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April 14, 2005

U. S. Nuclear Regulatory Commission
Document Control Desk
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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 23, Rev. 25.

Very truly yours,

R. A. Jones Site, Vice President
Oconee Nuclear Site

Attachment

A001

NRC Document Control Desk
April 14, 2005
Page 2

xc w/att: Mr. W. D. Travers, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II

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

Mr. Mel Shannon
Senior Resident Inspector
Oconee Nuclear Site

PRIORITY SuperRush

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- 2) 00813 DOC MGMT EC04T ORIGINAL
- 3) 06358 ONS REGUL COMPLIANCE ON03RC
- 4) 06700 ONS MANUAL MASTER FILE ON03DM
- 5) 06937 R R ST CLAIR EC08G

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OCONEE 1 CYCLE 23
 CORE OPERATING LIMITS REPORTS
 Page 1 of 1

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 GS-SVP NUCLEAR SUPPORT

BY:
 J W SIMMONS JWS/TER EC08H

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Oconee 1 Cycle 23

Core Operating Limits Report

QA Condition 1

FOR INFORMATION ONLY

Prepared By : L. D. McClain / *L. D. McClain*

Date : 06 Apr 2005

Checked By : J. D. Forster / *J. D. Forster*

Date : 06 Apr 2005

CDR By : T. P. Yadon / *T. P. Yadon*

Date : 4/6/05

Approved By : R. R. St. Clair / *R. R. St. Clair*

Date : 4/6/05

INSPECTION OF ENGINEERING INSTRUCTIONS

Inspection Waived By: R. R. St. Clair
 (Sponsor)

Date: 4/6/05

<u>CATAWBA</u>		
	Inspection Waived	
MCE (Mechanical & Civil)	<input type="checkbox"/>	Inspected By/Date: _____
RES (Electrical Only)	<input type="checkbox"/>	Inspected By/Date: _____
RES (Reactor)	<input type="checkbox"/>	Inspected By/Date: _____
MOD	<input type="checkbox"/>	Inspected By/Date: _____
Other (_____)	<input type="checkbox"/>	Inspected By/Date: _____

<u>OCONEE</u>		
	Inspection Waived	
MCE (Mechanical & Civil)	<input checked="" type="checkbox"/>	Inspected By/Date: _____
RES (Electrical Only)	<input checked="" type="checkbox"/>	Inspected By/Date: _____
RES (Reactor)	<input checked="" type="checkbox"/>	Inspected By/Date: _____
MOD	<input checked="" type="checkbox"/>	Inspected By/Date: _____
Other (_____)	<input type="checkbox"/>	Inspected By/Date: _____

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	Inspection Waived	
MCE (Mechanical & Civil)	<input type="checkbox"/>	Inspected By/Date: _____
RES (Electrical Only)	<input type="checkbox"/>	Inspected By/Date: _____
RES (Reactor)	<input type="checkbox"/>	Inspected By/Date: _____
MOD	<input type="checkbox"/>	Inspected By/Date: _____
Other (_____)	<input type="checkbox"/>	Inspected By/Date: _____

Oconee 1 Cycle 23
Core Operating Limits Report

Insertion Sheet for Revision 25

This revision is not valid until the end of operation for Oconee 1 Cycle 22.

Remove these Revision 24 pages

1 - 33

Insert these Revision 25 pages

1 - 33

Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
Oconee 1 Cycle 23 revisions below					
25	Apr 2005	1 - 33	-	-	33
Oconee 1 Cycle 22 revisions below					
24	Mar 2005	1 - 3, 5	-	-	33
23	Feb 2005	1 - 4, 6	-	-	33
22	Dec 2004	1 - 3, 30	-	-	33
21	Feb 2004	1 - 4, 6	-	-	33
20	Nov 2003	1 - 32	33	-	33
Oconee 1 Cycle 21 revisions below					
19	Aug 2003	1, 2, 3	1a	-	32
18	Apr 2002	1, 2, 4	-	-	32
17	Mar 2002	1 - 31	32	-	32
Oconee 1 Cycle 20 revisions below					
16	May 2001	1 - 4	-	-	31
15	Nov 2000	1 - 31	-	-	31

Oconee 1 Cycle 23

1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O1C23 has been prepared in accordance with the requirements of TS 5.6.5. The core operating limits within this report have been developed using NRC approved methodology identified in references 1 through 11. The RPS protective limits and maximum allowable setpoints are documented in references 12 through 14. These limits are validated for use in O1C23 by references 15 through 16. The O1C23 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_g reduction of up to 10°F provided 4 RCPs are in operation and Tav_g 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 O1C23 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 5, SER dated December 8, 2000.
4. ONS Core Thermal Hydraulic Methodology Using VIPRE-01, DPC-NE-2003P-A, Revision 1, SER dated June 23, 2000.
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, Revision 0, SER dated April 3, 1995.
7. UFSAR Chapter 15 Transient Analysis Methodology, DPC-NE-3005-PA, Revision 2, SER dated September 24, 2003.
8. DPC-NE-3000P-A, Thermal Hydraulic Transient Analysis Methodology, Rev. 3, SER dated September 24, 2003.
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-10164P-A, Rev. 4, "RELAP5/MOD2-B&W - An Advanced Computer Program for Light Water Reactor LOCA and Non-LOCA Transient Analysis", SER dated April 9, 2002.
11. BAW-10227-PA, Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel, SER dated February 4, 2000.
12. RPS RCS Pressure & Temperature Trip Function Uncertainty Analyses and Variable Low Pressure Safety Limit, OSC-4048, Revision 4, January 2001.
13. Power Imbalance Safety Limits and Tech Spec Setpoints Using Error Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 2, October 2001.
14. ΔT_c and EOC Reduced Tav_g Operation, OSC-7265, Rev. 1, Duke Power Co., June 2002.
15. O1C23 Maneuvering Analysis, OSC-8658, Revision 1, April 2005.
16. O1C23 Reload Safety Evaluation, OSC-8718, Revision 0, April 2005.

Oconee 1 Cycle 23

Miscellaneous Setpoints

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

Spent fuel pool boron concentration shall be greater than 2220 ppm.
Referred to by TS 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 TS SLC 16.5.13.

CFT boron concentration shall be greater than 1874 ppm. The average boron concentration in the CFT's shall be less than 4000 ppm. Referred to by TS 3.5.1.

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

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

Moderator Temperature Coefficient (MTC) shall be less than:
Linear interpolation is valid within the table provided.
Referred to by TS 3.1.3.

