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May 12, 2003

U. S. Nuclear Regulatory Commission
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Subject: Oconee Nuclear Site Docket No. 50-287
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 3, Cycle 21, Rev. 17.

Very truly yours,

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

Attachment

A001

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. Mel Shannon
Senior Resident Inspector
Oconee Nuclear Site

PRIORITY [redacted]

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WORK ITEM: M-7
RESP GROUP: NE

CORE OPERATING LIMITS REPORT
OCONEE 3 CYCLE 21

Page 1 of 1

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K S CANADY
MANAGER
NUCLEAR ENGINEERING

BY:
J W SIMMONS JWS/TER EC08H

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Oconee 3 Cycle 21

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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: R. W. Murray R. W. Murray Date: 10 Apr 2003

Checked By: L. D. McClain L. Dwain McClain Date: 10 Apr 2003

CDR By: R. G. Chow Raymond Chow Date: 4/10/2003

Approved By: R. R. St. Clair R. R. St. Clair Date: 4/10/2003

INSPECTION OF ENGINEERING INSTRUCTIONS

Inspection Waived By: K.R. St Clair (Sponsor) Date: 4/10/2003

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RES (Electrical Only)	☐	Inspected By/Date:
RES (Reactor)	☐	Inspected By/Date:
MOD	☐	Inspected By/Date:
Other ( )	☐	Inspected By/Date:

OCONEE

	Inspection Waived	
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RES (Electrical Only)	☑	Inspected By/Date:
RES (Reactor)	☑	Inspected By/Date:
MOD	☑	Inspected By/Date:
Other ( )	☐	Inspected By/Date:

MCGUIRE

	Inspection Waived	
MCE (Mechanical & Civil)	☐	Inspected By/Date:
RES (Electrical Only)	☐	Inspected By/Date:
RES (Reactor)	☐	Inspected By/Date:
MOD	☐	Inspected By/Date:
Other ( )	☐	Inspected By/Date:

Oconee 3 Cycle 21

Core Operating Limits Report

Insertion Sheet for Revision 17

This revision is not valid until the end of operation for Oconee 3 Cycle 20.

Remove these revision 16 pages	Insert these revision 17 pages
1-31	1-33

Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
Oconee 3 Cycle 21 revisions below					
17	Apr. 2003	1 - 31	32 - 33	-	33
Oconee 3 Cycle 20 revisions below					
16	Oct. 2002	1 - 3, 5	-	-	31
15	Nov. 2001	1 - 3	-	-	31
14	Nov. 2001	1 - 31	-	-	31
Oconee 3 Cycle 19 revisions below					
13	Apr. 2000	1 - 31	-	-	31

Oconee 3 Cycle 21

1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O3C21 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 O3C21 by references 14 through 16. The O3C21 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, and an EOC ($\leq$ 100 ppmB) Tavg reduction of up to 10 ^{0}F provided 4 RCPs are in operation and Tavg does not decrease below 569 ^{0}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 O3C21 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, 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 4, January 2001.

12. Power Imbalance Safety Limits and Tech Spec Setpoints Using Error Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 2, October 2001.

13. ΔTc and EOC Reduced Tavg Operation, OSC-7265, Rev. 1, Duke Power Co., June 2002.

14. O3C21 Maneuvering Analysis, OSC-8178, Revision 0, November 2002.

15. O3C21 Specific DNB Analysis, OSC-8220, Revision 0, October 2002.

16. O3C21 Reload Safety Evaluation, OSC-8400, Revision 0, April 2003.

Oconee 3 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.
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% Δk/k.
Referred to by ITS 3.1.1.

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

MTC x 10-4 Δρ / °F	% FP
+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 ≥ 2125 psig
3 RCP: measured hot leg pressure ≥ 2125 psig

DNB parameter for RCS loop average temperature shall be:
Referred to by ITS 3.4.1.

The measured Tavg must be less than COLR limits minus instrument uncertainty. ΔTc is the setpoint value selected by the operators. Values are expanded by linear interpolation on page 33 of this document **without** instrument uncertainty.

	Max Loop Tavg (Incl 2°F unc)	
ΔTc, °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

* 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 Tavg.

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

4 RCP: Measured ≥ 107.5 %df
3 RCP: Measured ≥ 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 ITS 3.2.1.

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

Oconee 3 Cycle 21

Steady State Operating Band

	Rod Index		APSR %WD	
EFPD	Min	Max	Min	Max
0 to 445	292 ± 5	300	30	40
445 to EOC	292 ± 5	300	100	100

