Duke Power Company

Oconee 1 Cycle 18

Core Operating Limits Report

QA Condition 1

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Approved By: K. K. St. Clair Date: 2/26/99

Oconee 1 Cycle 18

Core Operating Limits Report

Insertion Sheet for Revision 10

This revision is effective upon ITS implementation. This revision supersedes Revision 9 for Oconee 1 Cycle 18 operation.

Remove these revision 9 pages	Insert these revision 10 pages
1 - 38	1 - 31

Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
Oconee 1 Cycle 18 revisions below					
10	Mar-99	1 - 31	-	32 - 38	31
9	Feb-98	1-3, 5, 13, 16, 17, 32, 36	-	-	38
8	Nov-97	1-3, 5, 10, 32	37	-	38
7	Aug-97	1 - 38	-	-	38
Oconee 1 Cycle 17 revisions below					
6	Nov-95	1-33	34-38	-	38
Oconee 1 Cycle 16 revisions below					
5	Sep-95	1-3, 11	-	-	34
4	Mar-95	1-3, 12, 19, 22-25	-	-	34
3	Jan-95	1-3, 12, 19, 22-25	-	-	34
2	Jun-94	1-3, 10, 17	-	-	34
1	May-94	1-4, 15	4a	-	34
0	Apr-94	-	1-33	-	33

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1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O1C18 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 documented in references 6 and 7. These limits are validated for use in O1C18 by references 5 and 8. The O1C18 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 (Fz) 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 O1C18 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. O1C18 Maneuvering Analysis, OSC-6672, Revision 6, 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. O1C18 Specific DNB Analysis, OSC-6729, Revision 2, November 1997.
9. O1C18 Reload Safety Evaluation, OSC-6907, Revision 3, July 1998.

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Miscellaneous Setpoints

BWST boron concentration shall be greater than 2210 ppm and less than 3000 ppm.
Referred to by ITS 3.5.4.

Spent Fuel Pool boron concentration shall be greater than 2210 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 2210 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 $+0.9 \times 10^{-4}$ $\Delta k/k/°F$ at power levels less than 95% and less than or equal to 0.0 $\Delta k/k/°F$ 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 °F
Referred to by ITS 3.4.1.

> ***Note 1:*** Non-zero ΔTc operation is not allowed unless the max loop Tavg remains below 581.0 °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:
Referred to by ITS 3.4.1.

4 RCP:	measured $\geq$ 110.5 %df
3 RCP:	measured $\geq$ 74.7 % of the 4 RCP minimum flows

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% ± 5% between two sequential groups.
Referred to by ITS 3.2.1.

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Steady State Operating Band

EFPD	Rod Index Min	Rod Index Max	APSR %WD Min	APSR %WD Max
0 to 444	292 ± 5	300	30	40
444 to EOC	292 ± 5	300	100	100

Quadrant Power Tilt Setpoints

Core Power Level, %FP	Steady State 30 - 100	Steady State 0 - 30	Transient 30 - 100	Transient 0 - 30	Maximum 0 - 100
Full Incore	3.50	7.57	7.07	9.36	16.51
Out of Core	2.18	6.09	5.63	7.72	14.22
Backup Incore	2.20	3.87	3.63	4.82	10.08

Referred to by ITS 3.2.3.

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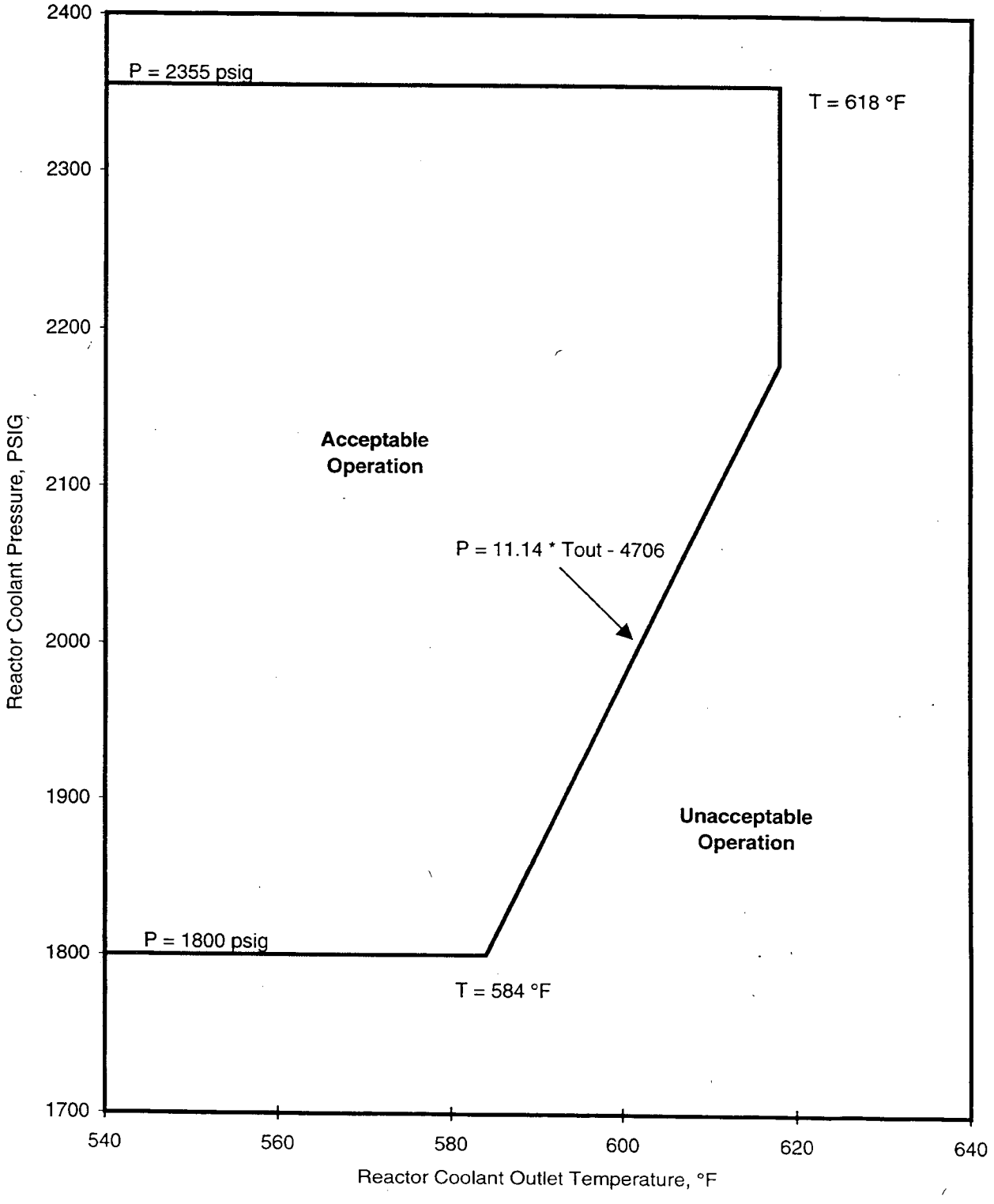
Variable Low RCS Pressure RPS Setpoints

