

Duke Power Company

Oconee 1 Cycle 19

Core Operating Limits Report

QA Condition 1

~~Not Reviewed or Approved by CFAM 3.13~~ *gls*

REVIEWED AND APPROVED BY CFAM 3.13

Prepared By: T. P. Phelps

Date: 22 APR 99

Checked By: J. L. Elw

Date: 22 APR 99

Approved By: R. R. St. Clair

Date: 22 APR 99

9906210068 990614  
PDR ADOCK 05000269  
P PDR

Oconee 1 Cycle 19  
Core Operating Limits Report

Insertion Sheet for Revision 11

This revision is not valid until the end of operation for Unit 1 Cycle 18.

Remove these revision 10 pages

1 - 31

Insert these revision 11 pages

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	1,2,3,5,13, 16,17,32,36	-	-	38
8	Nov-97	1,2,3,5,10, 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 19

### 1.0 Error Adjusted Core Operating Limits

The Core Operating Limits Report for O1C19 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, 4, 5, and 6. The RPS protective limits and maximum allowable setpoints are documented in references 7 and 8. These limits are validated for use in O1C19 by references 9, 10, and 11. The O1C19 analyses assume a design flow of 107.5% of 88,000 gpm per RCS pump, radial local peaking ( $F_{\Delta h}$ ) of 1.714, and axial peaking factor ( $F_z$ ) of 1.5.

The error adjusted core operating limits included in section 1 of the report incorporate all necessary uncertainties and margins required for operation of the O1C19 reload core.

### 1.1 References

1. Nuclear Design Methodology Using CASMO-3 / SIMULATE-3P, DPC-NE-1004A, Revision 0, SER dated November 23, 1992.
2. Oconee Nuclear Station Reload Design Methodology II, DPC-NE-1002A, Revision 1, SER dated October 1, 1985.
3. Oconee Nuclear Station Reload Design Methodology, NFS-1001A, Revision 4, SER dated July 29, 1981.
4. ONS Core Thermal Hydraulic Methodology Using VIPRE-01, DPC-NE-2003A, July 1989, SER dated July 19, 1989.
5. Thermal Hydraulic Statistical Core Design Methodology, DPC-NE-2005P-A, Revision 1, SER dated November 7, 1996.
6. Fuel Mechanical Reload Analysis Methodology Using TACO3, DPC-NE-2008P-A, SER dated April 3, 1995.
7. Variable Low Pressure Safety Limit, OSC-4048, Revision 3, July 1998.
8. Power Imbalance Safety Limits and Tech Spec Setpoints Using Error Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 1, November 1998.
9. O1C19 Maneuvering Analysis, OSC-7295, Revision 0, April 1999.
10. O1C19 Specific DNB Analysis, OSC-7302, Revision 1, March 1999.
11. O1C19 Reload Safety Evaluation and 50.59, OSC-7402, Revision 0, May 1999.

Referred to by ITS 3.2.1.

## Oconee 1 Cycle 19

### Steady State Operating Band

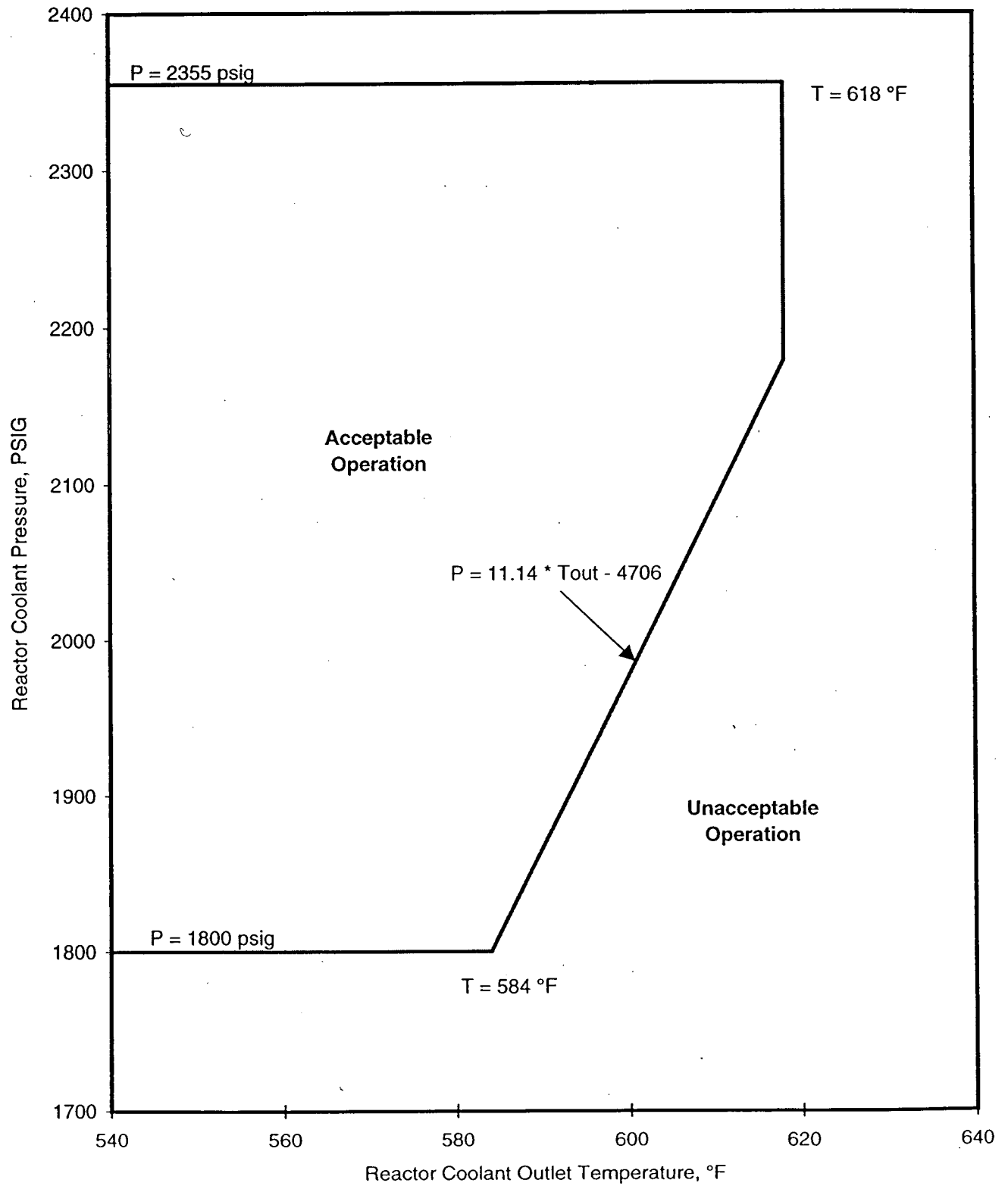
EFPD	Rod Index		APSR %WD	
	Min	Max	Min	Max
0 to 470	292 ± 5	300	30	40
470 to EOC	292 ± 5	300	100	100