Quandrant Power Tilt Setpoints

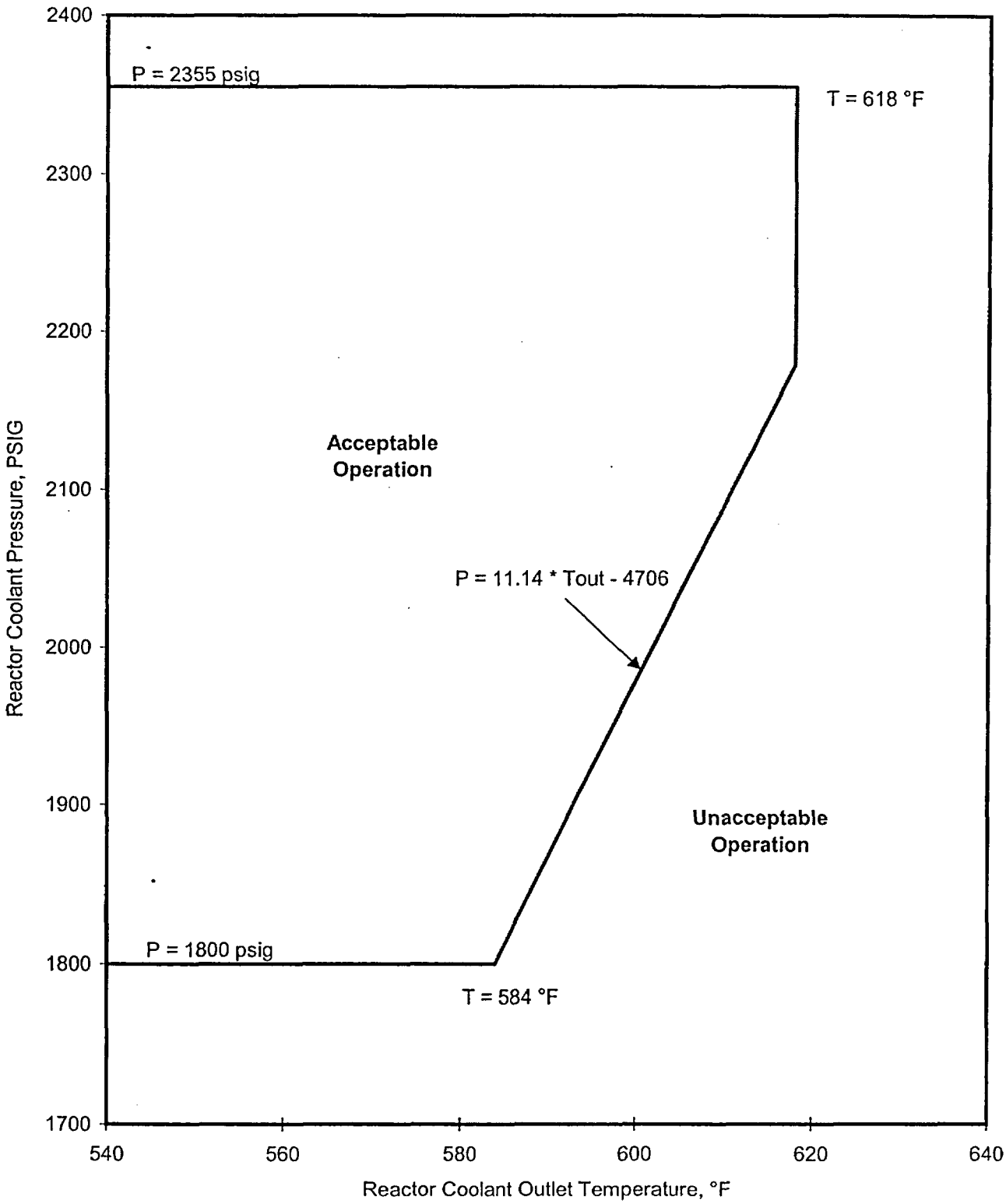
	Steady State		Transient		Maximum
Core Power Level, %FP	30 - 100	0 - 30	30 - 100	0 - 30	0 - 100
Full Incore	3.50	7.57	7.07	9.36	16.51
Out of Core	2.39	6.09	5.63	7.72	14.22
Backup Incore	2.26	3.87	3.63	4.81	10.07

Referred to by ITS 3.2.3.

Oconee 3 Cycle 21

Variable Low RCS Pressure RPS Setpoints

Referred to by ITS 3.3.1



Oconee 3 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 3 Cycle 21

Operational Power Imbalance Setpoints

	%FP	Full Incore	Backup Incore	Out of Core
4 Pumps	0	-25.6	-25.1	-25.6
	80	-25.6	-25.1	-25.6
	90	-22.5	-22.1	-22.5
	100	-14.3	-14.0	-14.3
	102	-12.7	-12.3	-12.7
	102	17.0	17.0	17.0
	100	19.1	18.9	19.1
	90	24.9	24.5	24.9
	80	27.6	27.1	27.6
	0	27.6	27.1	27.6
3 Pumps	0.0	-25.6	-25.1	-25.6
	68.87	-25.6	-	-25.6
	69.35	-	-25.1	-
	77.0	-12.7	-12.3	-12.7
	77.0	17.0	17.0	17.0
	67.46	-	27.1	-
	66.98	27.6	-	27.6
	0.0	27.6	27.1	27.6

Oconee 3 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	-12.70	17.00	-12.70	17.00
101	-21.73	21.73	-13.50	18.05	-13.50	18.05
100	-22.80	22.80	-14.30	19.10	-14.30	19.10
99	-23.86	23.86	-15.12	19.68	-15.12	19.68
98	-24.92	24.92	-15.94	20.26	-15.94	20.26
97	-25.99	25.99	-16.76	20.84	-16.76	20.84
96	-27.05	27.05	-17.58	21.42	-17.58	21.42
95	-28.11	28.11	-18.40	22.00	-18.40	22.00
94	-29.17	29.17	-19.22	22.58	-19.22	22.58
93	-30.24	30.24	-20.04	23.16	-20.04	23.16
92	-31.30	31.30	-20.86	23.74	-20.86	23.74
91	-32.36	32.36	-21.68	24.32	-21.68	24.32
90.4	-33.00	33.00	-22.17	24.67	-22.17	24.67
90	-33.00	33.00	-22.50	24.90	-22.50	24.90
89	-33.00	33.00	-22.81	25.17	-22.81	25.17
88	-33.00	33.00	-23.12	25.44	-23.12	25.44
87	-33.00	33.00	-23.43	25.71	-23.43	25.71
86	-33.00	33.00	-23.74	25.98	-23.74	25.98
85	-33.00	33.00	-24.05	26.25	-24.05	26.25
84	-33.00	33.00	-24.36	26.52	-24.36	26.52
83	-33.00	33.00	-24.67	26.79	-24.67	26.79
82	-33.00	33.00	-24.98	27.06	-24.98	27.06
81	-33.00	33.00	-25.29	27.33	-25.29	27.33
80	-33.00	33.00	-25.60	27.60	-25.60	27.60
0	-33.00	33.00	-25.60	27.60	-25.60	27.60
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 3 Cycle 21

