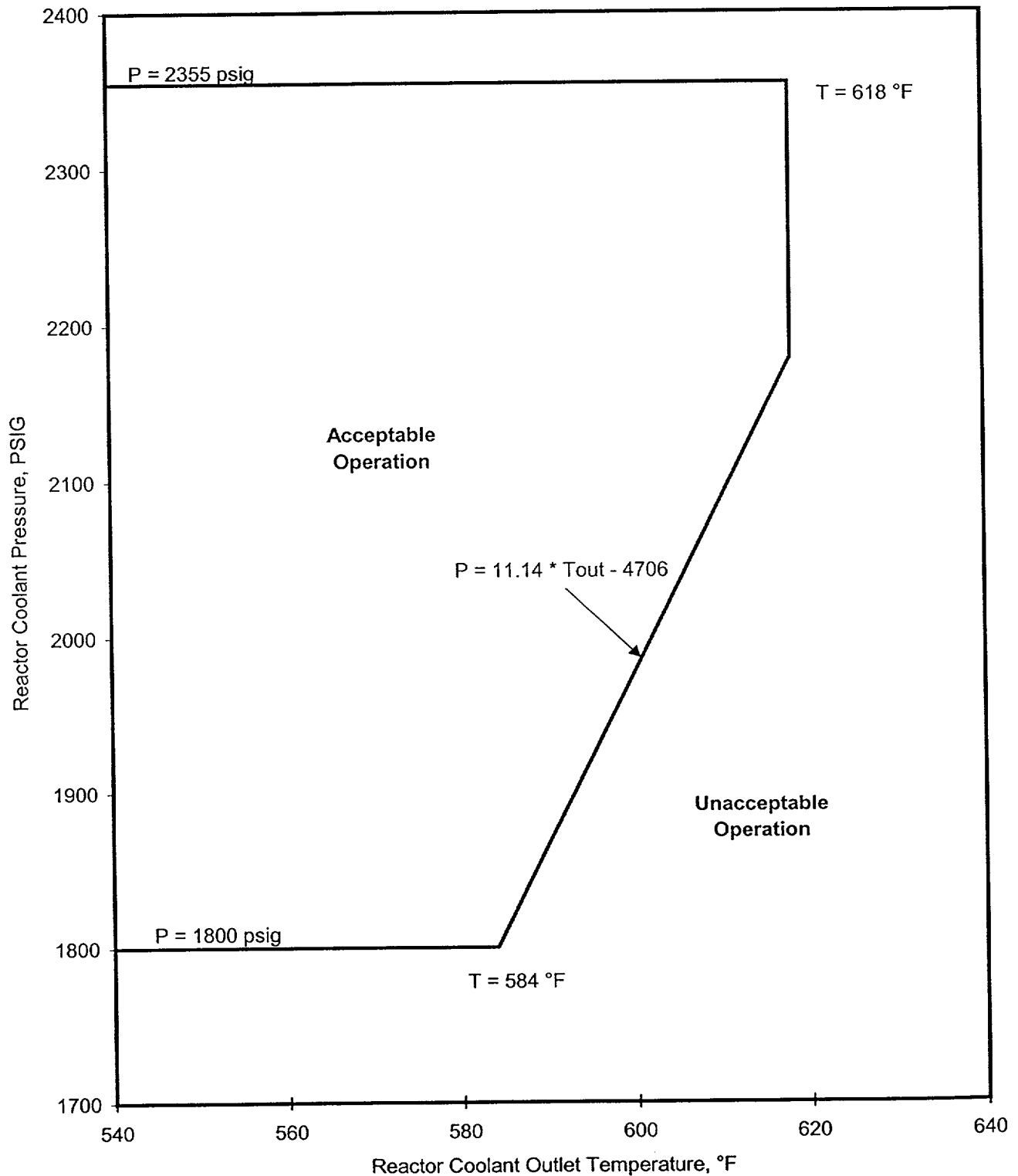
| Core Power Level, %FP | Steady State |        | Transient |        | Maximum |
|-----------------------|--------------|--------|-----------|--------|---------|
|                       | 30 - 100     | 0 - 30 | 30 - 100  | 0 - 30 |         |
| Full Incore           | 3.50         | 7.72   | 7.22      | 9.51   | 16.66   |
| Out of Core           | 2.25         | 6.09   | 5.63      | 7.72   | 14.22   |
| Backup Incore         | 2.22         | 3.87   | 3.63      | 4.81   | 10.07   |

Referred to by ITS 3.2.3.

## Oconee 1 Cycle 21

## Variable Low RCS Pressure RPS Setpoints

Referred to by ITS 3.3.1



## Oconee 1 Cycle 21

### RPS Power Imbalance Setpoints

|         | % FP  | % Imbalance |
|---------|-------|-------------|
| 4 Pumps | 0     | -33.0       |
|         | 90.4  | -33.0       |
|         | 107.9 | -14.4       |
|         | 107.9 | 14.4        |
|         | 90.4  | 33.0        |
|         | 0     | 33.0        |
|         |       |             |
| 3 Pumps | 0     | -33.0       |
|         | 63.1  | -33.0       |
|         | 80.6  | -14.4       |
|         | 80.6  | 14.4        |
|         | 63.1  | 33.0        |
|         | 0     | 33.0        |
|         |       |             |

### Maximum Allowable RPS Power Imbalance Setpoints

|         | % FP  | % Imbalance |
|---------|-------|-------------|
| 4 Pumps | 0     | -35.0       |
|         | 90    | -35.0       |
|         | 109.4 | -14.4       |
|         | 109.4 | 14.4        |
|         | 90    | 35.0        |
|         | 0     | 35.0        |
|         |       |             |
| 3 Pumps | 0     | -35.0       |
|         | 62.3  | -35.0       |
|         | 81.7  | -14.4       |
|         | 81.7  | 14.4        |
|         | 62.3  | 35.0        |
|         | 0     | 35.0        |
|         |       |             |

# Oconee 1 Cycle 21

## Operational Power Imbalance Setpoints

|         | %FP   | Full<br>Incore | Backup<br>Incore | Out of<br>Core |
|---------|-------|----------------|------------------|----------------|
| 4 Pumps | 0     | -28.9          | -28.4            | -28.9          |
|         | 80    | -28.9          | -28.4            | -28.9          |
|         | 90    | -25.7          | -25.4            | -25.7          |
|         | 100   | -17.3          | -17.0            | -17.3          |
|         | 102   | -15.6          | -15.3            | -15.6          |
|         | 102   | 17.0           | 17.0             | 17.0           |
|         | 100   | 19.1           | 18.9             | 19.1           |
|         | 90    | 27.0           | 26.7             | 27.0           |
|         | 80    | 29.4           | 29.0             | 29.4           |
|         | 0     | 29.4           | 29.0             | 29.4           |
| 3 Pumps | 0.0   | -28.9          | -28.4            | -28.9          |
|         | 65.76 | -28.9          | -                | -28.9          |
|         | 66.23 | -              | -28.4            | -              |
|         | 77.0  | -15.6          | -15.3            | -15.6          |
|         | 77.0  | 17.0           | 17.0             | 17.0           |
|         | 65.66 | -              | 29.0             | -              |
|         | 65.28 | 29.4           | -                | 29.4           |
|         | 0.0   | 29.4           | 29.0             | 29.4           |

# Oconee 1 Cycle 21

## Operational Power Imbalance Setpoints

Operation with 4 RCS Pumps, BOC to EOC

| % FP  | RPS Trip |       | Full Incore Alarm |       | Out of Core Alarm |       |
|-------|----------|-------|-------------------|-------|-------------------|-------|
| 107.9 | -14.40   | 14.40 |                   |       |                   |       |
| 107   | -15.36   | 15.36 |                   |       |                   |       |
| 106   | -16.42   | 16.42 |                   |       |                   |       |
| 105   | -17.48   | 17.48 |                   |       |                   |       |
| 104   | -18.55   | 18.55 |                   |       |                   |       |
| 103   | -19.61   | 19.61 |                   |       |                   |       |
| 102   | -20.67   | 20.67 | -15.60            | 17.00 | -15.60            | 17.00 |
| 101   | -21.73   | 21.73 | -16.45            | 18.05 | -16.45            | 18.05 |
| 100   | -22.80   | 22.80 | -17.30            | 19.10 | -17.30            | 19.10 |
| 99    | -23.86   | 23.86 | -18.14            | 19.89 | -18.14            | 19.89 |
| 98    | -24.92   | 24.92 | -18.98            | 20.68 | -18.98            | 20.68 |
| 97    | -25.99   | 25.99 | -19.82            | 21.47 | -19.82            | 21.47 |
| 96    | -27.05   | 27.05 | -20.66            | 22.26 | -20.66            | 22.26 |
| 95    | -28.11   | 28.11 | -21.50            | 23.05 | -21.50            | 23.05 |
| 94    | -29.17   | 29.17 | -22.34            | 23.84 | -22.34            | 23.84 |
| 93    | -30.24   | 30.24 | -23.18            | 24.63 | -23.18            | 24.63 |
| 92    | -31.30   | 31.30 | -24.02            | 25.42 | -24.02            | 25.42 |
| 91    | -32.36   | 32.36 | -24.86            | 26.21 | -24.86            | 26.21 |
| 90.4  | -33.00   | 33.00 | -25.36            | 26.68 | -25.36            | 26.68 |
| 90    | -33.00   | 33.00 | -25.70            | 27.00 | -25.70            | 27.00 |
| 89    | -33.00   | 33.00 | -26.02            | 27.24 | -26.02            | 27.24 |
| 88    | -33.00   | 33.00 | -26.34            | 27.48 | -26.34            | 27.48 |
| 87    | -33.00   | 33.00 | -26.66            | 27.72 | -26.66            | 27.72 |
| 86    | -33.00   | 33.00 | -26.98            | 27.96 | -26.98            | 27.96 |
| 85    | -33.00   | 33.00 | -27.30            | 28.20 | -27.30            | 28.20 |
| 84    | -33.00   | 33.00 | -27.62            | 28.44 | -27.62            | 28.44 |
| 83    | -33.00   | 33.00 | -27.94            | 28.68 | -27.94            | 28.68 |
| 82    | -33.00   | 33.00 | -28.26            | 28.92 | -28.26            | 28.92 |
| 81    | -33.00   | 33.00 | -28.58            | 29.16 | -28.58            | 29.16 |
| 80    | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 0     | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| % FP  | RPS Trip |       | Full Incore Alarm |       | Out of Core Alarm |       |