### Quadrant Power Tilt Setpoints

Core Power Level, %FP	Steady State		Transient		Maximum
	30 - 100	0 - 30	30 - 100	0 - 30	
Full Incore	3.50	8.00	7.50	9.79	16.94
Out of Core	1.99	6.09	5.63	7.72	14.22
Backup Incore	1.64	3.94	3.64	5.03	9.58

Referred to by ITS 3.2.3.

Oconee 1 Cycle 19  
Variable Low RCS Pressure RPS Setpoints  
Referred to by ITS 3.3.1



Oconee 1 Cycle 19

RPS Power Imbalance Setpoints

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

# Oconee 1 Cycle 19

## 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	-29.7	-29.3	-29.7
	100	-19.1	-18.7	-19.1
	102	-17.0	-16.5	-17.0
	102	17.0	17.0	17.0
	100	19.1	18.7	19.1
	90	22.4	21.8	22.4
	80	23.1	22.3	23.1
	0	23.1	22.3	23.1
3 Pumps	0.0	-31.5	-31.0	-31.5
	63.30	-31.5	-	-31.5
	63.30	-	-31.0	-
	77.0	-17.0	-16.5	-17.0
	77.0	17.0	17.0	17.0
	60.86	-	22.3	-
	61.23	23.1	-	23.1
	0.0	23.1	22.3	23.1



Oconee 1 Cycle 19

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	-20.16	19.43	-20.16	19.43
98	-24.92	24.92	-21.22	19.76	-21.22	19.76
97	-25.99	25.99	-22.28	20.09	-22.28	20.09
96	-27.05	27.05	-23.34	20.42	-23.34	20.42
95	-28.11	28.11	-24.40	20.75	-24.40	20.75
94	-29.17	29.17	-25.46	21.08	-25.46	21.08
93	-30.24	30.24	-26.52	21.41	-26.52	21.41
92	-31.30	31.30	-27.58	21.74	-27.58	21.74
91	-32.36	32.36	-28.64	22.07	-28.64	22.07
90.4	-33.00	33.00	-29.28	22.27	-29.28	22.27
90	-33.00	33.00	-29.70	22.40	-29.70	22.40
89	-33.00	33.00	-29.88	22.47	-29.88	22.47
88	-33.00	33.00	-30.06	22.54	-30.06	22.54
87	-33.00	33.00	-30.24	22.61	-30.24	22.61
86	-33.00	33.00	-30.42	22.68	-30.42	22.68
85	-33.00	33.00	-30.60	22.75	-30.60	22.75
84	-33.00	33.00	-30.78	22.82	-30.78	22.82
83	-33.00	33.00	-30.96	22.89	-30.96	22.89
82	-33.00	33.00	-31.14	22.96	-31.14	22.96
81	-33.00	33.00	-31.32	23.03	-31.32	23.03
80	-33.00	33.00	-31.50	23.10	-31.50	23.10
0	-33.00	33.00	-31.50	23.10	-31.50	23.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