Operational Power Imbalance Setpoints

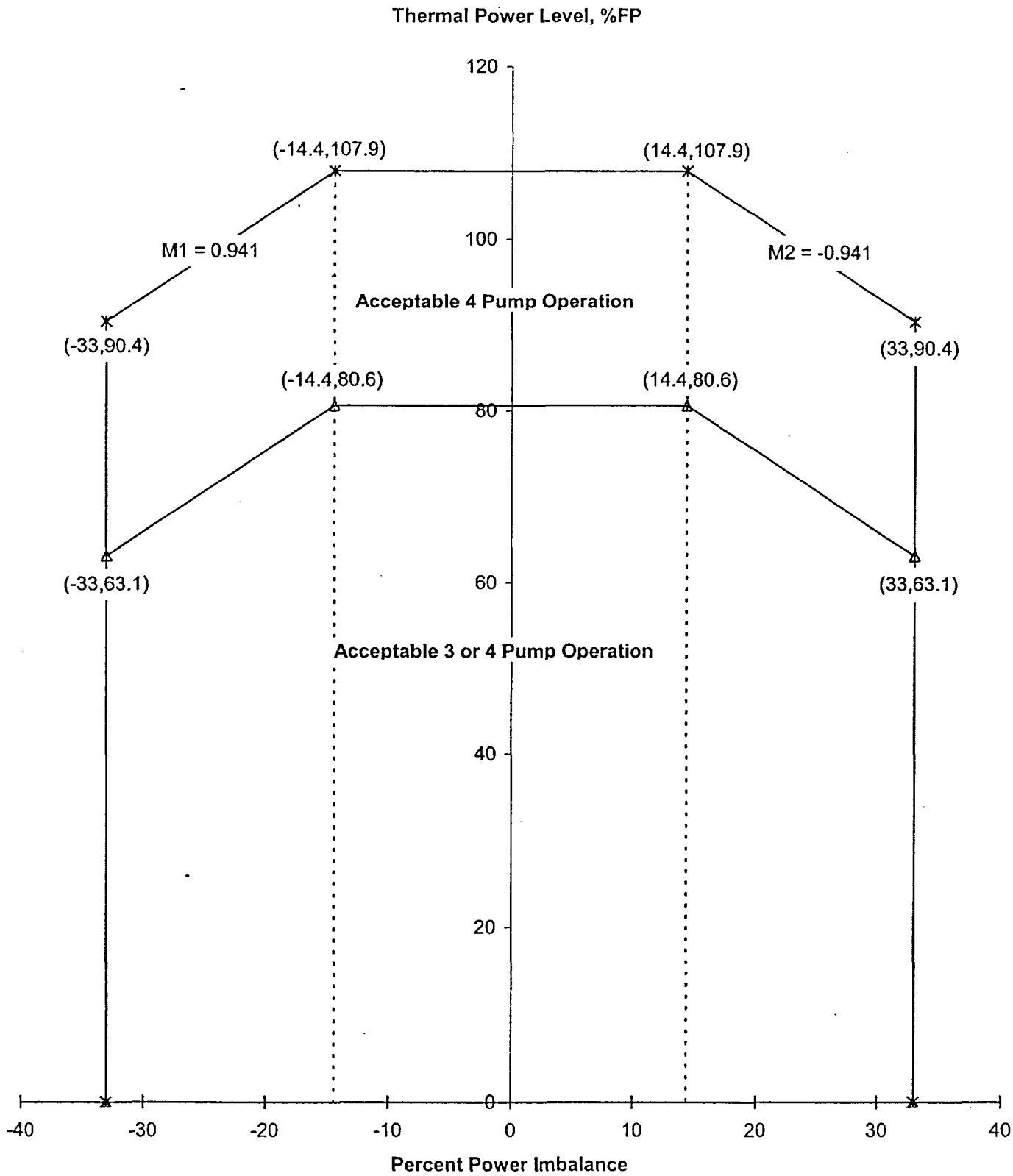
Operation with 3 RCS Pumps, BOC to EOC

% 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	-12.70	17.00	-12.70	17.00
76	-19.29	19.29	-14.29	18.06	-14.29	18.06
75	-20.35	20.35	-15.88	19.12	-15.88	19.12
74	-21.41	21.41	-17.46	20.18	-17.46	20.18
73	-22.48	22.48	-19.05	21.23	-19.05	21.23
72	-23.54	23.54	-20.64	22.29	-20.64	22.29
71	-24.60	24.60	-22.23	23.35	-22.23	23.35
70	-25.67	25.67	-23.81	24.41	-23.81	24.41
69	-26.73	26.73	-25.40	25.47	-25.40	25.47
68.9	-26.86	26.86	-25.60	25.60	-25.60	25.60
68	-27.79	27.79	-25.60	26.53	-25.60	26.53
67	-28.85	28.85	-25.60	27.58	-25.60	27.58
66.98	-28.87	28.87	-25.60	27.60	-25.60	27.60
66	-29.92	29.92	-25.60	27.60	-25.60	27.60
65	-30.98	30.98	-25.60	27.60	-25.60	27.60
64	-32.04	32.04	-25.60	27.60	-25.60	27.60
63.1	-33.00	33.00	-25.60	27.60	-25.60	27.60
63	-33.00	33.00	-25.60	27.60	-25.60	27.60
62	-33.00	33.00	-25.60	27.60	-25.60	27.60
61	-33.00	33.00	-25.60	27.60	-25.60	27.60
60	-33.00	33.00	-25.60	27.60	-25.60	27.60
0	-33.00	33.00	-25.60	27.60	-25.60	27.60
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 3 Cycle 21

