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DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OCONEE 1, CYCLE 10

STARTUP TESTING REPORT

Part I Zero Power Physics Test

Part II Power Escalation Test

Prepared By: Vijay D. Daji

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OCONEE 1 CYCLE 10
Startup Testing Report
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OCONEE 1 CYCLE 10

STARTUP TESTING REPORT

PART I

ZERO POWER PHYSICS TEST

1.0 Introduction and Summary

The Oconee 1 Cycle 10 Zero Power Physics Test (ZPPT) program was conducted on 05/01/86 - 05/02/86 per Station Procedure TT/1/A/0711/10 (Oconee 1 Cycle 10 Zero Power Physics Test). The purpose of this testing was to verify the nuclear parameters upon which the Oconee 1 Cycle 10 safety analysis and Technical Specifications are based.

The ZPPT measurements were made with reactor power controlled between 1.0 x 10^{-10} amps and 7.5 x 10^{-8} amps on the intermediate range instrumentation; reactivity insertions were maintained < ± 1000 $\mu\rho$. RCS pressure and temperature were maintained at ~ 2155 PSIG and ~ 532°F, respectively.

The following nuclear parameters were measured per the ZPPT:

(a) All rods out boron concentration (See Enclosure 1.0)

(b) Integral rod worth for CRA groups 5, 6, and 7 (See Enclosure 2.0)

(c) Differential boron worth (See Enclosure 1.0)

(d) Temperature and moderator coefficients of reactivity (See Enclosure 5.0)

The plant computer was used to record RC pressure, RC temperature, intermediate range NI power levels, and control rod positions. Reactivity was calculated by the plant computer and output to a chart recorder.

On 05/02/86 at 2040, ZPPT was declared complete. All acceptance criteria were met.

2.0 Approach to Critical

The initial RCS heatup following the refueling outage began on 04/26/86. Hot shutdown was reached on 05/01/86 at 0815. Source range count rates were recorded and 1/M (inverse multiplication) vs RC temperature plots were generated throughout heatup.

Rod withdrawal for the Control Rod Drive Trip Time Test began at 2130 on 05/01/86. 1/M vs. withdrawn rod worth plots were maintained. The RCS boron concentration had been adjusted to approximately the all-rods-out critical concentration to achieve criticality near the all-rods-out conditions.

At 0540 on 05/02/86 initial criticality was established with Group 7 at 100% wd, Group 8 at 0% wd and the RCS at 534°F. Boron was adjusted to achieve ARO conditions. CR Groups 1-7 were then tripped into the core to complete the trip time test. Criticality was reestablished on 05/02/86 at 0735.

3.0 Pre-Physics Measurements

After establishing steady conditions with the reactor critical, the NI overlap and sensible heat determination measurements were performed. From the sensible heat determination, the upper limit on the intermediate range NIs (as indicated on the Control Room Chart) was established for ZPPT.

An on-line reactimeter checkout* was then performed by making reactivity insertions of about ± 500 and ± 900 μρ and measuring the associated doubling times. These doubling times were input to an off-line reactivity calculation and the results were then compared to the on-line reactivity values.

*NOTE: An "off-line" reactimeter checkout was performed during RCS heatup. This checkout verified correct calculational and chart recorder response to three test cases in which simulated power ramps were input via floppy discs.

4.0 Physics Testing

A. All Rods Out Boron Concentration Measurement

The RCS equilibrium boron concentration was measured with the CR Groups within ± 1200 μρ of the all-rods-out configuration. The control rods were moved to their all-rods-out position and the associated reactivity change was converted to ppmB. Boron concentration was then calculated.

B. Reactivity Coefficient Measurements

The temperature coefficient measurement was made with the CR Groups within ± 1200 μρ of the all-rods-out configuration while maintaining equilibrium boron concentration in the RCS. This measurement was made by increasing RCS temperature about 10°F and observing the associated reactivity change. The change in reactivity was divided by the change in RCS temperature to calculate the temperature coefficient. The measured temperature coefficient was corrected for the difference in RCS average test temperature and reference temperature (532°F). The moderator coefficient was calculated by subtracting the isothermal doppler coefficient from the measured temperature coefficient.