Oconee 1 Cycle 19

Operational Power Imbalance Setpoints

Operation with 3 RCS Pumps, BOC to EOC

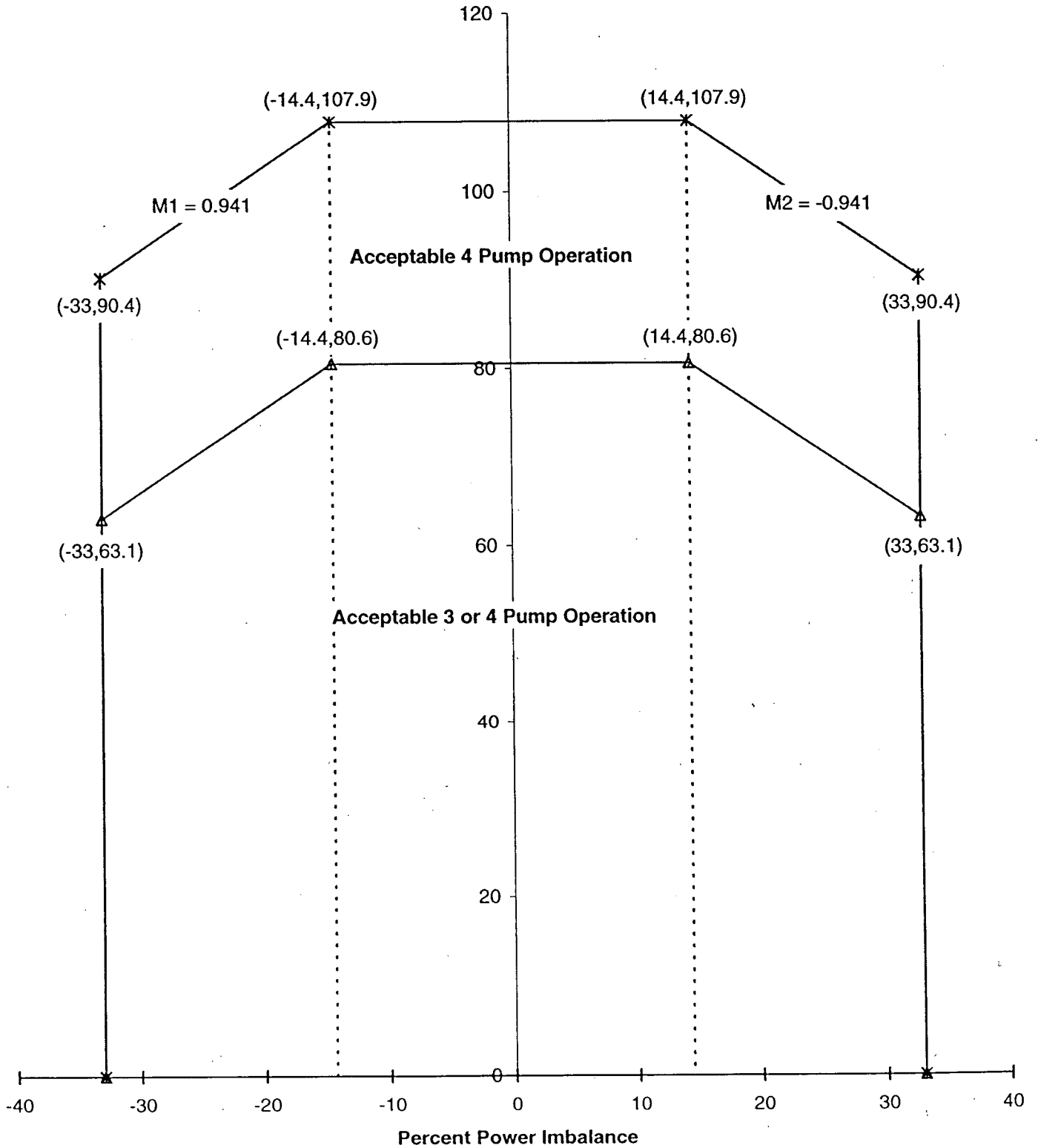
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	
80.6	-14.40	14.40				
80	-15.04	15.04				
79	-16.10	16.10				
78	-17.16	17.16				
77.0	-18.23	18.23	-17.00	17.00	-17.00	17.00
76	-19.29	19.29	-18.06	17.39	-18.06	17.39
75	-20.35	20.35	-19.12	17.77	-19.12	17.77
74	-21.41	21.41	-20.18	18.16	-20.18	18.16
61.2	-34.99	34.99	-33.69	23.10	-33.69	23.10
73	-22.48	22.48	-21.23	23.10	-21.23	23.10
72	-23.54	23.54	-22.29	23.10	-22.29	23.10
71	-24.60	24.60	-23.35	23.10	-23.35	23.10
70	-25.67	25.67	-24.41	23.10	-24.41	23.10
69	-26.73	26.73	-25.47	23.10	-25.47	23.10
68	-27.79	27.79	-26.53	23.10	-26.53	23.10
67	-28.85	28.85	-27.58	23.10	-27.58	23.10
66	-29.92	29.92	-28.64	23.10	-28.64	23.10
65	-30.98	30.98	-29.70	23.10	-29.70	23.10
64	-32.04	32.04	-30.76	23.10	-30.76	23.10
63.3	-32.79	32.79	-31.50	23.10	-31.50	23.10
63.1	-33.00	33.00	-31.50	23.10	-31.50	23.10
63	-33.00	33.00	-31.50	23.10	-31.50	23.10
62	-33.00	33.00	-31.50	23.10	-31.50	23.10
61	-33.00	33.00	-31.50	23.10	-31.50	23.10
60	-33.00	33.00	-31.50	23.10	-31.50	23.10
0	-33.00	33.00	-31.50	23.10	-31.50	23.10
% FP	RPS Trip		Full Incore Alarm		Out of Core Alarm	