## Oconee 1 Cycle 21

## Operational Power Imbalance Setpoints

Operation with 3 RCS Pumps, BOC to EOC

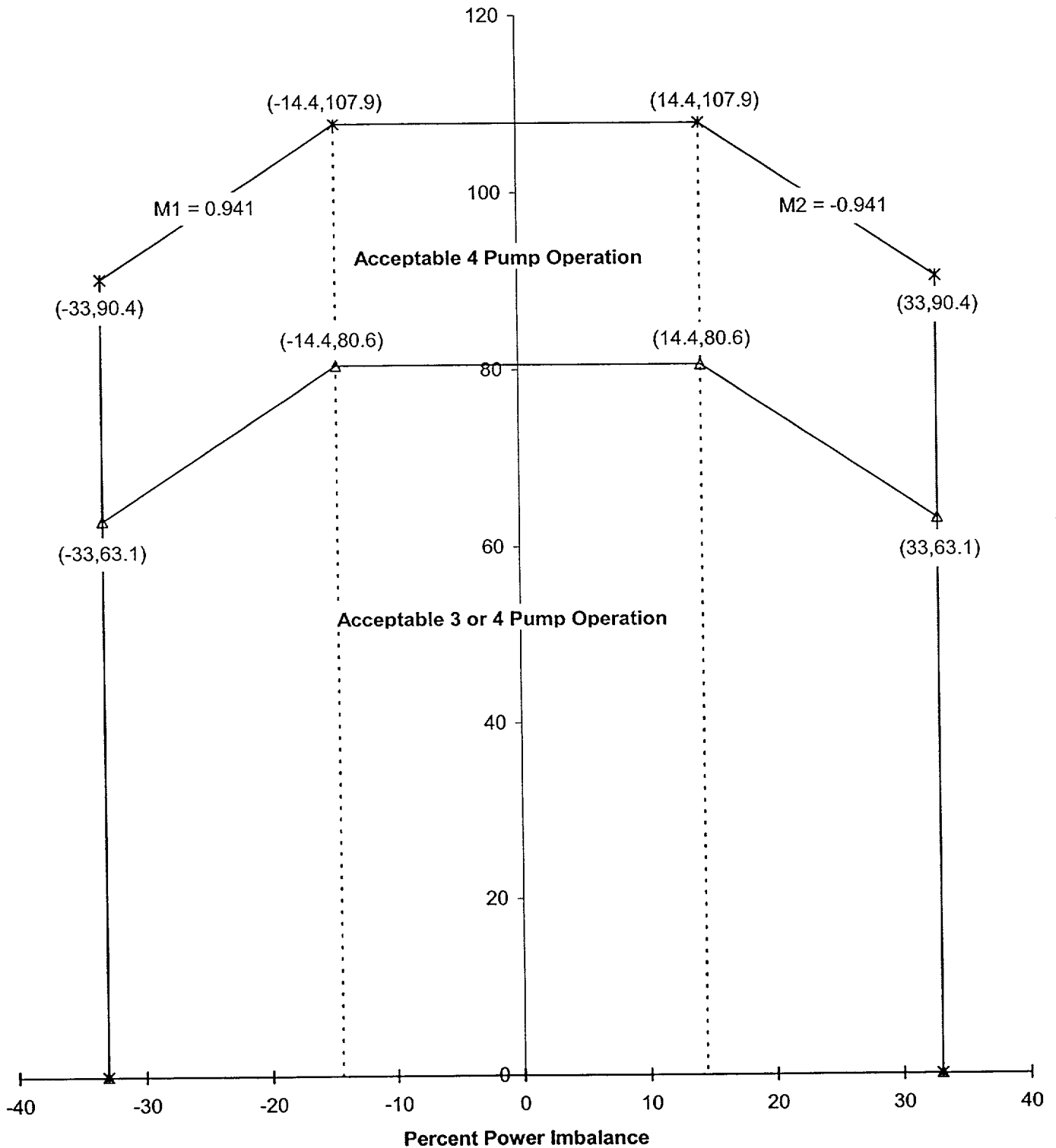
| % FP | RPS Trip |       | Full Incore Alarm |       | Out of Core Alarm |       |
|------|----------|-------|-------------------|-------|-------------------|-------|
|      |          |       |                   |       |                   |       |
| 80.6 | -14.40   | 14.40 |                   |       |                   |       |
| 80   | -15.04   | 15.04 |                   |       |                   |       |
| 79   | -16.10   | 16.10 |                   |       |                   |       |
| 78   | -17.16   | 17.16 |                   |       |                   |       |
| 77.0 | -18.23   | 18.23 | -15.60            | 17.00 | -15.60            | 17.00 |
| 76   | -19.29   | 19.29 | -16.78            | 18.06 | -16.78            | 18.06 |
| 75   | -20.35   | 20.35 | -17.97            | 19.12 | -17.97            | 19.12 |
| 74   | -21.41   | 21.41 | -19.15            | 20.18 | -19.15            | 20.18 |
| 73   | -22.48   | 22.48 | -20.33            | 21.23 | -20.33            | 21.23 |
| 72   | -23.54   | 23.54 | -21.51            | 22.29 | -21.51            | 22.29 |
| 71   | -24.60   | 24.60 | -22.70            | 23.35 | -22.70            | 23.35 |
| 70   | -25.67   | 25.67 | -23.88            | 24.41 | -23.88            | 24.41 |
| 69   | -26.73   | 26.73 | -25.06            | 25.47 | -25.06            | 25.47 |
| 68   | -27.79   | 27.79 | -26.25            | 26.53 | -26.25            | 26.53 |
| 67   | -28.85   | 28.85 | -27.43            | 27.58 | -27.43            | 27.58 |
| 66   | -29.92   | 29.92 | -28.61            | 28.64 | -28.61            | 28.64 |
| 65.8 | -30.18   | 30.18 | -28.90            | 28.90 | -28.90            | 28.90 |
| 65.3 | -30.68   | 30.68 | -28.90            | 29.40 | -28.90            | 29.40 |
| 65   | -30.98   | 30.98 | -28.90            | 29.40 | -28.90            | 29.40 |
| 64   | -32.04   | 32.04 | -28.90            | 29.40 | -28.90            | 29.40 |
| 63.1 | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 63   | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 62   | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 61   | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 60   | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| 0    | -33.00   | 33.00 | -28.90            | 29.40 | -28.90            | 29.40 |
| % FP | RPS Trip |       | Full Incore Alarm |       | Out of Core Alarm |       |

