NINE MILE POINT UNIT 1

Startup Physics Test Results-Cycle 6

June 1979

7908310416

1.0 Core Loading Verification

Abstract

The purpose of the test is to verify that the cycle 6 core was loaded as specified. During the end of cycle 5 refueling outage, the reactor core was completely unloaded and reloaded. All fuel moves were specified by the Reactor Analyst Department. The operator verified by checkoff that each fuel assembly was loaded in the correct core location. When the core was completely loaded, it was verified by the Reactor Analyst Department using an underwater TV system and video recorder in accordance with Fuel Handling Procedure No. 22, Core Post Alteration Inspection and Verification.

Test Results

Two independent checks of the video tape were made by the Reactor Analyst Technicians to verify that the core was arranged as specified by the core map. As shown on figure 1.1, the cycle 6 core has been loaded and verified.

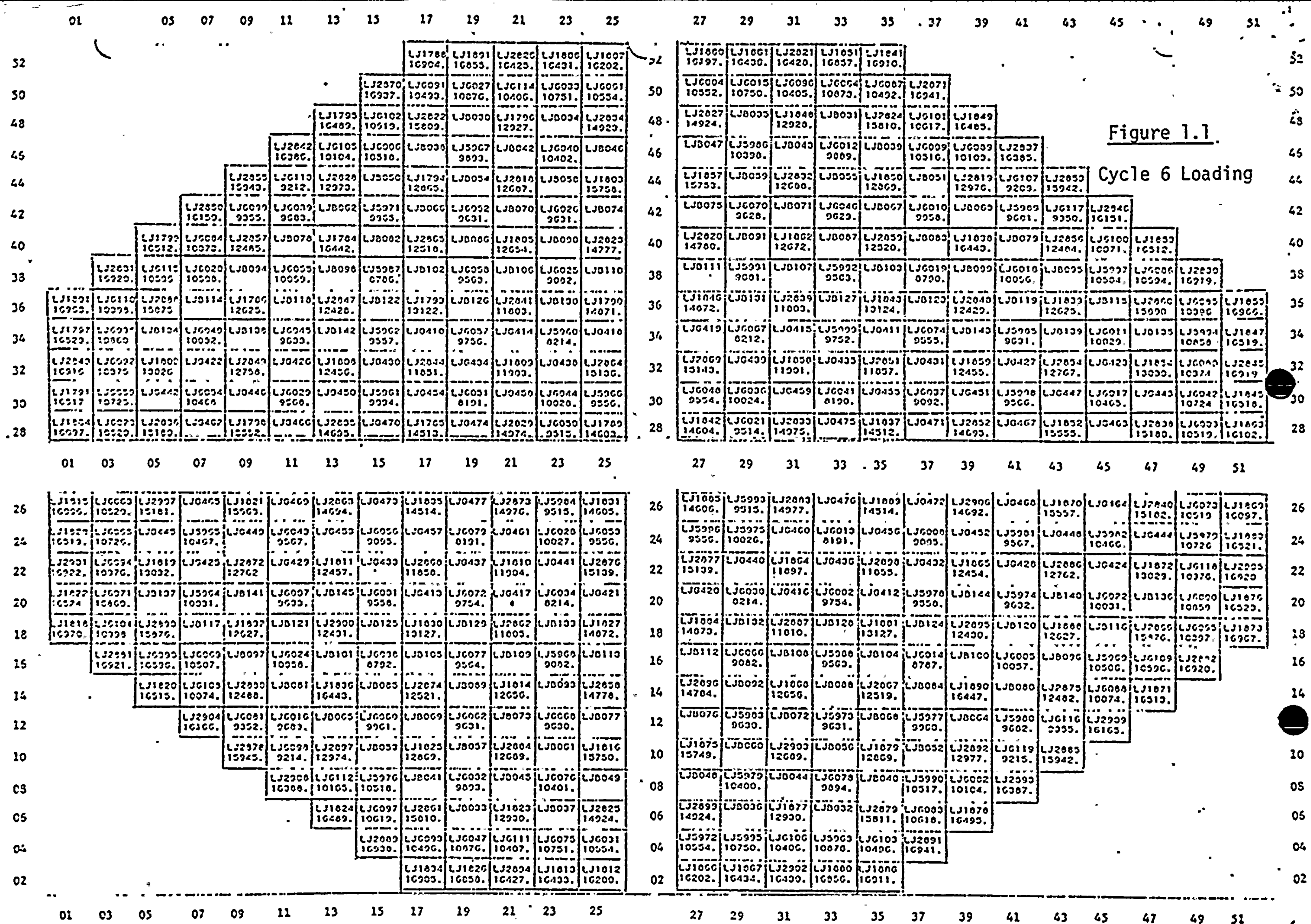

Figure 1.1

Cycle 6 Loading

VERIFICATION COMPLETED BY: R.L. Tessier DATE: 5/31/79

TIME: 20:20

[signature] DATE: 5/31/79

TIME: 20:20

APPROVED BY: William C. [signature] DATE 6/1/79

TIME 0800

2.0 SHUTDOWN MARGIN TEST

Abstract

The purpose of the test is to demonstrate that the reactor can be made subcritical with a shutdown margin of 0.25 percent delta K at anytime in the cycle with the strongest operable rod fully withdrawn.

The shutdown margin test was performed in accordance with the Reactor Physics Surveillance Procedure No. 4, Reactivity Margin-Core Loading. With the core in its most reactive condition, cold and Xenon free, the strongest control rod was fully withdrawn from the core. A second control rod was withdrawn to a position which inserted an amount of reactivity at least equal to the required margin of 0.25 percent Delta K.