C. Control Rod Group Integral Worths and Differential Boron Worth Measurement

The worths of Groups 5, 6, and 7 were measured by steadily deborating the RCS and compensating for the resulting positive reactivity ramp by inserting (in discrete steps of ~ - 800 μρ) the control rods from 100% wd on Group 7 to 0% wd on Group 5 (with no rod overlap). The reactivity changes resulting from the discrete control rod insertions were summed for each group to obtain the group integral worth.

The differential boron worth was calculated by dividing the total rod worth inserted during the rod worth measurements by the corresponding change in RCS boron concentration. The initial value for the boron concentration was recorded at critical equilibrium conditions. The final values of boron concentration and reactivity were recorded as they were approaching steady-state at a rate of less than 1 ppmB/minute.

PART II

POWER ESCALATION TEST

1.0 Introduction and Summary

The Oconee 1 Cycle 10 Power Escalation Test was performed between 04/29/86 and 06/04/86* per Station Procedure TT/1/A/0811/10. Testing was performed at 14%, 57% and 100% Full Power (FP) to verify the nuclear parameters upon which the Oconee 1 Cycle 10 safety analysis and Technical Specifications are based. The following tests and verifications were performed:

(A) Initial Core Symmetry Check @ 14% FP

(B) NSS Heat Balance (including RCS flow measurement at 100% FP) @ 14% FP, 57% FP, and 100% FP (See Enclosure 6.0)

(C) Incore Detector Checkout @ 57% FP and 100% FP

(D) Core Power Distribution @ 57% FP and 100% FP (See Enclosure 3.0-3.3 and 4.0)

(E) Reactivity Coefficients @ 100% FP (See Enclosure 5.0)

(F) All Rods Out Critical Boron Concentration @ 100% FP

The Unit reached 14% FP at 0300 on 05/03/86. Testing at this power level was completed by 0630 that same day.

The Unit reached 57% FP at 0405 on 05/07/86. Testing at this power level was completed by 0155 on 05/08/86. The radial/total peaking factor data met the 100% FP acceptance criteria. Intermediate Power Testing (70-85% FP) was, therefore, not required according to the Oconee Generic Startup Physics Test Program.

The Unit was shutdown for RCS leakage repairs on 05/09/86. The Unit was on-line again on the same day at ~ 1730 hrs. While escalation to 100% FP the Unit tripped from 50% FP at 0616 on 05/10/86. The Unit tripped due to loss of feedwater pumps following loss of 'D' heater drain pump. Trip details are referenced in Incident Investigation Report #086-15-1.

Unit recovered to 100% FP at ~0700 on 05/12/86. The incore Detector Checkout was complete on 05/12/86. The NSS Heat Balance including verification of RC Flow Constants (PT/0/A/0275/03) was completed on 6/3/86. The Core Power Distribution Test and the Reactivity Coefficient at Power Calculation were completed on 05/13/86 and 06/04/86 respectively.

*NOTE: The Unit was shutdown from 05/17/86 to 05/27/86 for Steam Generator tube leak repairs.

2.0 NSS Heat Balance/RC Flow Verification

Off-line secondary and primary heat balances were performed at 14% (primary only), 57% and 100% FP. These tests verified the accuracy of CTPA, the on-line plant computer program which performs primary and secondary heat balances. The plant computer was used to average heat balance data (flows, temperatures, pressures, etc.) for 15 minutes. This data was input into the off-line heat balance programs and the results were compared to CTPA averages for the same period.

At full power, an off-line program was used to calculate RC flow based on a secondary heat balance and measured primary loop enthalpy changes. This demonstrated that the RC flow rate was above that assumed in the core design (106.5% design flow) and below that which would cause core lift at 325°F (110.5% design flow).

After establishing the primary flow rate at full power, the plant computer flow constant (used to calculate flow from the primary ΔP instrumentation) was normalized. Slope and reference flow constants for the ΔT power indication were then normalized, based on secondary heat balance.

