

**Duke Power Company**

**Oconee 3 Cycle 18**

**Core Operating Limits Report**

**QA Condition 1**

Prepared By: Joy D. Forster

Date: 22 FEB 99

Checked By: G. Michael Presnell

Date: 2/22/99

Approved By: R. R. St. Clair

Date: 2/26/99

# Oconee 3 Cycle 18

## Core Operating Limits Report

### Insertion Sheet for Revision 10

This revision is effective after the ITS implementation.  
This revision supercedes Revision 9 for Oconee 3 Cycle 18 operation.

Remove these revision 9 pages

1 - 38

Insert these revision 10 pages

1 - 31

### Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
Oconee 3 cycle 18 revisions below					
10	Mar-99	1 - 31	-	32 - 38	31
9	Oct-98	1 - 38	-	-	38
Oconee 3 cycle 17 revisions below					
8	Mar-98	1, 2, 3, 5, 13 16, 17, 32, 36			38
7	Dec-96	1 - 38	-	-	38
Oconee 3 cycle 16 revisions below					
6	Sep-95	1, 2, 3, 9, 28, 29, 30 31	-	-	38
5	Jun-95	1, 2, 3, 7	-	-	38
4	May-95	1 - 33	34 - 38	-	38

## Oconee 3 Cycle 18

### 1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O3C18 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, 2, 3, and 4. The RPS protective limits and maximum allowable setpoints are as of this revision is effective after the ITS implementation. use in O3C18 by references 5 and 8. The O3C18 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.

The error adjusted core operating limits included in section 1 of the report incorporate all necessary uncertainties and margins required for operation of the O3C18 reload core.

### 1.1 References

1. Nuclear Design Methodology Using CASMO-3 / SIMULATE-3P, DPC-NE-1004A, November 1992.
2. Oconee Nuclear Station Reload Design Methodology II, DPC-NE-1002A, October 1985.
3. Oconee Nuclear Station Reload Design Methodology, NFS-1001A, April 1984.
4. ONS Core Thermal Hydraulic Methodology Using VIPRE-01, DPC-NE-2003A, July 1989.
5. O3C18 Maneuvering Analysis, OSC-7091, Revision 2, February 1999.
6. Variable Low Pressure Safety Limit, OSC-4048, Revision 3, July 1998.
7. Power Imbalance Safety Limits and Tech Spec Setpoints Using Error Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 1, January 1999.
8. O3C18 Specific DNB Analysis, OSC-7138, Revision 1, August 1998.
9. O3C18 Reload Safety Evaluation and 50.59, OSC-7235, Revision 0, September 1998.

## Oconee 3 Cycle 18

### 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  $+0.9 \times 10^{-4} \Delta k/k/^{\circ}F$  at power levels less than 95% and less than or equal to  $0.0 \Delta k/k/^{\circ}F$  at power levels greater than or equal to 95%.  
Referred to by ITS 3.1.3.

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 $\geq 2070$ psig
3 RCP:	measured hot leg pressure $\geq 2100$ psig

DNB parameter for RCS loop average temperature shall be: Loop Tavg  $\leq 581.0^{\circ}F$   
Referred to by ITS 3.4.1.

**Note 1:** Non-zero  $\Delta T_c$  operation is not allowed unless the max loop Tavg remains below  $581.0^{\circ}F$ .

**Note 2:** The measured value must be less than the temperature given above by an amount equal to the uncertainty corresponding to the instrument from which it is read.

DNB parameter for RCS loop total flow shall be:

4 RCP:	measured $\geq 109.5$ %df
3 RCP:	measured $\geq 74.7$ % of the 4 RCP minimum flow

Referred to by ITS 3.4.1.

Regulating rod groups shall be withdrawn in sequence starting with Group 5, then 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 3 Cycle 18

### Steady State Operating Band

EFPD	Rod Index		APSR %WD	
	Min	Max	Min	Max
0 to 450	292 ± 5	300	30	40
450 to EOC	292 ± 5	300	100	100