Test Result

Figure 2.1 summarizes the results of the shutdown margin test. Control rod 26-31, shown analytically to be the strongest, was fully withdrawn from the core. Control rod 22-35 was then withdrawn to position 08 which analytically resulted in an insertion of approximately 0.50 percent Delta K. As shown on Figure 2.1, the reactor remained subcritical throughout the test. Results of the test are within the criteria specified in the Technical Specifications.

Figure 2.1

Reactivity Margin - Core Loading

Procedure:

1. All Rods In

SRM	11	12	13	14
Readings	9	10	9	15

2. Rod CR1 26-31 selected
3. Rod CR1 26-31 to position 48, coupling check verified
4. Reactor Subcritical

SRM	11	12	13	14
Readings	13	10	9	15

5. Rod CR2 22-35 selected
6. Rod CR2 22-35 to position 08
7. Reactor Subcritical

SRM	11	12	13	14
Readings	17	11	9	17

3.0 Control Rod Drive Scram Time Test

Abstract

The purpose of this test is to demonstrate that the requirements of the Technical Specifications are met prior to power operation.

The control rod drive scram time test was performed in accordance with the Reactor Analyst Procedure No. N1-RAP-3, Full Core Control Rod Scram Timing Sequence. Each control rod was individually scrammed. A recording was made of control blade position versus time. From these recordings, the average scram insertion time corresponding to 5, 20, 50, and 90 percent insertion into the core was obtained.

Test Result

Figure 3.1 contains the results of the control rod drive scram time test. Results of the test are within the values specified by the Technical Specifications (see figure 3.2).