3.0 Core Power Distribution

Core Power Distribution tests were conducted at 57% and 100% FP. These tests verified that reactor power imbalance, quadrant power tilt, minimum DNBR, maximum LHR and radial/total power peaks did not exceed their respective specified limits. An initial Core Symmetry Check was performed at 14% FP.

Specific checks were made as follows:

Incore imbalance was compared to the error adjusted imbalance LOCA limit curve and was verified to be within specified limits (based on Tech. Spec. 3.5.2.7).

The maximum positive quadrant power tilt was verified to be less than the error adjusted LOCA limit (based on Tech. Spec. 3.5.2.4).

The maximum LHR was verified to be within the LOCA limit maximum allowable heat rate (per Reload Report DPC-RD-2006).

The worst case minimum DNBR and maximum LHR, when extrapolated to the overpower trip, were verified to be within the fuel melt limits (per Technical Specification 2.1). This was required for Low Power Testing only.

Prior to performing the radial and total peaking factor comparisons, PT/0/B/0302/06 (Review and Control of Incore Neutron Detector Signals) was performed to identify bad SPND signals. This test was performed at 57% FP and 100% FP as directed in the Incore Detector Checkout.

The radial and total peaking factors were measured and compared to the predicted values. The following acceptance criteria were applied:

(a) $\% \text{ Deviation} = \frac{(\text{Predicted} - \text{Measured})}{\text{Measured}} \times 100 \leq \pm 20\%$ for total peaking factors

$\pm 15\%$ for radial peaking factors

(b) $\frac{\text{LMP} - \text{LPP}}{\text{LMP}} \times 100 \leq$

	Radial	Total	
	8.0%	12.0%	@ LPT plateau
	5.0%	7.5%	@ FPT (and IMPT) plateau

Where: LMP is the largest measured peaking factor
LPP is the largest predicted peaking factor

(C) The <u>full core</u> root mean square radial peaking factor deviation (RMS) for all core locations with <u>operable</u> incore detector strings was limited as follows:

$$\text{RMS} = \sum_{i=1}^{N} \left[(PP_i - MP_i)^2/(N-1) \right]^{1/2} \leq \begin{array}{l} 0.100 \text{ @ LPT plateau} \\ 0.075 \text{ @ FPT (and IMPT) plateau} \end{array}$$

Where: PP = Predicted radial peaking factor
MP = Measured radial peaking factor
N = Total number of operable incore detector strings (Strings 22, 34 and 44 were inoperable for both 57% and 100% FP)

According to the "Oconee Generic Startup Test Program", the following criteria were verified at 57% FP to allow deletion of the Intermediate Power (70% to 85% FP) Testing:

a) $\frac{\text{LMP} - \text{LPP}}{\text{LMP}} \times 100 <$ Radial 5.0%, Total 7.5%

b) RMS < 0.075

4.0 Power Imbalance Detector Correlation

The Power Imbalance Detector Correlation Test was performed at 57% FP. The purpose of this test was to measure the outcore to full incore power imbalance correlation slopes for NI Channels 5, 6, 7, and 8; and to verify these slopes to be equal to or greater than 0.95.

The incore/outcore imbalance correlation slope for each NI Channel (5-8) was determined by a least squares fit of outcore to incore imbalance indications. A total of 37 incore imbalance points which ranged between - 11.39% and + 6.92% were used. All the slopes were verified to be greater than 0.95.

The correlation slopes for NI Channels (5-8) were calculated to be 0.973, 0.976, 0.960 and 0.958 respectively. The differential amp gain settings for NI Channels (5-8) were 3.70, 3.70, 3.60, and 3.70 respectively.

5.0 Reactivity Coefficients at Power

Data for calculating the doppler and temperature coefficients was taken at ~ 95% FP. This test verified that the measured and extrapolated reactivity coefficients were conservative relative to the specified values in the FSAR.

