

DUKE POWER COMPANY
OCONEE 2 CYCLE 14
CORE OPERATING LIMITS REPORT
REVISION 2

REFERENCE OSC-4999

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Date: 11-16-93

Oconee Nuclear Station

Unit 2 Cycle 14

Core Operating Limits Report

Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
0	11-Dec-92	-	1-29	-	29
1	11-May-93	1-3, 15	-	-	29
2	16-Nov-93	1-29	30-33	-	33

Oconee Nuclear Station
Unit 2 Cycle 14
Core Operating Limits Report
Insertion Sheet for Revision 2

Remove these Revision 1 pages

1-29

Insert these Revision 2 pages

1-33

1.0 CORE OPERATING LIMITS

This Core Operating Limits Report for O2C14 has been prepared in accordance with the requirements of Technical Specification 6.9. The core operating limits have been developed using NRC-approved methodology (References 1, 2 and 3) and are documented in Reference 4. The setpoints for O2C14 are documented in References 5 and 6. The Reactor Coolant System design flow used in Reference 4 for O2C14 is 107.5 % (of 88,000 gpm per RCP). The core operating limits have been developed with a radial local peaking factor ($F_{\Delta H}^N$) of 1.714 and an axial peaking factor (F_Z^N) of 1.5.

The following cycle-specific core operating limits are included in this report:

- 1) Axial power imbalance and variable low pressure protective limits (Figures 1.1 and 1.2),
- 2) RPS limiting safety system settings (Figures 1.3 and 1.4),
- 3) Quadrant power tilt limits,
- 4) Steady state operating band,
- 5) Operational power-imbalance breakpoints,
- 6) Operational and shutdown margin-limited control rod position limits, and
- 7) BWST, CBAST, and CFT boron requirements.

1.1 REFERENCES

- 1) Duke Power Company, Oconee Nuclear Station, Reload Design Methodology II, DPC-NE-1002A, October 1985.
- 2) NFS-1001A, Reload Design Methodology, April 1984.
- 3) DPC-DE-2003A, Oconee Nuclear Station Core Thermal Hydraulic Methodology Using VIPRE-01, July 1989.
- 4) O2C14 Maneuvering Analysis, Duke Power Company calculational file, OSC-4999, Revision 2, November 1993.
- 5) Variable Low Pressure Safety Limit, Duke Power Company calculational file, OSC-4048, Revision 0, 24JUL90.
- 6) Power-Imbalance Safety Limits and Tech Spec Setpoints using Error-Adjusted Flux-Flow Ratio of 1.094, OSC-5604, Revision 0, DPCo, November 1993..