## Oconee 1 Cycle 21

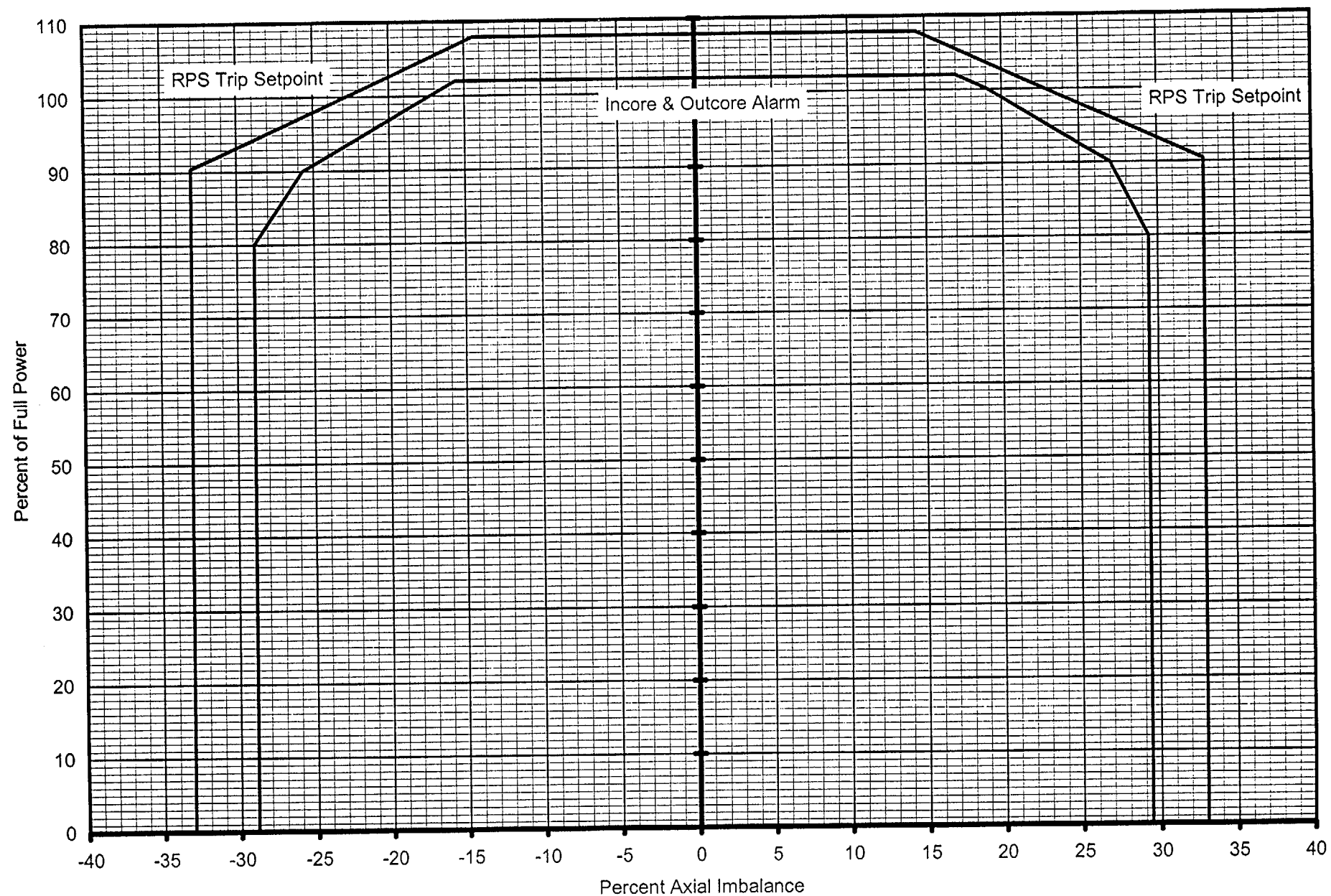
## RPS Power Imbalance Setpoints

Referred to by ITS 3.3.1

Thermal Power Level, %FP

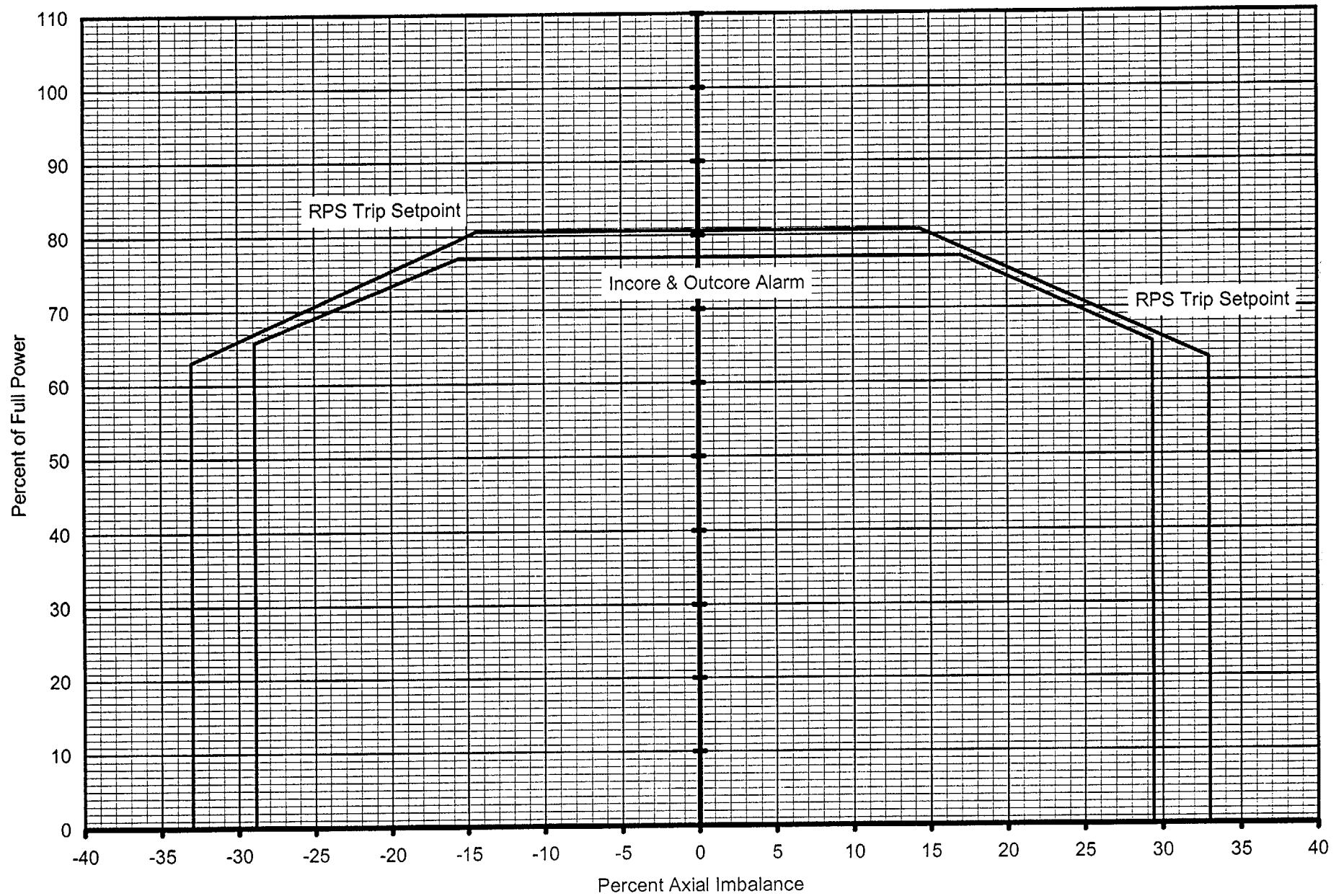


Oconee 1 Cycle 21  
Imbalance Setpoints for 4 Pump Operation, BOC to EOC



## Oconee 1 Cycle 21

## Imbalance Setpoints for 3 Pump Operation, BOC to EOC



## Oconee 1 Cycle 21

### Operational Rod Index Setpoints

|         | %FP   | RI Insertion Setpoint |            | RI Withdrawal Setpoint |
|---------|-------|-----------------------|------------|------------------------|
|         |       | No Inop Rod           | 1 Inop Rod |                        |
| 4 Pumps | 102.0 | 263.5                 | 283.4      | 300                    |
|         | 100.0 | 261.5                 | 281.5      | 300                    |
|         | 90.0  | 251.5                 | 271.9      | 300                    |
|         | 80.0  | 241.5                 | 262.3      | 300                    |
|         | 50.0  | 201.5                 | 233.4      | 300                    |
|         | 48.0  | 195.2                 | 231.5      | 300                    |
|         | 15.0  | 91.5                  | 165.5      | 300                    |
|         | 13.0  | 76.5                  | 161.5      | 300                    |
|         | 5.0   | 16.5                  | 93.5       | 300                    |
|         | 3.0   | 1.5                   | 76.5       | 300                    |
|         | 2.8   | 0.0                   | 74.8       | 300                    |
|         | 0.0   | 0.0                   | 51.0       | 300                    |
| 3 Pumps | 77.0  | 237.5                 | 285.2      | 300                    |
|         | 75.0  | 234.8                 | 281.5      | 300                    |
|         | 50.0  | 201.5                 | 235.2      | 300                    |
|         | 48.0  | 195.2                 | 231.5      | 300                    |
|         | 15.0  | 91.5                  | 165.5      | 300                    |
|         | 13.0  | 76.5                  | 161.5      | 300                    |
|         | 5.0   | 16.5                  | 93.5       | 300                    |
|         | 3.0   | 1.5                   | 76.5       | 300                    |
|         | 2.8   | 0.0                   | 74.8       | 300                    |
|         | 0.0   | 0.0                   | 51.0       | 300                    |

# Oconee 1 Cycle 21

## Shutdown Margin Rod Index Setpoints

|         | %FP   | RI Insertion Setpoint |            | RI Withdrawal Setpoint |
|---------|-------|-----------------------|------------|------------------------|
|         |       | No Inop Rod           | 1 Inop Rod |                        |
| 4 Pumps | 102.0 | 224.6                 | 283.4      | 300                    |
|         | 100.0 | 221.5                 | 281.5      | 300                    |
|         | 48.0  | 141.5                 | 231.5      | 300                    |
|         | 13.0  | 76.5                  | 161.5      | 300                    |
|         | 3.0   | 1.5                   | 76.5       | 300                    |
|         | 2.8   | 0.0                   | 74.8       | 300                    |
|         | 0.0   | 0.0                   | 51.0       | 300                    |
| 3 Pumps | 77.0  | 227.4                 | 285.2      | 300                    |
|         | 75.0  | 221.5                 | 281.5      | 300                    |
|         | 48.0  | 141.5                 | 231.5      | 300                    |
|         | 13.0  | 76.5                  | 161.5      | 300                    |
|         | 3.0   | 1.5                   | 76.5       | 300                    |
|         | 2.8   | 0.0                   | 74.8       | 300                    |
|         | 0.0   | 0.0                   | 51.0       | 300                    |

## Rod Index Setpoints

4 Pump Operation, No Inoperable Rods, BOC to EOC

| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 102  | 100                      | 99.8   | 24.8   | 100                        | 100    | 63.5   |
| 101  | 100                      | 99.0   | 24.0   | 100                        | 100    | 62.5   |
| 100  | 100                      | 98.2   | 23.2   | 100                        | 100    | 61.5   |
| 99   | 100                      | 97.5   | 22.5   | 100                        | 100    | 60.5   |
| 98   | 100                      | 96.7   | 21.7   | 100                        | 100    | 59.5   |
| 97   | 100                      | 95.9   | 20.9   | 100                        | 100    | 58.5   |
| 96   | 100                      | 95.2   | 20.2   | 100                        | 100    | 57.5   |
| 95   | 100                      | 94.4   | 19.4   | 100                        | 100    | 56.5   |
| 94   | 100                      | 93.6   | 18.6   | 100                        | 100    | 55.5   |
| 93   | 100                      | 92.9   | 17.9   | 100                        | 100    | 54.5   |
| 92   | 100                      | 92.1   | 17.1   | 100                        | 100    | 53.5   |
| 91   | 100                      | 91.3   | 16.3   | 100                        | 100    | 52.5   |
| 90   | 100                      | 90.6   | 15.6   | 100                        | 100    | 51.5   |
| 89   | 100                      | 89.8   | 14.8   | 100                        | 100    | 50.5   |
| 88   | 100                      | 89.0   | 14.0   | 100                        | 100    | 49.5   |
| 87   | 100                      | 88.2   | 13.2   | 100                        | 100    | 48.5   |
| 86   | 100                      | 87.5   | 12.5   | 100                        | 100    | 47.5   |
| 85   | 100                      | 86.7   | 11.7   | 100                        | 100    | 46.5   |
| 84   | 100                      | 85.9   | 10.9   | 100                        | 100    | 45.5   |
| 83   | 100                      | 85.2   | 10.2   | 100                        | 100    | 44.5   |
| 82   | 100                      | 84.4   | 9.4    | 100                        | 100    | 43.5   |
| 81   | 100                      | 83.6   | 8.6    | 100                        | 100    | 42.5   |
| 80   | 100                      | 82.9   | 7.9    | 100                        | 100    | 41.5   |
| 79   | 100                      | 82.1   | 7.1    | 100                        | 100    | 40.2   |
| 78   | 100                      | 81.3   | 6.3    | 100                        | 100    | 38.8   |
| 77   | 100                      | 80.6   | 5.6    | 100                        | 100    | 37.5   |
| 76   | 100                      | 79.8   | 4.8    | 100                        | 100    | 36.2   |
| 75   | 100                      | 79.0   | 4.0    | 100                        | 100    | 34.8   |
| 74   | 100                      | 78.2   | 3.2    | 100                        | 100    | 33.5   |
| 73   | 100                      | 77.5   | 2.5    | 100                        | 100    | 32.2   |
| 72   | 100                      | 76.7   | 1.7    | 100                        | 100    | 30.8   |
| 71   | 100                      | 75.9   | 0.9    | 100                        | 100    | 29.5   |
| 70   | 100                      | 75.2   | 0.2    | 100                        | 100    | 28.2   |
| 69.8 | 100                      | 75.0   | 0      | 100                        | 100    | 27.9   |
| 69   | 100                      | 73.8   | 0      | 100                        | 100    | 26.8   |
| 68   | 100                      | 72.3   | 0      | 100                        | 100    | 25.5   |
| 67.6 | 100                      | 71.7   | 0      | 100                        | 100    | 25.0   |
| 67   | 100                      | 70.7   | 0      | 100                        | 99.6   | 24.6   |
| 66   | 100                      | 69.2   | 0      | 100                        | 98.9   | 23.9   |
| 65   | 100                      | 67.7   | 0      | 100                        | 98.2   | 23.2   |
| 64   | 100                      | 66.1   | 0      | 100                        | 97.6   | 22.6   |
| 63   | 100                      | 64.6   | 0      | 100                        | 96.9   | 21.9   |
| 62   | 100                      | 63.0   | 0      | 100                        | 96.2   | 21.2   |
| 61   | 100                      | 61.5   | 0      | 100                        | 95.6   | 20.6   |
| 60   | 100                      | 60.0   | 0      | 100                        | 94.9   | 19.9   |
| 59   | 100                      | 58.4   | 0      | 100                        | 94.2   | 19.2   |
| 58   | 100                      | 56.9   | 0      | 100                        | 93.6   | 18.6   |
| 57   | 100                      | 55.3   | 0      | 100                        | 92.9   | 17.9   |
| 56   | 100                      | 53.8   | 0      | 100                        | 92.2   | 17.2   |
| 55   | 100                      | 52.3   | 0      | 100                        | 91.6   | 16.6   |
| 54   | 100                      | 50.7   | 0      | 100                        | 90.9   | 15.9   |
| 53   | 100                      | 49.2   | 0      | 100                        | 90.2   | 15.2   |
| 52   | 100                      | 47.7   | 0      | 100                        | 89.6   | 14.6   |
| 51   | 100                      | 46.1   | 0      | 100                        | 88.9   | 13.9   |
| 50   | 100                      | 44.6   | 0      | 100                        | 88.2   | 13.2   |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