The temperature coefficient of reactivity was determined by varying the average RC temperature (thermal power was held as steady as possible) and measuring the resulting change in Group 7 position. The power doppler coefficient of reactivity was determined by varying reactor power level (average RC temperature was held as steady as possible) and measuring the resulting change in Group 7 position.

Predicted rod worth data was used with the temperature change and power changes to calculate the temperature and the power doppler coefficients, respectively. Corrections for xenon and temperature/power variations were also made.

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STARTUP REPORT

ENCLOSURE 1.0

ARO AND DIFFERENTIAL BORON WORTH RESULTS

PARAMETER	CONDITIONS	MEASURED VALUE	PREDICTED VALUE	DEVIATION	ACCEPTANCE CRITERIA
All Rods Out Boron Conc.	Gp 7 @ 100% wd Gp 8 @ 25% wd*	1543 ppm	1565 ppm	- 22 ppm	Predicted ± 50 ppm
Differential Boron Worth	1340 ppm Average During Measurement Initial: Gp 7 @ 92% wd, Gp 8 @ 25% wd 1539 ppm Final: Gp 4 @ 64% wd, Gp 5 @ 0% wd, Gp 8 @ 25% wd 1141 ppm	- 0.8997 $\Delta K/K$ per 100 ppm	- 0.8608% $\Delta K/K$ per 100 ppm	- 4.52%	Measured <-1.33% $\Delta K/K$ per 100 ppm and ± 15% Deviation

*Actual Equilibrium Conditions: Gp 7 @ 93% wd, Gp 8 @ 25.0% wd, B_{10} @ 1539 ppm

$$**\% \text{ Deviation} = \frac{\text{predicted} - \text{measured}}{\text{measured}} \times 100$$

OCONEE 1 CYCLE 10

STARTUP REPORT

ENCLOSURE 2.0

INTEGRAL GROUP ROD WORTH MEASUREMENTS

PARAMETER	MEASURED VALUE (% ΔK/K)	PREDICTED VALUE (% ΔK/K)	DEVIATION* (%)	ACCEPTANCE CRITERION
Gp 7 Integral Worth	- 0.877	- 0.777	- 11.4	± 15% Deviation
Gp 6 Integral Worth	- 1.026	- 1.020	- 0.5	± 15% Deviation
Gp 5 Integral Worth	- 1.494	- 1.349	- 9.7	± 15% Deviation
Gp 5-7 Integral Worth	- 3.397	- 3.146	- 7.4%	± 10% Deviation

$$* \text{ \% Deviation} = \frac{\text{predicted - measured}}{\text{measured}} \times 100$$

OCONEE 1 CYCLE 10
STARTUP REPORT
ENCLOSURE 3.0

Radial Peaking Factors @ 57% FP

	8	9	10	11	12	13	14	15
H	0.84 0.76 10.5%	1.00 0.93 7.5%	1.13 1.11 1.8%	1.32 1.24 6.5%	1.02 1.02 0%	1.30 1.36 -4.4%	1.04 1.05 -1.0%	0.44 0.44 0%
K		1.08 1.03 4.9%	1.33 1.22 9.0%	1.19 1.17 1.7%	1.30 1.26 2.8%	1.10 1.18 -6.8%	1.17 1.21 -2.9%	0.53 0.48 10.4%
L			1.18 1.18 0%	1.33 1.29 3.1%	1.07 1.16 -7.8%	1.26 1.29 -2.2%	1.01 1.03 -1.9%	0.41 0.41 0%
M				1.13 1.23 -8.1%	1.23 1.26 -2.4%	1.02 1.06 -3.8%	0.87 0.89 -2.2%	
N		pred. meas. % dev.			0.99 1.01 -2.0%	0.77 0.77 0%	0.41 0.41 0%	
O						0.42 0.42 0%		

NOTE: All values in 1/8th core map have been rounded to two significant digits.