Figure 1.1. Axial Power Imbalance Protective Limits

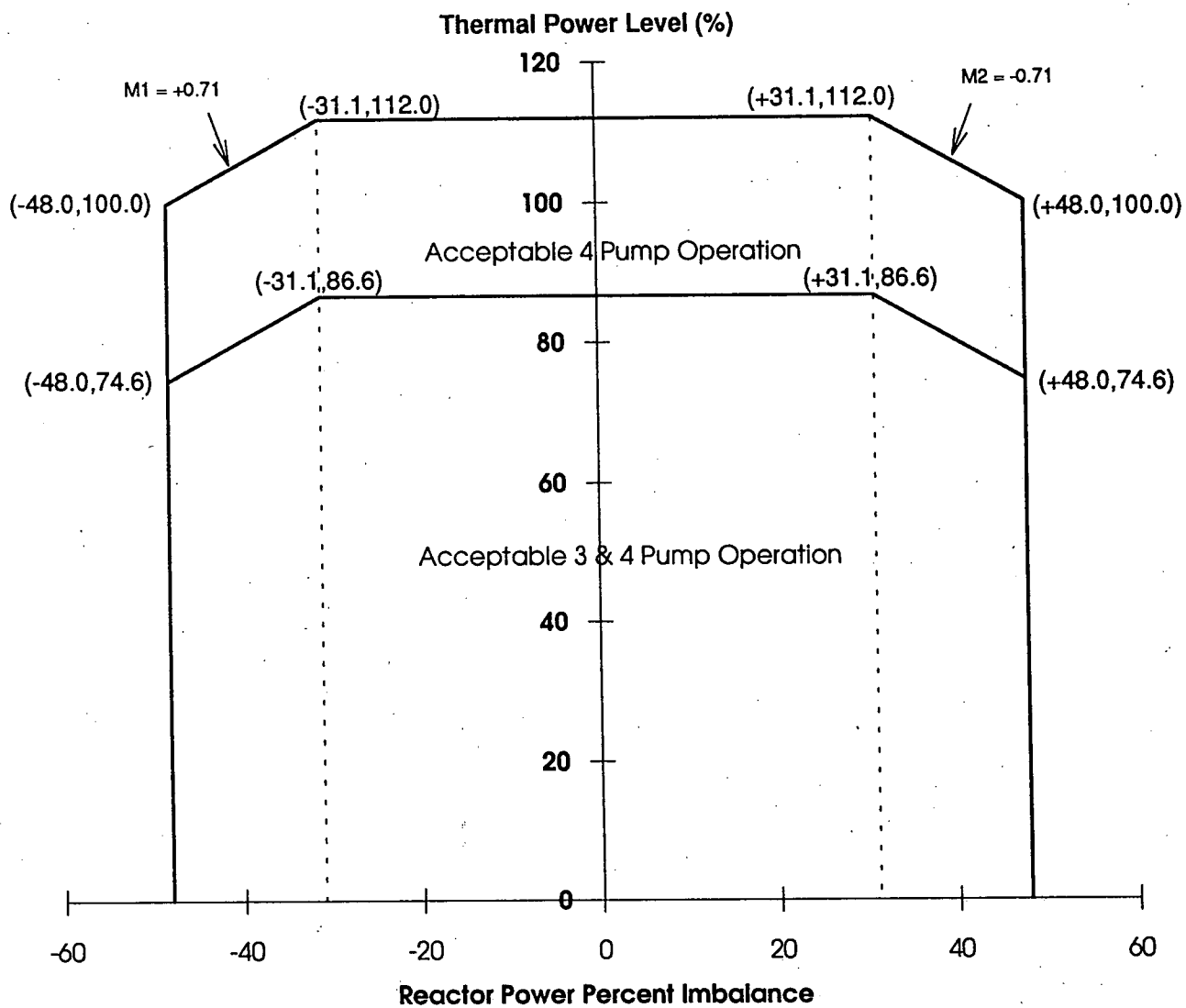


Figure 1.2. Variable Low Pressure Protective Limits

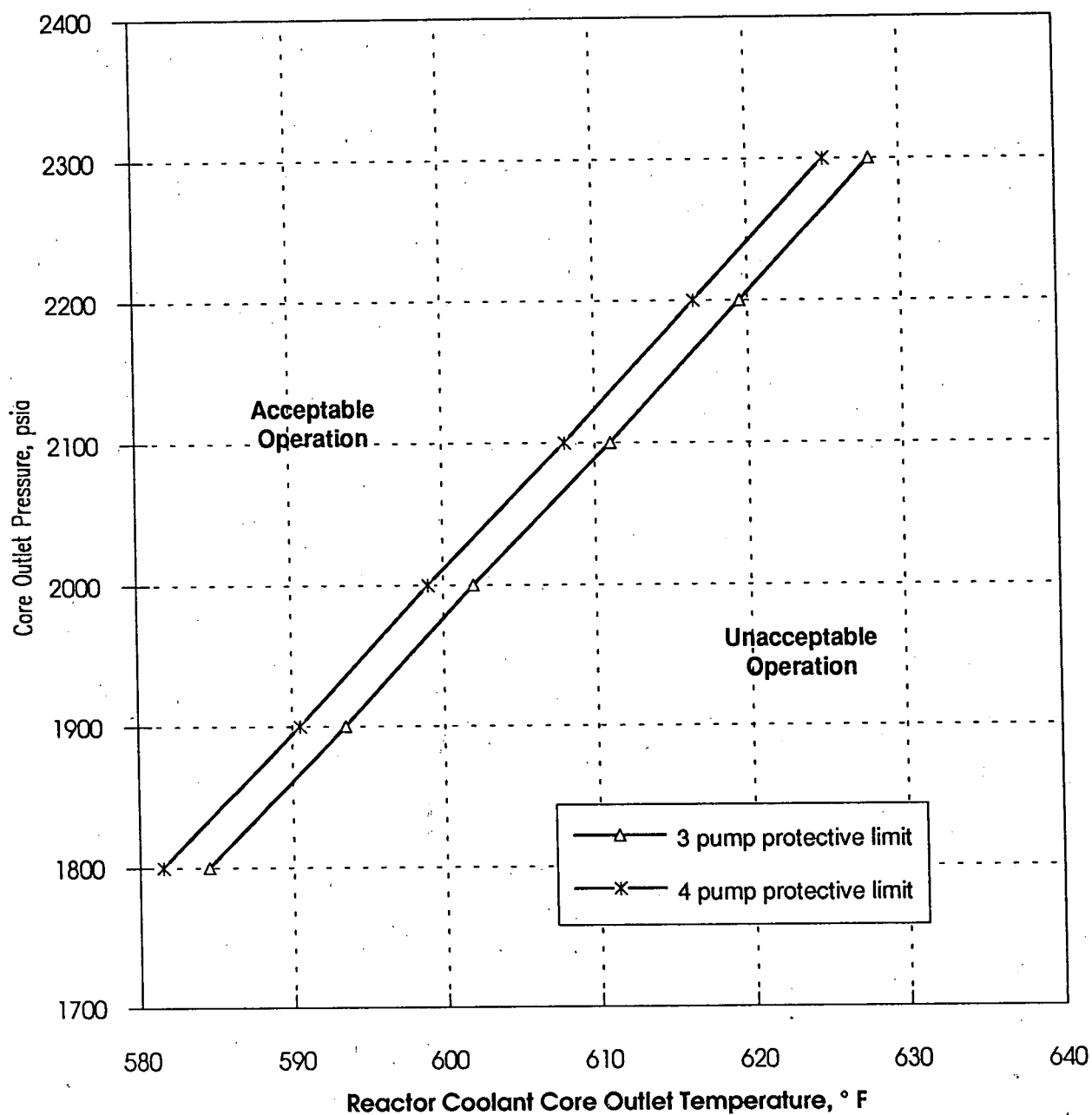


Figure 1.3. Protective System Maximum Allowable Setpoints
for Oconee Unit 2

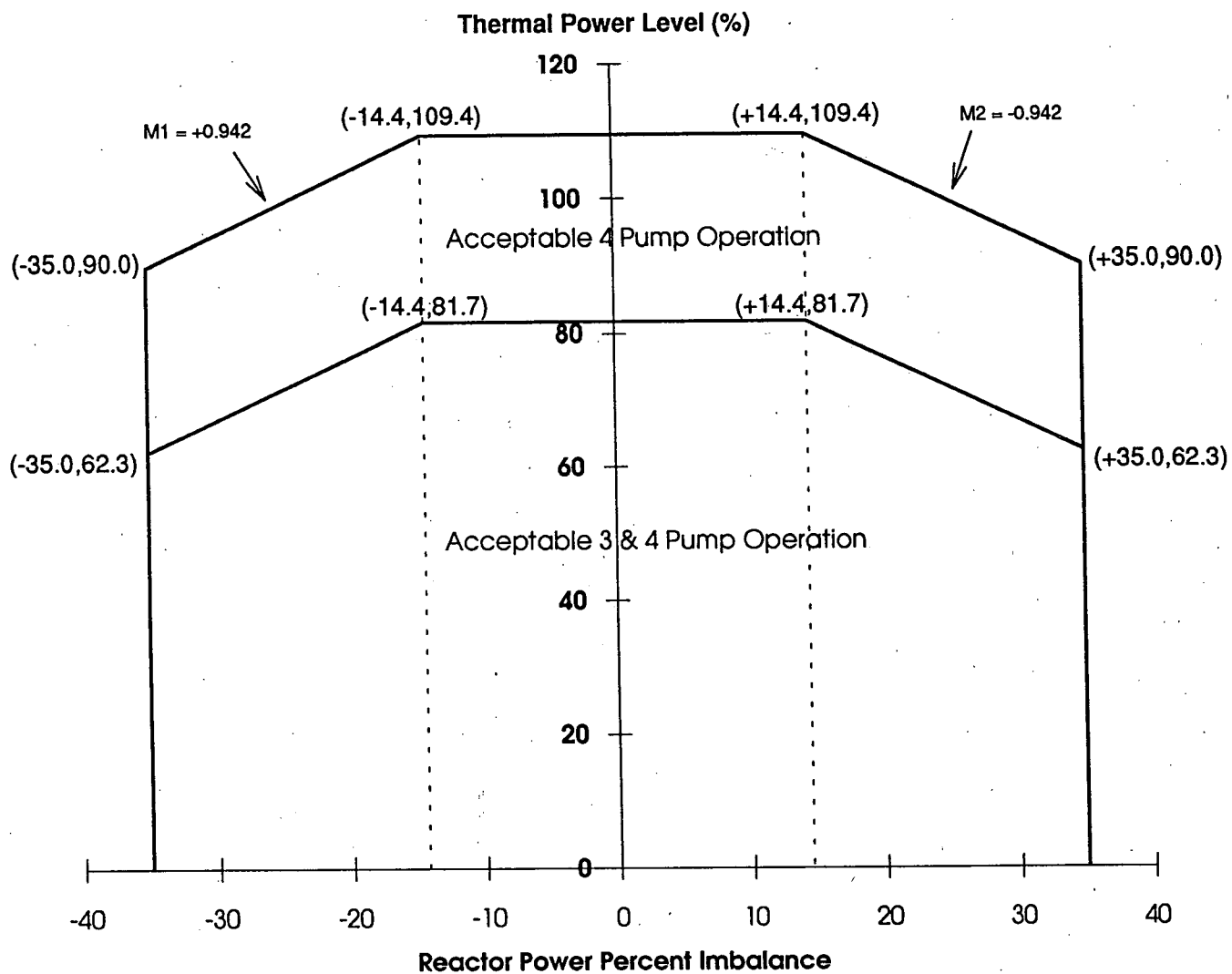
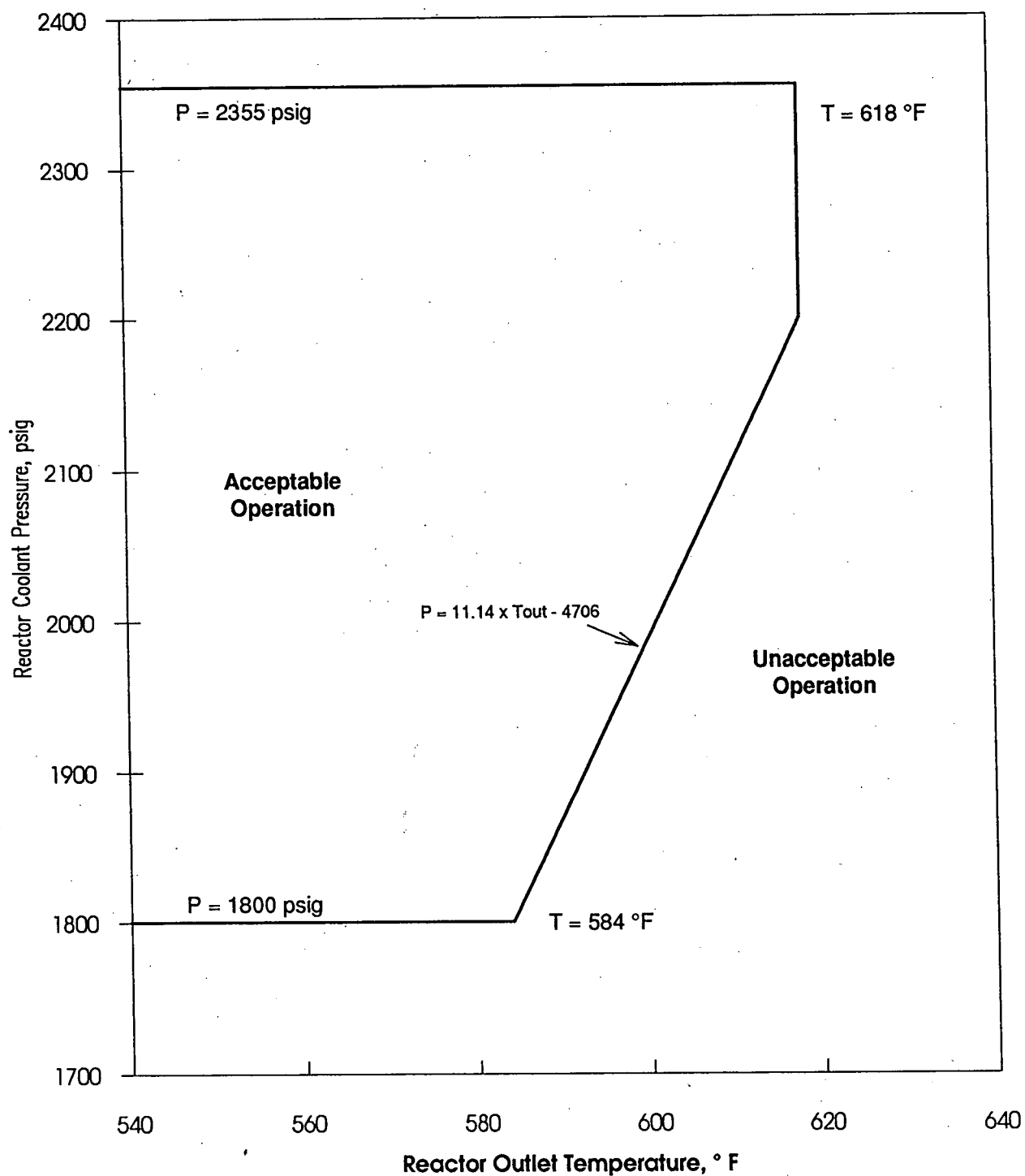