## Oconee 1 Cycle 19

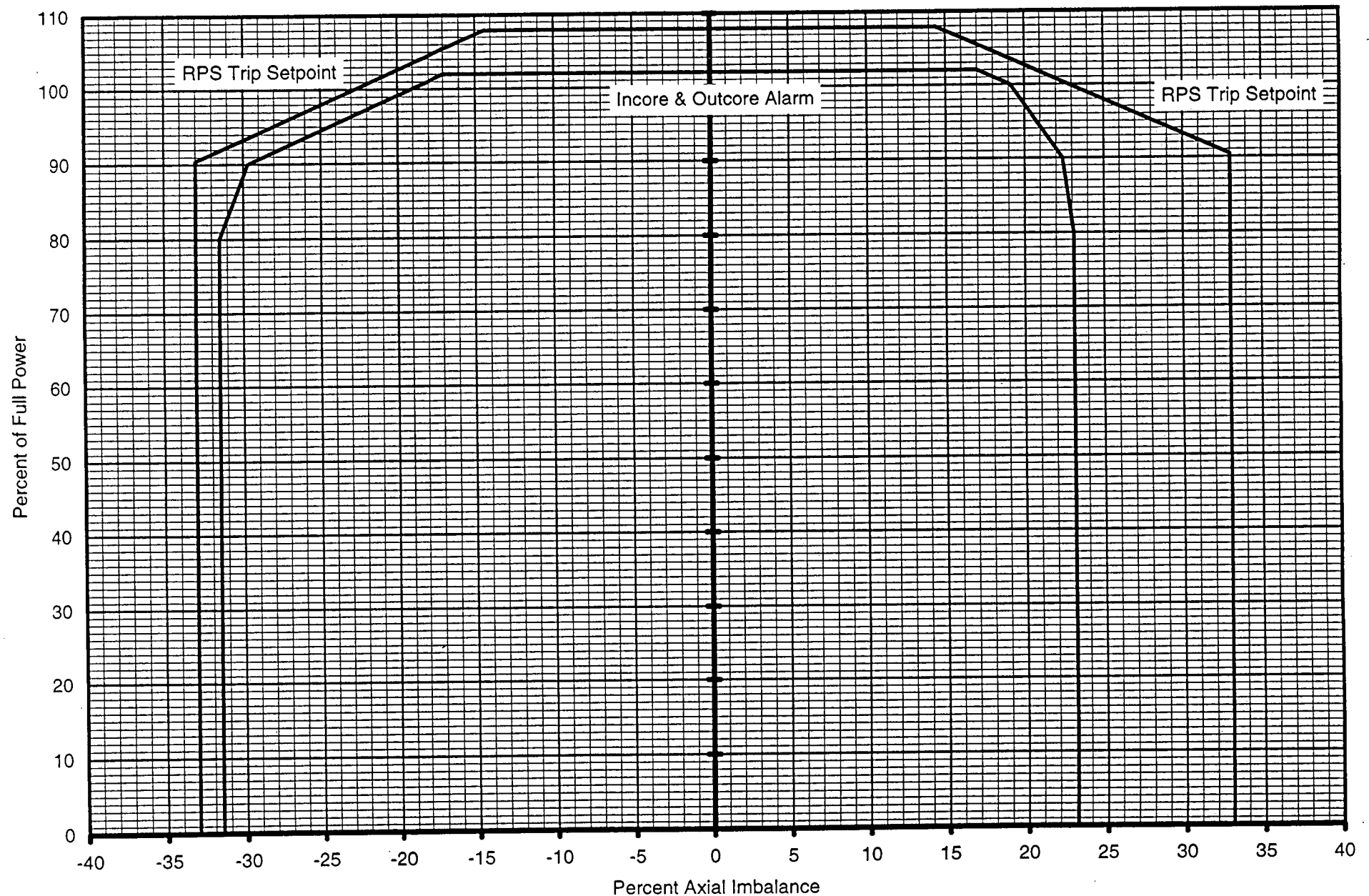
## RPS Power Imbalance Setpoints

Referred to by ITS 3.3.1

Thermal Power Level, %FP

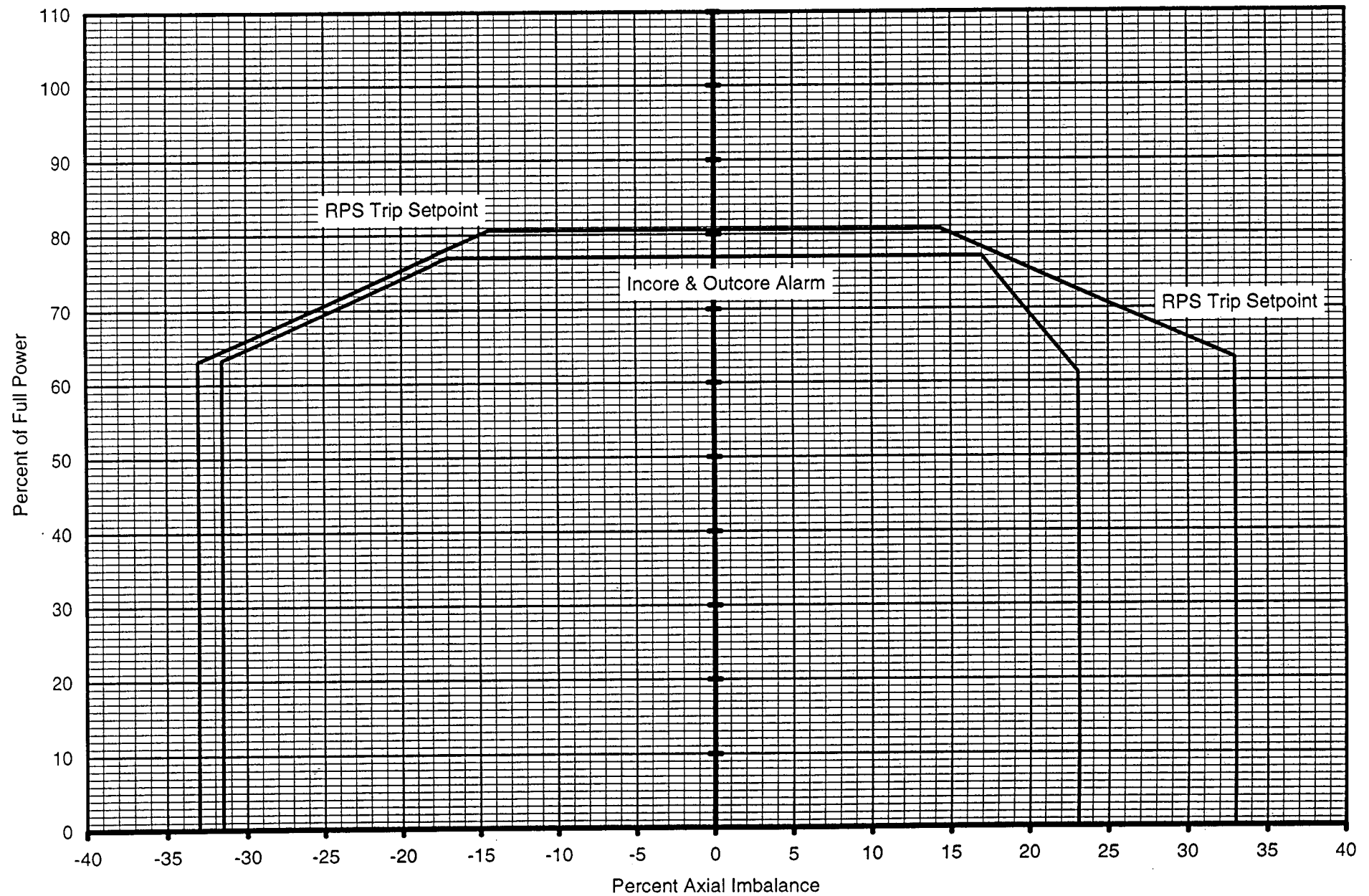


Oconee 1 Cycle 19  
Imbalance Setpoints for 4 Pump Operation, BOC to EOC



## Oconee 1 Cycle 19

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



# Oconee 1 Cycle 19

## Operational Rod Index Setpoints

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

# Oconee 1 Cycle 19

## Shutdown Margin Rod Index Setpoints

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

## Rod Index Setpoints

4 Pump Operation, No Inoperable Rods, BOC to EOC

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



Oconee 1 Cycle 19  
Rod Index Setpoints  
4 Pump Operation, No Inoperable Rods, BOC to EOC

ONEI-0400-50 Rev 11  
Page 17 of 31

% 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 19  
Rod Index Setpoints  
3 Pump Operation, No Inoperable Rods, BOC to EOC

ONEI-0400-50 Rev 11

Page 18 of 31

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

RI = 300 is withdrawal limit at all power levels.

Continued on next page.

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

Page 19 of 31

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

% 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 19  
Rod Index Setpoints  
4 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-50 Rev 11  
Page 21 of 31

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

RI = 300 is withdrawal limit at all power levels.

Oconee 1 Cycle 19  
Rod Index Setpoints  
3 Pump Operation, 1 Inoperable Rod, BOC to EOC

ONEI-0400-50 Rev 11  
Page 22 of 31

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

RI = 300 is withdrawal limit at all power levels.

