SOUTHERN NUCLEAR OPERATING COMPANY

J. M. FARLEY NUCLEAR PLANT

UNIT 1

FIFTH PERIODIC REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

JULY 1994

FINAL REPORT

Prepared by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The Fifth Periodic Integrated Leakage Rate Test (ILRT) at Alabama Power Company's Joseph M. Farley Nuclear Plant (FNP) Unit 1 was performed on March 9-10, 1994. The ILRT was performed as required by 10CFR50 Appendix J (Reference 1) and the Farley FSAR (Reference 4) to demonstrate that leakage through the containment boundary at design basis accident pressure does not exceed the FNP Technical Specification (Reference 2) limit. The test was performed in accordance with procedure FNP-1-STP-117.0 Revision 12, Official Test Copy #940304-1 (Reference 3). The following documentation is retained at the site along with the Official Test Copy of the procedure:

- o instrumentation validation (calibrations, ISG, etc.)
- o test instrumentation status
- o plant systems status
- o access control
- o test procedure
- o event log
- o temperature stabilization data
- o integrated leakage rate data
- o verification leakage rate data
- o local leak rate test data

A summary of general plant information as related to the Integrated Leak Rate Test is provided in Appendix IV.

2.0 SUMMARY

The Fifth Periodic Integrated Leakage Rate Test for the Farley Unit 1 containment was successfully completed at 12:45 p.m. on March 10, 1994. The duration of the test was 24 hours. The results of the test follow: (Additional leakage to account for penetrations in service or isolated during the test and not in post accident alignment is included in the leakage rates. The 95% UCL plus any penalty addition is referred to as the final leakage rate.)

Leakage Rate (weight % per day)			
Mass Point Analysis			
Calculated Leakage Rate	95% UCL	Final Leakage Rate (UCL + penalties)	Acceptance Limit (0.75 La)
0.0345	0.0361	0.0479	0.1125

3.0 METHODOLOGY

3.1 Leakage Rate Calculations

Data from the instrumented containment is reduced by direct application of the ideal gas law, PV = w RT, to calculate air mass at each data point. The change in air mass provides information to develop the leakage rate.

The mass point data analysis technique assumes that the leakage rate is constant with time and thus the data can be analyzed by the method of linear least squares. The slope of this line represents the rate of change of air mass with respect to time, which is the leakage rate. A typical description of the mass point method can be found in ANSI/ANS 56.8 1987 (Reference 5).

An upper confidence limit (UCL) is set such that there is only a five percent chance that the actual containment leakage rate exceeds the reported UCL value. This 95% UCL on calculated leakage rate rather than the calculated rate itself is the number used to determine acceptance.

3.2 Test Measurements

Twenty-four drybulb and six dewpoint temperature sensors located inside containment were used to collect information for leakage rate calculations. These were located at approximately equally spaced elevations. Sensor locations and volume fractions (Table 1) were established by considering temperature distributions in past tests, temperature surveys and the containment free volume.

Drybulb temperatures were measured using 100 Ohm platinum resistance temperature detectors (RTDs). Dewpoint temperatures were measured using optical chilled mirror dew point hygrometers. These devices use a direct-measuring sensor automatically held at the dew point temperature by an optical system. This technique is a primary measurement of the water vapor content of the air. The mirror temperature represents the true dew point temperature and is measured by an imbedded precision platinum resistance thermometer.

Absolute pressure was measured using a vibrating cylinder element sensor connected through tubing to a containment penetration. The change in pressure during an ILRT is quite small relative to absolute pressure. The pressure device used has an accuracy of +/- 0.015% RDG, +/- 0.002% F.S. and a repeatability of +/- 0.001% F.S.

A data logger was used to collect data at fifteen minute intervals. Information from the RTDs, dewpoint sensors, and pressure indicators was transferred from the data logger to the ILRT computer for analysis. The data system generated a printed tape record of each data set transmitted to the computer.

The computer used for the ILRT was an IBM compatible. A compiled Basic program as described in Appendix I was run on the computer.