Referred to by ITS 3.3.1



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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

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Operational Power Imbalance Setpoints

	%FP	Full Incore	Backup Incore	Out of Core
4 Pumps	0	-31.5	-31.0	-31.5
	80	-31.5	-31.0	-31.5
	90	-27.6	-27.1	-27.6
	100	-19.1	-18.7	-19.1
	102	-17.0	-17.0	-17.0
	102	17.0	17.0	17.0
	100	19.1	18.7	19.1
	90	21.2	20.6	21.2
	80	22.0	21.2	22.0
	0	22.0	21.2	22.0
3 Pumps	0.0	-31.5	-31.0	-31.5
	63.3	-31.5	-	-31.5
	63.8	-	-31.0	-
	77.0	-17.0	-17.0	-17.0
	77.0	17.0	17.0	17.0
	73.0	-	21.2	-
	72.3	22.0	-	22.0
	0.0	22.0	21.2	22.0

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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	18.05	-18.05	18.05
100	-22.80	22.80	-19.10	19.10	-19.10	19.10
99	-23.86	23.86	-19.95	19.31	-19.95	19.31
98	-24.92	24.92	-20.80	19.52	-20.80	19.52
97	-25.99	25.99	-21.65	19.73	-21.65	19.73
96	-27.05	27.05	-22.50	19.94	-22.50	19.94
95	-28.11	28.11	-23.35	20.15	-23.35	20.15
94	-29.17	29.17	-24.20	20.36	-24.20	20.36
93	-30.24	30.24	-25.05	20.57	-25.05	20.57
92	-31.30	31.30	-25.90	20.78	-25.90	20.78
91	-32.36	32.36	-26.75	20.99	-26.75	20.99
90.4	-33.00	33.00	-27.26	21.12	-27.26	21.12
90	-33.00	33.00	-27.60	21.20	-27.60	21.20
89	-33.00	33.00	-27.99	21.28	-27.99	21.28
88	-33.00	33.00	-28.38	21.36	-28.38	21.36
87	-33.00	33.00	-28.77	21.44	-28.77	21.44
86	-33.00	33.00	-29.16	21.52	-29.16	21.52
85	-33.00	33.00	-29.55	21.60	-29.55	21.60
84	-33.00	33.00	-29.94	21.68	-29.94	21.68
83	-33.00	33.00	-30.33	21.76	-30.33	21.76
82	-33.00	33.00	-30.72	21.84	-30.72	21.84
81	-33.00	33.00	-31.11	21.92	-31.11	21.92
80	-33.00	33.00	-31.50	22.00	-31.50	22.00
0	-33.00	33.00	-31.50	22.00	-31.50	22.00
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

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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
72.28	-23.25	23.25	-22.00	22.00	-22.00	22.00
72	-23.54	23.54	-22.29	22.00	-22.29	22.00
71	-24.60	24.60	-23.35	22.00	-23.35	22.00
70	-25.67	25.67	-24.41	22.00	-24.41	22.00
69	-26.73	26.73	-25.47	22.00	-25.47	22.00
68	-27.79	27.79	-26.53	22.00	-26.53	22.00
67	-28.85	28.85	-27.58	22.00	-27.58	22.00
66	-29.92	29.92	-28.64	22.00	-28.64	22.00
65	-30.98	30.98	-29.70	22.00	-29.70	22.00
64	-32.04	32.04	-30.76	22.00	-30.76	22.00
63.3	-32.79	32.79	-31.50	22.00	-31.50	22.00
63.1	-33.00	33.00	-31.50	22.00	-31.50	22.00
63	-33.00	33.00	-31.50	22.00	-31.50	22.00
62	-33.00	33.00	-31.50	22.00	-31.50	22.00
61	-33.00	33.00	-31.50	22.00	-31.50	22.00
60	-33.00	33.00	-31.50	22.00	-31.50	22.00
0	-33.00	33.00	-31.50	22.00	-31.50	22.00
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