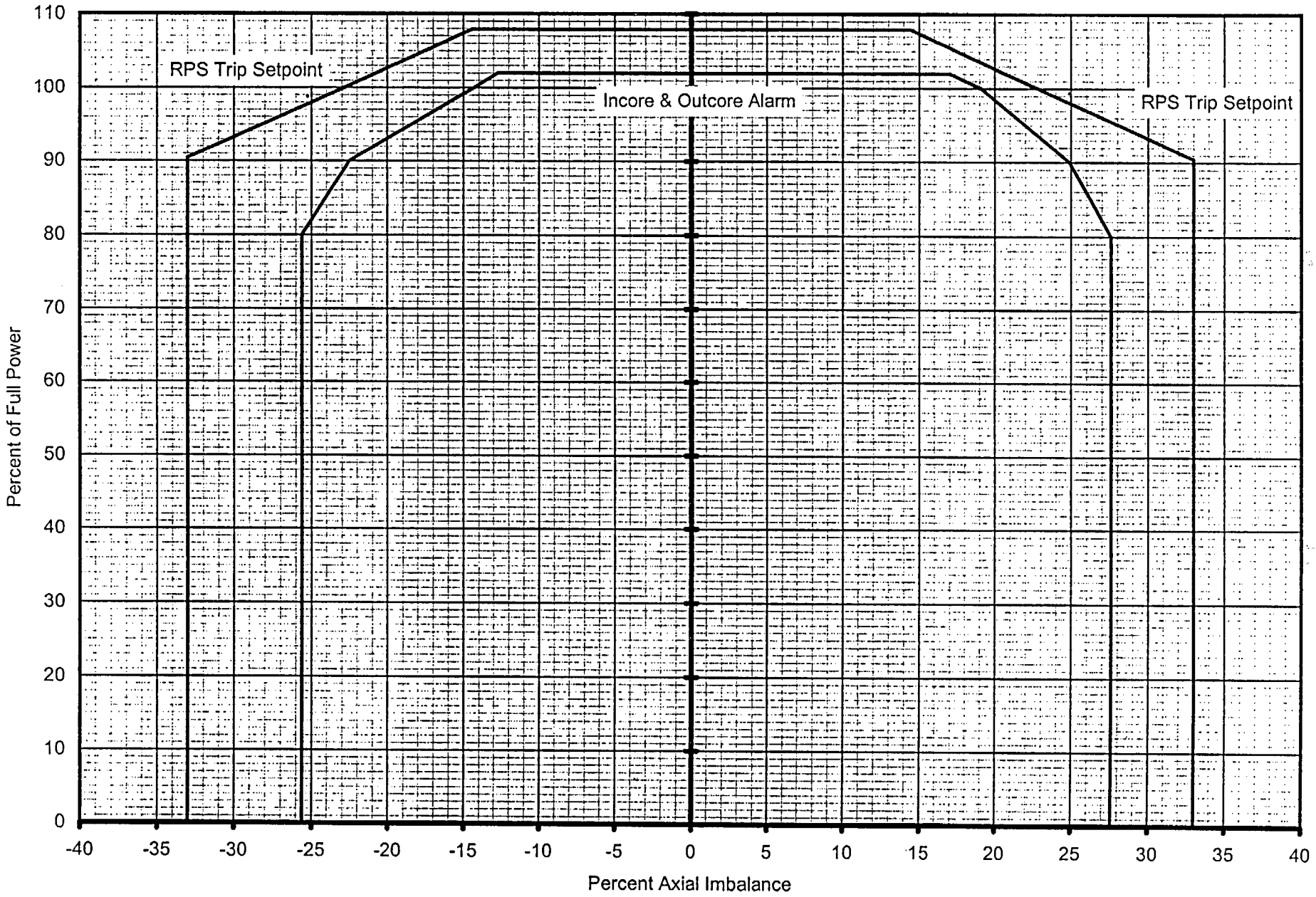
RPS Power Imbalance Setpoints

Referred to by ITS 3.3.1



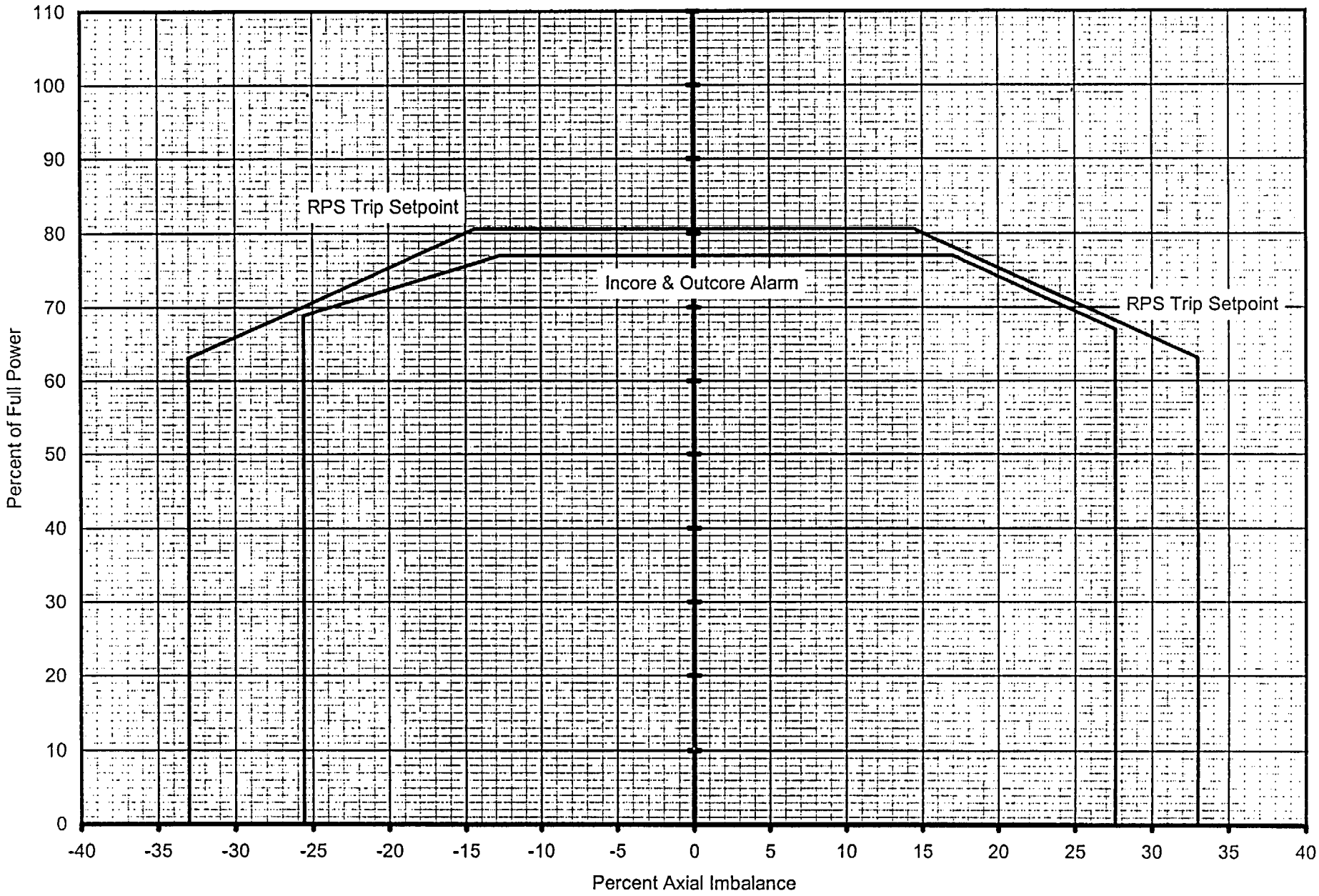
Oconee 3 Cycle 21

Imbalance Setpoints for 4 Pump Operation, BOC to EOC



Oconee 3 Cycle 21

Imbalance Setpoints for 3 Pump Operation, BOC to EOC



Oconee 3 Cycle 21

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	289.7	300
	100.0	261.5	287.5	300
	90.0	251.5	276.7	300
	80.0	241.5	266.0	300
	50.0	201.5	233.7	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 21

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	289.7	300
	100.0	221.5	287.5	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 21
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
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68	100	72.3	0	100	100	25.5
67.6	100	71.7	0	100	100	25.0
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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
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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 21
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 3 Cycle 21
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		

RI = 300 is withdrawal limit at all power levels.

Continued on next page.

Oconee 3 Cycle 21
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 3 Cycle 21
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	89.7	100	100	89.7
101	100	100	88.6	100	100	88.6
100	100	100	87.5	100	100	87.5
99	100	100	86.4	100	100	86.4
98	100	100	85.3	100	100	85.3
97	100	100	84.3	100	100	84.3
96	100	100	83.2	100	100	83.2
95	100	100	82.1	100	100	82.1