## Rod Index Setpoints

4 Pump Operation, No Inoperable Rods, BOC to EOC

| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 49   | 100                      | 43.0   | 0      | 100                        | 86.7   | 11.7   |
| 48   | 100                      | 41.5   | 0      | 100                        | 85.1   | 10.1   |
| 47   | 100                      | 39.6   | 0      | 100                        | 83.5   | 8.5    |
| 46   | 100                      | 37.8   | 0      | 100                        | 82.0   | 7.0    |
| 45   | 100                      | 35.9   | 0      | 100                        | 80.4   | 5.4    |
| 44   | 100                      | 34.1   | 0      | 100                        | 78.8   | 3.8    |
| 43   | 100                      | 32.2   | 0      | 100                        | 77.2   | 2.2    |
| 42   | 100                      | 30.4   | 0      | 100                        | 75.7   | 0.7    |
| 41.6 | 100                      | 29.6   | 0      | 100                        | 75.0   | 0      |
| 41   | 100                      | 28.5   | 0      | 100                        | 73.2   | 0      |
| 40   | 100                      | 26.6   | 0      | 100                        | 70.1   | 0      |
| 39.1 | 100                      | 25.0   | 0      | 100                        | 67.3   | 0      |
| 39   | 99.9                     | 24.9   | 0      | 100                        | 66.9   | 0      |
| 38   | 99.0                     | 24.0   | 0      | 100                        | 63.8   | 0      |
| 37   | 98.0                     | 23.0   | 0      | 100                        | 60.6   | 0      |
| 36   | 97.1                     | 22.1   | 0      | 100                        | 57.5   | 0      |
| 35   | 96.2                     | 21.2   | 0      | 100                        | 54.3   | 0      |
| 34   | 95.2                     | 20.2   | 0      | 100                        | 51.2   | 0      |
| 33   | 94.3                     | 19.3   | 0      | 100                        | 48.1   | 0      |
| 32   | 93.4                     | 18.4   | 0      | 100                        | 44.9   | 0      |
| 31   | 92.5                     | 17.5   | 0      | 100                        | 41.8   | 0      |
| 30   | 91.5                     | 16.5   | 0      | 100                        | 38.6   | 0      |
| 29   | 90.6                     | 15.6   | 0      | 100                        | 35.5   | 0      |
| 28   | 89.7                     | 14.7   | 0      | 100                        | 32.4   | 0      |
| 27   | 88.8                     | 13.8   | 0      | 100                        | 29.2   | 0      |
| 26   | 87.8                     | 12.8   | 0      | 100                        | 26.1   | 0      |
| 25.7 | 87.5                     | 12.5   | 0      | 100                        | 25.0   | 0      |
| 25   | 86.9                     | 11.9   | 0      | 99.0                       | 24.0   | 0      |
| 24   | 86.0                     | 11.0   | 0      | 97.4                       | 22.4   | 0      |
| 23   | 85.0                     | 10.0   | 0      | 95.8                       | 20.8   | 0      |
| 22   | 84.1                     | 9.1    | 0      | 94.2                       | 19.2   | 0      |
| 21   | 83.2                     | 8.2    | 0      | 92.7                       | 17.7   | 0      |
| 20   | 82.2                     | 7.2    | 0      | 91.1                       | 16.1   | 0      |
| 19   | 81.3                     | 6.3    | 0      | 89.5                       | 14.5   | 0      |
| 18   | 80.4                     | 5.4    | 0      | 88.0                       | 13.0   | 0      |
| 17   | 79.5                     | 4.5    | 0      | 86.4                       | 11.4   | 0      |
| 16   | 78.5                     | 3.5    | 0      | 84.8                       | 9.8    | 0      |
| 15   | 77.6                     | 2.6    | 0      | 83.2                       | 8.2    | 0      |
| 14   | 76.7                     | 1.7    | 0      | 79.5                       | 4.5    | 0      |
| 13   | 75.8                     | 0.8    | 0      | 75.8                       | 0.8    | 0      |
| 12.8 | 75.0                     | 0      | 0      | 75.0                       | 0      | 0      |
| 12   | 69.0                     | 0      | 0      | 69.0                       | 0      | 0      |
| 11   | 61.5                     | 0      | 0      | 61.5                       | 0      | 0      |
| 10   | 54.0                     | 0      | 0      | 54.0                       | 0      | 0      |
| 9    | 46.5                     | 0      | 0      | 46.5                       | 0      | 0      |
| 8    | 39.0                     | 0      | 0      | 39.0                       | 0      | 0      |
| 7    | 31.5                     | 0      | 0      | 31.5                       | 0      | 0      |
| 6    | 24.0                     | 0      | 0      | 24.0                       | 0      | 0      |
| 5    | 16.5                     | 0      | 0      | 16.5                       | 0      | 0      |
| 4    | 9.0                      | 0      | 0      | 9.0                        | 0      | 0      |
| 3    | 1.5                      | 0      | 0      | 1.5                        | 0      | 0      |
| 2.8  | 0                        | 0      | 0      | 0                          | 0      | 0      |
| 2    | 0                        | 0      | 0      | 0                          | 0      | 0      |
| 1    | 0                        | 0      | 0      | 0                          | 0      | 0      |
| 0    | 0                        | 0      | 0      | 0                          | 0      | 0      |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

RI = 300 is withdrawal limit at all power levels.

## Rod Index Setpoints

3 Pump Operation, No Inoperable Rods, BOC to EOC

| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 77   | 100                      | 100    | 27.4   | 100                        | 100    | 37.5   |
| 76.2 | 100                      | 100    | 25.0   | 100                        | 100    | 36.4   |
| 76   | 100                      | 99.7   | 24.7   | 100                        | 100    | 36.1   |
| 75   | 100                      | 98.2   | 23.2   | 100                        | 100    | 34.8   |
| 74   | 100                      | 96.8   | 21.8   | 100                        | 100    | 33.5   |
| 73   | 100                      | 95.3   | 20.3   | 100                        | 100    | 32.1   |
| 72   | 100                      | 93.8   | 18.8   | 100                        | 100    | 30.8   |
| 71   | 100                      | 92.3   | 17.3   | 100                        | 100    | 29.5   |
| 70   | 100                      | 90.8   | 15.8   | 100                        | 100    | 28.1   |
| 69   | 100                      | 89.4   | 14.4   | 100                        | 100    | 26.8   |
| 68   | 100                      | 87.9   | 12.9   | 100                        | 100    | 25.5   |
| 67.6 | 100                      | 87.4   | 12.4   | 100                        | 100    | 25.0   |
| 67   | 100                      | 86.4   | 11.4   | 100                        | 99.6   | 24.6   |
| 66   | 100                      | 84.9   | 9.9    | 100                        | 98.9   | 23.9   |
| 65   | 100                      | 83.4   | 8.4    | 100                        | 98.2   | 23.2   |
| 64   | 100                      | 82.0   | 7.0    | 100                        | 97.6   | 22.6   |
| 63   | 100                      | 80.5   | 5.5    | 100                        | 96.9   | 21.9   |
| 62   | 100                      | 79.0   | 4.0    | 100                        | 96.2   | 21.2   |
| 61   | 100                      | 77.5   | 2.5    | 100                        | 95.6   | 20.6   |
| 60   | 100                      | 76.0   | 1.0    | 100                        | 94.9   | 19.9   |
| 59.3 | 100                      | 75.0   | 0      | 100                        | 94.4   | 19.4   |
| 59   | 100                      | 74.1   | 0      | 100                        | 94.2   | 19.2   |
| 58   | 100                      | 71.1   | 0      | 100                        | 93.6   | 18.6   |
| 57   | 100                      | 68.2   | 0      | 100                        | 92.9   | 17.9   |
| 56   | 100                      | 65.2   | 0      | 100                        | 92.2   | 17.2   |
| 55   | 100                      | 62.2   | 0      | 100                        | 91.6   | 16.6   |
| 54   | 100                      | 59.3   | 0      | 100                        | 90.9   | 15.9   |
| 53   | 100                      | 56.3   | 0      | 100                        | 90.2   | 15.2   |
| 52   | 100                      | 53.4   | 0      | 100                        | 89.6   | 14.6   |
| 51   | 100                      | 50.4   | 0      | 100                        | 88.9   | 13.9   |
| 50   | 100                      | 47.4   | 0      | 100                        | 88.2   | 13.2   |
| 49   | 100                      | 44.5   | 0      | 100                        | 86.7   | 11.7   |
| 48   | 100                      | 41.5   | 0      | 100                        | 85.1   | 10.1   |
| 47   | 100                      | 39.6   | 0      | 100                        | 83.5   | 8.5    |
| 46   | 100                      | 37.8   | 0      | 100                        | 82.0   | 7.0    |
| 45   | 100                      | 35.9   | 0      | 100                        | 80.4   | 5.4    |
| 44   | 100                      | 34.1   | 0      | 100                        | 78.8   | 3.8    |
| 43   | 100                      | 32.2   | 0      | 100                        | 77.2   | 2.2    |
| 42   | 100                      | 30.4   | 0      | 100                        | 75.7   | 0.7    |
| 41.6 | 100                      | 29.6   | 0      | 100                        | 75.0   | 0      |
| 41   | 100                      | 28.5   | 0      | 100                        | 73.2   | 0      |
| 40   | 100                      | 26.6   | 0      | 100                        | 70.1   | 0      |
| 39.1 | 100                      | 25.0   | 0      | 100                        | 67.3   | 0      |
| 39   | 99.9                     | 24.9   | 0      | 100                        | 66.9   | 0      |
| 38   | 99                       | 24.0   | 0      | 100                        | 63.8   | 0      |
| 37   | 98                       | 23.0   | 0      | 100                        | 60.6   | 0      |
| 36   | 97.1                     | 22.1   | 0      | 100                        | 57.5   | 0      |
| 35   | 96.2                     | 21.2   | 0      | 100                        | 54.3   | 0      |
| 34   | 95.2                     | 20.2   | 0      | 100                        | 51.2   | 0      |
| 33   | 94.3                     | 19.3   | 0      | 100                        | 48.1   | 0      |
| 32   | 93.4                     | 18.4   | 0      | 100                        | 44.9   | 0      |
| 31   | 92.5                     | 17.5   | 0      | 100                        | 41.8   | 0      |
| 30   | 91.5                     | 16.5   | 0      | 100                        | 38.6   | 0      |
| 29   | 90.6                     | 15.6   | 0      | 100                        | 35.5   | 0      |
| 28   | 89.7                     | 14.7   | 0      | 100                        | 32.4   | 0      |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