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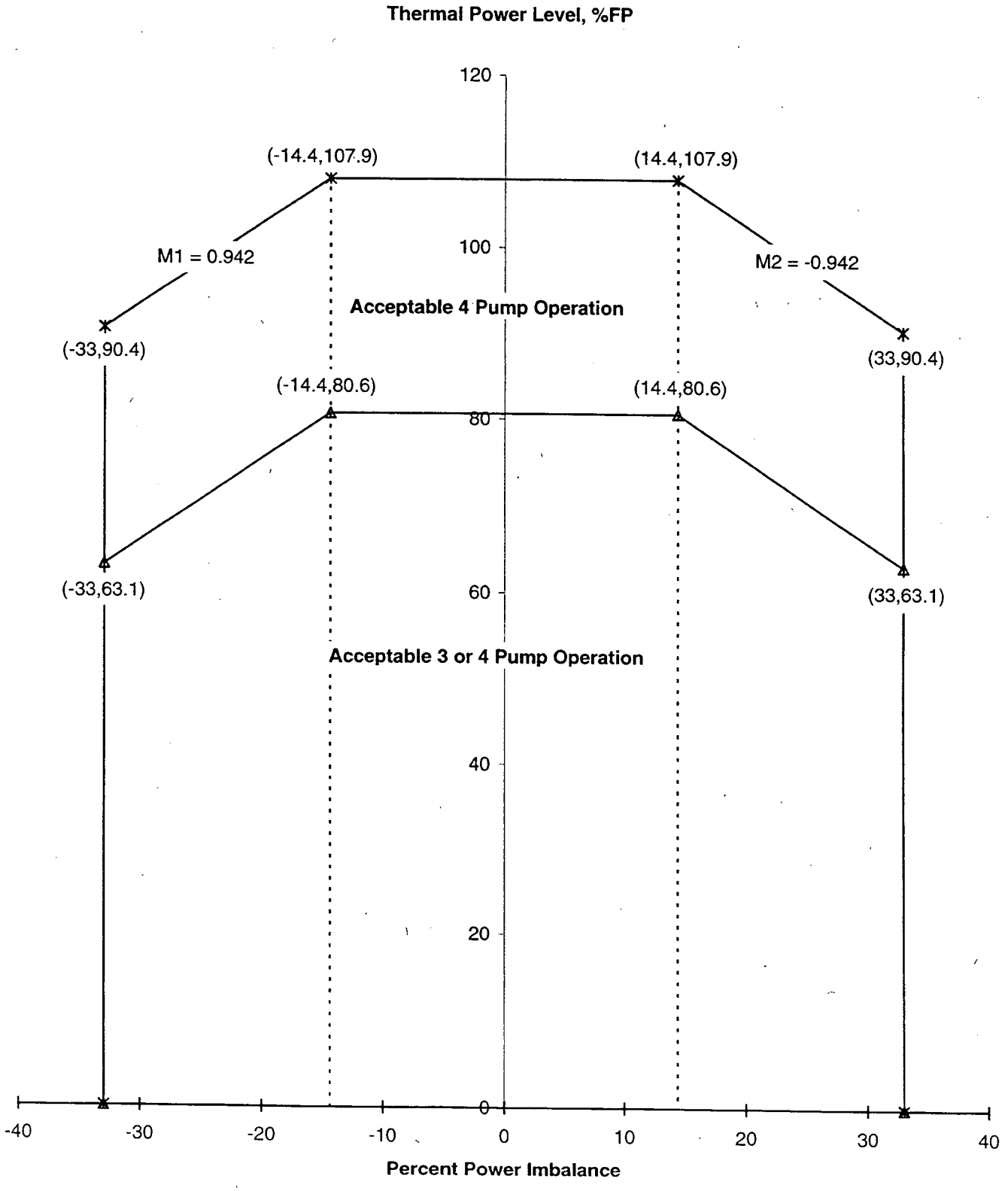
RPS Power Imbalance Setpoints