94	100	100	81.0	100	100	81.0
93	100	100	80.0	100	100	80.0
92	100	100	78.9	100	100	78.9
91	100	100	77.8	100	100	77.8
90	100	100	76.7	100	100	76.7
89	100	100	75.7	100	100	75.7
88	100	100	74.6	100	100	74.6
87	100	100	73.5	100	100	73.5
86	100	100	72.4	100	100	72.4
85	100	100	71.3	100	100	71.4
84	100	100	70.3	100	100	70.3
83	100	100	69.2	100	100	69.2
82	100	100	68.1	100	100	68.1
81	100	100	67.0	100	100	67.1
80	100	100	66.0	100	100	66.0
79	100	100	64.9	100	100	64.9
78	100	100	63.8	100	100	63.8
77	100	100	62.7	100	100	62.8
76	100	100	61.7	100	100	61.7
75	100	100	60.6	100	100	60.6
74	100	100	59.5	100	100	59.5
73	100	100	58.4	100	100	58.5
72	100	100	57.3	100	100	57.4
71	100	100	56.3	100	100	56.3
70	100	100	55.2	100	100	55.2
69	100	100	54.1	100	100	54.2
68	100	100	53.0	100	100	53.1
67	100	100	52.0	100	100	52.0
66	100	100	50.9	100	100	50.9
65	100	100	49.8	100	100	49.9
64	100	100	48.7	100	100	48.8
63	100	100	47.7	100	100	47.7
62	100	100	46.6	100	100	46.6
61	100	100	45.5	100	100	45.5
60	100	100	44.4	100	100	44.5
59	100	100	43.3	100	100	43.4
58	100	100	42.3	100	100	42.3
57	100	100	41.2	100	100	41.2
56	100	100	40.1	100	100	40.2
55	100	100	39.0	100	100	39.1
54	100	100	38.0	100	100	38.0
53	100	100	36.9	100	100	36.9
52	100	100	35.8	100	100	35.9
51	100	100	34.7	100	100	34.8
50	100	100	33.7	100	100	33.7
49	100	100	32.6	100	100	32.6
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 21
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	74.8	0	0	74.8	0	0
2	68.0	0	0	68.0	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 3 Cycle 21
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		