MTC x 10 ⁻⁴	$\Delta\rho / ^\circ\text{F}$	% FP
+0.70		0
+0.525		20
0.00		80
0.00		100
0.00		120

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

$\Delta T_c, ^\circ\text{F}$	Max Loop Tav _g (Incl 2°F unc)	
	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_g must be less than COLR limits minus instrument uncertainty. ΔT_c is the setpoint value selected by the operators. Values are expanded by linear interpolation on page 33 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_g.

DNB parameter for RCS loop total flow shall be:
Referred to by TS 3.4.1.

4 RCP:	Measured \geq 108.5 %df
3 RCP:	Measured \geq 74.7 % of 4 RCP min flow

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

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

Misaligned, dropped, or inoperable rods may be excluded from control rod group average calculations when determining if overlap requirements are met as these situations are explicitly addressed by TS 3.1.4 (Control Rod Group Alignment Limits), TS 3.1.5 (Safety Rod Position Limits), and TS 3.2.3 (Quadrant Power Tilt).

Oconee 1 Cycle 23

Steady State Operating Band

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

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	7.32	6.82	9.10	16.26
Out of Core	2.33	6.09	5.63	7.72	14.22
Backup Incore	2.25	3.87	3.63	4.81	10.07

Referred to by TS 3.2.3

Correlation Slope (CS)

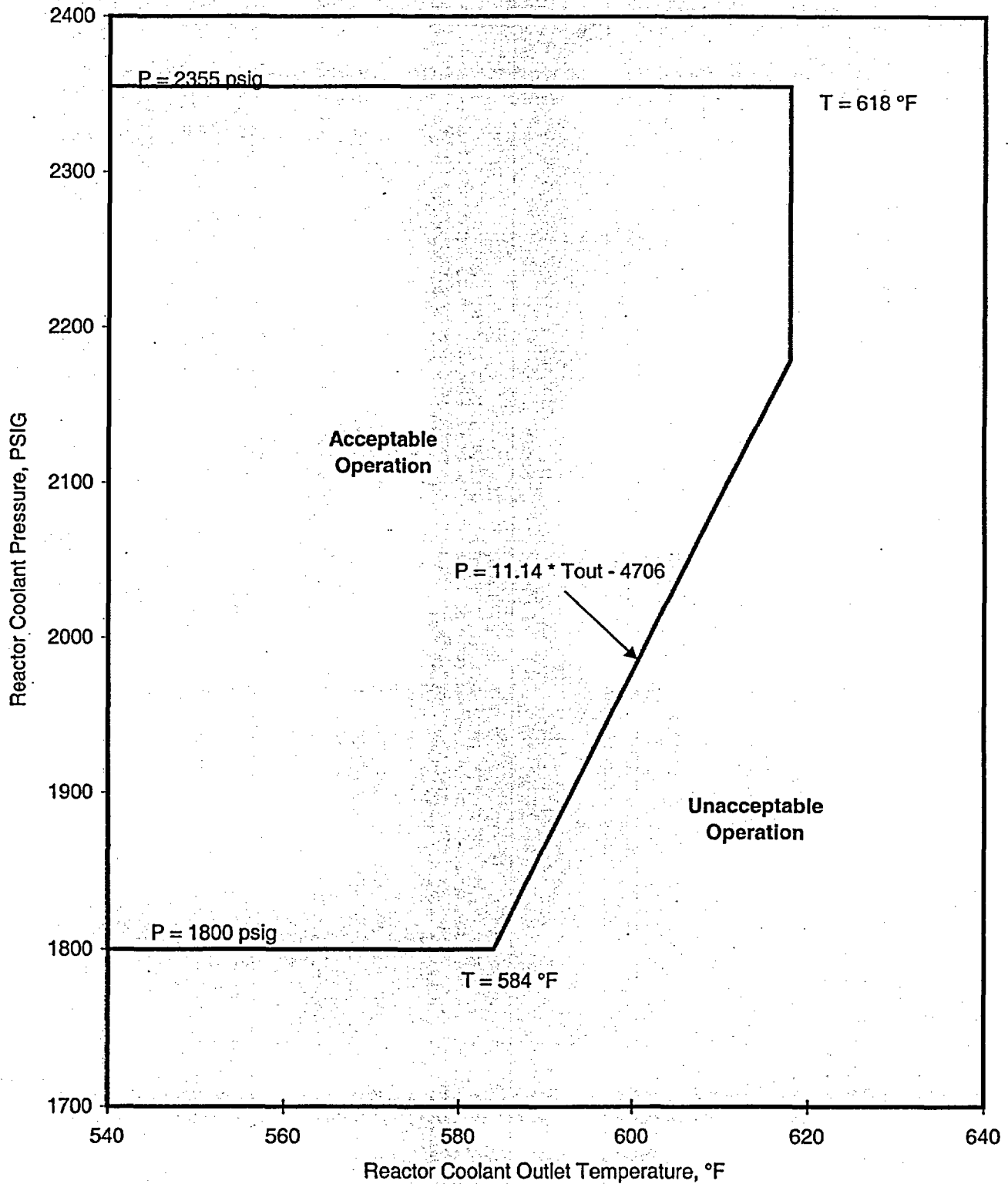
1.15

Referred to by TS 3.3.1 (SR 3.3.1.3).

Oconee 1 Cycle 23

Variable Low RCS Pressure RPS Setpoints

Referred to by TS 3.3.1



Oconee 1 Cycle 23

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 Limits

	% FP	% Imbalance
4 Pumps	0	-35.0
	90.0	-35.0
	109.4	-14.4
	109.4	14.4
	90.0	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 23

Operational Power Imbalance Setpoints

	%FP	Full Incore	Backup Incore	Out of Core
4 Pumps	0	-31.2	-30.8	-31.2
	80	-31.2	-30.8	-31.2
	90	-27.5	-27.3	-27.5
	100	-19.1	-18.9	-19.1
	102	-17.0	-17.0	-17.0
	102	17.0	16.9	17.0
	100	19.1	18.9	19.1
	90	28.1	27.6	28.1
	80	28.1	27.6	28.1
	0	28.1	27.6	28.1
3 Pumps	0.0	-31.2	-30.8	-31.2
	63.58	-31.2	-	-31.2
	63.96	-	-30.8	-
	77.0	-17.0	-17.0	-17.0
	77.0	17.0	16.9	17.0
	66.98	-	27.6	-
	66.51	28.1	-	28.1
	0.0	28.1	27.6	28.1