Core Conditions for Predicted Peaking Factors:

Group 5 @ 100% WD

Group 6 @ 100% WD

Group 7 @ 92% WD

Group 8 @ 35% WD

Imbalance @ -2.8% FP

Core Burnup @ 2 EFPD
Power @ 60 % FP

Core Conditions for Measured Peaking Factors:

Group 5 @ 100 % WD

Group 6 @ 99 % WD

Group 7 @ 89 % WD

Group 8 @ 35 % WD

Imbalance @ 10.42 % FP

Core Burnup @0.95 EFPD
Power @ 57% FP

Boron Concentration @ 1166 PPM

Incore Tilt:

WX	XY	YZ	ZW
-0.28	2.09	-0.26	-1.55

Highest % Deviation = 10.5% in 1/8th core location H-8.
Highest Measured Total Peak = 1.36 in 1/8th core location H-13.

$\frac{LMP-LPP}{LMP} \times 100 = 2.2\%$; % RMS Deviation = 5.0%

*Inoperable Detector: N/A

OCONEE 1 CYCLE 10
STARTUP REPORT
ENCLOSURE 3.1

Total Peaking Factors @ 57% FP

	8	9	10	11	12	13	14	15
H	0.96 0.89 7.9%	1.15 1.11 3.6%	1.28 1.34 -4.5%	1.51 1.49 1.3%	1.16 1.29 -10.1%	1.50 1.67 -10.2%	1.19 1.29 -7.8%	0.50 0.52 -3.8%
K		1.25 1.20 4.2%	1.54 1.45 6.6%	1.38 1.39 -0.4%	1.51 1.51 -0.3%	1.25 1.47 -15.0%	1.37 1.50 -8.4%	0.60 0.59 1.7%
L			1.34 1.38 -2.9%	1.55 1.52 1.6%	1.28 1.35 -5.2%	1.47 1.57 -6.1%	1.17 1.24 -5.6%	0.47 0.50 -6.0%
M				1.30 1.46 -11.0%	1.43 1.53 -6.5%	1.17 1.28 -8.9%	1.02 1.11 -8.1%	
N		pred. meas. % dev.			1.14 1.29 -11.6%	0.88 0.98 -10.2%	0.48 0.51 -5.9%	
O						0.48 0.53 -9.4%		

NOTE: All values in 1/8th core map have been rounded to two significant digits.

Core Conditions for Predicted Peaking Factors:

Group 5 @ 100 % WD
Group 6 @ 100 % WD
Group 7 @ 92 % WD
Group 8 @ 35 % WD
Imbalance @ -2.8 % FP
Core Burnup @ 2 EFPD
Power @ 60 % FP

Core Conditions for Measured Peaking Factors:

Group 5 @ 100% WD
Group 6 @ 99% WD
Group 7 @ 89% WD
Group 8 @ 35% WD
Imbalance @ 4.11% FP
Core Burnup @ 1.15 EFPD
Power @ 57 % FP

Boron Concentration @ 1145 PPM

Incore Tilt:	WX	XY	YZ	ZW
	-0.31	1.98	-0.24	-1.43

Highest % Deviation = -15.0 % in 1/8th core location K-13.
Highest Measured Total Peak = 1.67 in 1/8th core location H-13.

$\frac{LMP-LPP}{LMP} \times 100 = 7.2\%$; % RMS Deviation = 8.76%

*Inoperable Detector: N/A

OCONEE 1 CYCLE 10
STARTUP REPORT
ENCLOSURE 3.2

Radial Peaking Factors @ 100% FP

	8	9	10	11	12	13	14	15
H	0.84 0.79 6.3%	0.99 0.95 4.2%	1.12 1.13 -0.9%	1.31 1.26 4.0%	1.02 1.04 -1.9%	1.29 1.34 -3.7%	1.04 1.05 -1.0%	0.45 0.45 0%
K		1.08 1.05 2.9%	1.32 1.23 7.3%	1.18 1.17 0.9%	1.29 1.25 2.8%	1.10 1.16 -5.2%	1.17 1.21 -2.9%	0.54 0.49 10.2%
L			1.18 1.19 -0.8%	1.32 1.28 3.1%	1.07 1.14 -6.1%	1.26 1.28 -1.4%	1.02 1.04 -1.9%	0.42 0.42 0%
M				1.12 1.21 -7.4%	1.22 1.26 -3.2%	1.02 1.06 -3.8%	0.88 0.89 -1.1%	
N		pred. meas. % dev.			0.99 1.02 -2.9%	0.78 0.77 1.3%	0.42 0.41 2.4%	
O						0.43 0.42 2.4%		

NOTE: All values in 1/8th core map have been rounded to two significant digits.

