



Carolina Power & Light Company

November 8, 1979

FILE: NG-3513 (B)

SERIAL: GD-79-2820

Mr. James P. O'Reilly, Director
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, GA 30303

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
LICENSE NO. DPR-62
DOCKET NO. 50-324
CYCLE 3 SUMMARY START-UP TEST REPORT

Dear Mr. O'Reilly:

This report is submitted in accordance with Technical Specifications, Section 6.9, to provide the Start-up Test Report for Unit No. 2 Cycle 3 as appropriate for insertion of 8 x 8R fuel. Due to a misinterpretation of the start-up test reporting requirements, this report is not submitted within 90 days of resumption of commercial operation; however, it is within 90 days of completion of start-up testing and represents completion of start-up test reporting required by Technical Specification 6.9.1.3.

The following physics testing was performed on Brunswick Unit No. 2 during the beginning of cycle start-up and power ascension:

1. Shutdown Margin Demonstration

The beginning of cycle, cold, xenon-free shutdown margin test was performed to demonstrate that the reactor remained shut down by the prescribed margin with the strongest rod fully withdrawn. With the strongest rod fully withdrawn, a diagonally adjacent control rod was withdrawn to a calculated position corresponding to $.38\% + R$, and the reactor was observed to remain shut down ($R = 0.0$ for this cycle).

2. Reactivity Anomaly

At $\geq 95\%$ power and core flow, the predicted control rod density was compared to the actual control rod density with the following results:

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<u>Control Rod Density Required</u>		<u>Control Rod Density Measured</u>
	<u>Predicted</u>	3.5%
<u>Minimum</u>		
0.0	<u>Maximum</u>	
	6.8%	

The hot, full power reactivity measurement was found to be within the required band ($\pm 1\%$ reactivity) and as predicted.

3. Critical Eigenvalue

The cold, critical, xenon-free eigenvalue was measured on the initial start-up of Cycle 2. The results are as follows:

<u>Predicted K_{eff}</u>	<u>Measured K_{eff}</u>	<u>% Deviation From Predicted</u>
1.006	1.0091	.31%

The cold, critical eigenvalue was found to be close to the predicted value and within the acceptance criteria of $\pm 1\%$.

4. TIP Uncertainty

Total TIP uncertainty was determined above and below 75% power while at steady state. Results are as follows:

<u>Maximum Allowed Uncertainty</u>	<u>Measured Uncertainty</u>
9.00%	4.85% at $< 75\%$
	5.31% at $> 75\%$

The TIP uncertainty was determined to be well below the required limit.

5. Core Power Distribution and Symmetry

- a. At medium and high power levels, bundle power comparisons were made between symmetric bundles with the following results:

<u>Maximum Expected Bundle Power Asymmetry</u>	<u>Maximum Measured Bundle Power Asymmetry</u>
15%	4.66%

- b. Measured and predicted values of core thermal limits (MCPR, MAPCHGR, LHGR) were compared at $\geq 95\%$, and the measured values were found to be within $\pm 10\%$ of the predicted values.

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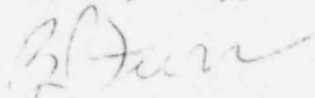
The core power distribution and symmetry test indicated a symmetric power distribution as well as close agreement between predicted and measured values of core thermal limits.

As discussed in our letter to Mr. T. A. Ippolito of March 16, 1979, on the subject of Physics Start-up Test Program, the following tests were satisfactorily concluded:

- a. Core Loading Verification - A core loading verification was performed per BSEP Fuel Handling Procedure (FH-11). It was verified that the core was loaded as specified by the design reference loading pattern. This has recently been reverified from video tapes.
- b. Core Power Symmetry - See Response No. 4, TIP Uncertainty.
- c. Control Rod Mobility - Control rod mobility was verified prior to start-up by control rod functional/friction testing. Each control rod was verified to move full travel without binding or excessive friction. In addition, the reactor was observed to remain subcritical during the withdrawal of each control rod.
- d. Reactivity Testing - Refer to Item 1, Shutdown Margin, and Item 3, Critical Eigenvalue.

Core physics testing performed during the Unit No. 1 beginning of Cycle 2 start-up and power ascension indicates that the reactor is performing safely and as predicted.

Yours very truly,



B. J. Furr

Vice President - Nuclear Operations

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