Oconee 1 Cycle 23

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	-19.94	20.00	-19.94	20.00
98	-24.92	24.92	-20.78	20.90	-20.78	20.90
97	-25.99	25.99	-21.62	21.80	-21.62	21.80
96	-27.05	27.05	-22.46	22.70	-22.46	22.70
95	-28.11	28.11	-23.30	23.60	-23.30	23.60
94	-29.17	29.17	-24.14	24.50	-24.14	24.50
93	-30.24	30.24	-24.98	25.40	-24.98	25.40
92	-31.30	31.30	-25.82	26.30	-25.82	26.30
91	-32.36	32.36	-26.66	27.20	-26.66	27.20
90.40	-33.00	33.00	-27.16	27.74	-27.16	27.74
90	-33.00	33.00	-27.50	28.10	-27.50	28.10
89	-33.00	33.00	-27.87	28.10	-27.87	28.10
88	-33.00	33.00	-28.24	28.10	-28.24	28.10
87	-33.00	33.00	-28.61	28.10	-28.61	28.10
86	-33.00	33.00	-28.98	28.10	-28.98	28.10
85	-33.00	33.00	-29.35	28.10	-29.35	28.10
84	-33.00	33.00	-29.72	28.10	-29.72	28.10
83	-33.00	33.00	-30.09	28.10	-30.09	28.10
82	-33.00	33.00	-30.46	28.10	-30.46	28.10
81	-33.00	33.00	-30.83	28.10	-30.83	28.10
80	-33.00	33.00	-31.20	28.10	-31.20	28.10
0	-33.00	33.00	-31.20	28.10	-31.20	28.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 1 Cycle 23

Operational Power Imbalance Setpoints

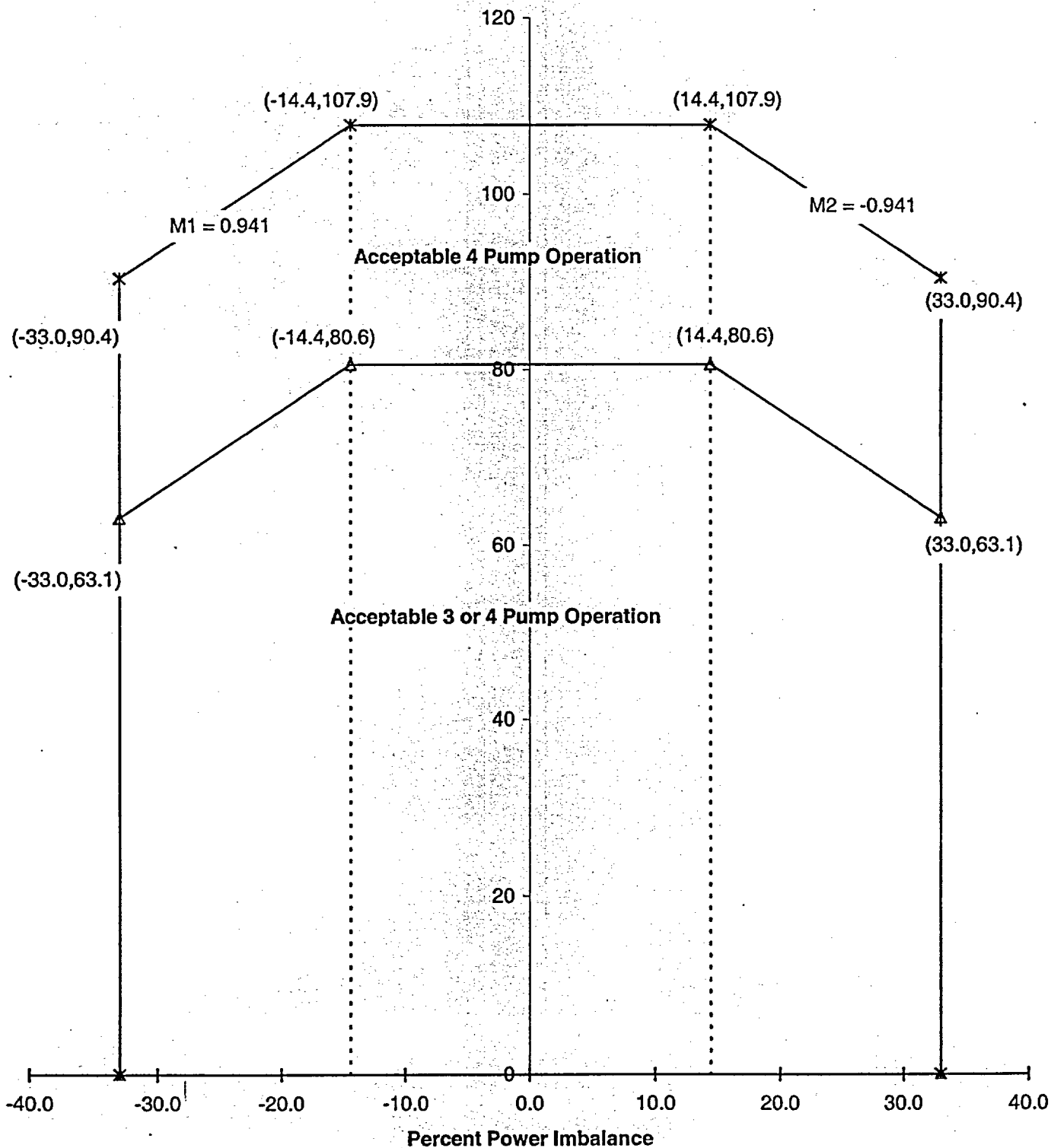
Operation with 3 RCS Pumps, BOC to EOC

% 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	-24.60	24.60	-23.35	23.35	-23.35	23.35
70	-25.67	25.67	-24.41	24.41	-24.41	24.41
69	-26.73	26.73	-25.47	25.47	-25.47	25.47
68	-27.79	27.79	-26.53	26.53	-26.53	26.53
67	-28.85	28.85	-27.58	27.58	-27.58	27.58
66.5	-29.37	29.37	-28.10	28.10	-28.10	28.10
66	-29.92	29.92	-28.64	28.10	-28.64	28.10
65	-30.98	30.98	-29.70	28.10	-29.70	28.10
64	-32.04	32.04	-30.76	28.10	-30.76	28.10
63.58	-32.49	32.49	-31.20	28.10	-31.20	28.10
63.1	-33.00	33.00	-31.20	28.10	-31.20	28.10
63	-33.00	33.00	-31.20	28.10	-31.20	28.10
62	-33.00	33.00	-31.20	28.10	-31.20	28.10
61	-33.00	33.00	-31.20	28.10	-31.20	28.10
60	-33.00	33.00	-31.20	28.10	-31.20	28.10
0	-33.00	33.00	-31.20	28.10	-31.20	28.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 1 Cycle 23 RPS Power Imbalance Setpoints