Figure 1.4. Protective System Maximum Allowable Setpoints
for Oconee Unit 2



Oconee 2 Cycle 14

RPS SAFETY LIMIT BREAKPOINTS

	POWER % OF 2568 MW	IMBALANCE LIMITS
4 PUMP	0.0	-48.00
	100.0	-48.00
	112.0	-31.10
	112.0	31.10
	100.0	48.00
	0.0	48.00
3 PUMP	0.0	-48.00
	74.6	-48.00
	86.6	-31.10
	86.6	31.10
	74.6	48.00
	0.0	48.00

Oconee 2 Cycle 14

QUADRANT POWER TILT SETPOINTS

STEADY STATE		TRANSIENT		MAXIMUM
30 - 100 % FP	0 - 30 % FP	30 - 100 % FP	0 - 30 % FP	0 - 100 % FP
5.00	10.00	9.44	12.00	20.00

Referred to by Tech. Spec.

3.5.2.4.a

3.5.2.4.b

3.5.2.4.d

3.5.2.4.e

3.5.2.4.f

Oconee 2 Cycle 14

STEADY STATE OPERATING BAND

	Rod Index		APSR % withdrawn	
	Min	Max	Min	Max
0 to 375 EFPD	292	300	30	40
375 to 440 EFPD	292	300	100	100

Oconee 2 Cycle 14

**OPERATIONAL POWER IMBALANCE
BREAKPOINTS**

	POWER % OF 2568 MW	IMBALANCE LIMITS
4 PUMP	0.0	-47.33
	80.0	-47.33
	90.0	-47.73
	102.0	-34.66
	102.0	+20.57
	90.0	+28.19
	80.0	+34.93
	0.0	+34.93
3 PUMP	0.0	-47.33
	77.0	-47.33
	77.0	+34.93
	0.0	+34.93

Referred to by Tech. Spec. 3.5.2.6

Oconee 2 Cycle 14

ROD INDEX OPERATIONAL LIMITS

0 EFPD to EOC

	POWER (PERCENT OF 2568 MW)	MINIMUM ROD INDEX WITH <i>ZERO</i> INOPERABLE RODS	MINIMUM ROD INDEX WITH <i>ONE</i> INOPERABLE ROD	MAXIMUM ROD INDEX
4 PUMP	102	260.0	270.0	300.0
	90	260.0	260.0	300.0
	80	240.0	240.0	300.0
	50	200.0	200.0	300.0
	15	90.0	120.0	300.0
	5	0.0	40.0	300.0
3 PUMP	77	236.0	260.0	300.0
	50	200.0	200.0	300.0
	15	90.0	130.0	300.0
	5	0.0	40.0	300.0

Referred to by Tech. Spec.

3.1.3.5

3.1.11

3.5.2.1.b

3.5.2.2.d.2.c

3.5.2.3

3.5.2.5.c

Oconee 2 Cycle 14

ROD INDEX SHUTDOWN MARGIN LIMITS

0 EFPD to EOC

	POWER (PERCENT OF 2568 MW)	MINIMUM ROD INDEX WITH <i>ZERO</i> INOPERABLE RODS	MINIMUM ROD INDEX WITH <i>ONE</i> INOPERABLE ROD	MAXIMUM ROD INDEX
4 PUMP	102	220.0	270.0	300.0
	50	160.0	180.0	300.0
	15	90.0	120.0	300.0
	5	0.0	40.0	300.0
3 PUMP	77	210.0	260.0	300.0
	50	160.0	200.0	300.0
	15	90.0	130.0	300.0
	5	0.0	40.0	300.0

Referred to by Tech. Spec.:

3.1.3.5

3.1.11

3.5.2.1.b

3.5.2.2.d.2.c

3.5.2.3

3.5.2.5.c

Oconee 2 Cycle 14

BWST, CBAST, and CFT Boron Requirements

0 EFPD to EOC

- 1) The BWST boron concentration shall be greater than 2210 ppm and less than 2400 ppm (referred to by Tech Spec 3.3.4).
- 2) The equivalent of at least 1100 cubic feet of 11,000 ppm boron shall be maintained in the CBAST (referred to by Tech Spec 3.2.2).
- 3) The boron concentration in each CFT shall be greater than 1835 ppm (referred to by Tech Spec 3.3.3).
- 4) The refueling canal boron concentration shall be greater than 2210 ppm (referred to by Tech Spec 3.8.4). There is no upper limit on the refueling canal boron concentration.

2.0 ERROR-ADJUSTED OPERATING LIMITS

The error-adjusted operating limits have been determined for O2C14, with all necessary uncertainties and margins applied. The calculations that support these limits are documented in Reference 1.

The following cycle specific error-adjusted limits are included in this report:

- 1) Quadrant tilt setpoints
- 2) RPS Imbalance Trip Setpoints
- 3) Operational Imbalance Alarm Setpoints
- 4) Operational and shutdown margin-limited control rod position limits

2.1 REFERENCE

- 1) O2C14 Maneuvering Analysis, Duke Power Company calculational file, OSC-4999, Revision 2, November 1993.