Figure 3.1

NINE MILE POINT UNIT 1
CONTROL ROD SCRAM TIME DATA

DATE JUN 1979

ROD NO.	LOCATION X-Y	SCRAM TIME DATA 5%	20%	50%	90%
1	18- 3	0.370	0.800	1.710	2.900
2	22- 3	0.360	0.780	1.640	2.790
3	26- 3	0.380	0.820	1.680	2.840
4	30- 3	0.360	0.780	1.620	2.700
5	34- 3	0.375	0.830	1.880	3.270
6	14- 7	0.350	0.750	1.540	2.600
7	18- 7	0.375	0.735	1.575	2.660
8	22- 7	0.375	0.810	1.690	2.810
9	26- 7	0.350	0.770	1.610	2.710
10	30- 7	0.350	0.800	1.700	2.820
11	34- 7	0.340	0.710	1.580	2.780
12	38- 7	0.365	0.775	1.670	2.825
13	10-11	0.370	0.840	1.750	2.940
14	14-11	0.380	0.800	1.660	2.790
15	18-11	0.360	0.780	1.610	2.695
16	22-11	0.350	0.785	1.675	2.850
17	26-11	0.360	0.780	1.660	2.810
18	30-11	0.365	0.820	1.730	2.915
19	34-11	0.365	0.780	1.620	2.730
20	38-11	0.350	0.770	1.640	2.780
21	42-11	0.355	0.800	1.665	2.815
22	6-15	0.360	0.820	1.760	2.980
23	10-15	0.365	0.750	1.700	3.140
24	14-15	0.370	0.790	1.650	2.770
25	18-15	0.340	0.790	1.700	2.920
26	22-15	0.345	0.775	1.620	2.710
27	26-15	0.375	0.795	1.660	2.820
28	30-15	0.360	0.720	1.500	2.550
29	34-15	0.360	0.815	1.780	3.040
30	38-15	0.335	0.805	1.780	3.060
31	42-15	0.370	0.800	1.670	2.830
32	46-15	0.360	0.800	1.620	2.840
33	2-19	0.360	0.760	1.565	2.650
34	6-19	0.350	0.770	1.600	2.650
35	10-19	0.360	0.780	1.640	2.760
36	14-19	0.330	0.700	1.420	2.390
37	18-19	0.370	0.800	1.665	2.780
38	22-19	0.380	0.830	1.700	2.845
39	26-19	0.380	0.830	1.710	2.870
40	30-19	0.360	0.770	1.590	2.665
41	34-19	0.360	0.730	1.470	2.460
42	38-19	0.365	0.800	1.660	2.810
43	42-19	0.380	0.850	1.780	3.010
44	46-19	0.375	0.790	1.620	2.720
45	50-19	0.380	0.800	1.640	2.750
46	2-23	0.370	0.810	1.740	2.870
47	6-23	0.380	0.815	1.660	2.770
48	10-23	0.350	0.780	1.640	2.780
49	14-23	0.365	0.755	1.550	2.560
50	18-23	0.350	0.790	1.680	2.880

Figure [illegible].1 (Continued)

NINE MILE POINT UNIT 1
CONTROL ROD SCRAM TIME DATA

DATE JUN 1979

ROD NO.	LOCATION X-Y	SCRAM TIME DATA 5%	20%	50%	90%
51	22-23	0.380	0.830	1.780	3.050
52	26-23	0.350	0.780	1.630	2.750
53	30-23	0.340	0.790	1.620	2.750
54	34-23	0.370	0.810	1.675	2.885
55	38-23	0.365	0.800	1.660	2.785
56	42-23	0.370	0.785	1.640	2.740
57	46-23	0.370	0.750	1.650	2.820
58	50-23	0.370	0.765	1.580	2.680
59	2-27	0.360	0.775	1.615	2.720
60	6-27	0.360	0.800	1.680	2.820
61	10-27	0.375	0.840	1.770	3.000
62	14-27	0.370	0.840	1.800	3.050
63	18-27	0.375	0.835	1.755	2.955
64	22-27	0.360	0.765	1.595	2.670
65	26-27	0.350	0.710	1.420	2.360
66	30-27	0.300	0.770	1.680	2.910
67	34-27	0.320	0.740	1.550	2.650
68	38-27	0.380	0.815	1.715	2.880
69	42-27	0.360	0.800	1.660	2.800
70	46-27	0.370	0.810	1.700	2.830
71	50-27	0.350	0.770	1.615	2.750
72	2-31	0.330	0.740	1.530	2.560
73	6-31	0.370	0.835	1.720	2.920
74	10-31	0.340	0.740	1.560	2.600
75	14-31	0.360	0.840	1.760	2.960
76	18-31	0.350	0.780	1.660	2.830
77	22-31	0.370	0.720	1.440	2.380
78	26-31	0.340	0.675	1.395	2.375
79	30-31	0.350	0.780	1.610	2.730
80	34-31	0.370	0.750	1.550	2.585
81	38-31	0.350	0.720	1.450	2.420
82	42-31	0.360	0.750	1.575	2.620
83	46-31	0.360	0.840	1.775	2.965
84	50-31	0.370	0.800	1.680	2.820
85	2-35	0.360	0.780	1.645	2.790
86	6-35	0.370	0.800	1.670	2.800
87	10-35	0.375	0.775	1.750	3.130
88	14-35	0.350	0.710	1.450	2.430
89	18-35	0.340	0.690	1.410	2.350
90	22-35	0.370	0.725	1.440	2.380
91	26-35	0.370	0.810	1.680	2.800
92	30-35	0.370	0.780	1.620	2.700
93	34-35	0.380	0.820	1.718	2.895
94	38-35	0.360	0.800	1.685	2.850
95	42-35	0.385	0.830	1.715	2.910
96	46-35	0.370	0.830	1.740	2.920
97	50-35	0.350	0.750	1.560	2.640
98	6-39	0.360	0.810	1.680	2.825
99	10-39	0.380	0.820	1.710	2.860
100	14-39	0.370	0.780	1.650	2.780