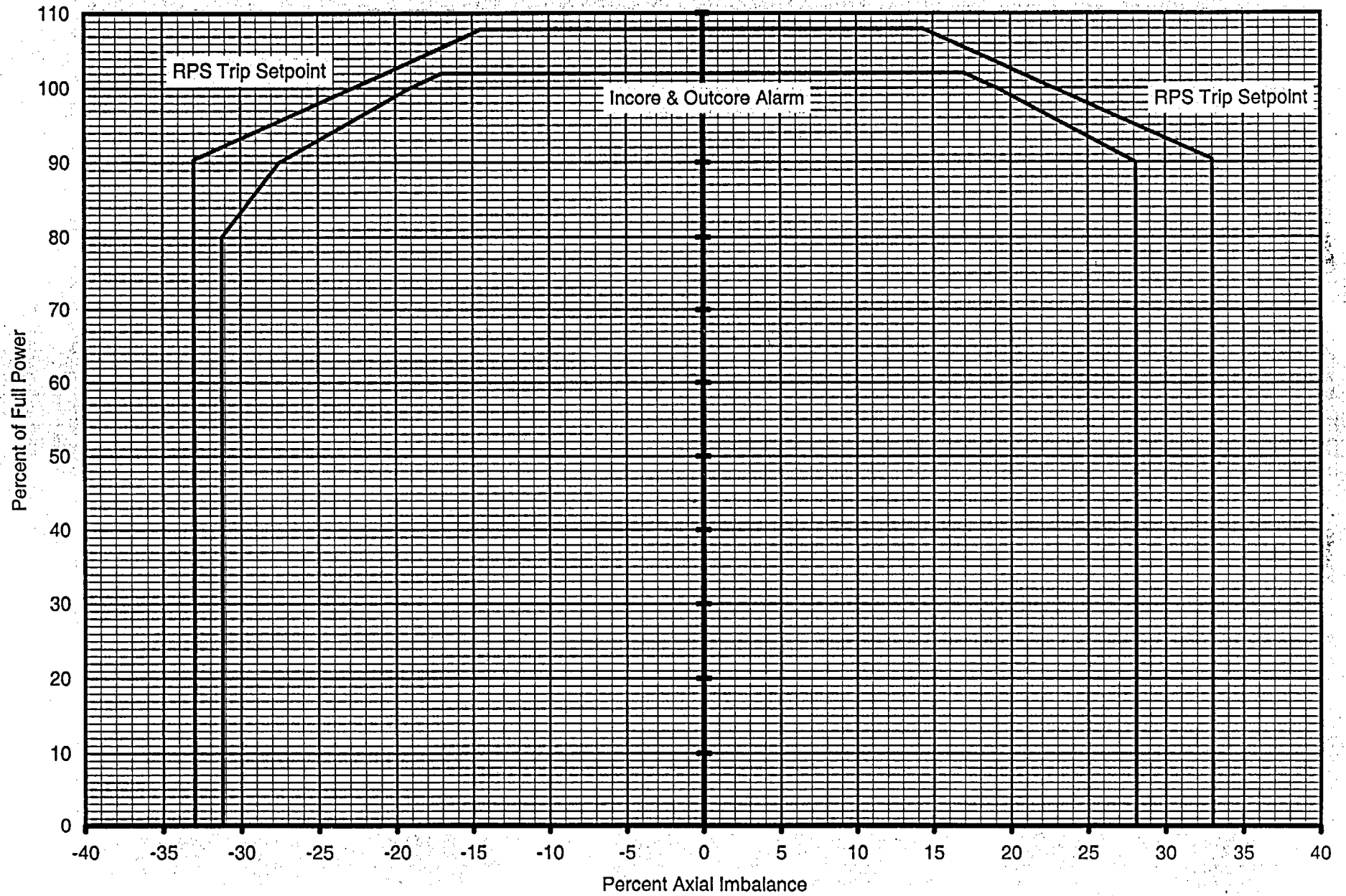
Referred to by TS 3.3.1

Thermal Power Level, %FP



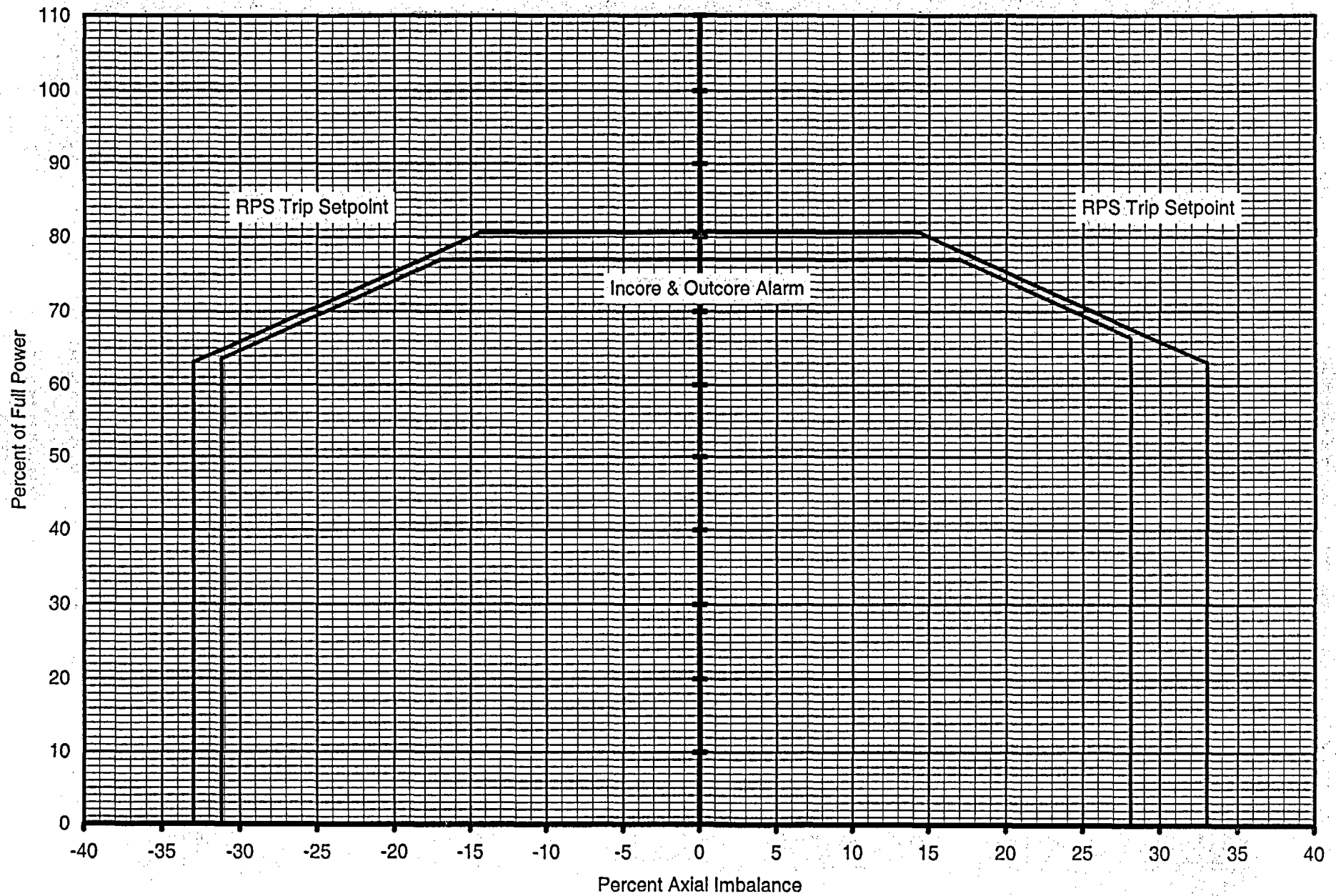
Oconee 1 Cycle 23

Imbalance Setpoints for 4 Pump Operation, BOC to EOC



Oconee 1 Cycle 23

Imbalance Setpoints for 3 Pump Operation, BOC to EOC



Oconee 1 Cycle 23

Operational Rod Index Setpoints

	%FP	RI Insertion Setpoint		RI Withdrawal Setpoint
		No Inop Rod	1 Inop Rod	
4 Pumps	102.0	261.5	283.4	300
	100.0	261.5	281.5	300
	90.0	261.5	271.9	300
	80.0	261.5	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	255.5	285.2	300
	75.0	251.5	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 23

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 1 Cycle 23
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	61.5
101	100	99.0	24.0	100	100	61.5
100	100	98.2	23.2	100	100	61.5
99	100	97.5	22.5	100	100	61.5
98	100	96.7	21.7	100	100	61.5
97	100	95.9	20.9	100	100	61.5
96	100	95.2	20.2	100	100	61.5
95	100	94.4	19.4	100	100	61.5
94	100	93.6	18.6	100	100	61.5
93	100	92.9	17.9	100	100	61.5
92	100	92.1	17.1	100	100	61.5
91	100	91.3	16.3	100	100	61.5
90	100	90.6	15.6	100	100	61.5
89	100	89.8	14.8	100	100	61.5
88	100	89.0	14.0	100	100	61.5
87	100	88.2	13.2	100	100	61.5
86	100	87.5	12.5	100	100	61.5
85	100	86.7	11.7	100	100	61.5
84	100	85.9	10.9	100	100	61.5
83	100	85.2	10.2	100	100	61.5
82	100	84.4	9.4	100	100	61.5
81	100	83.6	8.6	100	100	61.5
80	100	82.9	7.9	100	100	61.5
79	100	82.1	7.1	100	100	59.5
78	100	81.3	6.3	100	100	57.5
77	100	80.6	5.6	100	100	55.5
76	100	79.8	4.8	100	100	53.5
75	100	79.0	4.0	100	100	51.5
74	100	78.2	3.2	100	100	49.5
73	100	77.5	2.5	100	100	47.5
72	100	76.7	1.7	100	100	45.5
71	100	75.9	0.9	100	100	43.5