Oconee 2 Cycle 14

QUADRANT TILT LIMITS

	STEADY STATE		TRANSIENT		MAXIMUM
	30 - 100 % FP	0 - 30 % FP	30 - 100 % FP	0 - 30 % FP	0 - 100 % FP
Full Incore (*)	3.02	7.49	6.99	9.27	16.43
Excore	2.03	6.09	5.63	7.72	14.22
Backup Incore	1.92	3.94	3.64	5.03	9.58

* BASED UPON q (fraction of incore detector initial charge consumed) = 0.61

Oconee 2 Cycle 14

ERROR ADJUSTED RPS IMBALANCE TRIP SETPOINTS

	POWER % OF 2568 MW	IMBALANCE SETPOINT
4 PUMP	0.0	-33.00
	90.4	-33.00
	107.9	-14.40
	107.9	14.40
	90.4	33.00
	0.0	33.00
3 PUMP	0.00	-33.00
	63.1	-33.00
	80.6	-14.40
	80.6	14.40
	63.1	33.00
	0.00	33.00

Oconee 2 Cycle 14

ERROR ADJUSTED OPERATIONAL IMBALANCE LIMITS

0 EFPD to EOC

	POWER % OF 2568 MW	IMBALANCE LIMIT	FULL INCORE	ALARM SETPOINT BACKUP INCORE	OUT-OF-CORE
4 PUMP	0	-47.33	-31.50	-31.50	-31.50
	80	-47.33	-31.50	-31.50	-31.50
	90	-47.73	-29.70	-29.70	-29.70
	102	-34.66	-17.00	-17.00	-17.00
	102	+20.57	+17.00	+10.86	+11.26
	90	+28.19	+25.91	+17.68	+18.17
	80	+34.93	+31.50	+23.69	+24.24
	0	+34.93	+31.50	+23.69	+24.24
3 PUMP	0.00	-47.33	-31.50	-31.50	-31.50
	63.31	-	-31.50	-31.50	-31.50
	77.00	-47.33	-17.00	-17.00	-17.00
	77.00	+34.93	+17.00	+17.00	+17.00
	70.69	-	-	+23.69	-
	70.17	-	-	-	+24.24
	63.31	-	+31.50	-	-
	0.00	+34.93	+31.50	+23.69	+24.24

Oconee 2 Cycle 14

ERROR ADJUSTED ROD INDEX

0 EFPD to EOC

	POWER (PERCENT OF 2568 MW)	MINIMUM ROD INDEX WITH <i>ZERO</i> INOPERABLE RODS	MINIMUM ROD INDEX WITH <i>ONE</i> INOPERABLE ROD	MAXIMUM ROD INDEX
4 PUMP	102	261.5	275.0	300.0
	88	261.5	261.5	300.0
	78	241.5	241.5	300.0
	48	201.5	201.5	300.0
	13	91.5	121.5	300.0
	2.8	0.0	41.5	300.0
	0	0.0	17.5	300.0
3 PUMP	77	240.5	265.9	300.0
	75	237.5	261.5	300.0
	48	201.5	201.5	300.0
	13	91.5	131.5	300.0
	2.8	0.0	41.5	300.0
	0	0.0	14.5	300.0

Oconee 2 Cycle 14

ERROR ADJUSTED SHUTDOWN MARGIN LIMITS

0 EFPD to EOC

	POWER (PERCENT OF 2568 MW)	MINIMUM ROD INDEX WITH <i>ZERO</i> INOPERABLE RODS	MINIMUM ROD INDEX WITH <i>ONE</i> INOPERABLE ROD	MAXIMUM ROD INDEX
4 PUMP	102	223.8	275.0	300.0
	100	221.5	271.5	300.0
	48	161.5	181.5	300.0
	13	91.5	121.5	300.0
	2.8	0.0	41.5	300.0
	0	0.0	17.5	300.0
3 PUMP	77	215.5	265.9	300.0
	75	211.5	261.5	300.0
	48	161.5	201.5	300.0
	13	91.5	131.5	300.0
	2.8	0.0	41.5	300.0
	0	0.0	14.5	300.0

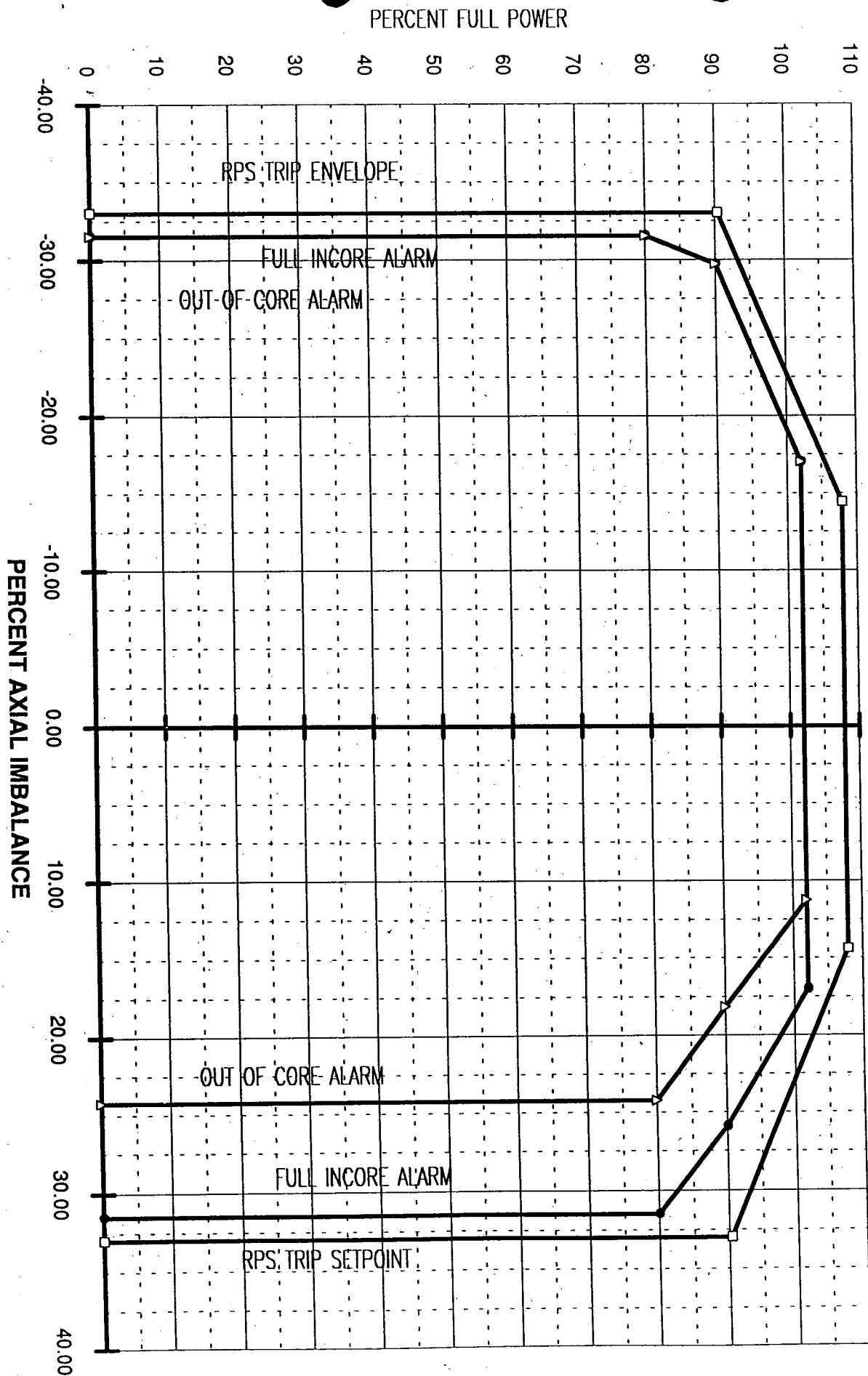
OCONEE 2 CYCLE 14 IMBALANCE SETPOINTS

4 PUMP OPERATION BOC TO EOC

PERCENT OF FULL POWER	R P S	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	11.26
101	-21.73	21.73	-18.06	17.74	-18.06	11.84
100	-22.80	22.80	-19.12	18.49	-19.12	12.41
99	-23.86	23.86	-20.18	19.23	-20.18	12.99
98	-24.92	24.92	-21.23	19.97	-21.23	13.56
97	-25.99	25.99	-22.29	20.71	-22.29	14.14
96	-27.05	27.05	-23.35	21.46	-23.35	14.72
95	-28.11	28.11	-24.41	22.20	-24.41	15.29
94	-29.17	29.17	-25.47	22.94	-25.47	15.87
93	-30.24	30.24	-26.53	23.68	-26.53	16.44
92	-31.30	31.30	-27.58	24.43	-27.58	17.02
91	-32.36	32.36	-28.64	25.17	-28.64	17.59
90.4	-33.00	33.00	-29.28	25.61	-29.28	17.94
90	-33.00	33.00	-29.70	25.91	-29.70	18.17
89	-33.00	33.00	-29.88	26.47	-29.88	18.78
88	-33.00	33.00	-30.06	27.03	-30.06	19.38
87	-33.00	33.00	-30.24	27.59	-30.24	19.99
86	-33.00	33.00	-30.42	28.15	-30.42	20.60
85	-33.00	33.00	-30.60	28.71	-30.60	21.21
84	-33.00	33.00	-30.78	29.26	-30.78	21.81
83	-33.00	33.00	-30.96	29.82	-30.96	22.42
82	-33.00	33.00	-31.14	30.38	-31.14	23.03
81	-33.00	33.00	-31.32	30.94	-31.32	23.63
80	-33.00	33.00	-31.50	31.50	-31.50	24.24
79	-33.00	33.00	-31.50	31.50	-31.50	24.24
78	-33.00	33.00	-31.50	31.50	-31.50	24.24
77	-33.00	33.00	-31.50	31.50	-31.50	24.24
76	-33.00	33.00	-31.50	31.50	-31.50	24.24
75	-33.00	33.00	-31.50	31.50	-31.50	24.24
0	-33.00	33.00	-31.50	31.50	-31.50	24.24
PERCENT OF FULL POWER	R P S	TRIP	FULL INCORE ALARM		OUT OF CORE ALARM	

