DUKE POWER COMPANY

OCONEE 2 CYCLE 17

CORE OPERATING LIMITS REPORT

REVISION 8

QA CONDITION 1

REFERENCE OSC-7056

Prepared by: L. Dowain McClain Date: 27 May 1998

Checked by: [signature] Date: 27 May 98

Approved by: R. R. St. Clair Date: 27 May 1998

Oconee Nuclear Station

Unit 2 Cycle 17

Core Operating Limits Report

Insertion Sheet for Revision 8

This revision is not valid until the end of operation for Unit 2 Cycle 16.

Remove these Revision 7 pages	**Insert these Revision 8 pages**
1-3, 5, 11, 32, 35	1-3, 5, 11, 32, 35

Oconee Nuclear Station

Unit 2 Cycle 17

Core Operating Limits Report

Revision Log

Revision	Effective Date	Pages Revised	Pages Added	Pages Deleted	Total Effective Pages
8	May 1998	1-3, 5, 11, 32, 35	-	-	38
7	March 1998	1-38	-	-	38

Oconee 2 Cycle 16 Revisions Below					
6	October 1996	1-3, 18	-	-	38
5	March 4, 1996	1-34	35-38	-	38

1.0 ERROR-ADJUSTED CORE OPERATING LIMITS

This Core Operating Limits Report for O2C17 has been prepared in accordance with the requirements of Technical Specification 6.9. The core operating limits within this report have been developed using NRC-approved methodology (References 1, 2, 3, and 4). The RPS protective limits and maximum allowable setpoints are documented in References 6 and 7, and validated in References 5 and 8 for O2C17. Operational limits and requirements are documented in Reference 5. The reactor coolant system design flow used in References 5 and 8 for O2C17 is 107.5 % (of 88,000 gpm per pump). The core operating limits have been developed with a radial local peaking factor ($F^N_{\Delta H}$) of 1.714 and an axial peaking factor (F^N_Z) of 1.5.

The error-adjusted core operating limits (i.e., setpoints) have been determined for O2C17, with all necessary uncertainties and margins applied. The calculations that support these setpoints are documented in Reference 5. The following cycle specific error-adjusted setpoints are included in this report:

1) RPS protective limits (Figures 1.1 and 2.1), and RPS maximum allowable setpoints (Figures 1.2 and 1.3),
2) Steady state operating band,
3) BWST, SFP, CBAST, and CFT boron requirements,
4) Quadrant power tilt operational setpoints,
5) RPS power-imbalance trip setpoints,
6) Power-imbalance operational setpoints and,
7) Rod index operational alarm and shutdown margin-restricted setpoints.

1.1 REFERENCES

1) DPCo, Nuclear Design Methodology Using CASMO-3 / SIMULATE-3P, DPC-NE-1004A, November 1992.
2) DPCo, Oconee Nuclear Station, Reload Design Methodology II, DPC-NE-1002A, October 1985.
3) DPCo, Oconee Nuclear Station, Reload Design Methodology, NFS-1001A, April 1984.
4) DPC-NE-2003A, Oconee Nuclear Station Core Thermal Hydraulic Methodology Using VIPRE-01, July 1989.
5) O2C17 Maneuvering Analysis, DPCo calculational file, OSC-7056, Rev. 2, May 1998.
6) Variable Low Pressure Safety Limit, DPCo calculational file, OSC-4048, Revision 0, July 1990.
7) Power-Imbalance Safety Limits and Tech. Spec. Setpoints Using Error-Adjusted Flux-Flow Ratio of 1.094, DPCo calculational file, OSC-5604, Revision 0, November 1993.
8) Oconee 2 Cycle 17 Specific DNB Analysis, DPCo calculational file, OSC-7057, Revision 0, December 1997.

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ERROR-ADJUSTED QUADRANT POWER TILT OPERATIONAL SETPOINTS

	CONDITION 1 (STEADY STATE)		CONDITION 2 (TRANSIENT)		CONDITION 3 (MAXIMUM)
	30 - 100 % FP	**0 - 30 % FP**	**30 - 100 % FP**	**0 - 30 % FP**	**0 - 100 % FP**
Full Incore Alarm *	3.50 $	7.69	7.19	9.48	16.63
Outcore Alarm	2.28	6.09	5.63	7.72	14.22
Backup Incore	1.95	3.94	3.64	5.03	9.58

$ **Limit is 5.01 from 30 - 60 % FP.**

* BASED UPON q (fraction of incore detector initial charge consumed) = 0.531
(See Reference 1 for more details on this calculation)

Note that the above limits will be used in the following order of priority:

1) Full Incore
2) Outcore
3) Backup Incore

The **backup incore** limits will be used in the event that the Operator Aid Computer is out of service. For normal operation with a working Operator Aid Computer, the **full incore** limits will be used as long as sufficient incore detector strings are operational. In the event that sufficient incore strings are not operational, the **outcore** limits will be used.

The Steady State, Transient, and Maximum Limits tabulated above define quadrant tilt ranges that impose different restrictions on power operation, and time intervals within which specific action may be required. In brief, Condition 1 applies to all power operation above 15% power excluding physics testing. For Conditions 2 and 3, steps are taken to reduce the tilt to within Condition 1 limits or a power reduction is required. If tilt is in excess of Condition 3 limits, reactor shutdown is required. Refer to the Technical Specification Sections listed below for more detailed information.

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

2.0 CORE OPERATING LIMITS (NOT ERROR-ADJUSTED)

The following cycle-specific core operating limits are included in this report. All computations performed in setting these limits used the approved SIMULATE methodology.

1) RPS protective limits (Figure 2.1 and table),

2) Quadrant power tilt operational limits,

3) Power-imbalance operational limits and,

4) Rod index operational alarm and shutdown margin-restricted limits.

2.1 REFERENCES

1) DPCo, Nuclear Design Methodology Using CASMO-3 / SIMULATE-3P, DPC-NE-1004A, November 1992.

2) DPCo, Oconee Nuclear Station, Reload Design Methodology II, DPC-NE-1002A, October 1985.

3) DPCo, Oconee Nuclear Station, Reload Design Methodology, NFS-1001A, April 1984.

4) DPC-NE-2003A, Oconee Nuclear Station Core Thermal Hydraulic Methodology Using VIPRE-01, July 1989.

5) O2C17 Maneuvering Analysis, DPCo calculation file, OSC-7056, Revision 2, May 1998.

6) Variable Low Pressure Safety Limit, DPCo calculational file, OSC-4048, Revision 0, July 1990.

7) Power-Imbalance Safety Limits and Tech. Spec. Setpoints Using Error-Adjusted Flux-Flow Ratio of 1.094, DPCo calculational file, OSC-5604, Revision 0, November 1993.

8) Oconee 2 Cycle 17 Specific DNB Analysis, DPCo calculation file, OSC-7057, Revision 0, December 1997.

Oconee 2 Cycle 17

QUADRANT POWER TILT OPERATIONAL LIMITS*

***NOT FOR PLANT USE -- SEE PAGE 11**

STEADY STATE		TRANSIENT		MAXIMUM
30 - 100 % FP	0 - 30 % FP	30 - 100 % FP	0 - 30 % FP	0 - 100 % FP
5.31 $	10.00	9.44	12.00	20.00

$ Limit is 7.00 from 30 - 60 % FP.

The Steady State, Transient, and Maximum Limits tabulated above define quadrant tilt ranges that impose different restrictions on power operation, and time intervals within which specific action may be required. Refer to the Technical Specification Sections listed below for more detailed information.

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