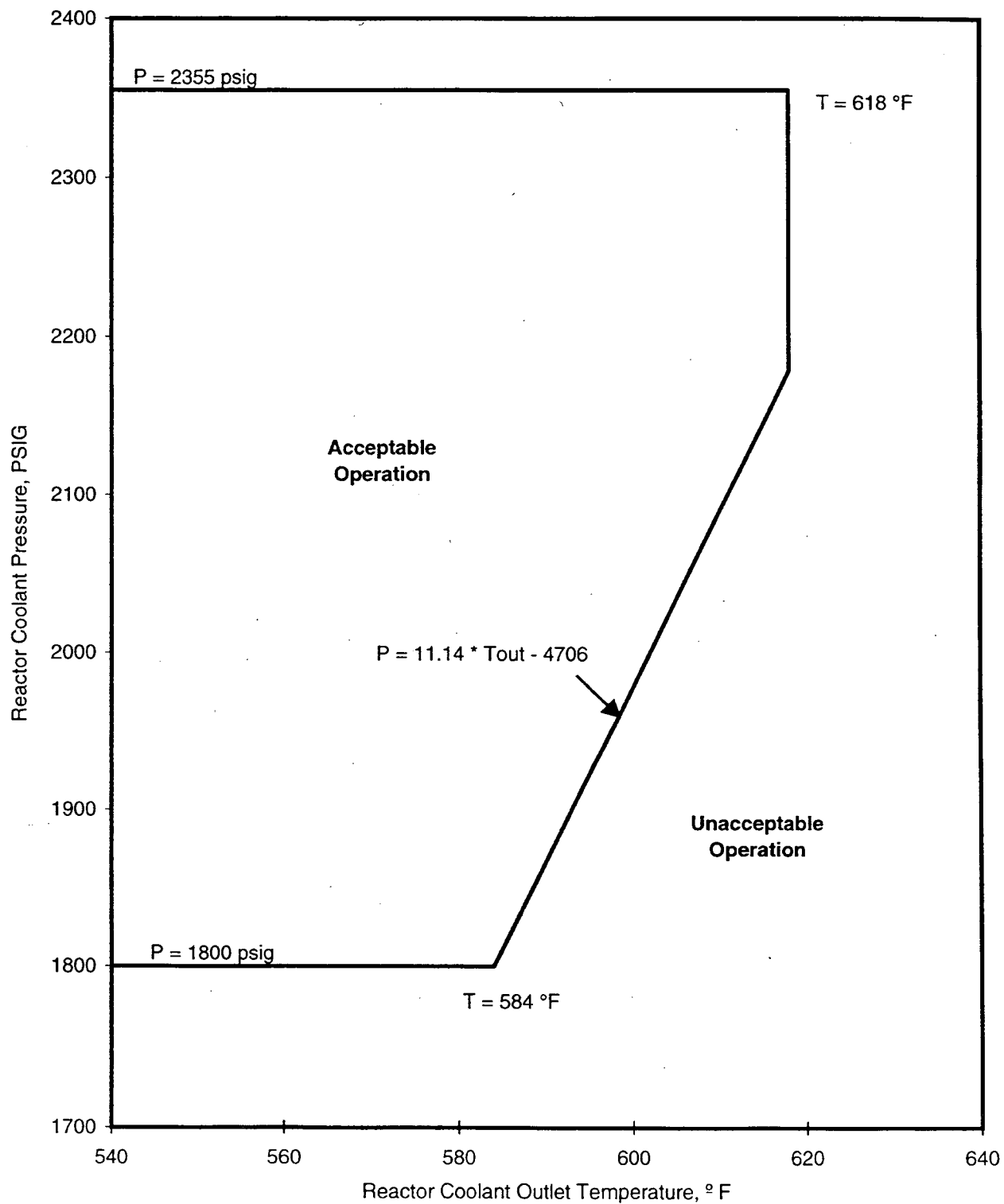
### Quadrant Power Tilt Setpoints

Core Power Level, %FP	Steady State		Transient		Maximum 0 - 100
	30 - 100	0 - 30	30 - 100	0 - 30	
Full Incore	3.50	8.03	7.53	9.82	16.97
Out of Core	1.97	6.09	5.63	7.72	14.22
Backup Incore	1.61	3.94	3.64	5.03	9.58

Referred to by ITS 3.2.3.

Oconee 3 Cycle 18  
Variable Low RCS Pressure RPS Setpoints

Referred to by ITS 3.3.1



# Oconee 3 Cycle 18

## 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

# Oconee 3 Cycle 18

## Operational Power Imbalance Setpoints

	%FP	Full Incore	Backup Incore	Out of Core
4 Pumps	0	-31.5	-31.2	-31.5
	80	-31.5	-31.2	-31.5
	90	-27.4	-27.1	-27.4
	100	-19.1	-18.9	-19.1
	102	-17.0	-17.0	-17.0
	102	17.0	16.8	17.0
	100	17.3	16.8	17.3
	90	17.3	16.8	17.3
	80	23.1	22.5	23.1
	0	23.1	22.5	23.1
3 Pumps	0	-31.5	-31.2	-31.5
	63.3	-31.5	-	-31.5
	63.6	-	-31.2	-
	77	-17.0	-17.0	-17.0
	77	17.0	16.8	17.0
	71.8	-	22.5	-
	71.2	23.1	-	23.1
	0	23.1	22.5	23.1



Oconee 3 Cycle 18

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	-17.00	17.00	-17.00	17.00
101	-21.73	21.73	-18.05	17.15	-18.05	17.15
100	-22.80	22.80	-19.10	17.30	-19.10	17.30
99	-23.86	23.86	-19.93	17.30	-19.93	17.30
98	-24.92	24.92	-20.76	17.30	-20.76	17.30
97	-25.99	25.99	-21.59	17.30	-21.59	17.30
96	-27.05	27.05	-22.42	17.30	-22.42	17.30
95	-28.11	28.11	-23.25	17.30	-23.25	17.30
94	-29.17	29.17	-24.08	17.30	-24.08	17.30
93	-30.24	30.24	-24.91	17.30	-24.91	17.30
92	-31.30	31.30	-25.74	17.30	-25.74	17.30
91	-32.36	32.36	-26.57	17.30	-26.57	17.30
90.4	-33.00	33.00	-27.07	17.30	-27.07	17.30
90	-33.00	33.00	-27.40	17.30	-27.40	17.30
89	-33.00	33.00	-27.81	17.88	-27.81	17.88
88	-33.00	33.00	-28.22	18.46	-28.22	18.46
87	-33.00	33.00	-28.63	19.04	-28.63	19.04
86	-33.00	33.00	-29.04	19.62	-29.04	19.62
85	-33.00	33.00	-29.45	20.20	-29.45	20.20
84	-33.00	33.00	-29.86	20.78	-29.86	20.78
83	-33.00	33.00	-30.27	21.36	-30.27	21.36
82	-33.00	33.00	-30.68	21.94	-30.68	21.94
81	-33.00	33.00	-31.09	22.52	-31.09	22.52
80	-33.00	33.00	-31.50	23.10	-31.50	23.10
0	-33.00	33.00	-31.50	23.10	-31.50	23.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 3 Cycle 18