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68	100	72.3	0	100	100	37.5
67	100	70.7	0	100	100	35.5
66	100	69.2	0	100	100	33.5
65	100	67.7	0	100	100	31.5
64	100	66.1	0	100	100	29.5
63	100	64.6	0	100	100	27.5
62	100	63.0	0	100	100	25.5
61.8	100	62.7	0	100	100	25.0
61	100	61.5	0	100	99.2	24.2
60	100	60.0	0	100	98.2	23.2
59	100	58.4	0	100	97.2	22.2
58	100	56.9	0	100	96.2	21.2
57	100	55.3	0	100	95.2	20.2
56	100	53.8	0	100	94.2	19.2
55	100	52.3	0	100	93.2	18.2
54	100	50.7	0	100	92.2	17.2
53	100	49.2	0	100	91.2	16.2
52	100	47.7	0	100	90.2	15.2
51	100	46.1	0	100	89.2	14.2
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		

Oconee 1 Cycle 23
 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 23
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	55.5
76.2	100	100	25.0	100	100	53.9
76	100	99.7	24.7	100	100	53.5
75	100	98.2	23.2	100	100	51.5
74	100	96.8	21.8	100	100	49.5
73	100	95.3	20.3	100	100	47.5
72	100	93.8	18.8	100	100	45.5
71	100	92.3	17.3	100	100	43.5
70	100	90.8	15.8	100	100	41.5
69	100	89.4	14.4	100	100	39.5
68	100	87.9	12.9	100	100	37.5
67	100	86.4	11.4	100	100	35.5
66	100	84.9	9.9	100	100	33.5
65	100	83.4	8.4	100	100	31.5
64	100	82.0	7.0	100	100	29.5
63	100	80.5	5.5	100	100	27.5
62	100	79.0	4.0	100	100	25.5
61.8	100	78.6	3.6	100	100	25.0
61	100	77.5	2.5	100	99.2	24.2
60	100	76.0	1.0	100	98.2	23.2
59.3	100	75.0	0	100	97.6	22.6
59	100	74.1	0	100	97.2	22.2
58	100	71.1	0	100	96.2	21.2
57	100	68.2	0	100	95.2	20.2
56	100	65.2	0	100	94.2	19.2
55	100	62.2	0	100	93.2	18.2
54	100	59.3	0	100	92.2	17.2
53	100	56.3	0	100	91.2	16.2
52	100	53.4	0	100	90.2	15.2
51	100	50.4	0	100	89.2	14.2
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		