Referred to by ITS 3.3.1



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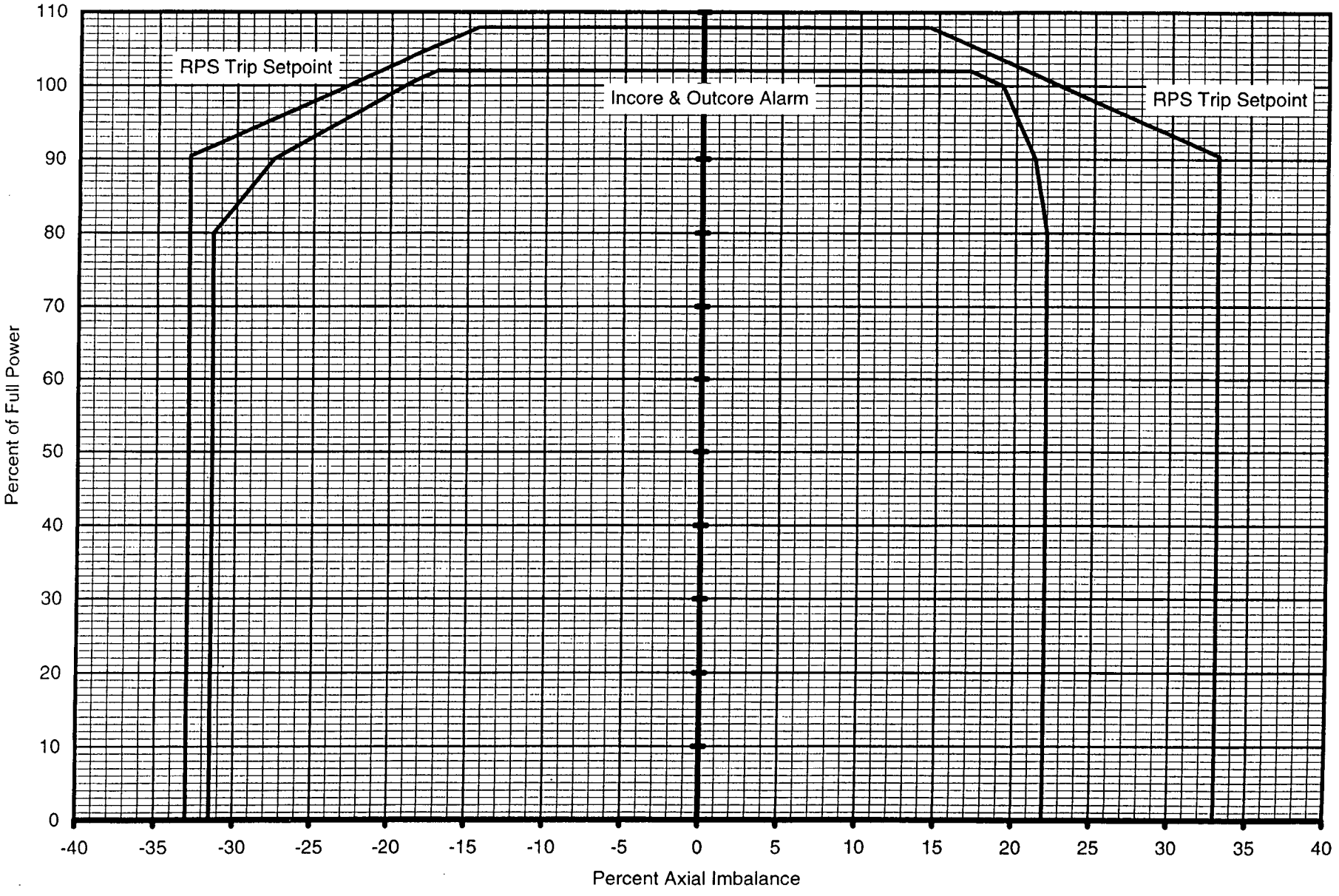
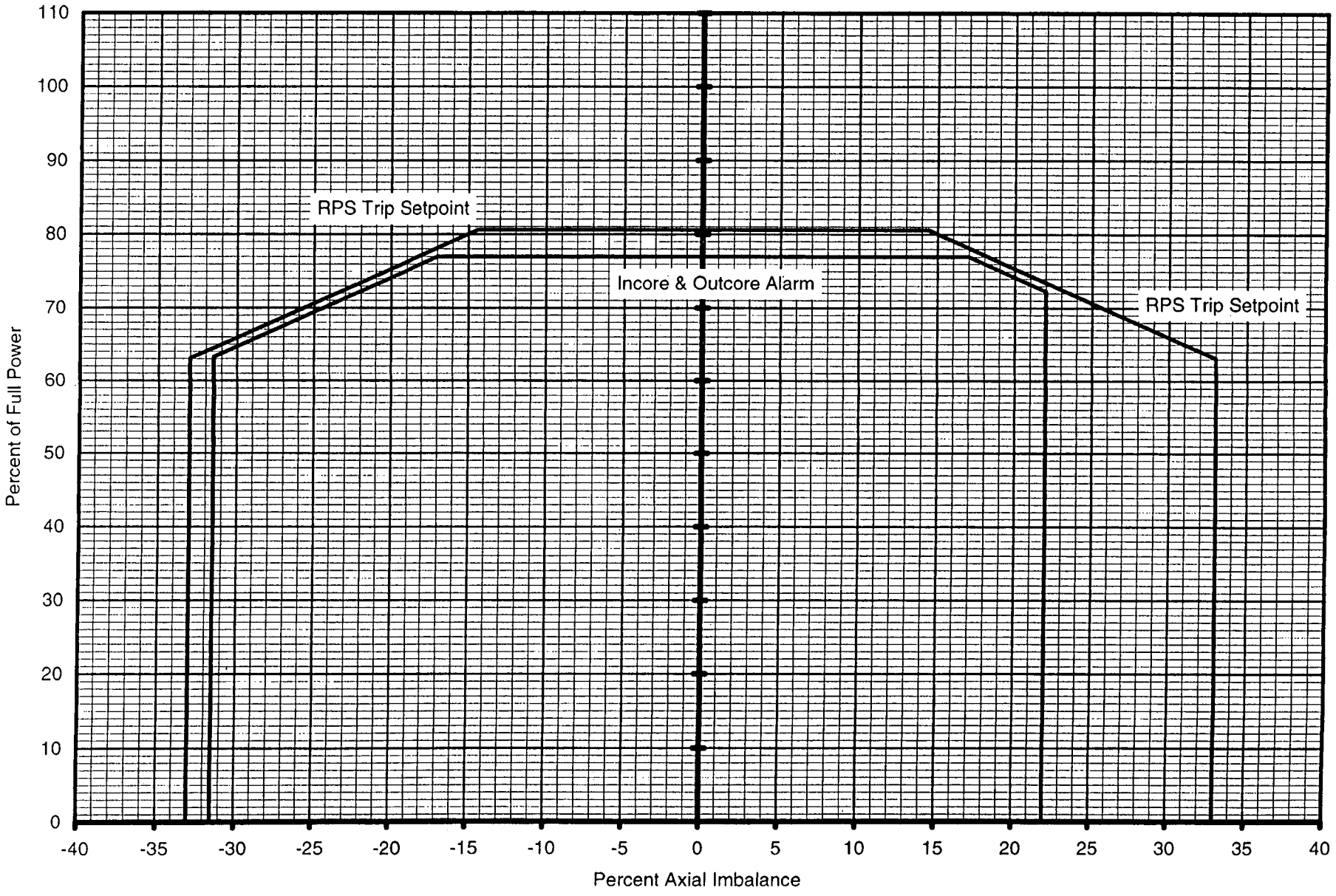
Imbalance Setpoints for 4 Pump Operation, BOC to EOC