### 3 Pump Operation, No Inoperable Rods, BOC to EOC

[illegible]

RI = 300 is withdrawal limit at all power levels.

Oconee 1 Cycle 21  
Rod Index Setpoints  
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-50 Rev 17  
Page 20 of 32

| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 102  | 100                      | 100    | 83.4   | 100                        | 100    | 83.4   |
| 101  | 100                      | 100    | 82.5   | 100                        | 100    | 82.5   |
| 100  | 100                      | 100    | 81.5   | 100                        | 100    | 81.5   |
| 99   | 100                      | 100    | 80.5   | 100                        | 100    | 80.5   |
| 98   | 100                      | 100    | 79.6   | 100                        | 100    | 79.6   |
| 97   | 100                      | 100    | 78.6   | 100                        | 100    | 78.6   |
| 96   | 100                      | 100    | 77.7   | 100                        | 100    | 77.7   |
| 95   | 100                      | 100    | 76.7   | 100                        | 100    | 76.7   |
| 94   | 100                      | 100    | 75.7   | 100                        | 100    | 75.7   |
| 93   | 100                      | 100    | 74.8   | 100                        | 100    | 74.8   |
| 92   | 100                      | 100    | 73.8   | 100                        | 100    | 73.8   |
| 91   | 100                      | 100    | 72.8   | 100                        | 100    | 72.9   |
| 90   | 100                      | 100    | 71.9   | 100                        | 100    | 71.9   |
| 89   | 100                      | 100    | 70.9   | 100                        | 100    | 70.9   |
| 88   | 100                      | 100    | 70.0   | 100                        | 100    | 70.0   |
| 87   | 100                      | 100    | 69.0   | 100                        | 100    | 69.0   |
| 86   | 100                      | 100    | 68.0   | 100                        | 100    | 68.1   |
| 85   | 100                      | 100    | 67.1   | 100                        | 100    | 67.1   |
| 84   | 100                      | 100    | 66.1   | 100                        | 100    | 66.1   |
| 83   | 100                      | 100    | 65.2   | 100                        | 100    | 65.2   |
| 82   | 100                      | 100    | 64.2   | 100                        | 100    | 64.2   |
| 81   | 100                      | 100    | 63.2   | 100                        | 100    | 63.3   |
| 80   | 100                      | 100    | 62.3   | 100                        | 100    | 62.3   |
| 79   | 100                      | 100    | 61.3   | 100                        | 100    | 61.3   |
| 78   | 100                      | 100    | 60.3   | 100                        | 100    | 60.4   |
| 77   | 100                      | 100    | 59.4   | 100                        | 100    | 59.4   |
| 76   | 100                      | 100    | 58.4   | 100                        | 100    | 58.4   |
| 75   | 100                      | 100    | 57.5   | 100                        | 100    | 57.5   |
| 74   | 100                      | 100    | 56.5   | 100                        | 100    | 56.5   |
| 73   | 100                      | 100    | 55.5   | 100                        | 100    | 55.6   |
| 72   | 100                      | 100    | 54.6   | 100                        | 100    | 54.6   |
| 71   | 100                      | 100    | 53.6   | 100                        | 100    | 53.6   |
| 70   | 100                      | 100    | 52.7   | 100                        | 100    | 52.7   |
| 69   | 100                      | 100    | 51.7   | 100                        | 100    | 51.7   |
| 68   | 100                      | 100    | 50.7   | 100                        | 100    | 50.7   |
| 67   | 100                      | 100    | 49.8   | 100                        | 100    | 49.8   |
| 66   | 100                      | 100    | 48.8   | 100                        | 100    | 48.8   |
| 65   | 100                      | 100    | 47.8   | 100                        | 100    | 47.8   |
| 64   | 100                      | 100    | 46.9   | 100                        | 100    | 46.9   |
| 63   | 100                      | 100    | 45.9   | 100                        | 100    | 45.9   |
| 62   | 100                      | 100    | 45.0   | 100                        | 100    | 45.0   |
| 61   | 100                      | 100    | 44.0   | 100                        | 100    | 44.0   |
| 60   | 100                      | 100    | 43.0   | 100                        | 100    | 43.0   |
| 59   | 100                      | 100    | 42.1   | 100                        | 100    | 42.1   |
| 58   | 100                      | 100    | 41.1   | 100                        | 100    | 41.1   |
| 57   | 100                      | 100    | 40.2   | 100                        | 100    | 40.2   |
| 56   | 100                      | 100    | 39.2   | 100                        | 100    | 39.2   |
| 55   | 100                      | 100    | 38.2   | 100                        | 100    | 38.2   |
| 54   | 100                      | 100    | 37.3   | 100                        | 100    | 37.3   |
| 53   | 100                      | 100    | 36.3   | 100                        | 100    | 36.3   |
| 52   | 100                      | 100    | 35.3   | 100                        | 100    | 35.3   |
| 51   | 100                      | 100    | 34.4   | 100                        | 100    | 34.4   |
| 50   | 100                      | 100    | 33.4   | 100                        | 100    | 33.4   |
| 49   | 100                      | 100    | 32.5   | 100                        | 100    | 32.5   |
| 48   | 100                      | 100    | 31.5   | 100                        | 100    | 31.5   |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

RI = 300 is withdrawal limit at all power levels.

Continued on next page.

Oconee 1 Cycle 21  
Rod Index Setpoints  
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-50 Rev 17  
Page 21 of 32

| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 47   | 100                      | 100    | 29.5   | 100                        | 100    | 29.5   |
| 46   | 100                      | 100    | 27.5   | 100                        | 100    | 27.5   |
| 45   | 100                      | 100    | 25.5   | 100                        | 100    | 25.5   |
| 44.8 | 100                      | 100    | 25.0   | 100                        | 100    | 25.0   |
| 44   | 100                      | 99.2   | 24.2   | 100                        | 99.2   | 24.2   |
| 43   | 100                      | 98.2   | 23.2   | 100                        | 98.2   | 23.2   |
| 42   | 100                      | 97.2   | 22.2   | 100                        | 97.2   | 22.2   |
| 41   | 100                      | 96.2   | 21.2   | 100                        | 96.2   | 21.2   |
| 40   | 100                      | 95.2   | 20.2   | 100                        | 95.2   | 20.2   |
| 39   | 100                      | 94.2   | 19.2   | 100                        | 94.2   | 19.2   |
| 38   | 100                      | 93.2   | 18.2   | 100                        | 93.2   | 18.2   |
| 37   | 100                      | 92.2   | 17.2   | 100                        | 92.2   | 17.2   |
| 36   | 100                      | 91.2   | 16.2   | 100                        | 91.2   | 16.2   |
| 35   | 100                      | 90.2   | 15.2   | 100                        | 90.2   | 15.2   |
| 34   | 100                      | 89.2   | 14.2   | 100                        | 89.2   | 14.2   |
| 33   | 100                      | 88.2   | 13.2   | 100                        | 88.2   | 13.2   |
| 32   | 100                      | 87.2   | 12.2   | 100                        | 87.2   | 12.2   |
| 31   | 100                      | 86.2   | 11.2   | 100                        | 86.2   | 11.2   |
| 30   | 100                      | 85.2   | 10.2   | 100                        | 85.2   | 10.2   |
| 29   | 100                      | 84.2   | 9.2    | 100                        | 84.2   | 9.2    |
| 28   | 100                      | 83.2   | 8.2    | 100                        | 83.2   | 8.2    |
| 27   | 100                      | 82.2   | 7.2    | 100                        | 82.2   | 7.2    |
| 26   | 100                      | 81.2   | 6.2    | 100                        | 81.2   | 6.2    |
| 25   | 100                      | 80.2   | 5.2    | 100                        | 80.2   | 5.2    |
| 24   | 100                      | 79.2   | 4.2    | 100                        | 79.2   | 4.2    |
| 23   | 100                      | 78.2   | 3.2    | 100                        | 78.2   | 3.2    |
| 22   | 100                      | 77.2   | 2.2    | 100                        | 77.2   | 2.2    |
| 21   | 100                      | 76.2   | 1.2    | 100                        | 76.2   | 1.2    |
| 20   | 100                      | 75.2   | 0.2    | 100                        | 75.2   | 0.2    |
| 19.8 | 100                      | 75.0   | 0      | 100                        | 75.0   | 0      |
| 19   | 100                      | 73.5   | 0      | 100                        | 73.5   | 0      |
| 18   | 100                      | 71.5   | 0      | 100                        | 71.5   | 0      |
| 17   | 100                      | 69.5   | 0      | 100                        | 69.5   | 0      |
| 16   | 100                      | 67.5   | 0      | 100                        | 67.5   | 0      |
| 15   | 100                      | 65.5   | 0      | 100                        | 65.5   | 0      |
| 14   | 100                      | 63.5   | 0      | 100                        | 63.5   | 0      |
| 13   | 100                      | 61.5   | 0      | 100                        | 61.5   | 0      |
| 12   | 100                      | 53.0   | 0      | 100                        | 53.0   | 0      |
| 11   | 100                      | 44.5   | 0      | 100                        | 44.5   | 0      |
| 10   | 100                      | 36.0   | 0      | 100                        | 36.0   | 0      |
| 9    | 100                      | 27.5   | 0      | 100                        | 27.5   | 0      |
| 8.7  | 100                      | 25.0   | 0      | 100                        | 25.0   | 0      |
| 8    | 97.0                     | 22.0   | 0      | 97.0                       | 22.0   | 0      |
| 7    | 92.8                     | 17.8   | 0      | 92.8                       | 17.8   | 0      |
| 6    | 88.5                     | 13.5   | 0      | 88.5                       | 13.5   | 0      |
| 5    | 84.2                     | 9.2    | 0      | 84.2                       | 9.2    | 0      |
| 4    | 80.0                     | 5.0    | 0      | 80.0                       | 5.0    | 0      |
| 3    | 75.8                     | 0.8    | 0      | 75.8                       | 0.8    | 0      |
| 2.8  | 75.0                     | 0      | 0      | 75.0                       | 0      | 0      |
| 2    | 68.0                     | 0      | 0      | 68.0                       | 0      | 0      |
| 1    | 59.5                     | 0      | 0      | 59.5                       | 0      | 0      |
| 0    | 51.0                     | 0      | 0      | 51.0                       | 0      | 0      |
|      |                          |        |        |                            |        |        |
|      |                          |        |        |                            |        |        |
|      |                          |        |        |                            |        |        |
|      |                          |        |        |                            |        |        |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