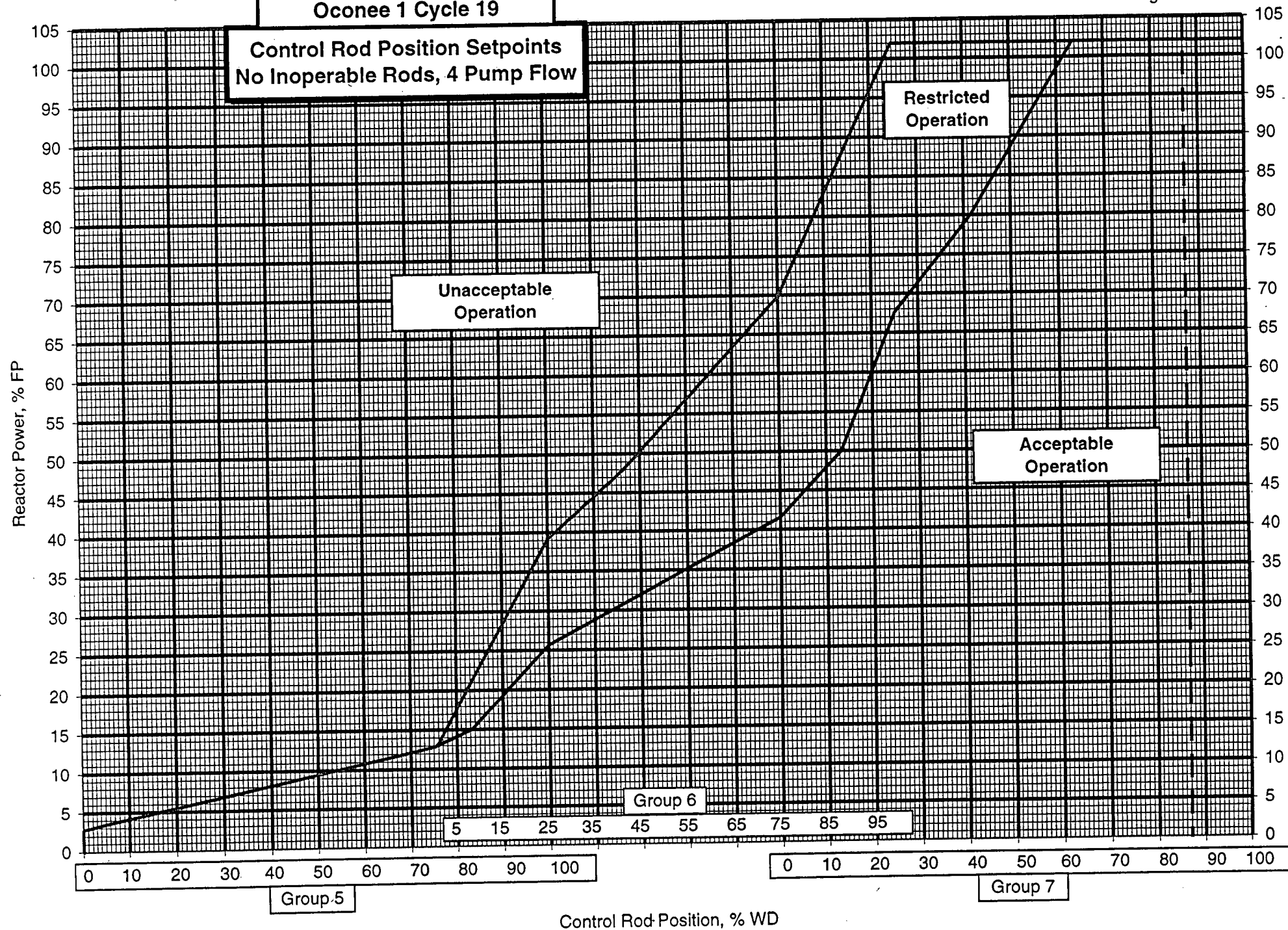
Continued on next page.

3 Pump Operation, 1 Inoperable Rod, BOC to EOC

[illegible]

RI = 300 is withdrawal limit at all power levels.

