

**Prairie Island
Startup Physics Testing Report
Unit 1 Cycle 17**

1.0 INTRODUCTION

Forty-eight reload fuel assemblies manufactured by Westinghouse were installed in the Prairie Island Unit 1 reactor during the June 1994 refueling outage. The core design uses the VANTAGE+ fuel assemblies enriched to 4.95 w/o U²³⁵. For peaking and ITC control this design uses 432 - 6 w/o gadolinium doped pins.

2.0 STARTUP PHYSICS TESTING

This report provides test results for the tests conducted during the startup of the Unit 1 Prairie Island Nuclear Generating Plant. The procedures used in the startup test program were the most recent revision reviewed by the Plant Operations Committee. The tests performed included:

- a) Zero Power Isothermal Temperature Coefficient
- b) Control Banks' Worth
- c) Critical Boron Concentration
- d) Power Distribution Measurements

Table 1 summarizes the data for each test performed.

3.0 SUMMARY

The results shown in Table 1 all fall within the acceptance criteria.

TABLE 1
Startup Physics Testing Results
Unit 1 Cycle 17

1.0 HZP Isothermal Temperature Coefficient

Procedure: D32
Revision: 5 (6/25/93)

<u>Test Condition</u>	<u>Measured Value</u>	<u>Acceptance Criteria</u>
ARO	+0.7 pcm/°F	< 5 pcm/°F

2.0 Control Banks' Worth Measurement

(Using the rod swap method - see report NSPNAD-88408-A, Rev 1,
"Prairie Island Units 1 and 2 Rod Swap Methodology", Sept. 1985.)

Procedure: D30
Revision: 24 (3/22/94)

<u>Test Condition</u>	<u>Measured Value</u>	<u>Acceptance Criteria</u>
Control Bank A (reference bank)	1296.4 pcm	1302 pcm \pm 10% (1172-1432 pcm)
Control Bank B	412.3 pcm	424 pcm \pm 15% (360-488 pcm)
Control Bank C	885.6 pcm	908 pcm \pm 15% (772-1044 pcm)
Control Bank D	804.4 pcm	831 pcm \pm 15% (706-956 pcm)
Shutdown Bank A	786.3 pcm	801 pcm \pm 15% (681-921 pcm)
Shutdown Bank B	786.3 pcm	801 pcm \pm 15% (681-921 pcm)
Total Banks	4971.3 pcm	5067 pcm \pm 10% (4560-5574 pcm)

TABLE 1 (continued)

3.0 Critical Boron Concentration

Procedure: D34

Revision: 4 (6/29/93)

<u>Test Condition</u>	<u>Measured Value</u>	<u>Acceptance Criteria</u>
ARO	1878 ppm	1892 ± 125 ppm
Bank A In, ORO	1728 ppm	1716 ± 125 ppm

4.0 Power Distribution Measurements

Procedure: SP 1116

Revision: 20 (6/28/94)

<u>Power</u>	<u>Parameter</u>	<u>Value</u>	<u>Acceptance Criteria</u>
30%	Max $(RRI_m - RRI_p)/RRI_p$		
	$p_i \geq 0.9$	+5.4%	$\pm 10\%$
	$p_i < 0.9$	+5.7%	$\pm 15\%$
	$F_Q^N \times 1.03 \times 1.05$	2.59	$< 4.80^*$
	$F_{\Delta H} \times 1.04$	1.78	$< 2.12^{**}$
	QPTR	0.984	≥ 0.98 and ≤ 1.02

* Acceptance criteria is $(2.40/P) \times K(z)$.** Acceptance criteria is $1.75 \times [1 + 0.3(1-P)]$

TABLE 1 (continued)

<u>Power</u>	<u>Parameter</u>	<u>Value</u>	<u>Acceptance Criteria</u>
100%	Max (RRI _m -RRI _p)/RRI _p		
	$p_i \geq 0.9$	-3.3%	$\pm 10\%$
	$p_i < 0.9$	+3.5%	$\pm 15\%$
	$F_Q^N \times 1.03 \times 1.05$	2.11	$< 2.21^{***}$
	$F_{\Delta H} \times 1.04$	1.69	$< 1.75^{**}$
	QPTR	0.988	≥ 0.98 and ≤ 1.02

** Acceptance criteria is $1.75 \times [1+0.3(1-P)]$

*** Acceptance criteria is $(2.40/P) \times (K(z)/V(z))$

Legend

ARO	All Rods Out
HZP	Hot Zero Power
ORO	Other Rods Out
p_i	Relative Assembly Power
P	Power
QPTR	Quadrant Power Tilt Ratio
RRI _m	Reaction Rate Integral - Measured
RRI _p	Reaction Rate Integral - Predicted