Oconee 1 Cycle 23
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		

Oconee 1 Cycle 23
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	75	0	0
2	68	0	0	68	0	0
1	59.5	0	0	59.5	0	0
0	51	0	0	51	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 23
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		

Oconee 1 Cycle 23 Rod Index Setpoints

3 Pump Operation, 1 Inoperable Rod, BOC to EOC

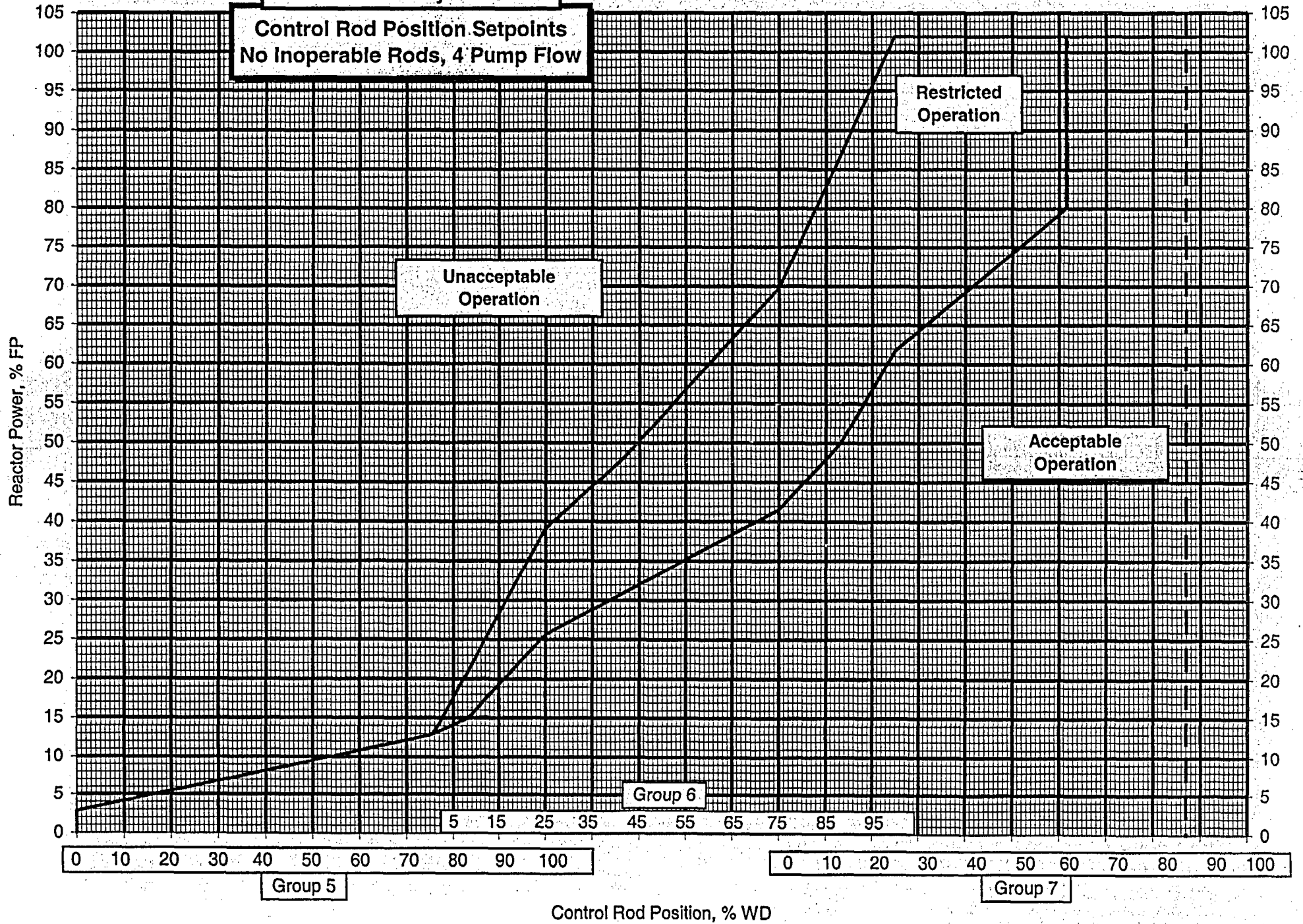
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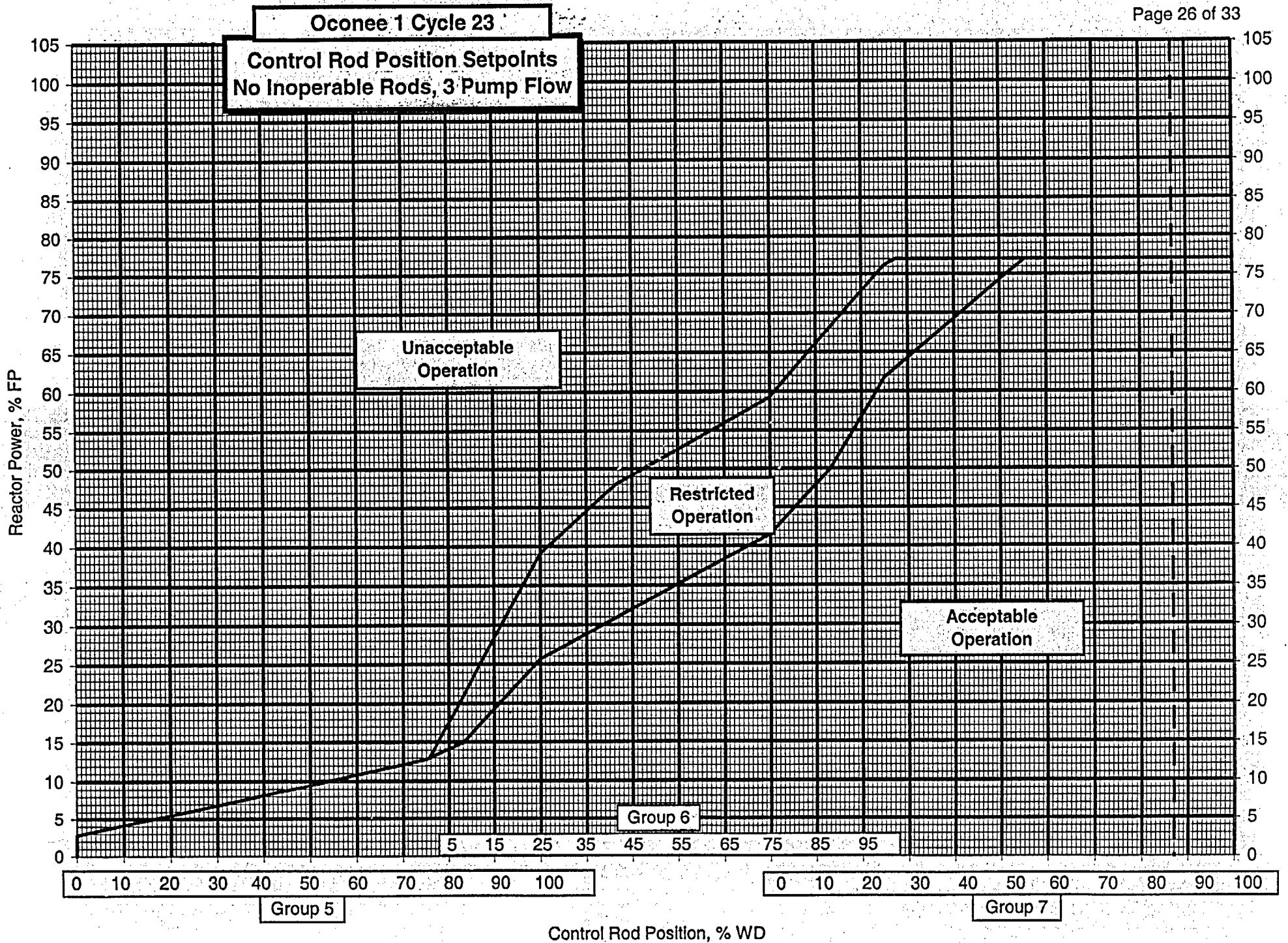
% FP	Shutdown Margin Setpoint			Operational Alarm Setpoint		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
23	100	78.2	3.2	100	78.2	3.2
22	100	77.2	2.2	100	77.2	2.2
21	100	76.2	1.2	100	76.2	1.2
20	100	75.2	0.2	100	75.2	0.2
19.8	100	75.0	0	100	75.0	0
19	100	73.5	0	100	73.5	0
18	100	71.5	0	100	71.5	0
17	100	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	68	0	0
1	59.5	0	0	59.5	0	0
0	51	0	0	51	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 23