OCONEE 2 CYCLE 14 IMBALANCE SETPOINTS 4 PUMP OPERATION -- BOC TO EOC

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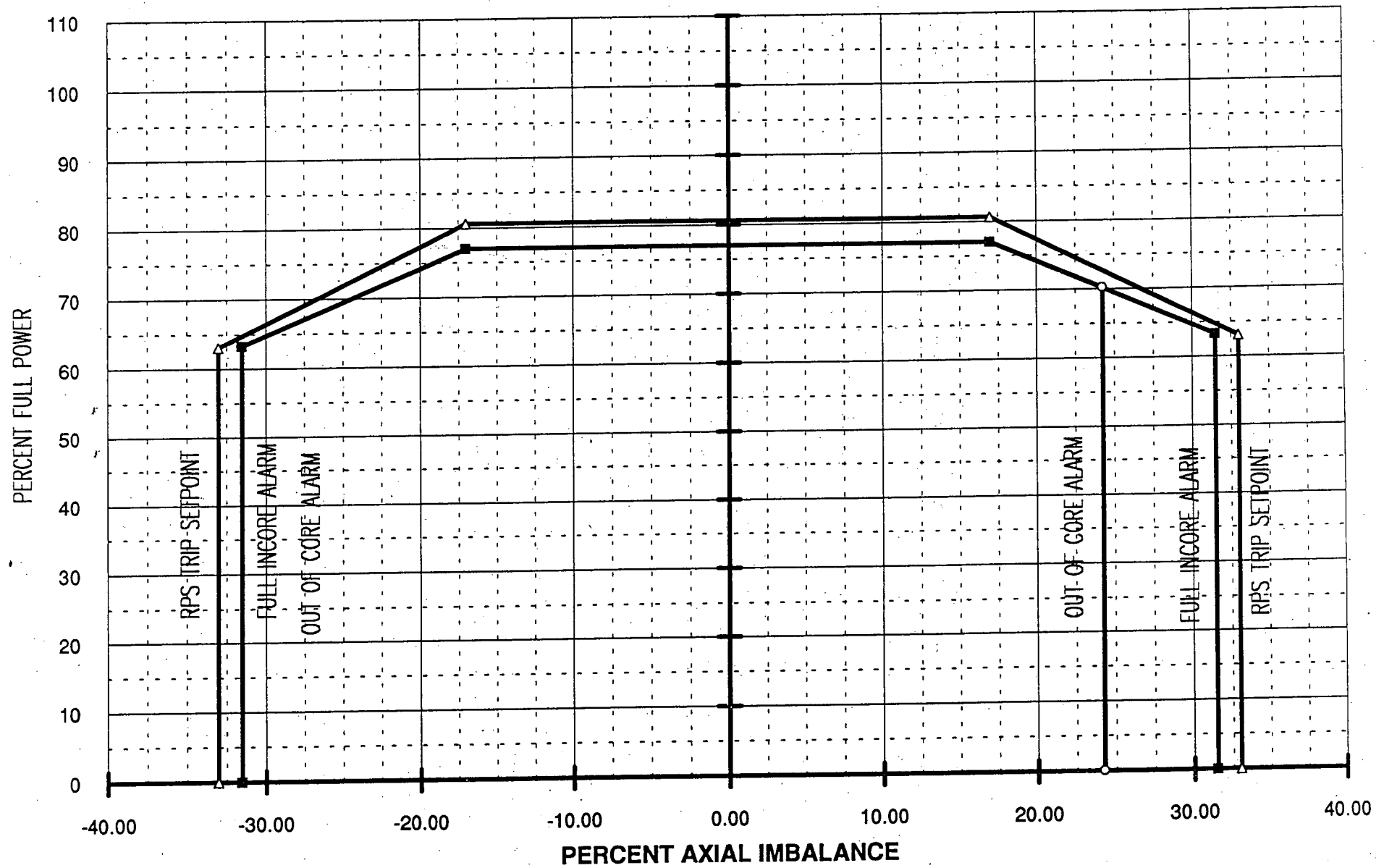
OCONEE 2 CYCLE 14 IMBALANCE SETPOINTS

3 PUMP OPERATION BOC TO EOC

PERCENT OF FULL POWER	R P S	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	-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	21.24
72	-23.54	23.54	-22.29	22.29	-22.29	22.30
71	-24.60	24.60	-23.35	23.35	-23.35	23.36
70.17	-25.49	25.49	-24.23	24.23	-24.23	24.24
70	-25.67	25.67	-24.41	24.41	-24.41	24.24
69	-26.73	26.73	-25.47	25.47	-25.47	24.24
68	-27.79	27.79	-26.53	26.53	-26.53	24.24
67	-28.85	28.85	-27.58	27.58	-27.58	24.24
66	-29.92	29.92	-28.64	28.64	-28.64	24.24
65	-30.98	30.98	-29.70	29.70	-29.70	24.24
64	-32.04	32.04	-30.76	30.76	-30.76	24.24
63.7	-32.36	32.36	-31.08	31.08	-31.08	24.24
63.3	-32.79	32.79	-31.50	31.50	-31.50	24.24
63.1	-33.00	33.00	-31.50	31.50	-31.50	24.24
63	-33.00	33.00	-31.50	31.50	-31.50	24.24
62	-33.00	33.00	-31.50	31.50	-31.50	24.24
61	-33.00	33.00	-31.50	31.50	-31.50	24.24
60	-33.00	33.00	-31.50	31.50	-31.50	24.24
0	-33.00	33.00	-31.50	31.50	-31.50	24.24
PERCENT OF FULL POWER	R P S	TRIP	FULL INCORE ALARM		OUT OF CORE ALARM	

OCONEE 2 CYCLE 14 IMBALANCE SETPOINTS 3 PUMP OPERATION -- BOC TO EOC

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OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

4 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
NO INOPERABLE CONTROL RODS