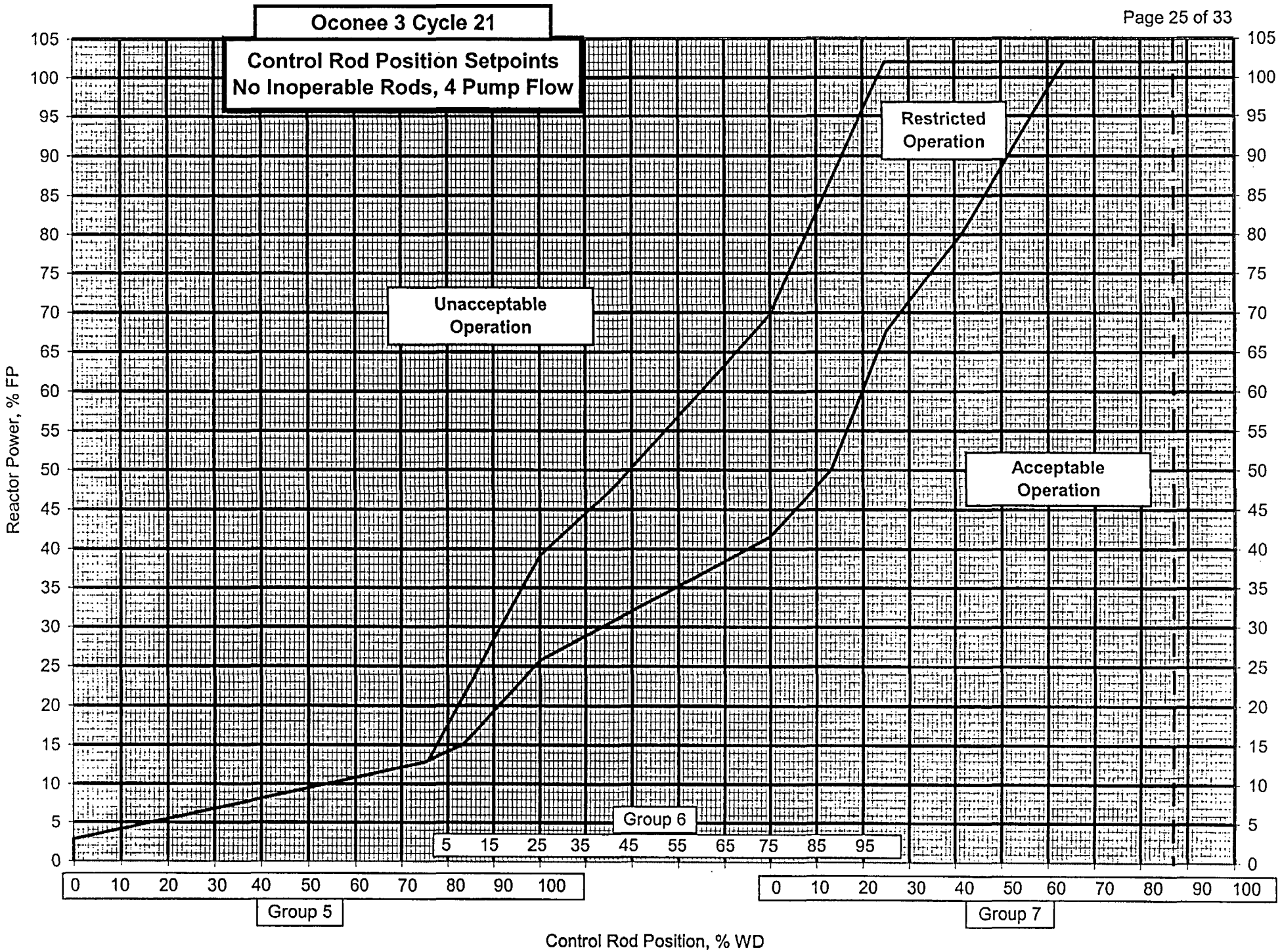
RI = 300 is withdrawal limit at all power levels.

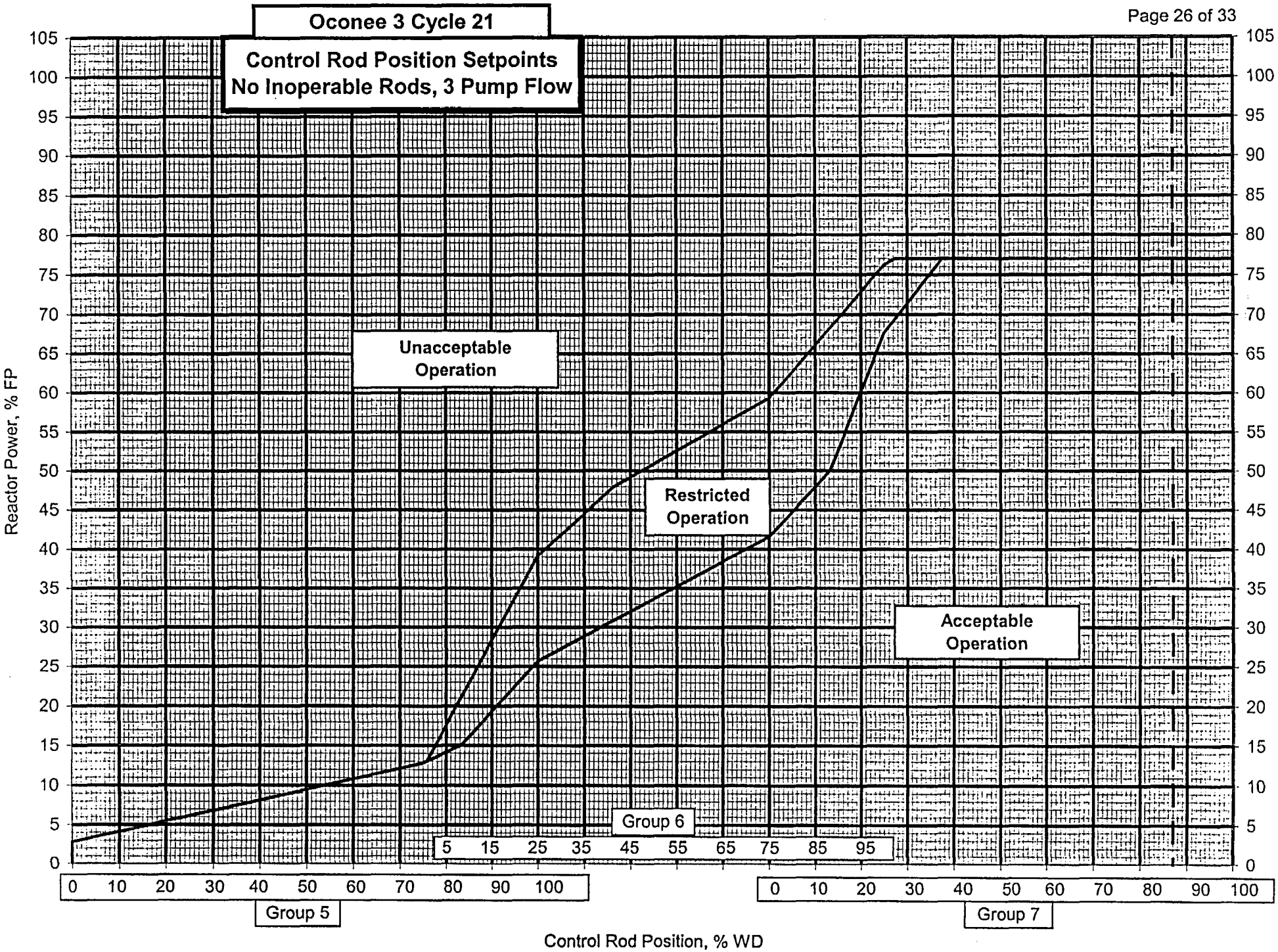
Continued on next page.