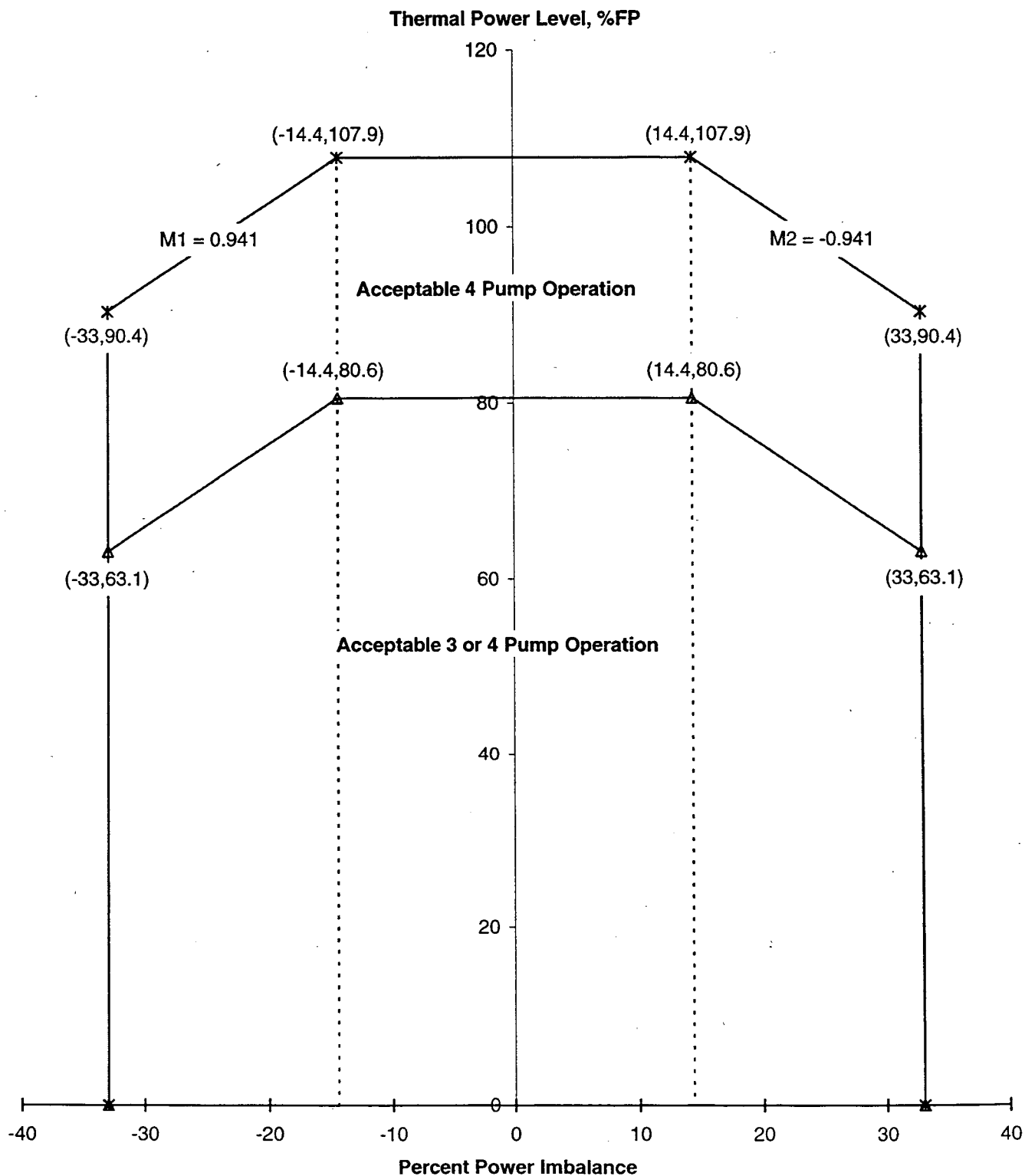
Operational Power Imbalance Setpoints

Operation with 3 RCS Pumps, BOC to EOC

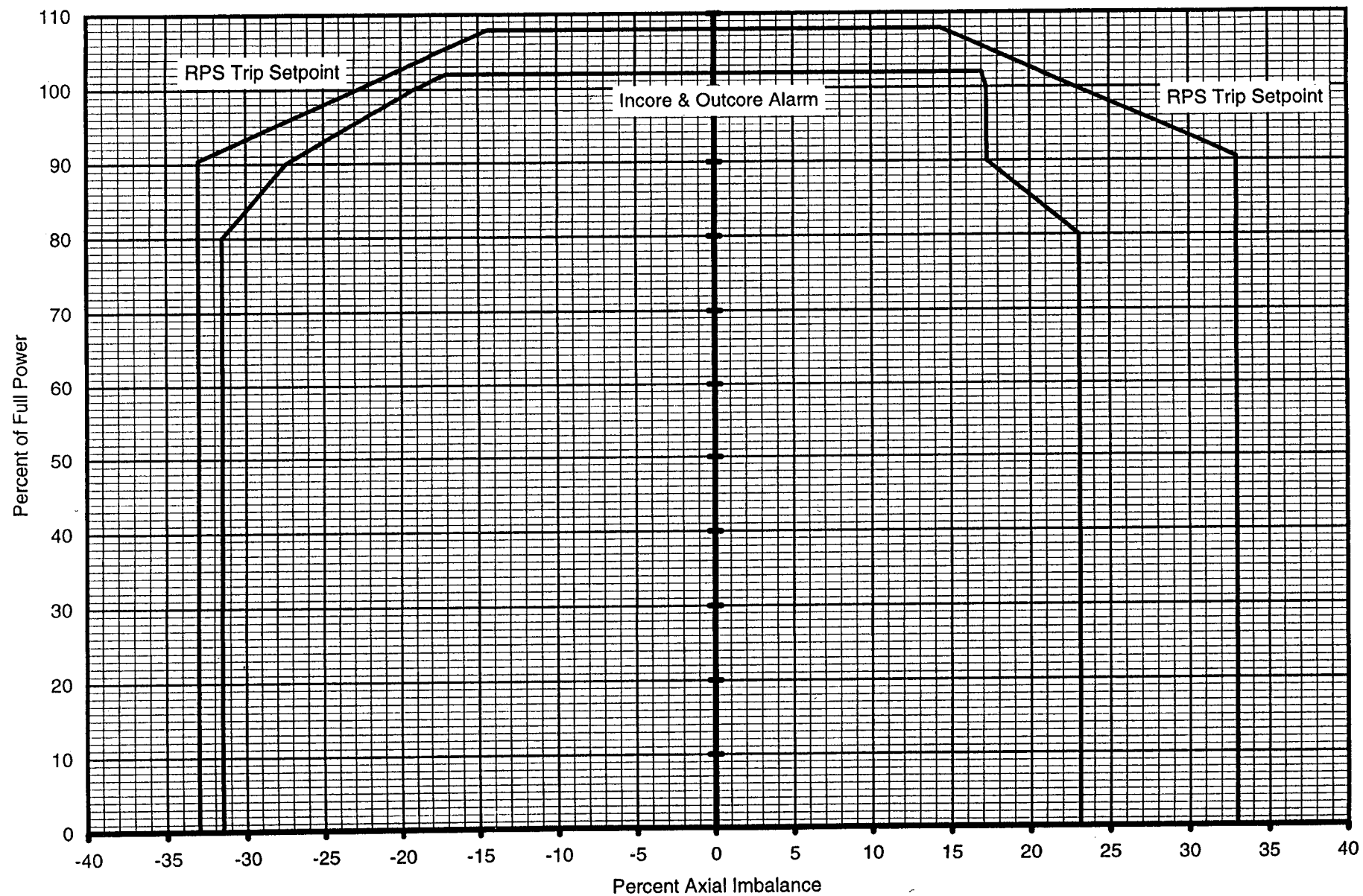
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	
80.6	-14.40	14.40				
80	-15.04	15.04				
79	-16.10	16.10				
78	-17.16	17.16				
77.0	-18.23	18.23	-17.00	17.00	-17.00	17.00
76	-19.29	19.29	-18.06	18.06	-18.06	18.06
75	-20.35	20.35	-19.12	19.12	-19.12	19.12
74	-21.41	21.41	-20.18	20.18	-20.18	20.18
73	-22.48	22.48	-21.23	21.23	-21.23	21.23
72	-23.54	23.54	-22.29	22.29	-22.29	22.29
71.2	-24.35	24.35	-23.10	23.10	-23.10	23.10
71	-24.60	24.60	-23.35	23.10	-23.35	23.10
70	-25.67	25.67	-24.41	23.10	-24.41	23.10
69	-26.73	26.73	-25.47	23.10	-25.47	23.10
68	-27.79	27.79	-26.53	23.10	-26.53	23.10
67	-28.85	28.85	-27.58	23.10	-27.58	23.10
66	-29.92	29.92	-28.64	23.10	-28.64	23.10
65	-30.98	30.98	-29.70	23.10	-29.70	23.10
64	-32.04	32.04	-30.76	23.10	-30.76	23.10
63.3	-32.79	32.79	-31.50	23.10	-31.50	23.10
63.1	-33.00	33.00	-31.50	23.10	-31.50	23.10
63	-33.00	33.00	-31.50	23.10	-31.50	23.10
62	-33.00	33.00	-31.50	23.10	-31.50	23.10
61	-33.00	33.00	-31.50	23.10	-31.50	23.10
60	-33.00	33.00	-31.50	23.10	-31.50	23.10
0	-33.00	33.00	-31.50	23.10	-31.50	23.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