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
102	100.0	99.4	24.4	100.0	100.0	61.5
101	100.0	98.8	23.8	100.0	100.0	61.5
100	100.0	98.2	23.2	100.0	100.0	61.5
99	100.0	97.7	22.7	100.0	100.0	61.5
98	100.0	97.1	22.1	100.0	100.0	61.5
97	100.0	96.5	21.5	100.0	100.0	61.5
96	100.0	95.9	20.9	100.0	100.0	61.5
95	100.0	95.4	20.4	100.0	100.0	61.5
94	100.0	94.8	19.8	100.0	100.0	61.5
93	100.0	94.2	19.2	100.0	100.0	61.5
92	100.0	93.6	18.6	100.0	100.0	61.5
91	100.0	93.1	18.1	100.0	100.0	61.5
90	100.0	92.5	17.5	100.0	100.0	61.5
89	100.0	91.9	16.9	100.0	100.0	61.5
88	100.0	91.3	16.3	100.0	100.0	61.5
87	100.0	90.7	15.7	100.0	100.0	59.5
86	100.0	90.2	15.2	100.0	100.0	57.5
85	100.0	89.6	14.6	100.0	100.0	55.5
84	100.0	89.0	14.0	100.0	100.0	53.5
83	100.0	88.4	13.4	100.0	100.0	51.5
82	100.0	87.9	12.9	100.0	100.0	49.5
81	100.0	87.3	12.3	100.0	100.0	47.5
80	100.0	86.7	11.7	100.0	100.0	45.5
79	100.0	86.1	11.1	100.0	100.0	43.5
78	100.0	85.6	10.6	100.0	100.0	41.5
77	100.0	85.0	10.0	100.0	100.0	40.2
76	100.0	84.4	9.4	100.0	100.0	38.8
75	100.0	83.8	8.8	100.0	100.0	37.6
74	100.0	83.2	8.2	100.0	100.0	36.2
73	100.0	82.7	7.7	100.0	100.0	34.9
72	100.0	82.1	7.1	100.0	100.0	33.5
71	100.0	81.5	6.5	100.0	100.0	32.2
70	100.0	80.9	5.9	100.0	100.0	30.9
69	100.0	80.4	5.4	100.0	100.0	29.5
68	100.0	79.8	4.8	100.0	100.0	28.2
67	100.0	79.2	4.2	100.0	100.0	26.9
66	100.0	78.6	3.6	100.0	100.0	25.5
65.6	100.0	78.4	3.4	100.0	100.0	25.0
65	100.0	78.1	3.1	100.0	99.6	24.6
64	100.0	77.5	2.5	100.0	98.9	23.9
63	100.0	76.9	1.9	100.0	98.3	23.3
62	100.0	76.3	1.3	100.0	97.6	22.6
61	100.0	75.7	0.7	100.0	96.9	21.9
60	100.0	75.2	0.2	100.0	96.3	21.3
59.7	100.0	75.0	0.0	100.0	96.1	21.1
59	100.0	74.2	0.0	100.0	95.6	20.6
58	100.0	73.0	0.0	100.0	95.0	20.0
57	100.0	71.9	0.0	100.0	94.3	19.3
56	100.0	70.7	0.0	100.0	93.6	18.6
55	100.0	69.6	0.0	100.0	93.0	18.0
54	100.0	68.4	0.0	100.0	92.3	17.3
53	100.0	67.3	0.0	100.0	91.6	16.6
52	100.0	66.1	0.0	100.0	91.0	16.0
51	100.0	65.0	0.0	100.0	90.3	15.3
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

(continued)

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

4 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
NO INOPERABLE CONTROL RODS

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
50	100.0	63.8	0.0	100.0	89.6	14.6
49	100.0	62.7	0.0	100.0	89.0	14.0
48	100.0	61.5	0.0	100.0	88.3	13.3
47	100.0	59.5	0.0	100.0	86.7	11.7
46	100.0	57.5	0.0	100.0	85.2	10.2
45	100.0	55.5	0.0	100.0	83.6	8.6
44	100.0	53.5	0.0	100.0	82.0	7.0
43	100.0	51.5	0.0	100.0	80.4	5.4
42	100.0	49.5	0.0	100.0	78.9	3.9
41	100.0	47.5	0.0	100.0	77.3	2.3
40	100.0	45.5	0.0	100.0	75.7	0.7
39.5	100.0	44.6	0.0	100.0	75.0	0.0
39	100.0	43.5	0.0	100.0	73.3	0.0
38	100.0	41.5	0.0	100.0	70.2	0.0
37	100.0	39.5	0.0	100.0	67.0	0.0
36	100.0	37.5	0.0	100.0	63.9	0.0
35	100.0	35.5	0.0	100.0	60.7	0.0
34	100.0	33.5	0.0	100.0	57.6	0.0
33	100.0	31.5	0.0	100.0	54.5	0.0
32	100.0	29.5	0.0	100.0	51.3	0.0
31	100.0	27.5	0.0	100.0	48.2	0.0
30	100.0	25.6	0.0	100.0	45.0	0.0
29.7	100.0	25.0	0.0	100.0	44.2	0.0
29	99.3	24.3	0.0	100.0	41.9	0.0
28	98.3	23.3	0.0	100.0	38.7	0.0
27	97.3	22.3	0.0	100.0	35.6	0.0
26	96.3	21.3	0.0	100.0	32.5	0.0
25	95.3	20.3	0.0	100.0	29.3	0.0
24	94.3	19.3	0.0	100.0	26.2	0.0
23.6	93.9	18.9	0.0	100.0	25.0	0.0
23	93.3	18.3	0.0	99.0	24.0	0.0
22	92.3	17.3	0.0	97.4	22.4	0.0
21	91.3	16.3	0.0	95.9	20.9	0.0
20	90.3	15.3	0.0	94.3	19.3	0.0
19	89.3	14.3	0.0	92.7	17.7	0.0
18	88.3	13.3	0.0	91.2	16.2	0.0
17	87.3	12.3	0.0	89.6	14.6	0.0
16	86.3	11.3	0.0	88.0	13.0	0.0
15	85.3	10.3	0.0	86.4	11.4	0.0
14	84.3	9.3	0.0	84.9	9.9	0.0
13	83.3	8.3	0.0	83.3	8.3	0.0
12	78.8	3.8	0.0	78.8	3.8	0.0
11.2	75.0	0.0	0.0	75.0	0.0	0.0
11	73.6	0.0	0.0	73.6	0.0	0.0
10	64.7	0.0	0.0	64.7	0.0	0.0
9	55.7	0.0	0.0	55.7	0.0	0.0
8	46.7	0.0	0.0	46.7	0.0	0.0
7	37.7	0.0	0.0	37.7	0.0	0.0
6	28.7	0.0	0.0	28.7	0.0	0.0
5	19.8	0.0	0.0	19.8	0.0	0.0
4	10.8	0.0	0.0	10.8	0.0	0.0
3	1.8	0.0	0.0	1.8	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0	0.0	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

3 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
NO INOPERABLE CONTROL RODS

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
77	100.0	95.3	20.1	100.0	100.0	40.5
76	100.0	94.3	19.2	100.0	100.0	39.0
75	100.0	93.3	18.3	100.0	100.0	37.5
74	100.0	92.3	17.3	100.0	100.0	36.2
73	100.0	91.4	16.4	100.0	100.0	34.8
72	100.0	90.5	15.5	100.0	100.0	33.5
71	100.0	89.5	14.5	100.0	100.0	32.2
70	100.0	88.6	13.6	100.0	100.0	30.8
69	100.0	87.7	12.7	100.0	100.0	29.5
68	100.0	86.8	11.8	100.0	100.0	28.2
67	100.0	85.8	10.8	100.0	100.0	26.8
66	100.0	84.9	9.9	100.0	100.0	25.5
65.6	100.0	84.6	9.6	100.0	100.0	25.0
65	100.0	84.0	9.0	100.0	99.6	24.6
64	100.0	83.1	8.1	100.0	98.9	23.9
63	100.0	82.1	7.1	100.0	98.3	23.3
62	100.0	81.2	6.2	100.0	97.6	22.6
61	100.0	80.3	5.3	100.0	96.9	21.9
60	100.0	79.4	4.4	100.0	96.3	21.3
59	100.0	78.4	3.4	100.0	95.6	20.6
58	100.0	77.5	2.5	100.0	94.9	19.9
57	100.0	76.6	1.6	100.0	94.3	19.3
56	100.0	75.7	0.7	100.0	93.6	18.6
55.3	100.0	75.0	0.0	100.0	93.1	18.1
55	100.0	74.5	0.0	100.0	92.9	17.9
54	100.0	72.6	0.0	100.0	92.3	17.3
53	100.0	70.8	0.0	100.0	91.6	16.6
52	100.0	68.9	0.0	100.0	90.9	15.9
51	100.0	67.1	0.0	100.0	90.3	15.3
50	100.0	65.2	0.0	100.0	89.6	14.6
49	100.0	63.4	0.0	100.0	88.9	13.9
48	100.0	61.5	0.0	100.0	88.3	13.3
47	100.0	59.5	0.0	100.0	86.7	11.7
46	100.0	57.5	0.0	100.0	85.1	10.1
45	100.0	55.5	0.0	100.0	83.5	8.5
44	100.0	53.5	0.0	100.0	82.0	7.0
43	100.0	51.5	0.0	100.0	80.4	5.4
42	100.0	49.5	0.0	100.0	78.8	3.8
41	100.0	47.5	0.0	100.0	77.3	2.3
40	100.0	45.5	0.0	100.0	75.7	0.7
39.6	100.0	44.6	0.0	100.0	75.0	0.0
39	100.0	43.5	0.0	100.0	73.2	0.0
38	100.0	41.5	0.0	100.0	70.1	0.0
37	100.0	39.5	0.0	100.0	67.0	0.0
36	100.0	37.5	0.0	100.0	63.8	0.0
35	100.0	35.5	0.0	100.0	60.7	0.0
34	100.0	33.5	0.0	100.0	57.5	0.0
33	100.0	31.5	0.0	100.0	54.4	0.0
32	100.0	29.5	0.0	100.0	51.3	0.0
31	100.0	27.5	0.0	100.0	48.1	0.0
30	100.0	25.6	0.0	100.0	45.0	0.0
29.7	100.0	25.0	0.0	100.0	44.1	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