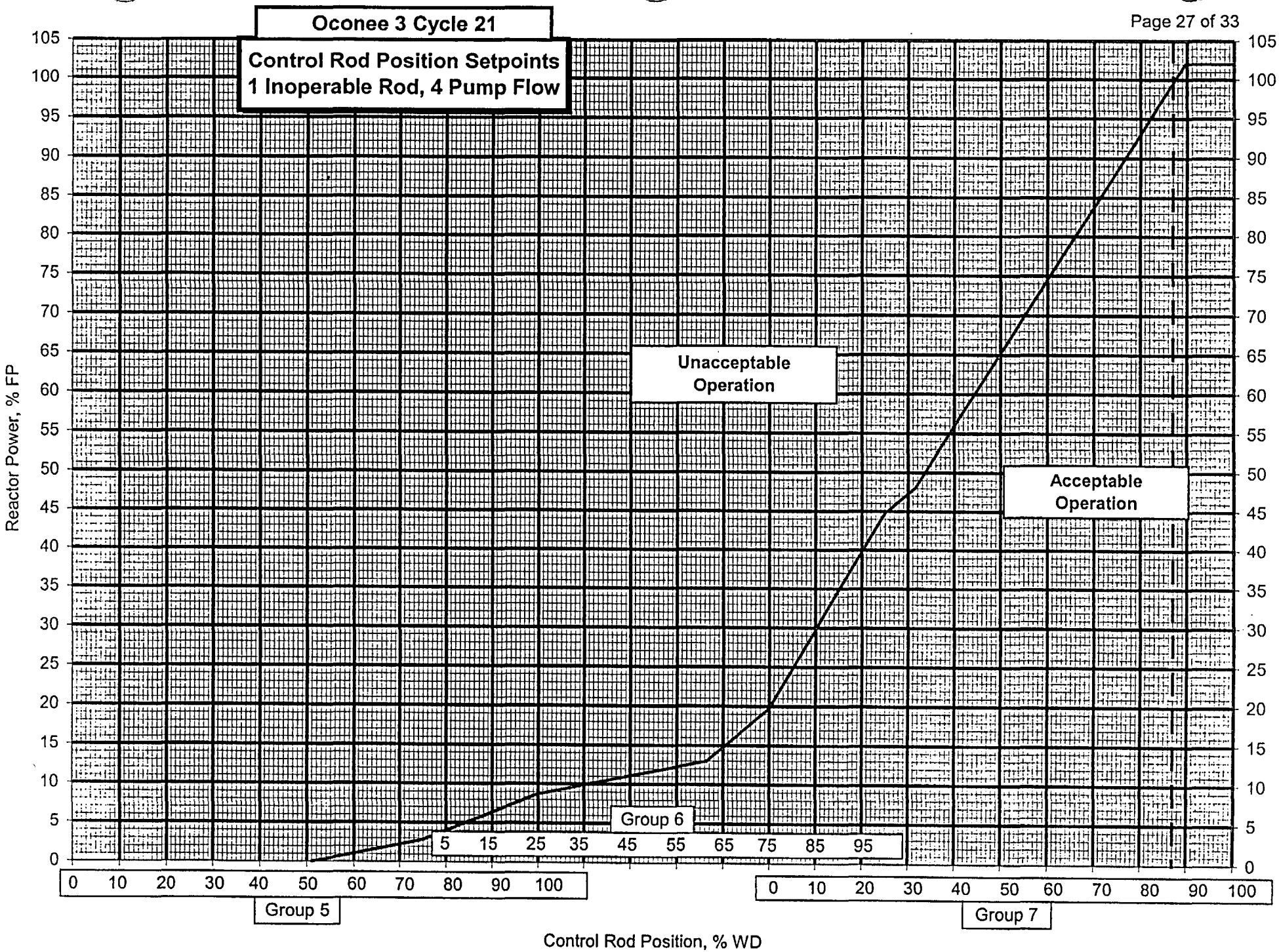
Oconee 3 Cycle 21
Rod Index Setpoints
3 Pump Operation, 1 Inoperable Rod, BOC to EOC