# Oconee 3 Cycle 18 RPS Power Imbalance Setpoints

Referred to by ITS 3.3.1

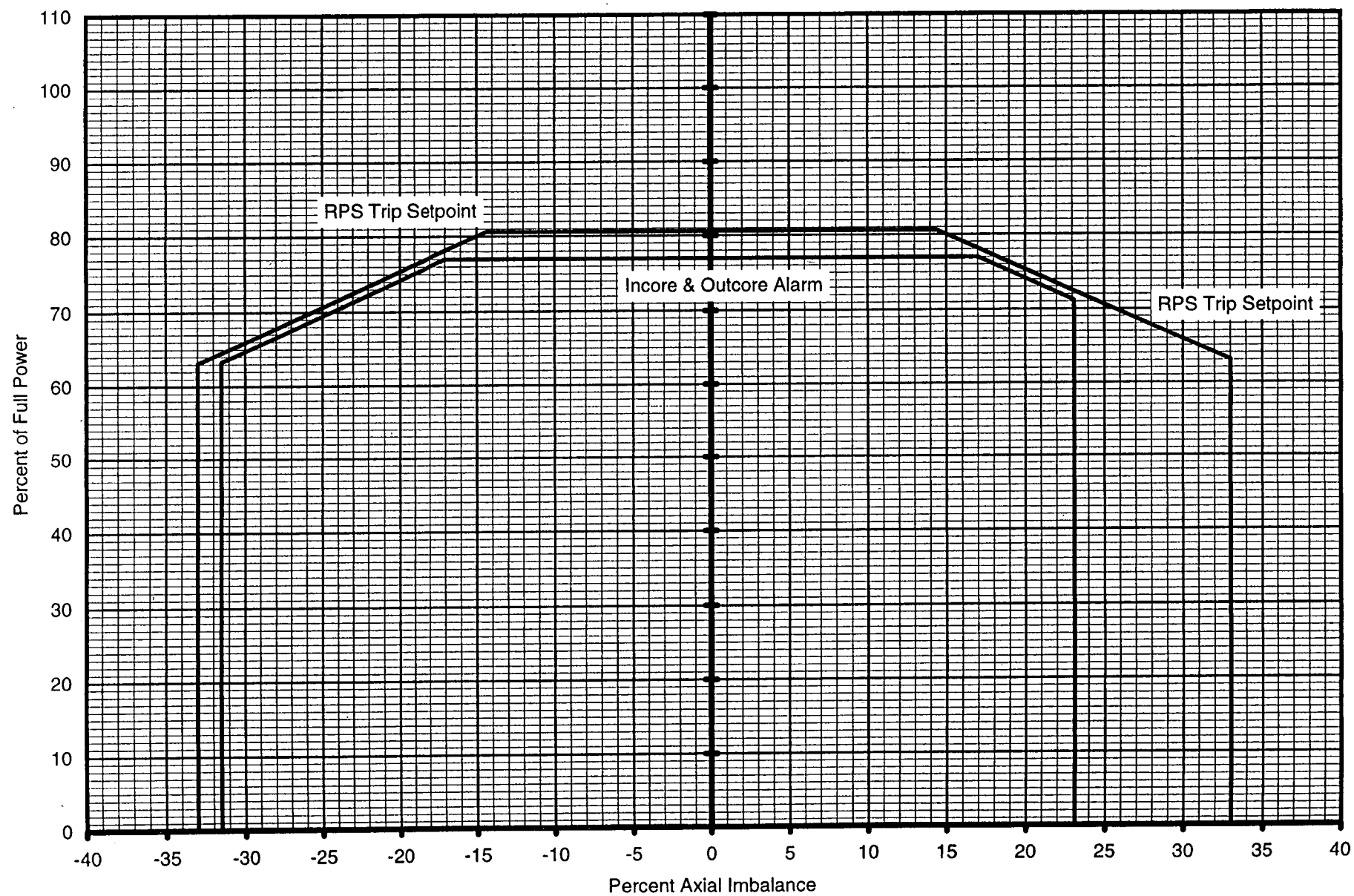


Oconee 3 Cycle 18  
Imbalance Setpoints for 4 Pump Operation, BOC to EOC



## Oconee 3 Cycle 18

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



### Oconee 3 Cycle 18

#### 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 3 Cycle 18

## 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

Oconee 3 Cycle 18  
Rod Index Setpoints  
4 Pump Operation, No Inoperable Rods, BOC to EOC

ONEI-0400-70 Rev 10  
Page 16 of 31

% 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		

RI = 300 is withdrawal limit at all power levels.

Continued on next page.



Oconee 3 Cycle 18  
Rod Index Setpoints

ONEI-0400-70 Rev 10

Page 17 of 31

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.

Oconee 3 Cycle 18  
Rod Index Setpoints

ONEI-0400-70 Rev 10  
Page 18 of 31

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		

RI = 300 is withdrawal limit at all power levels.

Continued on next page.

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

Page 19 of 31

RI = 300 is withdrawal limit at all power levels.

Oconee 3 Cycle 18  
Rod Index Setpoints  
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-70 Rev 10  
Page 20 of 31

% 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 3 Cycle 18  
Rod Index Setpoints  
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-70 Rev 10  
Page 21 of 31

% 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 3 Cycle 18  
Rod Index Setpoints  
3 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-70 Rev 10  
Page 22 of 31

