BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLFAR POWER PLANT

UNIT 2 Docket No. 50-318 License No. DPR-69

SUMMARY OF STARTUP TESTING

FOR SECOND CYCLE

7902120158

SUMMARY OF STARTUP TESTING FOR CALVERT CLIFFS UNIT TWO SECOND CYCLE

- The following tests were conducted for the Startup of Calvert Cliffs Unit Two for the Second Cycle. All tests were conducted in a manner similar to initial startup (Ref. 1).
 - A. CEDM/CEA Performance Test
 - B. RCS Flow Verification
 - C. CEA Symmetry Check
 - D. Initial Criticality
 - E. Critical Boron Concentration Measurements
 - F. Isothermal Temperature Coefficient Measurements
 - G. Group Rod Worth Measurements
 - H. Power Coefficient Measurements
 - I. Power Distribution Measurements
- II. The results of these tests and comparison with predictions are as follows:
 - A. All trippable CEA's reached a 90% insertion in less than 3.0 seconds at hot, full flow conditions. Except for those CEA's currently residing in Small Flow Hole Design Guide Tubes, there were no significant differences from previous tests. Table 1 presents a comparison between CEA's which have resided in both the Standard (large flow hole) and Small Flow Hole Design Guide Tubes.
 - B. Reactor Coolant System flow was verified not to have undergone any significant changes since the first cycle.

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- C. The CEA Symmetry Check verified that all CEA's were attached to their extension shafts.
- D. Initial Criticality was achieved at 1153 ppm Boron with CEA Group Five at 68" withdrawn. Predicted value was 1180 ppm.
- E. Critical Boron Measurements Table 2.
- F. Isothermal Temperature Coefficients Table 3.
- G. CEA Group Worth Measurements Table 4.
- H. Power Coefficient Measurements Table 3.
- I. Power Distribution Measurements Table 5.
- III. All test results were within acceptance limits.

REFERENCES

 <u>Calvert Cliffs Nuclear Power Plant Unit 2, Startup Test Report,</u> <u>May 12, 1977</u>.

TABLE 1

CEA DROP TIME TO 90% INSERTION

CEDM No.	Hot (532°F) Full Flow Conditions Cycle 1* Cycle 2**	
38	2.15	2.79
41	2.11	2.77
42	2.21	2.80
45	2.19	2.76
55	2.19	2.54
58	2.18	2.61
61	2.27	2.66
54	2.25	2.66

* Resides in Standard Design Guide Tube

** Resides in Small Flow Hole Design Guide Tube

TABLE 2

CRITICAL BORON MEASUREMENTS

	Measured	Predicted	
All Rods Out, 532°F	1185 ppm	1208 <u>+</u> 100 ppm	
CEA Group 5, 4, 3, 2, 1 Fully Inserted	956 ppm	986 <u>+</u> 100 ppm	

TABLE 3

ISOTHERMAL TEMPERATURE COEFFICIENTS AND POWER COEFFICIENTS

ITC

	Measured	Predicted	
Zero Power, CEA Group 5 at 105" Withdrawn	+ .43 x 10 ⁻⁴ Ap/OF	+.43 <u>+</u> .3 x 10 ⁻⁴ Δρ/ ⁰ F	
50% Group 5 at 105"	+.01 x 10-4 Ap/OF	+.07 <u>+</u> .3 x 10 ⁻⁴ Ap/ ⁰ F	
100% Group 5 at 105"	50 x 10-4 AD/0F	24 <u>+</u> .3 x 10 ⁻⁴ Δρ/ ⁰ F	

POWER COEFFICIENT

50% Group 5 at 105"	-1.12 x 10 ⁻⁴ dp/%	99 ± .2 × 10-4 Δρ/%
100% Group 5 at 105"	94 x 10 ⁻⁴ Ap/%	77 + .2 x 10-4 Ap/%

	Measared (%Ap)	Predicted $(%\Delta \rho)$
Group 5	.563	.585 <u>+</u> .088
Group 4	.372	.320 ± .060
Group 3	.542	.541 ± .081
Group 2	.455	.424 ± .064
Group 1	.600	.654 ± .090
TOTAL	2.532	2.524 + .252

TABLE 4

CEA GROUP WORTH MEASUREMENTS

TABLE 5

POWER DISTRIBUTION MEASUREMENTS

	Measured		Acceptance Limits	
	50%	100%	50%	100%
F _{xy} T	1.64	1.58	<u><</u> 1.74	<u><</u> 1.61
Fr	1.51	1.48	<u><</u> 1.644	<u><</u> 1.54
Tq	.006	.006	<u><</u> 0.030	<u><</u> 0.030