Figure 3.1 (Continued)

NINE MILE POINT UNIT 1
CONTROL ROD SCRAM TIME DATA

DATE JUN 1979

ROD NO.	LOCATION X-Y	SCRAM TIME DATA 5%	20%	50%	90%
101	18-39	0.340	0.680	1.400	2.320
102	22-39	0.370	0.810	1.680	2.830
103	26-39	0.345	0.770	1.610	2.720
104	30-39	0.380	0.820	1.700	2.810
105	34-39	0.395	0.830	1.695	2.840
106	38-39	0.375	0.818	1.700	2.850
107	42-39	0.380	0.810	1.680	2.840
108	46-39	0.350	0.740	1.535	2.595
109	10-43	0.370	0.800	1.640	2.750
110	14-43	0.360	0.780	1.660	2.790
111	18-43	0.360	0.790	1.665	2.815
112	22-43	0.365	0.790	1.670	2.815
113	26-43	0.360	0.800	1.640	2.750
114	30-43	0.370	0.820	1.720	2.880
115	34-43	0.370	0.815	1.720	2.890
116	38-43	0.370	0.780	1.600	2.680
117	42-43	0.375	0.805	1.680	2.830
118	14-47	0.355	0.760	1.595	2.680
119	18-47	0.365	0.830	1.765	2.980
120	22-47	0.370	0.760	1.550	2.600
121	26-47	0.345	0.760	1.590	2.680
122	30-47	0.350	0.770	1.600	2.675
123	34-47	0.350	0.760	1.560	2.720
124	38-47	0.330	0.720	1.490	2.510
125	18-51	0.350	0.750	1.570	2.660
126	22-51	0.385	0.835	1.725	2.870
127	26-51	0.360	0.770	1.620	2.740
128	30-51	0.380	0.800	1.680	2.825
129	34-51	0.365	0.780	1.595	2.690

Figure 3.2

NINE MILE POINT UNIT 1
AVERAGE SCRAM INSERTION TIME COMPARISONS
DATE JUN 1979

% INSERTED FROM FULLY WITHDRAWN	AVERAGE SCRAM INSERTION TIME(SEC)	TECH SPEC LIMIT (SEC)
5	0.362	0.375
20	0.784	0.900
50	1.641	2.000
90	2.769	5.000

4.0 Cold Critical Comparison With Actual Measurement

Abstract

The purpose of this test is to demonstrate that the requirements of the Technical Specifications are met.

The cold critical comparison with actual measurements was performed in accordance with the Reactor Physics Surveillance Procedure No. N1-RPSP-3, Reactivity Anomalies. A beginning of Cycle 6 critical control rod pattern was determined (see figure 4.1). The actual critical control rod pattern should not exceed the equivalent of ±1 percent in reactivity.

Test Report

The actual beginning of cycle 6 critical control rod pattern is shown on figure 4.2. Results of the test are within the value specified by the Technical Specifications (see figure 4.3).