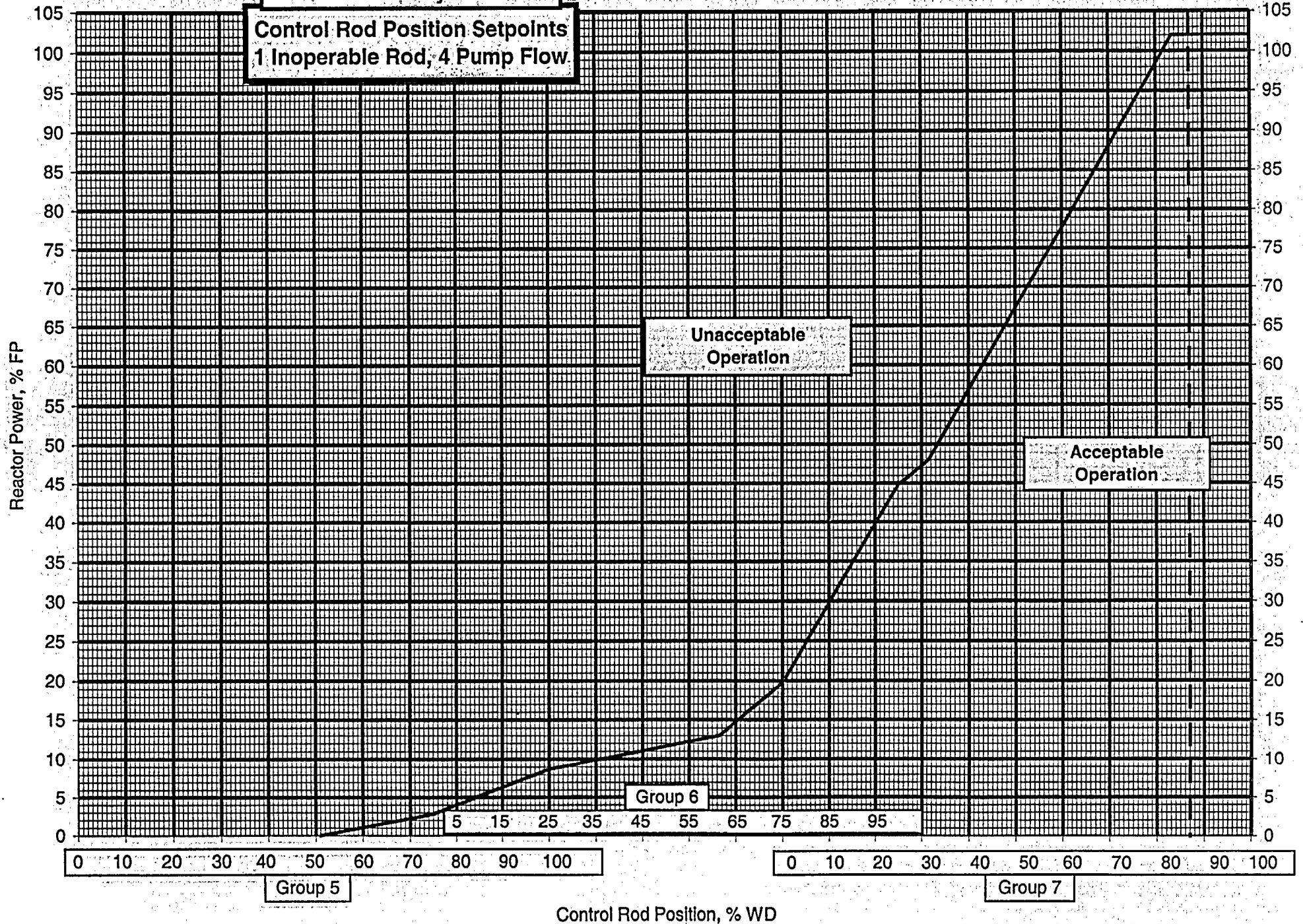
Control Rod Position Setpoints
No Inoperable Rods, 4 Pump Flow