Core Conditions for Predicted Peaking Factors:

Group 5 @ 100% WD

Group 6 @ 100% WD

Group 7 @ 92% WD

Group 8 @ 35% WD

Imbalance @ -8.87 % FP

Core Burnup @ 4 EFPD
Power @ 100% FP

Core Conditions for Measured Peaking Factors:

Group 5 @ 100 % WD

Group 6 @ 99 % WD

Group 7 @ 90 % WD

Group 8 @ 31 % WD

Imbalance @ -4.13 % FP

Core Burnup @ 4.5 EFPD
Power @ 100 % FP

Boron Concentration @ 1007 PPM

Incore Tilt:	WX	XY	YZ	ZW
	0.44	1.17	-0.74	-0.86

Highest % Deviation = 10.2% in 1/8th core location K-15.
Highest Measured Total Peak = 1.34 in 1/8th core location H-13.

$\frac{LMP-LPP}{LMP} \times 100 = 1.5\%$; % RMS Deviation = 4.12%

*Inoperable Detector: N/A

OCONEE 1 CYCLE 10
STARTUP REPORT
ENCLOSURE 3.3

Total Peaking Factors @100% FP

	8	9	10	11	12	13	14	15
H	0.97 0.90 7.8%	1.16 1.09 6.4%	1.29 1.30 -0.8%	1.52 1.50 1.3%	1.18 1.17 0.9%	1.53 1.52 0.7%	1.21 1.18 2.5%	0.51 0.50 2.0%
K		1.26 1.19 5.9%	1.55 1.44 7.6%	1.39 1.33 4.1%	1.53 1.44 6.6%	1.28 1.34 -4.5%	1.40 1.39 0.4%	0.62 0.55 12.7%
L			1.36 1.33 2.3%	1.57 1.49 5.4%	1.31 1.31 0.4%	1.51 1.48 2.3%	1.20 1.22 -1.6%	0.49 0.47 4.3%
M				1.33 1.36 -2.2%	1.46 1.44 1.4%	1.20 1.21 -0.4%	1.05 1.04 1.0%	
N		pred. meas. % dev.			1.17 1.16 0.9%	0.90 0.89 1.1%	0.49 0.46 6.5%	
O						0.49 0.48 2.1%		

NOTE: All values in 1/8th core map have been rounded to two significant digits.

Core Conditions for Predicted Peaking Factors:

Group 5 @ 100 % WD

Group 6 @ 100 % WD

Group 7 @ 92 % WD

Group 8 @ 35 % WD

Imbalance @ -8.87 % FP

Core Burnup @ 4 EFPD
Power @100 % FP

Core Conditions for Measured Peaking Factors:

Group 5 @ 100 % WD

Group 6 @ 99 % WD

Group 7 @ 90 % WD

Group 8 @ 31 % WD

Imbalance @ -4.13% FP

Core Burnup @ 4.5 EFPD
Power @ 100%FP

Boron Concentration @ 1007 PPM

Incore Tilt:	WX	XY	YZ	ZW
	0.44	1.17	-0.74	-0.86

Highest % Deviation = 12.7 % in 1/8th core location K-15.
Highest Measured Total Peak = 1.52 in 1/8th core location H-13.