RI = 300 is withdrawal limit at all power levels.

Oconee 1 Cycle 21  
Rod Index Setpoints  
3 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-50 Rev 17

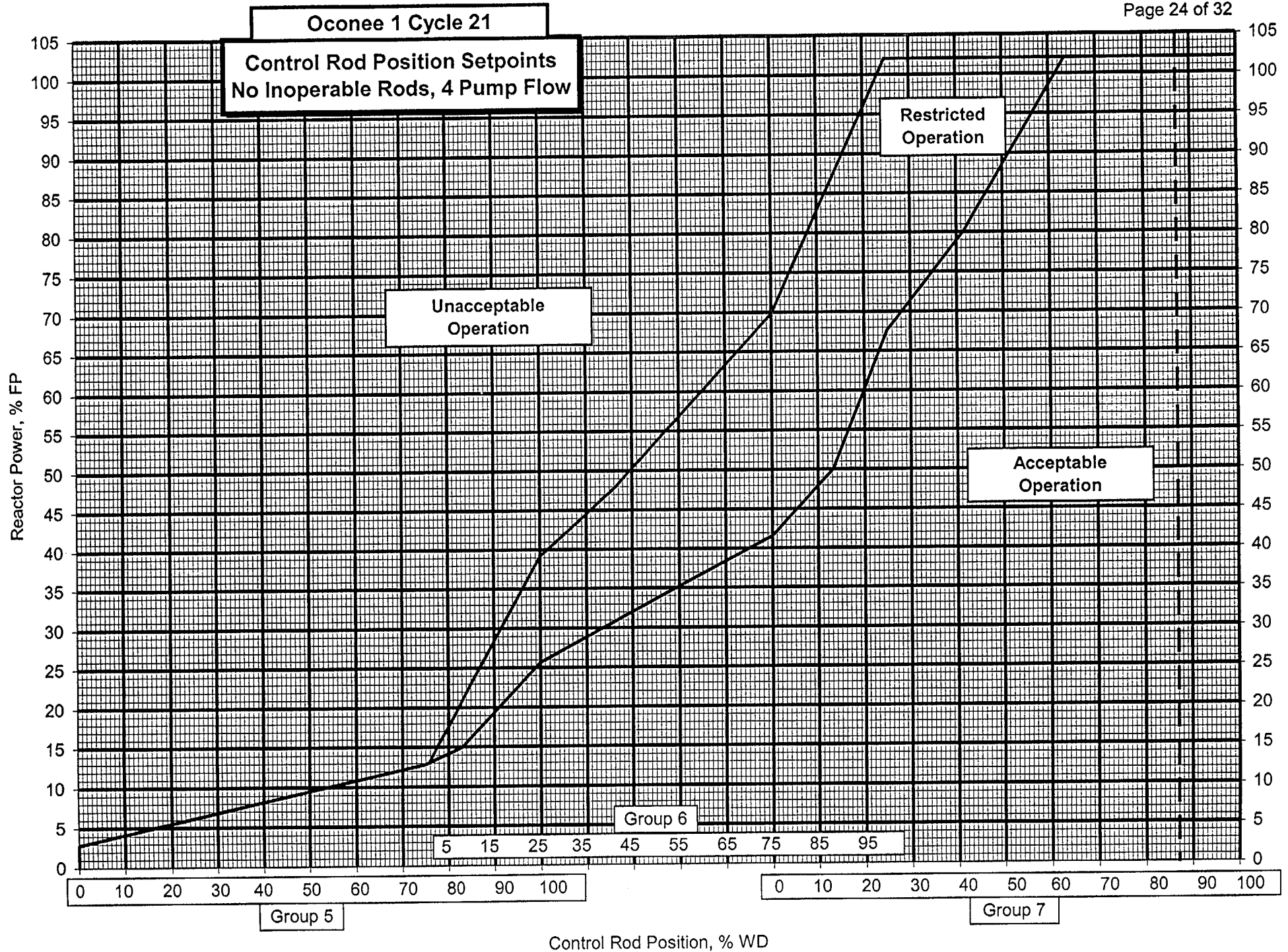
Page 22 of 32

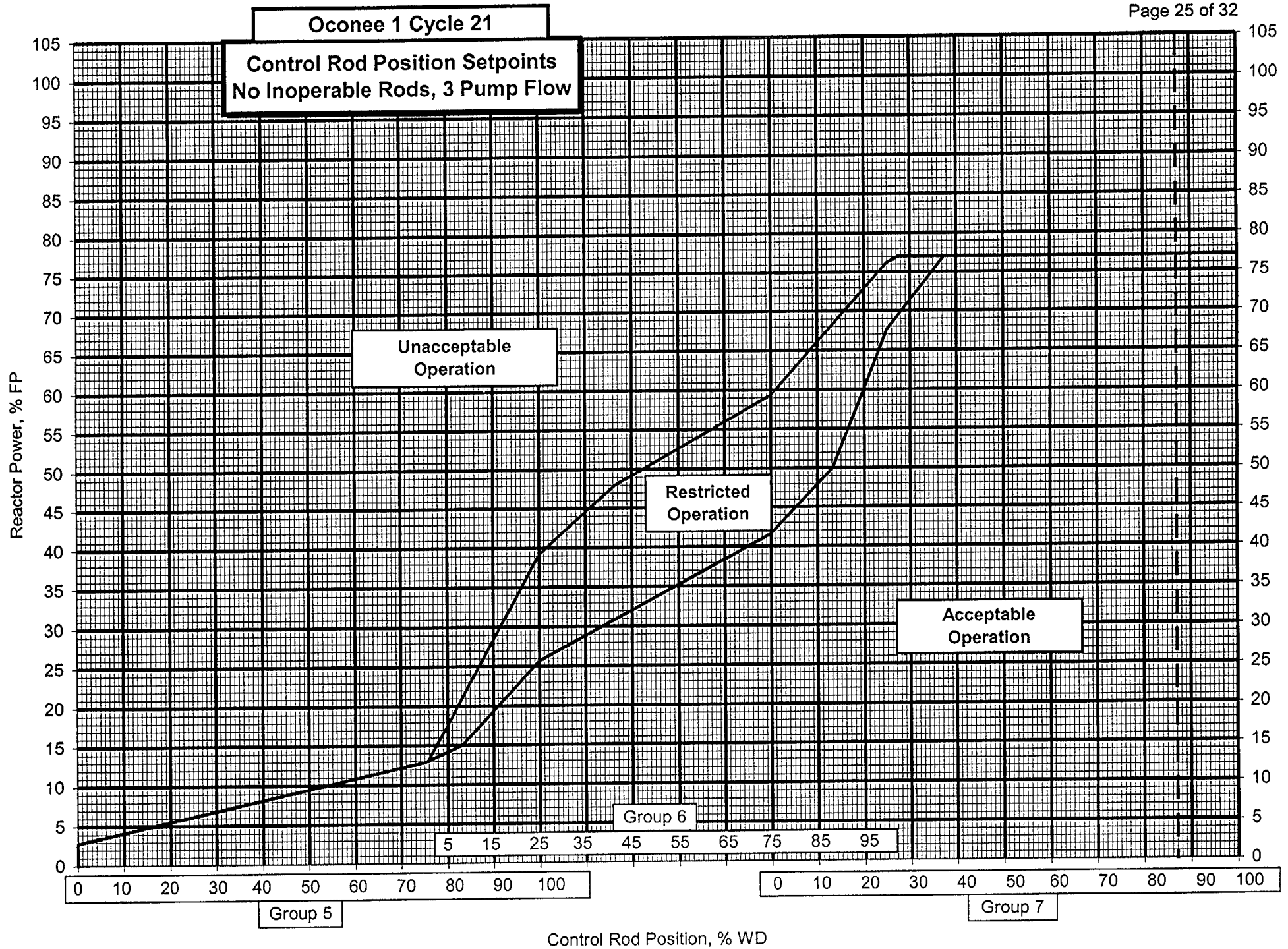
| % FP | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |
|------|--------------------------|--------|--------|----------------------------|--------|--------|
|      | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
| 77   | 100                      | 100    | 85.2   | 100                        | 100    | 85.2   |
| 76   | 100                      | 100    | 83.4   | 100                        | 100    | 83.4   |
| 75   | 100                      | 100    | 81.5   | 100                        | 100    | 81.5   |
| 74   | 100                      | 100    | 79.6   | 100                        | 100    | 79.6   |
| 73   | 100                      | 100    | 77.8   | 100                        | 100    | 77.8   |
| 72   | 100                      | 100    | 75.9   | 100                        | 100    | 75.9   |
| 71   | 100                      | 100    | 74.1   | 100                        | 100    | 74.1   |
| 70   | 100                      | 100    | 72.2   | 100                        | 100    | 72.2   |
| 69   | 100                      | 100    | 70.4   | 100                        | 100    | 70.4   |
| 68   | 100                      | 100    | 68.5   | 100                        | 100    | 68.5   |
| 67   | 100                      | 100    | 66.7   | 100                        | 100    | 66.7   |
| 66   | 100                      | 100    | 64.8   | 100                        | 100    | 64.8   |
| 65   | 100                      | 100    | 63.0   | 100                        | 100    | 63.0   |
| 64   | 100                      | 100    | 61.1   | 100                        | 100    | 61.1   |
| 63   | 100                      | 100    | 59.3   | 100                        | 100    | 59.3   |
| 62   | 100                      | 100    | 57.4   | 100                        | 100    | 57.4   |
| 61   | 100                      | 100    | 55.6   | 100                        | 100    | 55.6   |
| 60   | 100                      | 100    | 53.7   | 100                        | 100    | 53.7   |
| 59   | 100                      | 100    | 51.9   | 100                        | 100    | 51.9   |
| 58   | 100                      | 100    | 50.0   | 100                        | 100    | 50.0   |
| 57   | 100                      | 100    | 48.2   | 100                        | 100    | 48.2   |
| 56   | 100                      | 100    | 46.3   | 100                        | 100    | 46.3   |
| 55   | 100                      | 100    | 44.5   | 100                        | 100    | 44.5   |
| 54   | 100                      | 100    | 42.6   | 100                        | 100    | 42.6   |
| 53   | 100                      | 100    | 40.8   | 100                        | 100    | 40.8   |
| 52   | 100                      | 100    | 38.9   | 100                        | 100    | 38.9   |
| 51   | 100                      | 100    | 37.1   | 100                        | 100    | 37.1   |
| 50   | 100                      | 100    | 35.2   | 100                        | 100    | 35.2   |
| 49   | 100                      | 100    | 33.4   | 100                        | 100    | 33.4   |
| 48   | 100                      | 100    | 31.5   | 100                        | 100    | 31.5   |
| 47   | 100                      | 100    | 29.5   | 100                        | 100    | 29.5   |
| 46   | 100                      | 100    | 27.5   | 100                        | 100    | 27.5   |
| 45   | 100                      | 100    | 25.5   | 100                        | 100    | 25.5   |
| 44.8 | 100                      | 100    | 25.0   | 100                        | 100    | 25.0   |
| 44   | 100                      | 99.2   | 24.2   | 100                        | 99.2   | 24.2   |
| 43   | 100                      | 98.2   | 23.2   | 100                        | 98.2   | 23.2   |
| 42   | 100                      | 97.2   | 22.2   | 100                        | 97.2   | 22.2   |
| 41   | 100                      | 96.2   | 21.2   | 100                        | 96.2   | 21.2   |
| 40   | 100                      | 95.2   | 20.2   | 100                        | 95.2   | 20.2   |
| 39   | 100                      | 94.2   | 19.2   | 100                        | 94.2   | 19.2   |
| 38   | 100                      | 93.2   | 18.2   | 100                        | 93.2   | 18.2   |
| 37   | 100                      | 92.2   | 17.2   | 100                        | 92.2   | 17.2   |
| 36   | 100                      | 91.2   | 16.2   | 100                        | 91.2   | 16.2   |
| 35   | 100                      | 90.2   | 15.2   | 100                        | 90.2   | 15.2   |
| 34   | 100                      | 89.2   | 14.2   | 100                        | 89.2   | 14.2   |
| 33   | 100                      | 88.2   | 13.2   | 100                        | 88.2   | 13.2   |
| 32   | 100                      | 87.2   | 12.2   | 100                        | 87.2   | 12.2   |
| 31   | 100                      | 86.2   | 11.2   | 100                        | 86.2   | 11.2   |
| 30   | 100                      | 85.2   | 10.2   | 100                        | 85.2   | 10.2   |
| 29   | 100                      | 84.2   | 9.2    | 100                        | 84.2   | 9.2    |
| 28   | 100                      | 83.2   | 8.2    | 100                        | 83.2   | 8.2    |
| 27   | 100                      | 82.2   | 7.2    | 100                        | 82.2   | 7.2    |
| 26   | 100                      | 81.2   | 6.2    | 100                        | 81.2   | 6.2    |
| 25   | 100                      | 80.2   | 5.2    | 100                        | 80.2   | 5.2    |
| 24   | 100                      | 79.2   | 4.2    | 100                        | 79.2   | 4.2    |
| % FP | CRGP 5                   | CRGP 6 | CRGP 7 | CRGP 5                     | CRGP 6 | CRGP 7 |
|      | Shutdown Margin Setpoint |        |        | Operational Alarm Setpoint |        |        |