(continued)

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

3 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
NO INOPERABLE CONTROL RODS

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
29	99.3	24.3	0.0	100.0	41.8	0.0
28	98.3	23.3	0.0	100.0	38.7	0.0
27	97.3	22.3	0.0	100.0	35.6	0.0
26	96.3	21.3	0.0	100.0	32.4	0.0
25	95.3	20.3	0.0	100.0	29.3	0.0
24	94.3	19.3	0.0	100.0	26.1	0.0
23.6	93.9	18.9	0.0	100.0	25.0	0.0
23	93.3	18.3	0.0	99.0	24.0	0.0
22	92.3	17.3	0.0	97.4	22.4	0.0
21	91.3	16.3	0.0	95.9	20.9	0.0
20	90.3	15.3	0.0	94.3	19.3	0.0
19	89.3	14.3	0.0	92.7	17.7	0.0
18	88.3	13.3	0.0	91.2	16.2	0.0
17	87.3	12.3	0.0	89.6	14.6	0.0
16	86.3	11.3	0.0	88.0	13.0	0.0
15	85.3	10.3	0.0	86.4	11.4	0.0
14	84.3	9.3	0.0	84.9	9.9	0.0
13	83.3	8.3	0.0	83.3	8.3	0.0
12	78.8	3.8	0.0	78.8	3.8	0.0
11.2	75.0	0.0	0.0	75.0	0.0	0.0
11	73.6	0.0	0.0	73.6	0.0	0.0
10	64.7	0.0	0.0	64.7	0.0	0.0
9	55.7	0.0	0.0	55.7	0.0	0.0
8	46.7	0.0	0.0	46.7	0.0	0.0
7	37.7	0.0	0.0	37.7	0.0	0.0
6	28.7	0.0	0.0	28.7	0.0	0.0
5	19.8	0.0	0.0	19.8	0.0	0.0
4	10.8	0.0	0.0	10.8	0.0	0.0
3	1.8	0.0	0.0	1.8	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.0	0.0	0.0	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

4 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
ONE INOPERABLE CONTROL ROD

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
102	100.0	100.0	75.0	100.0	100.0	75.0
101	100.0	100.0	73.3	100.0	100.0	74.0
100	100.0	100.0	71.5	100.0	100.0	73.1
99	100.0	100.0	69.8	100.0	100.0	72.1
98	100.0	100.0	68.0	100.0	100.0	71.1
97	100.0	100.0	66.3	100.0	100.0	70.2
96	100.0	100.0	64.6	100.0	100.0	69.2
95	100.0	100.0	62.8	100.0	100.0	68.3
94	100.0	100.0	61.1	100.0	100.0	67.3
93	100.0	100.0	59.4	100.0	100.0	66.3
92	100.0	100.0	57.7	100.0	100.0	65.4
91	100.0	100.0	55.9	100.0	100.0	64.4
90	100.0	100.0	54.2	100.0	100.0	63.4
89	100.0	100.0	52.5	100.0	100.0	62.5
88	100.0	100.0	50.7	100.0	100.0	61.5
87	100.0	100.0	49.0	100.0	100.0	59.5
86	100.0	100.0	47.3	100.0	100.0	57.5
85	100.0	100.0	45.5	100.0	100.0	55.5
84	100.0	100.0	43.8	100.0	100.0	53.5
83	100.0	100.0	42.1	100.0	100.0	51.5
82	100.0	100.0	40.3	100.0	100.0	49.5
81	100.0	100.0	38.6	100.0	100.0	47.5
80	100.0	100.0	36.9	100.0	100.0	45.5
79	100.0	100.0	35.2	100.0	100.0	43.5
78	100.0	100.0	33.4	100.0	100.0	41.5
77	100.0	100.0	31.7	100.0	100.0	40.2
76	100.0	100.0	30.0	100.0	100.0	38.8
75	100.0	100.0	28.2	100.0	100.0	37.5
74	100.0	100.0	26.5	100.0	100.0	36.2
73.1	100.0	100.0	25.0	100.0	100.0	35.0
73	100.0	99.9	24.9	100.0	100.0	34.8
72	100.0	99.0	24.0	100.0	100.0	33.5
71	100.0	98.2	23.2	100.0	100.0	32.2
70	100.0	97.3	22.3	100.0	100.0	30.8
69	100.0	96.4	21.4	100.0	100.0	29.5
68	100.0	95.6	20.6	100.0	100.0	28.2
67	100.0	94.7	19.7	100.0	100.0	26.8
66	100.0	93.8	18.8	100.0	100.0	25.5
65.6	100.0	93.5	18.5	100.0	100.0	25.0
65	100.0	93.0	18.0	100.0	99.6	24.6
64	100.0	92.1	17.1	100.0	98.9	23.9
63	100.0	91.2	16.2	100.0	98.3	23.3
62	100.0	90.4	15.4	100.0	97.6	22.6
61	100.0	89.5	14.5	100.0	96.9	21.9
60	100.0	88.6	13.6	100.0	96.3	21.3
59	100.0	87.8	12.8	100.0	95.6	20.6
58	100.0	86.9	11.9	100.0	94.9	19.9
57	100.0	86.0	11.0	100.0	94.3	19.3
56	100.0	85.2	10.2	100.0	93.6	18.6
55	100.0	84.3	9.3	100.0	92.9	17.9
54	100.0	83.4	8.4	100.0	92.3	17.3
53	100.0	82.6	7.6	100.0	91.6	16.6
52	100.0	81.7	6.7	100.0	90.9	15.9
51	100.0	80.8	5.8	100.0	90.3	15.3
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

(continued)