Oconee 1 Cycle 18

Imbalance Setpoints for 3 Pump Operation, BOC to EOC



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Operational Rod Index Setpoints

	%FP	RI Insertion Setpoint No Inop Rod	RI Insertion Setpoint 1 Inop Rod	RI Withdrawal Setpoint
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 18

Shutdown Margin Rod Index Setpoints

	%FP	RI Insertion Setpoint No Inop Rod	RI Insertion Setpoint 1 Inop Rod	RI Withdrawal Setpoint
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 1 Cycle 18
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		

RI = 300 is withdrawal limit at all power levels.

Continued on next page.

Oconee 1 Cycle 18
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.

Oconee 1 Cycle 18
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	99.0	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
% 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 18
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
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 1 Cycle 18
Rod Index Setpoints
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

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

% 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 18
Rod Index Setpoints
3 Pump Operation, 1 Inoperable Rod, 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	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		

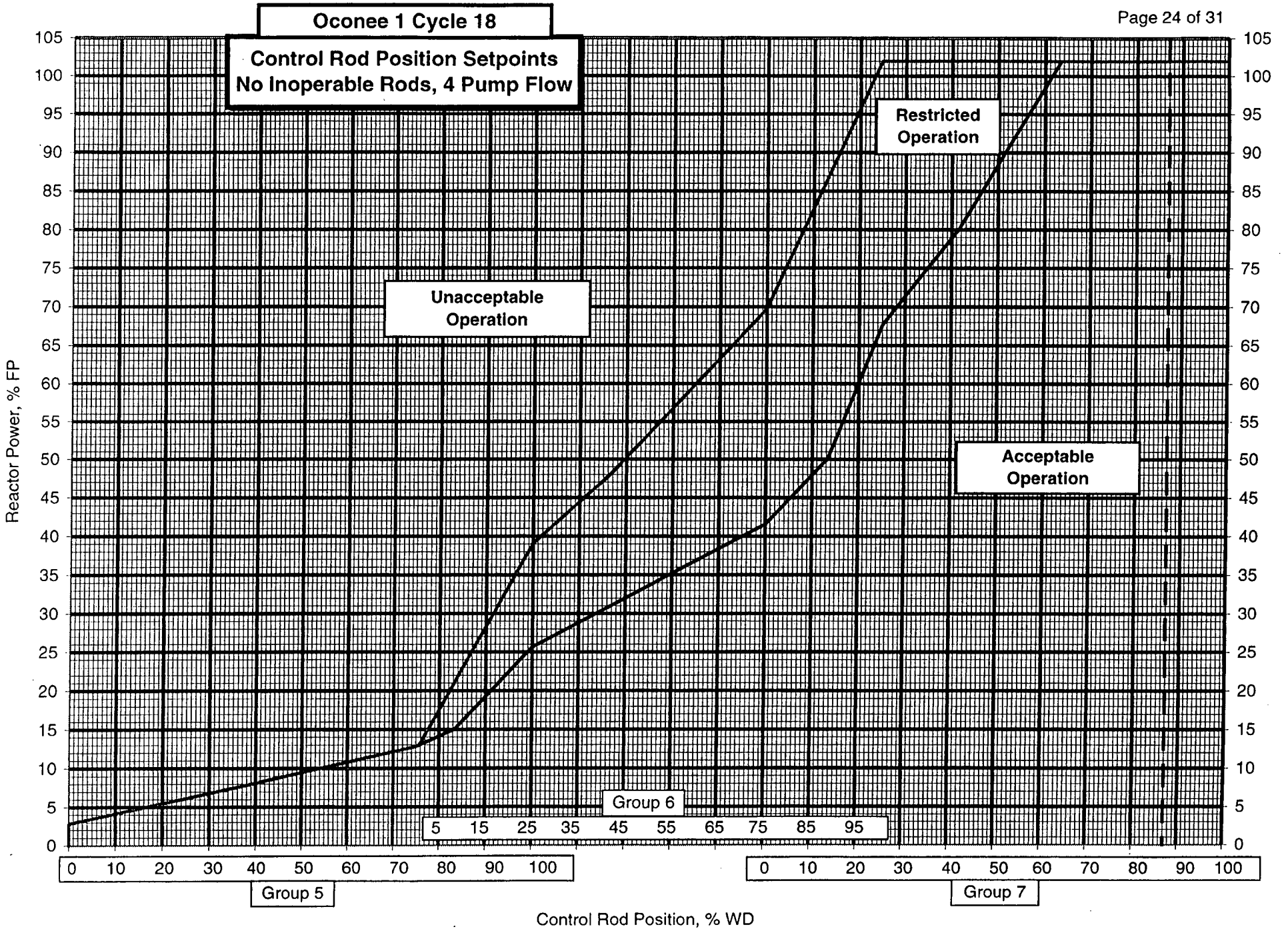
RI = 300 is withdrawal limit at all power levels.