% 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		

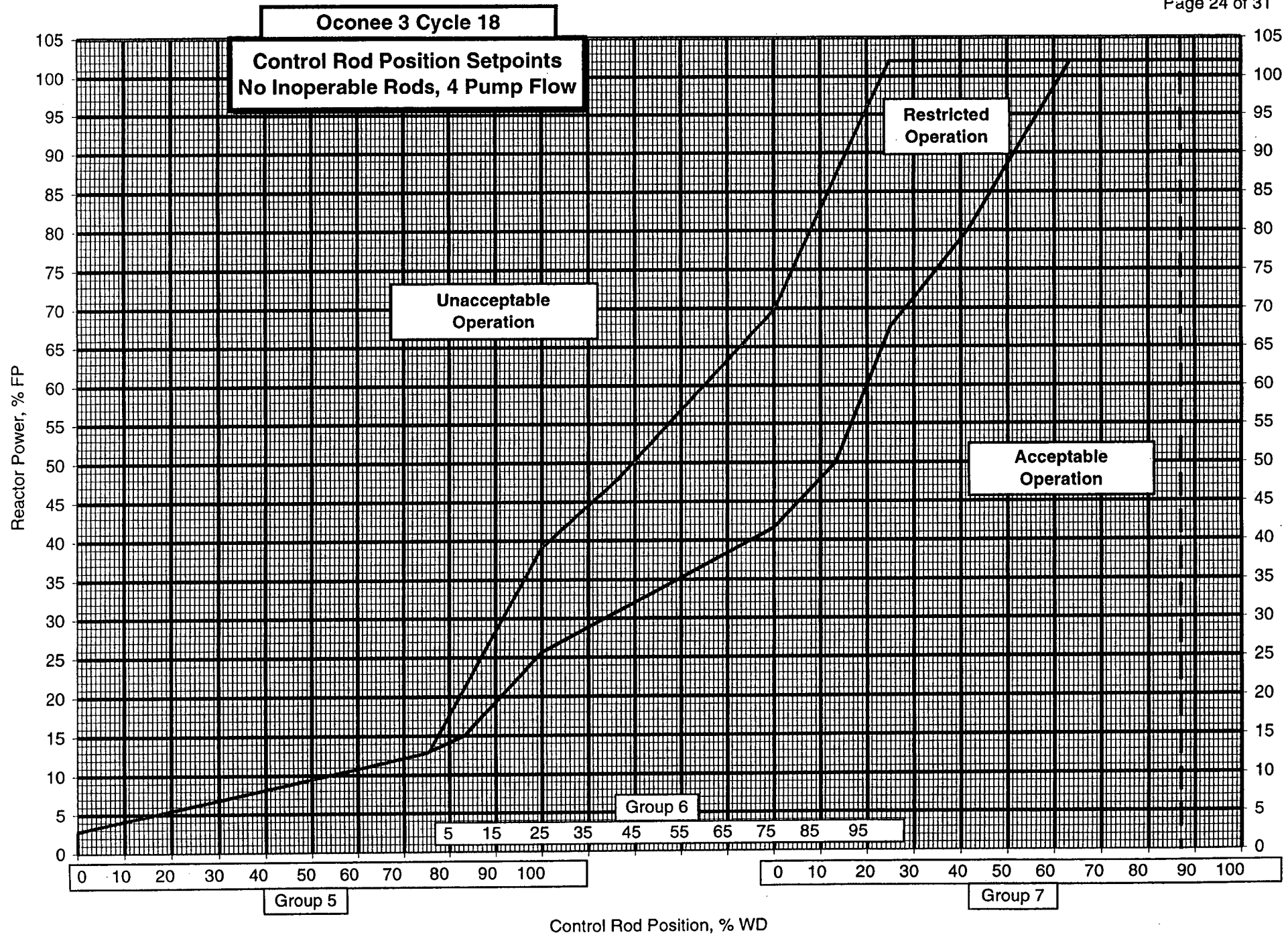
RI = 300 is withdrawal limit at all power levels.

Continued on next page.

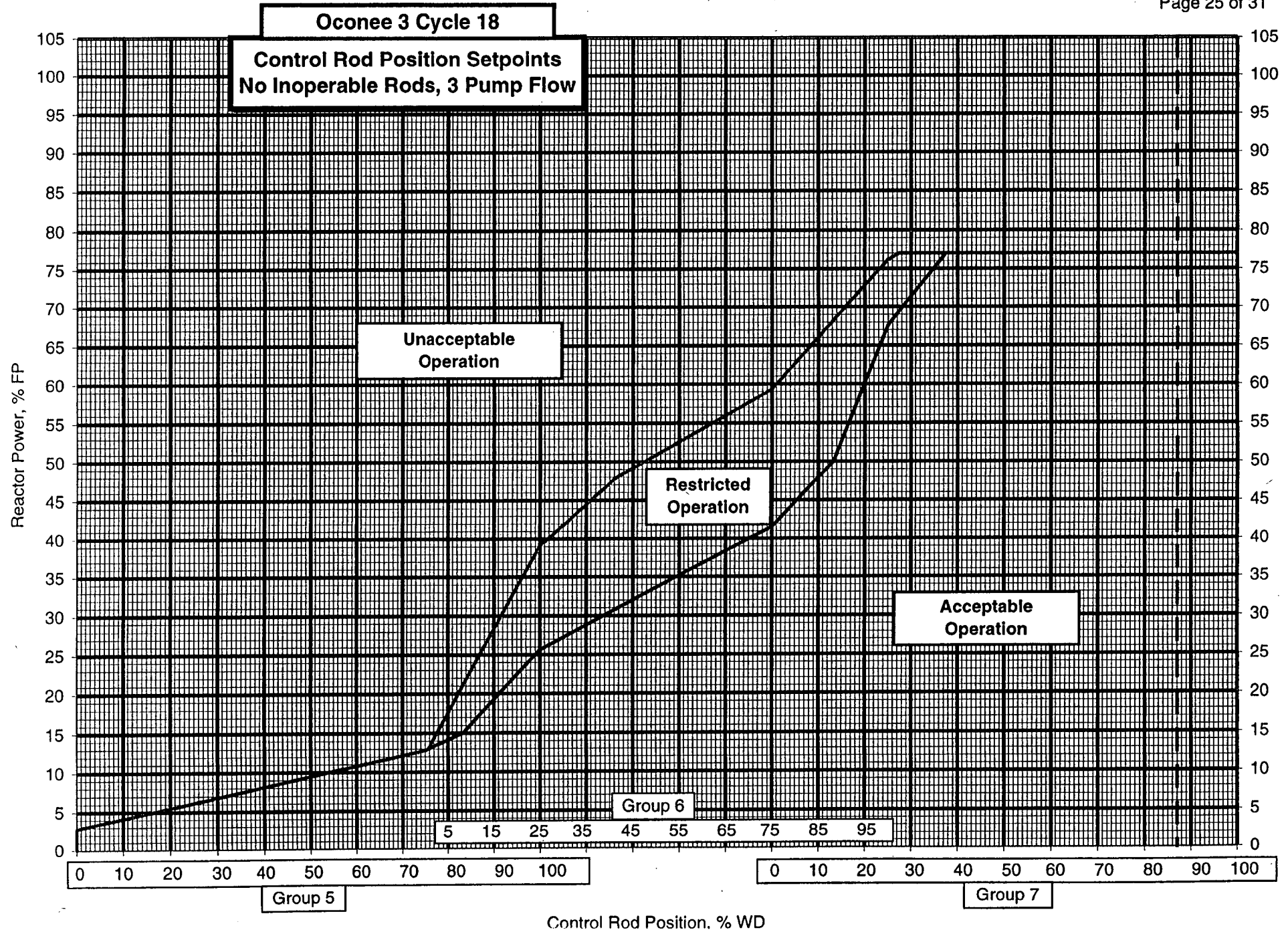
### 3 Pump Operation, 1 Inoperable Rod, BOC to EOC