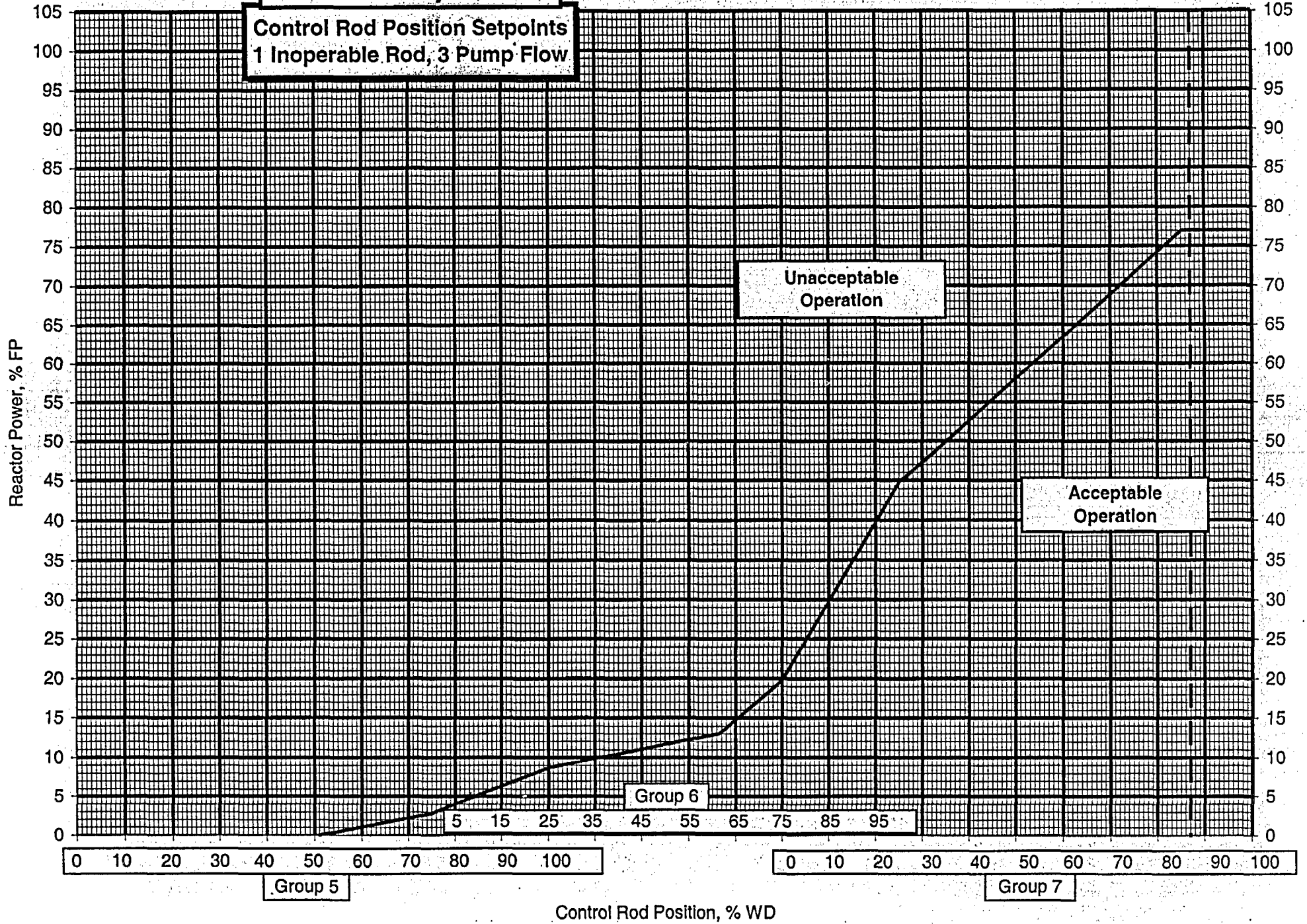
Oconee 1 Cycle 23

Control Rod Position Setpoints
1 Inoperable Rod, 4 Pump Flow



Oconee 1 Cycle 23

Control Rod Position Setpoints
1 Inoperable Rod, 3 Pump Flow



Oconee 1 Cycle 23

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 TS 3.2.3

	Steady State		Transient		Maximum
	30 - 100	0 - 30	30 - 100	0 - 30	0 - 100
Core Power Level, %FP	30 - 100	0 - 30	30 - 100	0 - 30	0 - 100
Quadrant Power Tilt, %	5.38	10.00	9.44	12.00	20.00

Variable Low RCS Pressure Protective Limits

Referred to by TS 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 23

Axial Power Imbalance Protective Limits

Referred to by TS 2.1.1

Not for Plant Use

	%FP	RPS	Operational
4 Pumps	0	-35.0	-43.4
	80	-	-43.4
	90	-35.0	-39.6
	100	-	-30.0
	109.4	-14.4	-
	109.4	14.4	-
	100	-	30.0
	90	35.0	40.3
	80	-	39.6
	0	35.0	39.6
3 Pumps	0	-35.0	-43.4
	62.3	-35.0	-
	77.0	-	-43.4
	81.7	-14.4	-
	81.7	14.4	-
	77.0	-	39.6
	62.3	35.0	-
	0	35.0	39.6

Oconee 1 Cycle 23

Rod Index Limits

Referred to by TS 3.2.1

Not for Plant Use

	%FP	Operational RI Insertion Limit	Shutdown Margin No Inop Rod	RI Insertion Limit 1 Inop Rod	RI Withdrawal Limit
4 Pumps	102	260	220	280	300
	100	260	-	-	300
	90	260	-	-	300
	80	260	-	-	300
	50	200	140	230	300
	15	90	75	160	300
	5	0	0	75	300
3 Pumps	77	254	220	280	300
	50	200	140	230	300
	15	90	75	160	300
	5	0	0	75	300

Oconee 1 Cycle 23

LOCA Limits

Not for Plant Use

Core Elevation Feet		LOCA LHR kw/ft Limit Versus Burnup		
		0 GWd/mtU	40 GWd/mtU	62 GWd/mtU
Mk-B11 Fuel	0.000	16.6	16.6	12.2
	2.506	17.5	17.5	12.2
	4.264	17.6	17.6	12.2
	6.021	17.7	17.7	12.2
	7.779	17.6	17.6	12.2
	9.536	17.5	17.5	12.2
	12.00	16.6	16.6	12.2
Mk-B10 Fuel	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

Oconee 1 Cycle 23

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

ΔT_{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