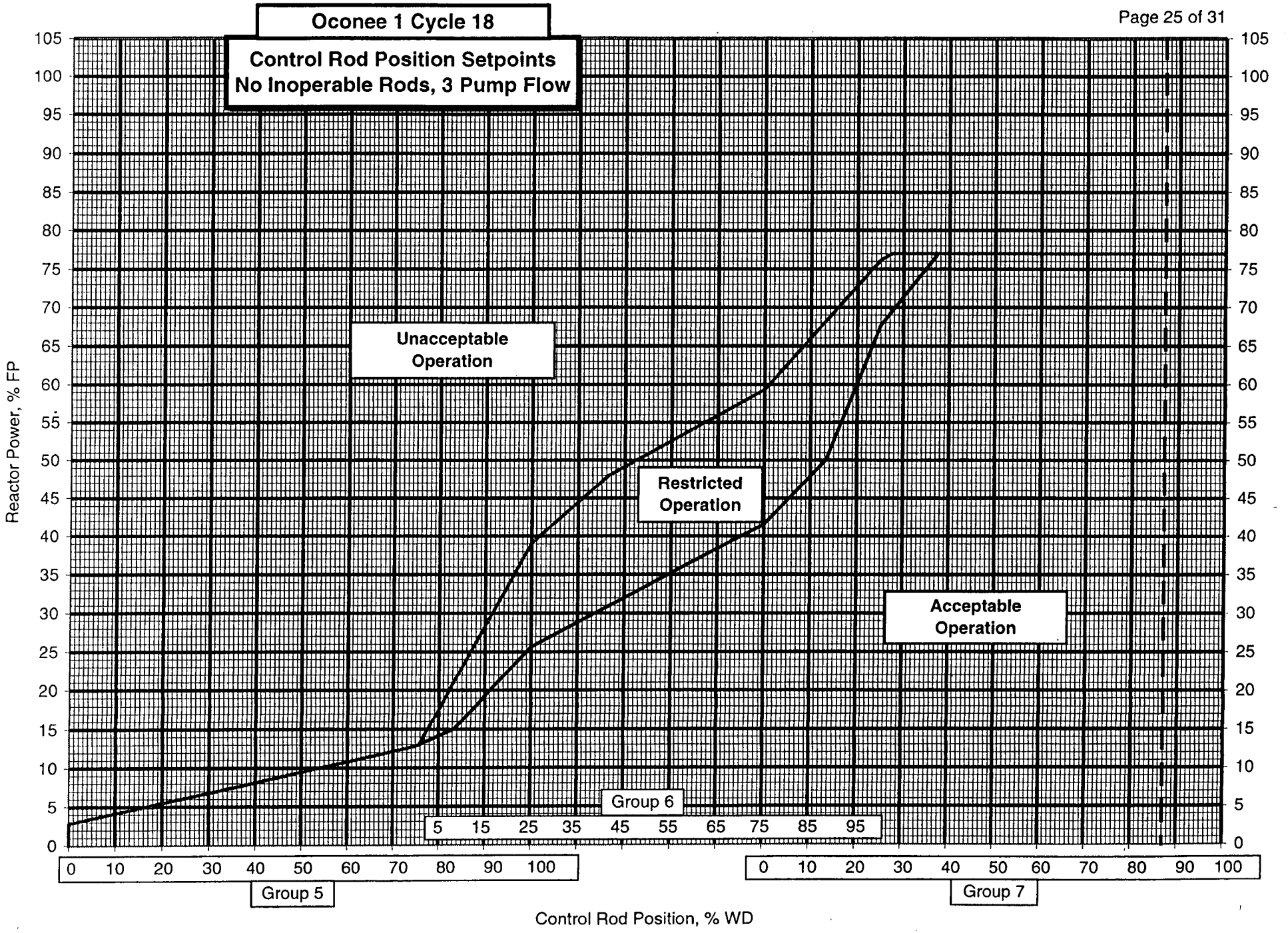
Continued on next page.