COLD CRITICAL CONTROL ROD PATTERN
X= POSITION 48

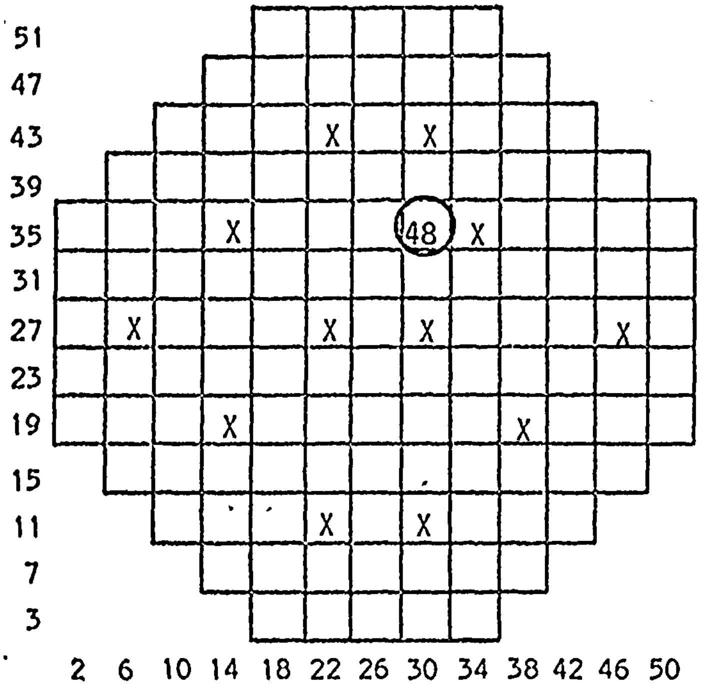

Figure 4.1

Predicted In-sequence Critical

624 notches withdrawn
Temperature: 68^{o}F

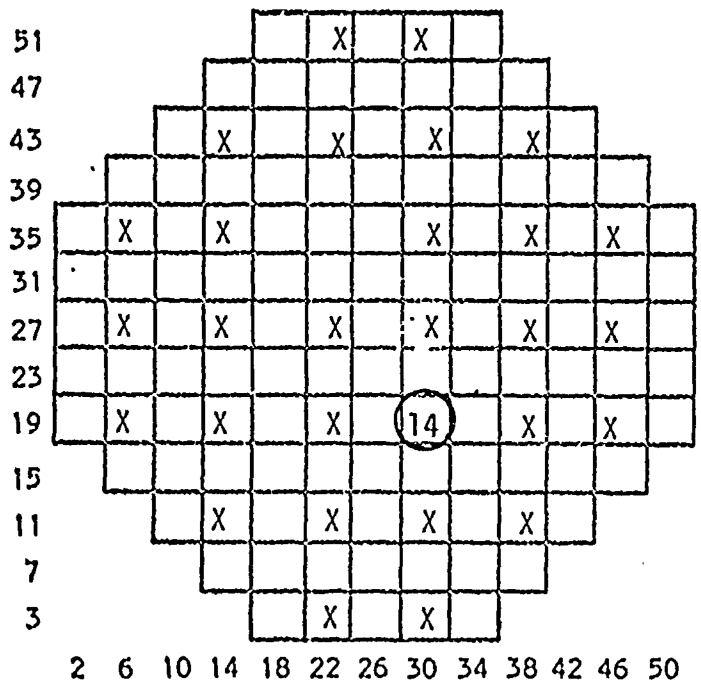

Figure 4.2

Actual In-sequence Critical

1358 notches withdrawn
Temperature: 142^{o}F

Figure 4.3

Cold Critical Technical Specification Requirements

	Notches Withdrawn
+1% ΔK	1444
Predicted Cycle 6	624
Actual Cycle 6	1358
-1% ΔK	480

5.0 TIP Uncertainty Calculation

Abstract

The purpose of this test is to ascertain the TIP uncertainty.

The TIP uncertainty calculation was performed in accordance with Reactor Core Parameter Calculation Procedure No. N1-RCPCP-18, TIP Uncertainty Calculation. TIP uncertainty consists of a random noise component and a geometric component. Measurements of the components were obtained by taking repetitive TIP readings at TIP locations which are symmetrical about the core diagonal of fuel loaded symmetrically.

Test Result

The total TIP uncertainty was calculated from the TIP data. The results of the calculation are shown on figure 5.1. The results are within the total TIP uncertainty criterion of 9 percent.

Figure 5.1

Nine Mile Point Unit 1 Cycle 6

TIP Uncertainty Calculation Results

Total TIP Uncertainty -	3.25%
TIP Random Noise Uncertainty -	2.79%
TIP Geometric Uncertainty -	1.67%