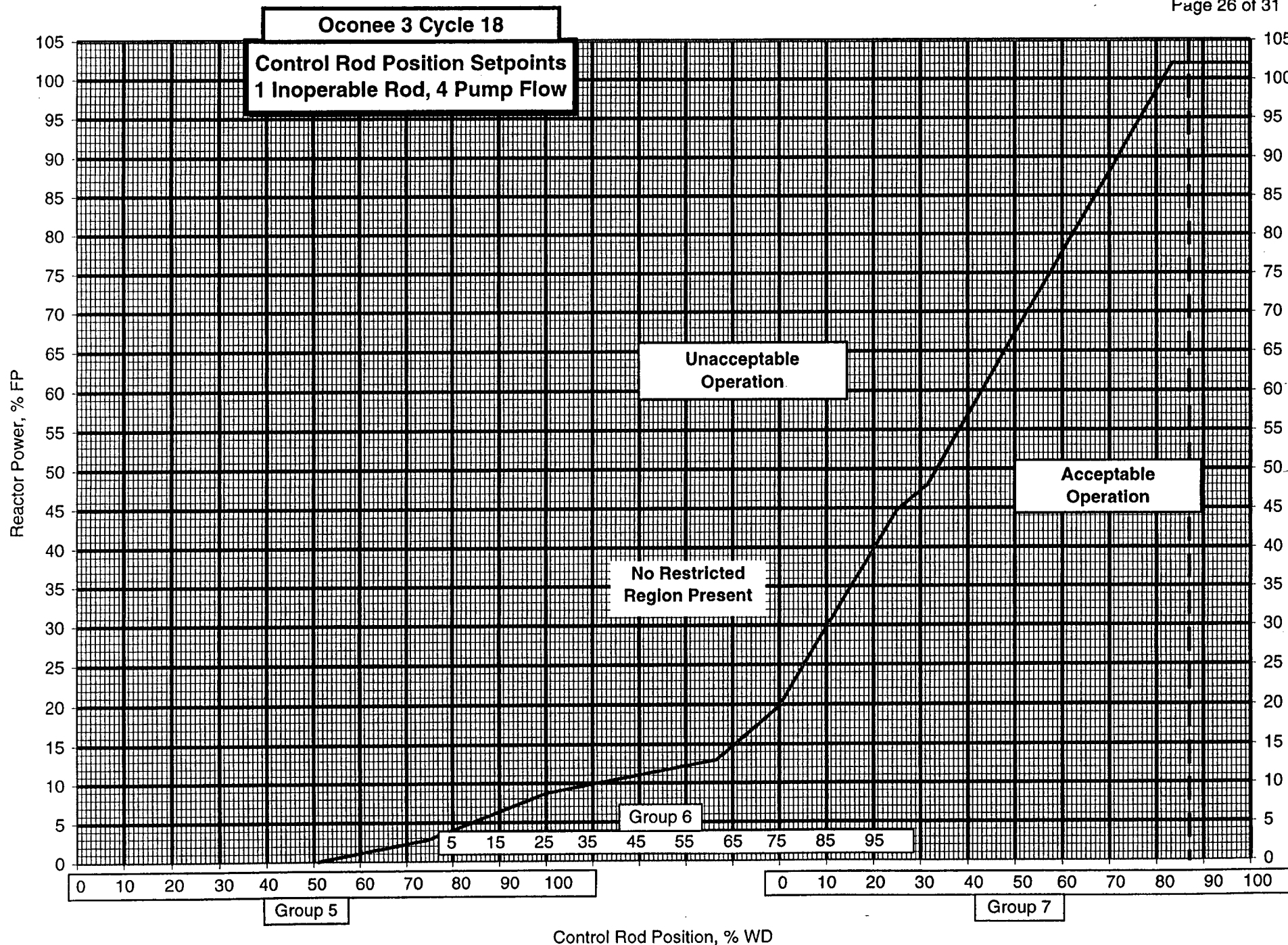
Page 23 of 31

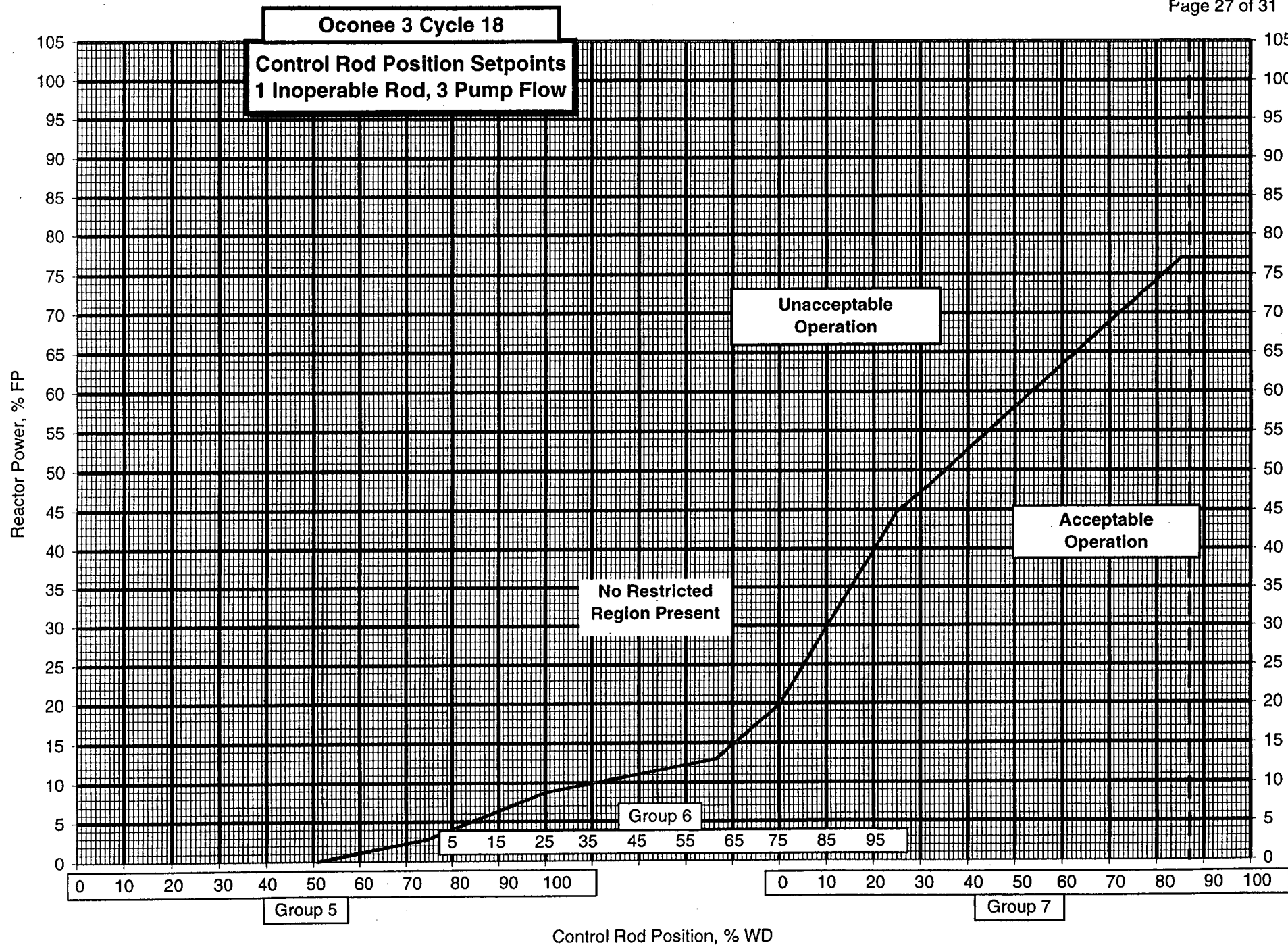
$R1 = 300$  is withdrawal limit at all power levels.











## Oconee 3 Cycle 18

### 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, %	4.93	10.00	9.44	12.00	20.00

### Variable Low RCS Pressure Protective Limits

Referred to by ITS 2.1.1

Core Outlet Pressure 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 3 Cycle 18

## Axial Power Imbalance Protective Limits

Referred to by ITS 2.1.1

**Not for Plant Use**

	%FP	RPS	Operational
4 Pumps	0	-48.0	-43.8
	80	-	-43.8
	90	-	-39.4
	100	-48.0	-30.0
	112	-31.1	-
	112	31.1	-
	100	48.0	30.0
	90	-	27.2
	80	-	33.5
	0	48.0	33.5
3 Pumps	0	-48.0	-43.8
	74.6	-48.0	-
	77.0	-	-43.8
	86.6	-31.1	-
	86.6	31.1	-
	77.0	-	33.5
	74.6	48.0	-
	0	48.0	33.5

# Oconee 3 Cycle 18

## Rod Index Limits

Referred to by ITS 3.2.1

Not for Plant Use

	%FP	Operational RI Insertion Limit	Shutdown Margin RI No Inop Rod	Insertion Limit 1 Inop Rod	RI Withdrawal 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 3 Cycle 18

LOCA Limits

Not for Plant Use

Mk-B10L Fuel	Core Elevation (ft)	LOCA LHR kw/ft Limit Versus Burnup		
		0 GWd/mtU	30 GWd/mtU	62 GWd/mtU
	0.000	16.2	16.2	11.9
	2.506	17.0	17.0	11.9
	4.264	17.3	17.3	11.9
	6.021	17.3	17.3	11.9
	7.779	17.3	17.3	11.9
	9.536	17.0	17.0	11.9
	12.000	16.2	16.2	11.9