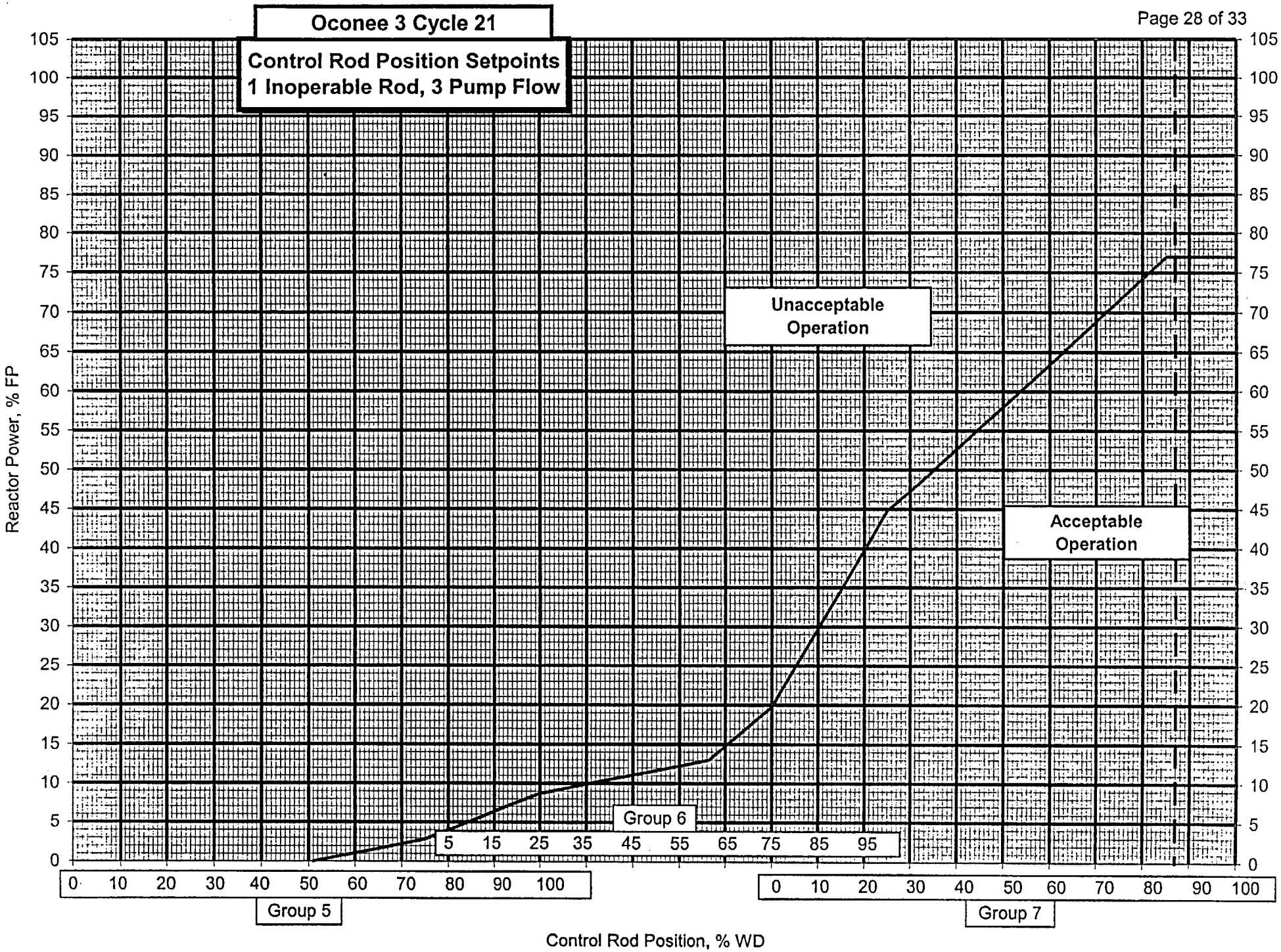
% FP	Shutdown Margin Setpoint			Operational Alarm Setpoint		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
23	100	78.2	3.2	100	78.2	3.2
22	100	77.2	2.2	100	77.2	2.2
21	100	76.2	1.2	100	76.2	1.2
20	100	75.2	0.2	100	75.2	0.2
19.8	100	75.0	0	100	75.0	0
19	100	73.5	0	100	73.5	0
18	100	71.5	0	100	71.5	0
17	100	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	74.8	0	0	74.8	0	0
2	68.0	0	0	68.0	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 3 Cycle 21
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 3 Cycle 21
Control Rod Position Setpoints
No Inoperable Rods, 3 Pump Flow
Unacceptable Operation
Restricted Operation
Acceptable Operation
Reactor Power, % FP
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105
Group 6
5 15 25 35 45 55 65 75 85 95
Group 5
0 10 20 30 40 50 60 70 80 90 100
Group 7
0 10 20 30 40 50 60 70 80 90 100
Control Rod Position, % WD


Oconee 3 Cycle 21
Control Rod Position Setpoints
1 Inoperable Rod, 4 Pump Flow
Unacceptable Operation
Acceptable Operation
Reactor Power, % FP
Control Rod Position, % WD
Group 5
Group 6
Group 7
0 10 20 30 40 50 60 70 80 90 100
5 15 25 35 45 55 65 75 85 95
0 10 20 30 40 50 60 70 80 90 100
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105


Oconee 3 Cycle 21
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 3 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, %	5.44	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 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	-36.6
	80	-	-36.6
	90	-	-33.5
	100	-48.0	-24.2
	112	-31.1	-
	112	31.1	-
	100	48.0	30.0
	90	-	36.4
	80	-	39.0
	0	48.0	39.0
3 Pumps	0	-48.0	-36.6
	74.6	-48.0	-
	77.0	-	-36.6
	86.6	-31.1	-
	86.6	31.1	-
	77.0	-	39.0
	74.6	48.0	-
	0	48.0	39.0

Oconee 3 Cycle 21

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	286	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 21

LOCA Limits

Not for Plant Use

	Core Elevation Feet	LOCA LHR kw/ft Limit Versus Burnup		
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 and Mk-B11A 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 3 Cycle 21

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

ΔTcold, °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