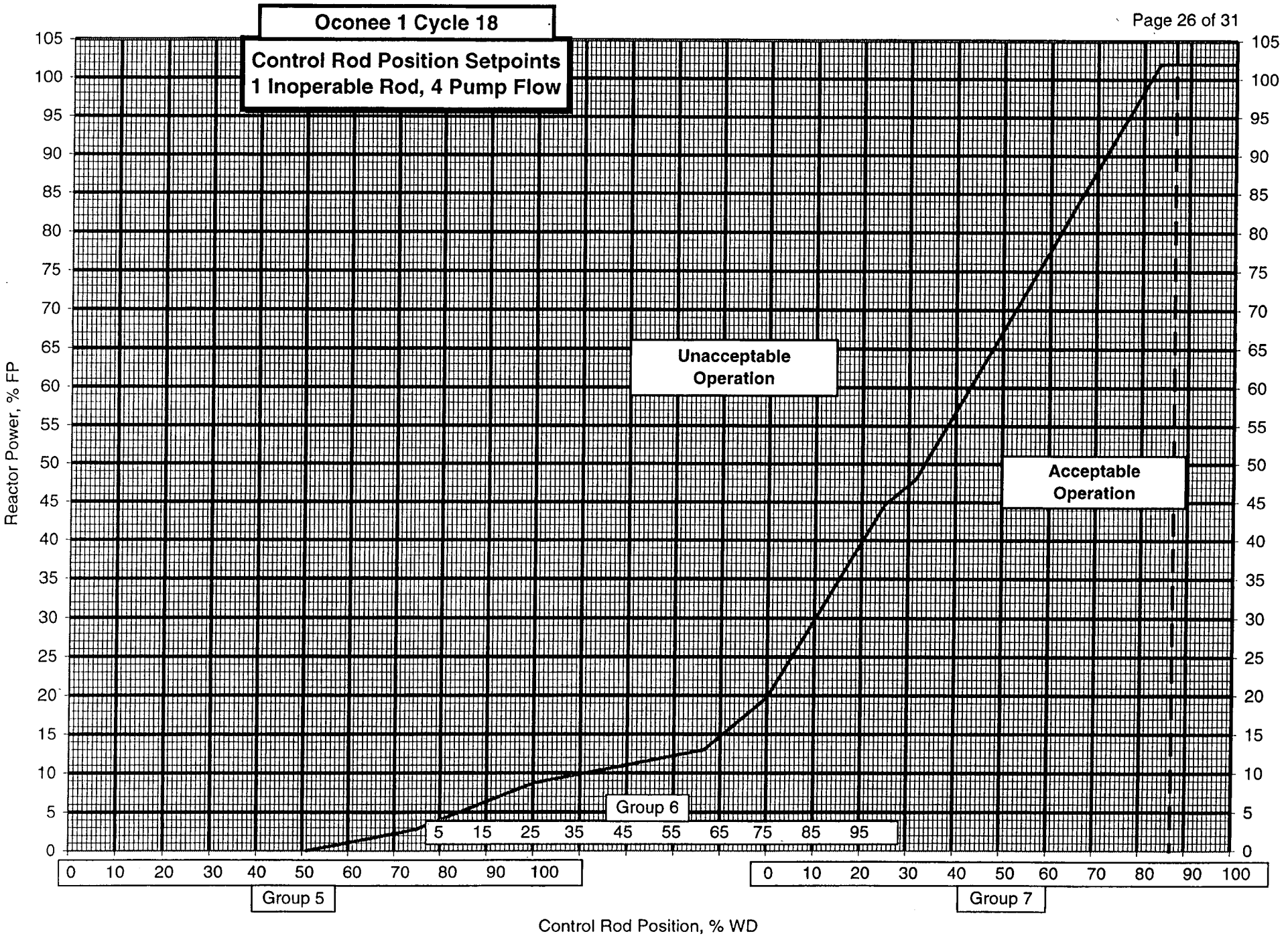
Oconee 1 Cycle 18
Rod Index Setpoints
3 Pump Operation, 1 Inoperable Rod, BOC to EOC