$\frac{LMP-LPP}{LMP} \times 100 = -3.3\%$; % RMS Deviation = 5.48%

*Inoperable Detector: N/A

OCONEE 1 CYCLE 10

STARTUP REPORT

ENCLOSURE 4.0

CORE POWER DISTRIBUTION DATA SUMMARY AT

57% AND 100% FP TEST PLATEAUS

Power Level	Burnup (EFPD)	Gp6/7/8 Positions (% WD)	Boron CONC (PPM)	Incore Imbalance (% F.P.)	Incore Tilt WX/XY YZ/ZW (%)	MDNBR	Extrapolated Worst Case MDNBR	MLHR (KW/FT)	Extrapolated Worst Case MLHR (KW/FT)
57	1.15	99/89/35	1145	4.11	-0.31/1.98 -0.24/-1.43	5.60	2.65	7.54	14.24
100	4.5	99/90/31	1007	-4.13	0.44/1.17 -0.74/-0.86	3.40	N/A	11.49	N/A

NOTE: The 57% FP case was extrapolated to 105.5% FP. The 100% FP case was not extrapolated.

OCONEE 1 CYCLE 10
STARTUP REPORT
ENCLOSURE 5.0 REACTIVITY COEFFICIENTS

PARAMETER	CONDITIONS	MEASURED VALUE	PREDICTED VALUE	ACCEPTANCE CRITERION
Hot Zero Power Temperature Coefficient (ARO)	T_{av} = 537°F Gp 7 @ 92% wd Gp 8 @ 25% wd 1539 ppm	-0.099×10^{-4} ΔK/K per °F	-0.1×10^{-4} ΔK/K per °F	Predicted ± 0.3×10^{-4} ΔK/K per °F
Hot Zero Power Moderator Coefficient (ARO)	T_{av} = 537°F Gp 7 @ 92% wd Gp 8 @ 25% WD 1539 ppm	0.061×10^{-4} ΔK/K per °F	0.055×10^{-4} ΔK/K per °F	Predicted ± 0.3×10^{-4} ΔK/K per °F and Measured $\leq + 0.5 \times 10^{-4}$ ΔK/K per °F
Hot Full Power BOC Temperature Coefficient Extrapolated to 95% FP	T_{av} = 579°F EFPD = 11	-1.135×10^{-4} ΔK/K per °F	-1.129×10^{-4} ΔK/K per °F	Temperature Coefficient more negative than -0.13×10^{-4} ΔK/K per °F at 95% FP
Hot Full Power BOC Temperature Coefficient Extrapolated to 100% FP	T_{av} = 579°F EFPD = 11	-1.151×10^{-4} ΔK/K per °F	-1.145×10^{-4} ΔK/K per °F	N/A
Hot Full Power BOC Power Doppler Coefficient Extrapolated to 100% FP	T_{av} = 579°F EFPD = 11	-0.935×10^{-4} ΔK/K per %FP	-1.040×10^{-4} ΔK/K per %FP	Power Doppler Coefficient more negative than -0.55×10^{-4} ΔK/K per %FP at 100%FP

OCONEE 1 CYCLE 10

STARTUP REPORT

ENCLOSURE 6.0

NSS HEAT BALANCE/RC FLOW VERIFICATION

Test Plateau	Plant Computer On Line Primary Power Level	Plant Computer On Line Secondary Power Level	Plant Computer "Delta Temp" Power Level	Off Line* Calculated Primary Power Level	Off Line* Calculated Secondary Power Level	Plant Computer RC Flow
14% FP	14.49	N/A	15.60	14.53	N/A	111.09% D.F.
57% FP	56.26	58.32	56.07	56.09	58.20	114.68% D.F.
100% FP	99.97	99.75	99.78	99.76	99.75	109.27% D.F.
100% FP (after adjusting constants)	100.01	100.04	99.79	N/A	N/A	109.46% D.F.

*Calculated by the off-line secondary heat balance program (POWER)

DUKE POWER COMPANY
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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

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July 22, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTENTION: Mr. J.F. Stolz, Project Director
PWR Project Directorate #6

Subject: Oconee Nuclear Station, Unit 1
Docket Nos. 50-269

Dear Sir:

Please find attached the Startup Test Report for Oconee Unit 1, Cycle 10.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

PJN/50/jgm

Attachments

xc: Dr. J. Nelson Grace, Regional Administrator
Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Ms. Helen Pastis
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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