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

4 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS

ONE INOPERABLE CONTROL ROD

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
50	100.0	80.0	5.0	100.0	89.6	14.6
49	100.0	79.1	4.1	100.0	88.9	13.9
48	100.0	78.3	3.3	100.0	88.3	13.3
47	100.0	77.4	2.4	100.0	87.1	12.1
46	100.0	76.5	1.5	100.0	86.0	11.0
45	100.0	75.7	0.7	100.0	84.8	9.8
44.2	100.0	75.0	0.0	100.0	83.9	8.9
44	100.0	74.6	0.0	100.0	83.7	8.7
43	100.0	72.9	0.0	100.0	82.5	7.5
42	100.0	71.2	0.0	100.0	81.4	6.4
41	100.0	69.5	0.0	100.0	80.3	5.3
40	100.0	67.8	0.0	100.0	79.1	4.1
39	100.0	66.1	0.0	100.0	78.0	3.0
38	100.0	64.4	0.0	100.0	76.8	1.8
37	100.0	62.6	0.0	100.0	75.7	0.7
36.4	100.0	61.6	0.0	100.0	75.0	0.0
36	100.0	60.9	0.0	100.0	74.1	0.0
35	100.0	59.2	0.0	100.0	71.8	0.0
34	100.0	57.5	0.0	100.0	69.5	0.0
33	100.0	55.8	0.0	100.0	67.2	0.0
32	100.0	54.1	0.0	100.0	64.9	0.0
31	100.0	52.4	0.0	100.0	62.6	0.0
30	100.0	50.6	0.0	100.0	60.4	0.0
29	100.0	48.9	0.0	100.0	58.1	0.0
28	100.0	47.2	0.0	100.0	55.8	0.0
27	100.0	45.5	0.0	100.0	53.5	0.0
26	100.0	43.8	0.0	100.0	51.2	0.0
25	100.0	42.1	0.0	100.0	48.9	0.0
24	100.0	40.4	0.0	100.0	46.6	0.0
23	100.0	38.6	0.0	100.0	44.4	0.0
22	100.0	36.9	0.0	100.0	42.1	0.0
21	100.0	35.2	0.0	100.0	39.8	0.0
20	100.0	33.5	0.0	100.0	37.5	0.0
19	100.0	31.8	0.0	100.0	35.2	0.0
18	100.0	30.1	0.0	100.0	32.9	0.0
17	100.0	28.4	0.0	100.0	30.6	0.0
16	100.0	26.6	0.0	100.0	28.4	0.0
15	100.0	25.0	0.0	100.0	26.1	0.0
14.5	99.5	24.5	0.0	100.0	25.0	0.0
14	99.1	24.1	0.0	99.4	24.4	0.0
13	98.3	23.3	0.0	98.3	23.3	0.0
12	94.3	19.3	0.0	94.3	19.3	0.0
11	90.4	15.4	0.0	90.4	15.4	0.0
10	86.5	11.5	0.0	86.5	11.5	0.0
9	82.6	7.6	0.0	82.6	7.6	0.0
8	78.6	3.6	0.0	78.6	3.6	0.0
7.1	75.0	0.0	0.0	75.0	0.0	0.0
7	74.4	0.0	0.0	74.4	0.0	0.0
6	66.6	0.0	0.0	66.6	0.0	0.0
5	58.8	0.0	0.0	58.8	0.0	0.0
4	50.9	0.0	0.0	50.9	0.0	0.0
3	43.1	0.0	0.0	43.1	0.0	0.0
2.8	41.5	0.0	0.0	41.5	0.0	0.0
2	34.6	0.0	0.0	34.6	0.0	0.0
1	26.1	0.0	0.0	26.1	0.0	0.0
0	17.5	0.0	0.0	17.5	0.0	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

3 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS

ONE INOPERABLE CONTROL ROD

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
77	100.0	100.0	65.9	100.0	100.0	65.9
76	100.0	100.0	63.7	100.0	100.0	63.7
75	100.0	100.0	61.5	100.0	100.0	61.5
74	100.0	100.0	59.3	100.0	100.0	59.3
73	100.0	100.0	57.1	100.0	100.0	57.1
72	100.0	100.0	54.8	100.0	100.0	54.8
71	100.0	100.0	52.6	100.0	100.0	52.6
70	100.0	100.0	50.4	100.0	100.0	50.4
69	100.0	100.0	48.2	100.0	100.0	48.2
68	100.0	100.0	45.9	100.0	100.0	45.9
67	100.0	100.0	43.7	100.0	100.0	43.7
66	100.0	100.0	41.5	100.0	100.0	41.5
65	100.0	100.0	39.3	100.0	100.0	39.3
64	100.0	100.0	37.1	100.0	100.0	37.1
63	100.0	100.0	34.8	100.0	100.0	34.8
62	100.0	100.0	32.6	100.0	100.0	32.6
61	100.0	100.0	30.4	100.0	100.0	30.4
60	100.0	100.0	28.2	100.0	100.0	28.2
59	100.0	100.0	25.9	100.0	100.0	25.9
58.6	100.0	100.0	25.0	100.0	100.0	25.0
58	100.0	99.4	24.4	100.0	99.4	24.4
57	100.0	98.3	23.3	100.0	98.3	23.3
56	100.0	97.1	22.1	100.0	97.1	22.1
55	100.0	96.0	21.0	100.0	96.0	21.0
54	100.0	94.9	19.9	100.0	94.9	19.9
53	100.0	93.8	18.8	100.0	93.8	18.8
52	100.0	92.7	17.7	100.0	92.7	17.7
51	100.0	91.6	16.6	100.0	91.6	16.6
50	100.0	90.5	15.5	100.0	90.5	15.5
49	100.0	89.4	14.4	100.0	89.4	14.4
48	100.0	88.3	13.3	100.0	88.3	13.3
47	100.0	87.3	12.3	100.0	87.3	12.3
46	100.0	86.3	11.3	100.0	86.3	11.3
45	100.0	85.3	10.3	100.0	85.3	10.3
44	100.0	84.3	9.3	100.0	84.3	9.3
43	100.0	83.3	8.3	100.0	83.3	8.3
42	100.0	82.3	7.3	100.0	82.3	7.3
41	100.0	81.3	6.3	100.0	81.3	6.3
40	100.0	80.3	5.3	100.0	80.3	5.3
39	100.0	79.3	4.3	100.0	79.3	4.3
38	100.0	78.3	3.3	100.0	78.3	3.3
37	100.0	77.3	2.3	100.0	77.3	2.3
36	100.0	76.3	1.3	100.0	76.3	1.3
35	100.0	75.3	0.3	100.0	75.3	0.3
34.7	100.0	75.0	0.0	100.0	75.0	0.0
34	100.0	73.5	0.0	100.0	73.5	0.0
33	100.0	71.5	0.0	100.0	71.5	0.0
32	100.0	69.5	0.0	100.0	69.5	0.0
31	100.0	67.5	0.0	100.0	67.5	0.0
30	100.0	65.5	0.0	100.0	65.5	0.0
29	100.0	63.5	0.0	100.0	63.5	0.0
28	100.0	61.5	0.0	100.0	61.5	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		

(continued)

OCONEE 2 CYCLE 14 CONTROL ROD SETPOINTS

3 PUMP OPERATION BOC TO EOC
RI = 300 IS WITHDRAWAL LIMIT AT ALL POWER LEVELS
ONE INOPERABLE CONTROL ROD

PERCENT OF FULL POWER	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		
	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
27	100.0	59.5	0.0	100.0	59.5	0.0
26	100.0	57.5	0.0	100.0	57.5	0.0
25	100.0	55.5	0.0	100.0	55.5	0.0
24	100.0	53.5	0.0	100.0	53.5	0.0
23	100.0	51.5	0.0	100.0	51.5	0.0
22	100.0	49.5	0.0	100.0	49.5	0.0
21	100.0	47.5	0.0	100.0	47.5	0.0
20	100.0	45.5	0.0	100.0	45.5	0.0
19	100.0	43.5	0.0	100.0	43.5	0.0
18	100.0	41.5	0.0	100.0	41.5	0.0
17	100.0	39.5	0.0	100.0	39.5	0.0
16	100.0	37.5	0.0	100.0	37.5	0.0
15	100.0	35.5	0.0	100.0	35.5	0.0
14	100.0	33.5	0.0	100.0	33.5	0.0
13	100.0	31.5	0.0	100.0	31.5	0.0
12.3	100.0	25.0	0.0	100.0	25.0	0.0
12	98.8	23.8	0.0	98.8	23.8	0.0
11	94.4	19.4	0.0	94.4	19.4	0.0
10	90.0	15.0	0.0	90.0	15.0	0.0
9	85.6	10.6	0.0	85.6	10.6	0.0
8	81.2	6.2	0.0	81.2	6.2	0.0
7	76.8	1.8	0.0	76.8	1.8	0.0
6.6	75.0	0.0	0.0	75.0	0.0	0.0
6	69.7	0.0	0.0	69.7	0.0	0.0
5	60.9	0.0	0.0	60.9	0.0	0.0
4	52.1	0.0	0.0	52.1	0.0	0.0
3	43.3	0.0	0.0	43.3	0.0	0.0
2.8	41.5	0.0	0.0	41.5	0.0	0.0
2	33.8	0.0	0.0	33.8	0.0	0.0
1	24.1	0.0	0.0	24.1	0.0	0.0
0	14.5	0.0	0.0	14.5	0.0	0.0
PERCENT OF FULL POWER	CRGP 5	CRGP 6	CRGP 7	CRGP 5	CRGP 6	CRGP 7
	SHUTDOWN MARGIN INSERTION SETPOINT			CONTROL ROD ALARM INSERTION SETPOINT		