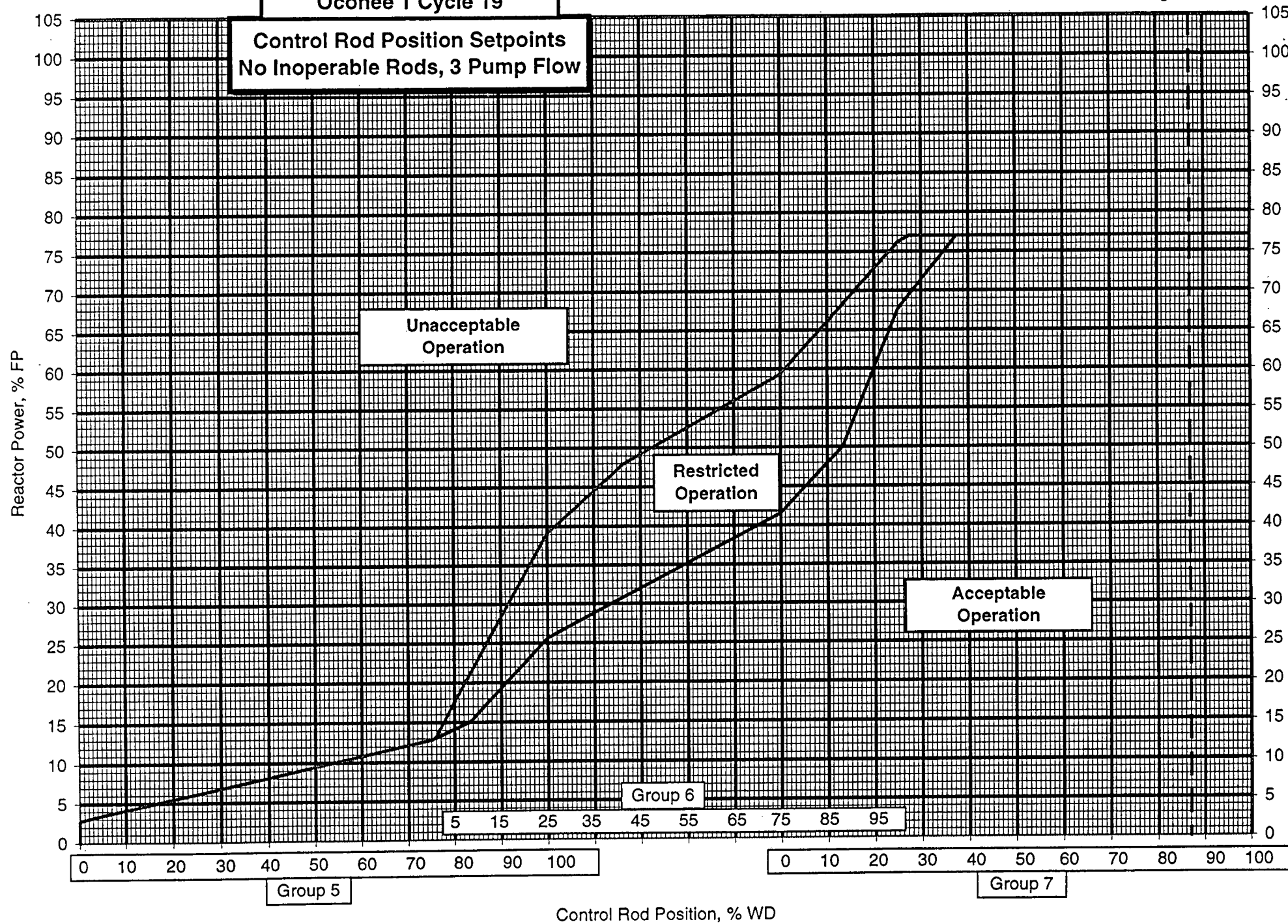
## Oconee 1 Cycle 19

Control Rod Position Setpoints  
No Inoperable Rods, 4 Pump Flow

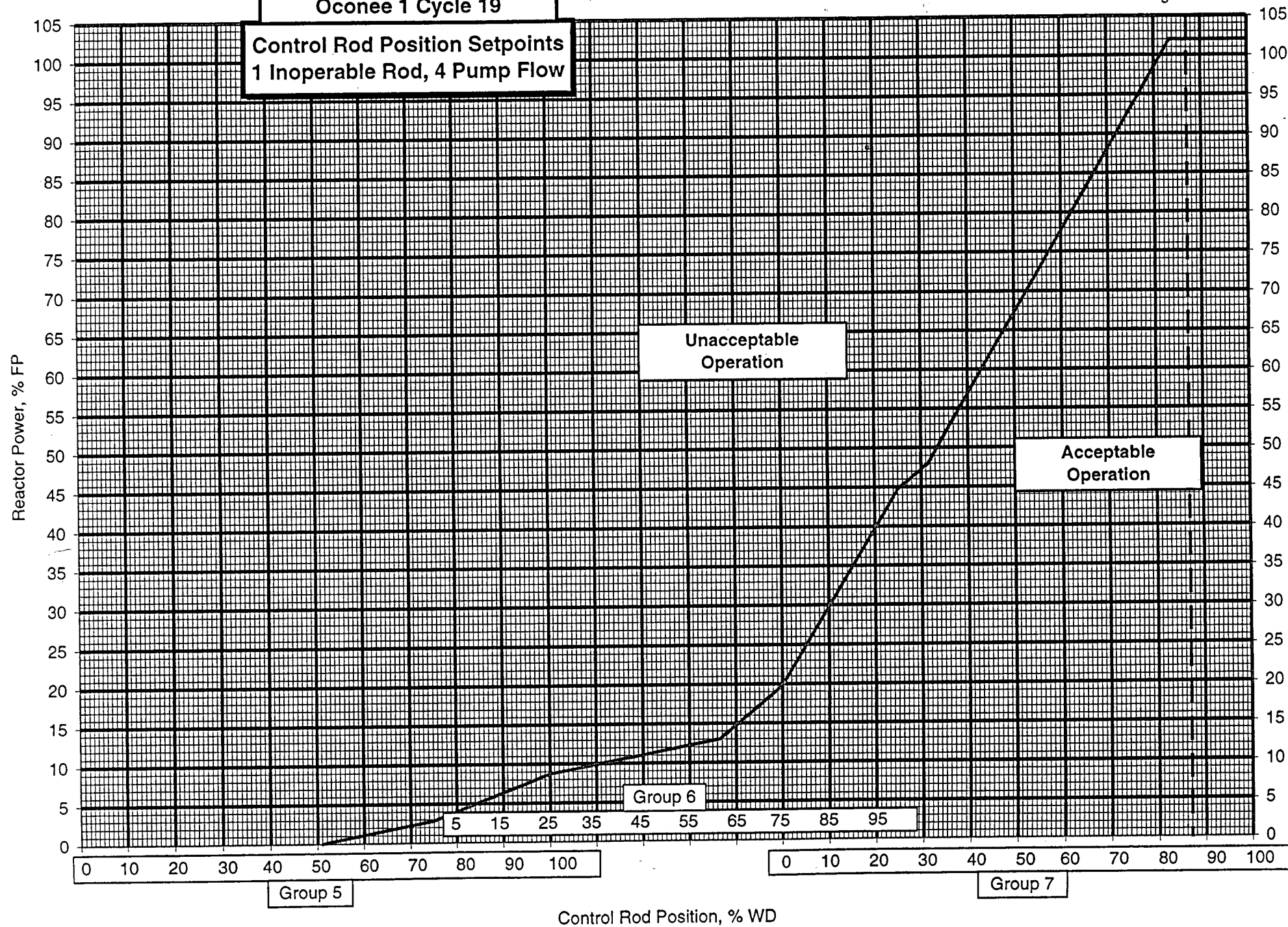


## Oconee 1 Cycle 19

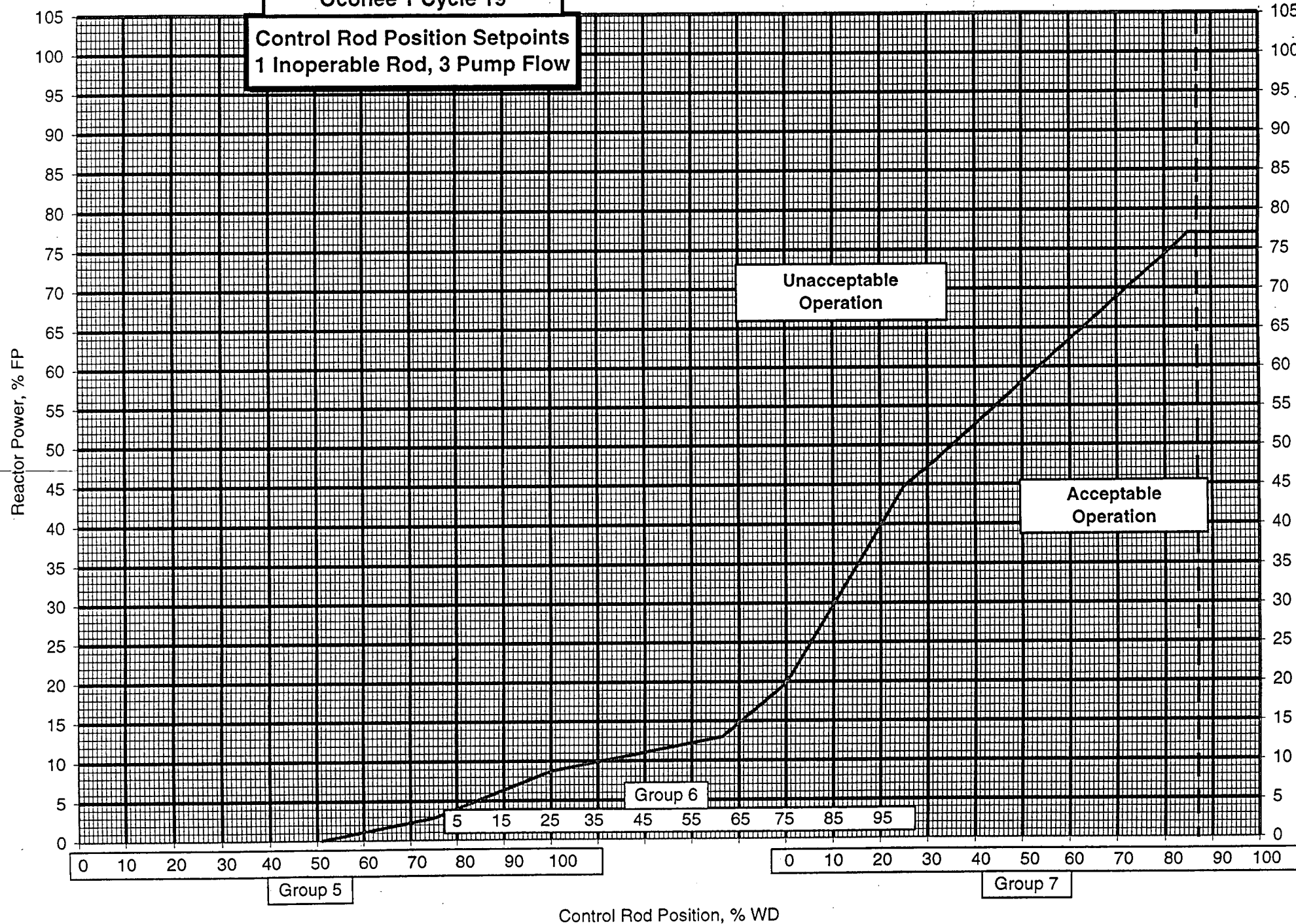
Control Rod Position Setpoints  
No Inoperable Rods, 3 Pump Flow



Oconee 1 Cycle 19

Control Rod Position Setpoints  
1 Inoperable Rod, 4 Pump Flow

## Oconee 1 Cycle 19

Control Rod Position Setpoints  
1 Inoperable Rod, 3 Pump Flow

## Oconee 1 Cycle 19

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

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

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

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

### Quadrant Power Tilt Limits

Referred to by ITS 3.2.3.

	Steady State		Transient		Maximum
Core Power Level, %FP	30 - 100	0 - 30	30 - 100	0 - 30	0 - 100
Quadrant Power Tilt, %	4.96	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 19

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	-	-42.3
	100	-48.0	-30.0
	112	-31.1	-
	112	31.1	-
	100	48.0	30.0
	90	-	33.4
	80	-	33.5
	0	48.0	33.5
3 Pumps	0	-48.0	-43.8
	74.6	-48.0	-
	77.0	-	-43.8
	86.6	-31.1	-
	86.6	31.1	-
	77.0	-	33.5
	74.6	48.0	-
	0	48.0	33.5

# Oconee 1 Cycle 19

## Rod Index Limits

Referred to by ITS 3.2.1

Not for Plant Use

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

# Oconee 1 Cycle 19

## 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