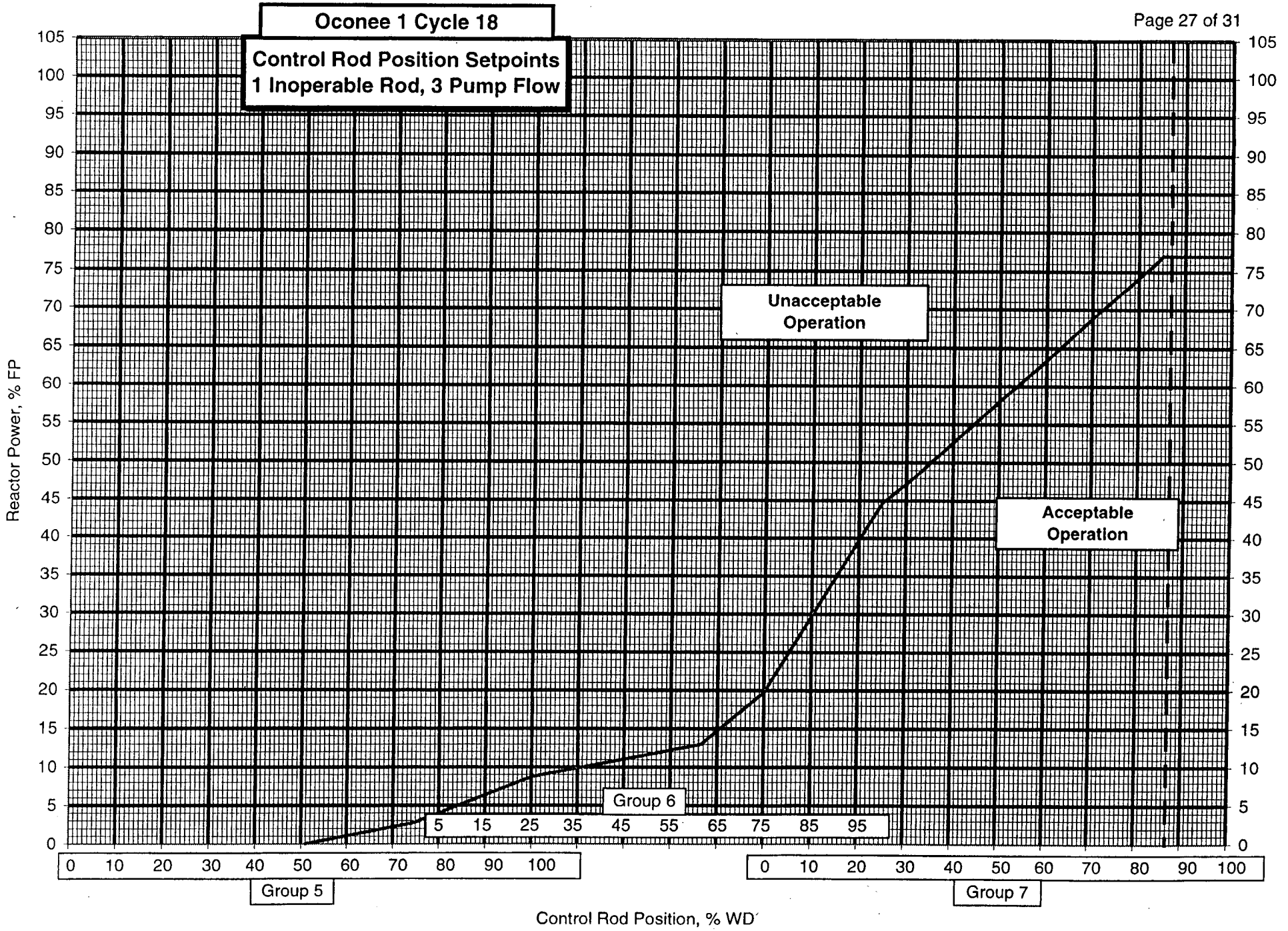
% FP	Shutdown Margin Setpoint			Operational Alarm Setpoint		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
23	100	78.2	3.2	100	78.2	3.2
22	100	77.2	2.2	100	77.2	2.2
21	100	76.2	1.2	100	76.2	1.2
20	100	75.2	0.2	100	75.2	0.2
19.8	100	75.0	0	100	75.0	0
19	100	73.5	0	100	73.5	0
18	100	71.5	0	100	71.5	0
17	100	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 18
Control Rod Position Setpoints
No Inoperable Rods, 4 Pump Flow
Restricted Operation
Unacceptable Operation
Acceptable Operation
Reactor Power, % FP
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Group 6
5 15 25 35 45 55 65 75 85 95
0 10 20 30 40 50 60 70 80 90 100
Group 5
0 10 20 30 40 50 60 70 80 90 100
Group 7
Control Rod Position, % WD


Oconee 1 Cycle 18
Control Rod Position Setpoints
No Inoperable Rods, 3 Pump Flow
Unacceptable Operation
Restricted Operation
Acceptable Operation
Reactor Power, % FP
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Group 6
5 15 25 35 45 55 65 75 85 95
0 10 20 30 40 50 60 70 80 90 100
Group 5
0 10 20 30 40 50 60 70 80 90 100
Group 7
Control Rod Position, % WD


Oconee 1 Cycle 18
Control Rod Position Setpoints
1 Inoperable Rod, 4 Pump Flow
Unacceptable Operation
Acceptable Operation
Reactor Power, % FP
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Group 6
5 15 25 35 45 55 65 75 85 95
0 10 20 30 40 50 60 70 80 90 100
Group 5
0 10 20 30 40 50 60 70 80 90 100
Group 7
Control Rod Position, % WD


Oconee 1 Cycle 18
Control Rod Position Setpoints
1 Inoperable Rod, 3 Pump Flow
Unacceptable Operation
Acceptable Operation
Reactor Power, % FP
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Group 6
5 15 25 35 45 55 65 75 85 95
0 10 20 30 40 50 60 70 80 90 100
Group 5
0 10 20 30 40 50 60 70 80 90 100
Group 7
Control Rod Position, % WD

Oconee 1 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, %	5.19	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 1 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	-	-39.7
	100	-48.0	-30.0
	112	-31.1	-
	112	31.1	-
	100	48.0	30.0
	90	-	32.0
	80	-	32.2
	0	48.0	32.2
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	-	32.2
	74.6	48.0	-
	0	48.0	32.2

Oconee 1 Cycle 18

Rod Index Limits

Referred to by ITS 3.2.1

Not for Plant Use

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

LOCA Limits

Not for Plant Use

	Core Elevation Feet	LOCA LHR kw/ft Limit Versus Burnup		
Mk-B10 Fuel		28 GWd/mtU	45 GWd/mtU	62 GWd/mtU
	0.000	15.8	15.8	13.36
	2.506	16.6	16.6	13.36
	4.264	17.0	17.0	13.36
	6.021	17.0	17.0	13.36
	7.779	17.0	17.0	13.36
	9.536	16.6	16.6	13.36
	12.00	15.8	15.8	13.36
Mk-B10L Fuel		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
	12.00	16.2	16.2	11.9