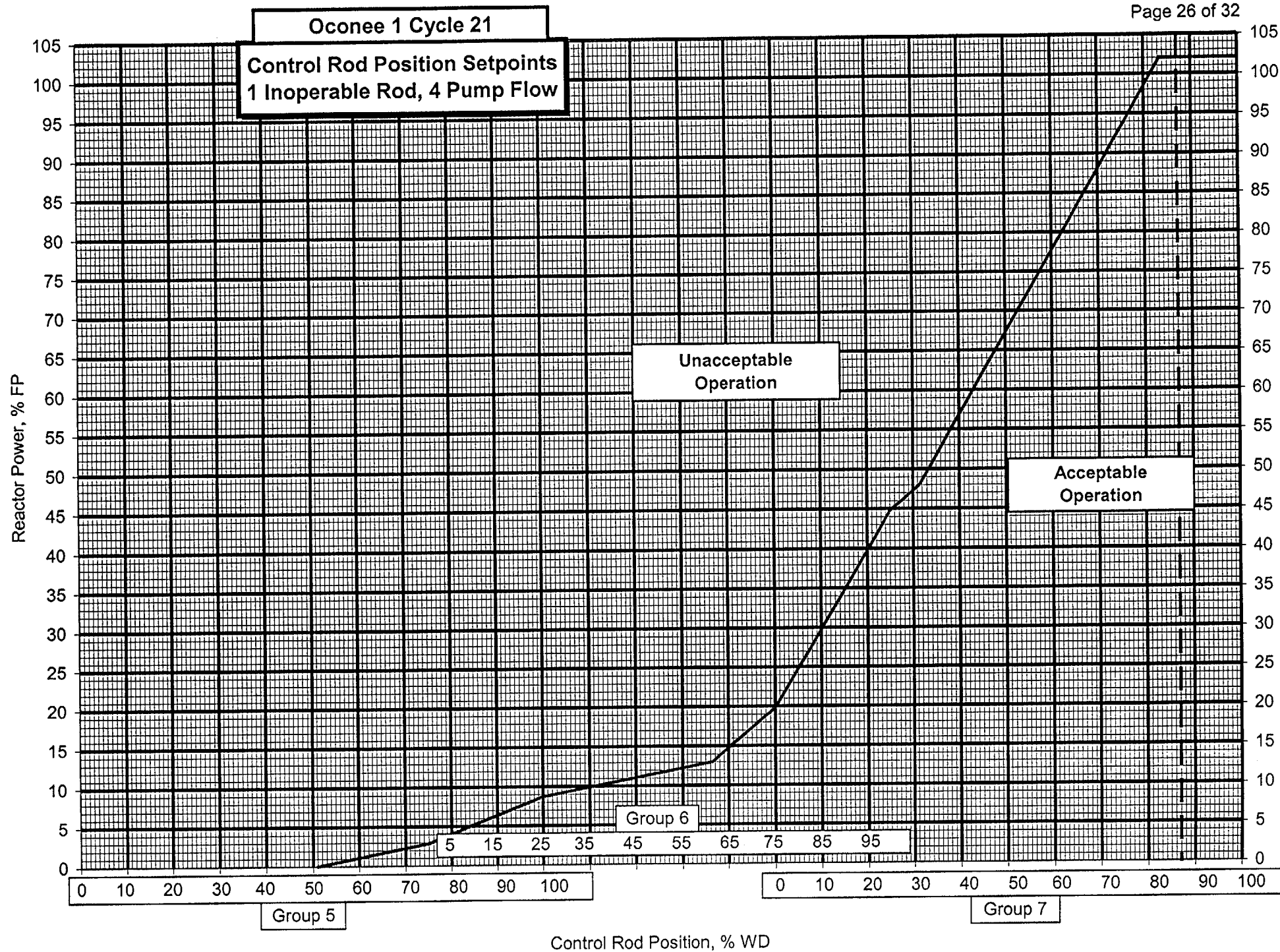
RI = 300 is withdrawal limit at all power levels.

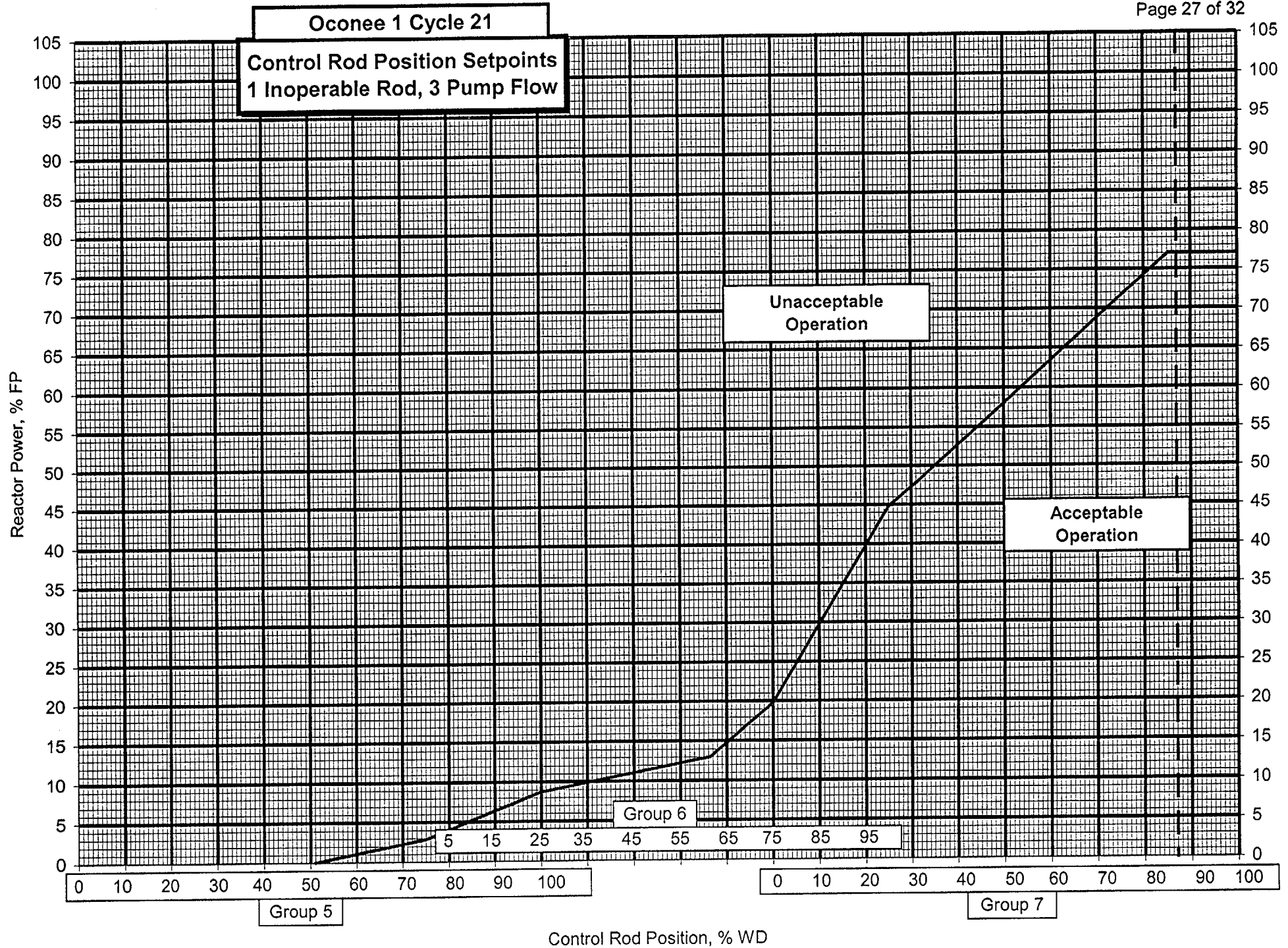
Continued on next page.

RI = 300 is withdrawal limit at all power levels.









## Oconee 1 Cycle 21

### 2.0 Core Operating Limits -- Not Error Adjusted

The data provided on the following pages satisfies a licensing commitment to identify specific parameters before instrumentation uncertainties are incorporated.

References provided in section 1 of this COLR identify the sources for the data which follows.

Information provided in this section should not be used in plant procedures.

### Quadrant Power Tilt Limits

Referred to by ITS 3.2.3.

|                        | Steady State |        | Transient |        | Maximum |
|------------------------|--------------|--------|-----------|--------|---------|
| Core Power Level, %FP  | 30 - 100     | 0 - 30 | 30 - 100  | 0 - 30 | 0 - 100 |
| Quadrant Power Tilt, % | 5.28         | 10.00  | 9.44      | 12.00  | 20.00   |

### Variable Low RCS Pressure Protective Limits

Referred to by ITS 2.1.1.

| Core Outlet Pressure<br>psia | Reactor Coolant Outlet Temperature, °F |             |
|------------------------------|--|-------------|
|                              | 3 RCS Pumps                            | 4 RCS Pumps |
| 1800                         | 581.0                                  | 578.3       |
| 1900                         | 590.0                                  | 587.3       |
| 2000                         | 598.9                                  | 596.3       |
| 2100                         | 607.9                                  | 605.2       |
| 2200                         | 616.9                                  | 614.2       |
| 2300                         | 625.9                                  | 623.2       |

# Oconee 1 Cycle 21

## Axial Power Imbalance Protective Limits

Referred to by ITS 2.1.1

Not for Plant Use

|         | %FP  | RPS   | Operational |
|---------|------|-------|-------------|
| 4 Pumps | 0    | -48.0 | -40.6       |
|         | 80   | -     | -40.6       |
|         | 90   | -     | -37.4       |
|         | 100  | -48.0 | -27.8       |
|         | 112  | -31.1 | -           |
|         | 112  | 31.1  | -           |
|         | 100  | 48.0  | 30.0        |
|         | 90   | -     | 39.0        |
|         | 80   | -     | 41.2        |
|         | 0    | 48.0  | 41.2        |
| 3 Pumps | 0    | -48.0 | -40.6       |
|         | 74.6 | -48.0 | -           |
|         | 77.0 | -     | -40.6       |
|         | 86.6 | -31.1 | -           |
|         | 86.6 | 31.1  | -           |
|         | 77.0 | -     | 41.2        |
|         | 74.6 | 48.0  | -           |
|         | 0    | 48.0  | 41.2        |

# Oconee 1 Cycle 21

## Rod Index Limits

Referred to by ITS 3.2.1

Not for Plant Use

|         | %FP | Operational RI<br>Insertion Limit | Shutdown Margin RI<br>No Inop Rod | Insertion Limit<br>1 Inop Rod | RI Withdrawal<br>Limit |
|---------|-----|-----------------------------------|-----------------------------------|-------------------------------|------------------------|
| 4 Pumps | 102 | 262                               | 220                               | 280                           | 300                    |
|         | 100 | 260                               | -                                 | -                             | 300                    |
|         | 90  | 250                               | -                                 | -                             | 300                    |
|         | 80  | 240                               | -                                 | -                             | 300                    |
|         | 50  | 200                               | 140                               | 230                           | 300                    |
|         | 15  | 90                                | 75                                | 160                           | 300                    |
|         | 5   | 0                                 | 0                                 | 75                            | 300                    |
| 3 Pumps | 77  | 236                               | 220                               | 280                           | 300                    |
|         | 50  | 200                               | 140                               | 230                           | 300                    |
|         | 15  | 90                                | 75                                | 160                           | 300                    |
|         | 5   | 0                                 | 0                                 | 75                            | 300                    |

# Oconee 1 Cycle 21

## LOCA Limits



| Core Elevation<br>Feet      |       | LOCA LHR kw/ft Limit Versus Burnup |            |            |
|-----------------------------|-------|------------------------------------|------------|------------|
| Mk-B10F and<br>Mk-B10L Fuel |       | 0 GWd/mtU                          | 30 GWd/mtU | 62 GWd/mtU |
|                             | 0.000 | 15.6                               | 15.6       | 11.6       |
|                             | 2.506 | 16.5                               | 16.5       | 11.6       |
|                             | 4.264 | 16.8                               | 16.8       | 11.6       |
|                             | 6.021 | 17.0                               | 17.0       | 11.6       |
|                             | 7.779 | 17.0                               | 17.0       | 11.6       |
|                             | 9.536 | 16.7                               | 16.7       | 11.6       |
|                             | 12.00 | 15.8                               | 15.8       | 11.6       |
| Mk-B11 Fuel                 |       | 0 GWd/mtU                          | 40 GWd/mtU | 62 GWd/mtU |
|                             | 0.000 | 15.5                               | 15.5       | 12.6       |
|                             | 2.506 | 16.3                               | 16.3       | 12.6       |
|                             | 4.264 | 16.5                               | 16.5       | 12.6       |
|                             | 6.021 | 16.8                               | 16.8       | 12.6       |
|                             | 7.779 | 16.5                               | 16.5       | 12.6       |
|                             | 9.536 | 16.2                               | 16.2       | 12.6       |
|                             | 12.00 | 15.4                               | 15.4       | 12.6       |

Oconee 1 Cycle 21

Not for Plant Use  
Instrument uncertainties are not included in the values shown.

| $\Delta T_{cold}$ , °F | 4 RCP Operation - Loop Average Temp., °F | 3 RCP Operation - Loop Average Temp., °F |
|------------------------|--|--|
|                        | Tavg (Analytical)                        | Tavg (Analytical)                        |
| 0.0                    | <581.0                                   | <581.0                                   |
| 0.1                    | <581.0                                   | <581.0                                   |
| 0.2                    | <581.1                                   | <581.0                                   |
| 0.3                    | <581.1                                   | <581.1                                   |
| 0.4                    | <581.2                                   | <581.1                                   |
| 0.5                    | <581.2                                   | <581.1                                   |
| 0.6                    | <581.2                                   | <581.1                                   |
| 0.7                    | <581.3                                   | <581.2                                   |
| 0.8                    | <581.3                                   | <581.2                                   |
| 0.9                    | <581.3                                   | <581.2                                   |
| 1.0                    | <581.4                                   | <581.2                                   |
| 1.1                    | <581.4                                   | <581.2                                   |
| 1.2                    | <581.5                                   | <581.3                                   |
| 1.3                    | <581.5                                   | <581.3                                   |
| 1.4                    | <581.5                                   | <581.3                                   |
| 1.5                    | <581.6                                   | <581.3                                   |
| 1.6                    | <581.6                                   | <581.4                                   |
| 1.7                    | <581.6                                   | <581.4                                   |
| 1.8                    | <581.7                                   | <581.4                                   |
| 1.9                    | <581.7                                   | <581.4                                   |
| 2.0                    | <581.8                                   | <581.4                                   |
| 2.1                    | <581.8                                   | <581.5                                   |
| 2.2                    | <581.8                                   | <581.5                                   |
| 2.3                    | <581.9                                   | <581.5                                   |
| 2.4                    | <581.9                                   | <581.5                                   |
| 2.5                    | <582.0                                   | <581.6                                   |
| 2.6                    | <582.0                                   | <581.6                                   |
| 2.7                    | <582.0                                   | <581.6                                   |
| 2.8                    | <582.1                                   | <581.6                                   |
| 2.9                    | <582.1                                   | <581.6                                   |
| 3.0                    | <582.1                                   | <581.7                                   |
| 3.1                    | <582.2                                   | <581.7                                   |
| 3.2                    | <582.2                                   | <581.7                                   |
| 3.3                    | <582.3                                   | <581.7                                   |
| 3.4                    | <582.3                                   | <581.7                                   |
| 3.5                    | <582.3                                   | <581.8                                   |
| 3.6                    | <582.4                                   | <581.8                                   |
| 3.7                    | <582.4                                   | <581.8                                   |
| 3.8                    | <582.4                                   | <581.8                                   |
| 3.9                    | <582.5                                   | <581.9                                   |
| 4.0                    | <582.5                                   | <581.9                                   |
| 4.1                    | <582.6                                   | <581.9                                   |
| 4.2                    | <582.6                                   | <581.9                                   |
| 4.3                    | <582.6                                   | <581.9                                   |
| 4.4                    | <582.7                                   | <582.0                                   |
| 4.5                    | <582.7                                   | <582.0                                   |
| 4.6                    | <582.7                                   | <582.0                                   |
| 4.7                    | <582.8                                   | <582.0                                   |
| 4.8                    | <582.8                                   | <582.1                                   |
| 4.9                    | <582.9                                   | <582.1                                   |
| 5.0                    | <582.9                                   | <582.1                                   |