The imposed leakage rate for the verification test was measured using a float type flowmeter.

All instrumentation was calibrated prior to the ILRT. Instrumentation characteristics and calibration information are summarized in Appendix III. Calibration documents are included with the official test copy of the procedure.

4.0 TEST PROCEDURE

4.1 Front-of-Outage Test

Previous ILRT's at Farley had been conducted at the end of the outage. After a review of the advantages and disadvantages of front-end and back-end tests, it was determined that this ILRT would be performed at the beginning of the outage.

This approach would not allow the local leak rate test (LLRT) program to be completed prior to the ILRT. Because a limited number of LLRTs could be completed, tests were performed for penetrations that were not going to be in correct post-LOCA alignment during the ILRT and for penetrations that had a history which showed some large as-found leakages. These tests provided the information to calculate penalty additions due to penetrations out of post-LOCA alignment due to systems in service or systems that would be isolated. These LLRTs also provided some opportunity to identify potential gross leakage through Containment Isolation Valves. No gross leakages were detected and no valve repairs were made prior to the ILRT.

Advantages of the front-end ILRT include: savings in critical path time, reduction in the valve lineups required by operations, reduction in time required for instrumenting the containment, and decrease in the time required to clean-up containment for the ILRT at the end of the outage.

4.2 Initial Conditions

A general inspection of the accessible interior and exterior surfaces of the containment building was performed prior to the ILRT. No repairs or adjustments were made to the containment after initiation of the inspection so that the building could be tested as close as practical to the "as is" condition. The inspection uncovered no evidence of structural deterioration which would affect the containment structural integrity or leak-tightness.

Plant systems were aligned for the ILRT as specified in the plant procedure. Isolation valves, except those in systems required to maintain the plant in a safe condition and those systems used to conduct the ILRT, were set in post-LOCA positions specified in the FSAR.

For those systems or penetrations that were in service or isolated during the test a penalty addition must be made to the Type A test results. The penalty addition is the sum of the minimum pathway leakages for those penetrations determined to be in a position other than normal post-LOCA position. Penetrations included in this penalty calculation were Normal Charging (#24), RCP Seal Return (#28), Service Water Return from Coolers (#32), RCP Cooling Water (#42), Excess Letdown CCW (#45), Component Cooling Water (#46), Pressurizer Steam Sample (#56), Pressurizer Liquid Sample (#57), Relief Valve Discharge to PRT (#59), Service Water Supply to Coolers (#60), and ILRT Post Accident Containment Sample / Pressure Sensing Line (#61A).

Piping was vented and drained to expose valve seats per post LOCA scenarios. All sources of gas at pressures above containment test pressure were isolated or vented to prevent leakage into the containment during the ILRT.

A temperature survey was performed to confirm the placement locations of the sensors. An in-situ test on the sensors was performed to demonstrate the proper functioning of the sensors and the data collection system. RTD in-situ tests were done using an ice bath (32 degrees F) and verifying that temperature at the data system. Dewpoint in-situ tests were done using a calibrated dewpoint instrument (spare dewcell) to measure dewpoint temperature at each sensor and comparing the results with dewpoint temperature at the data system. The in-situ checks that all RTDs were operating within +/- one degree of the standard and all dewcells were operating within +/- two degrees of the standard.

The Official Test Copy of the procedure documents the completion of the prerequisites for the test including all exceptions to specified conditions.

4.3 Pressurization

The containment was pressurized using oil free compressors discharging through an after cooler/moisture separator and refrigerated air dryer. Ten compressors with a combined capacity of 12,000 SCFM were used. Start of pressurization occurred at 1:30 p.m. on March 8, 1994. Pressurization was terminated when containment pressure reached 50 psig at 1:00 a.m. on March 9, 1994. This allowed a 2 psi margin for pressure drop to ensure the gage pressure would be at or above the 48 psig minimum pressure required for the test.

To assist with the circulation of pressurizing air the containment ventilation fans were run until the containment reached test pressure. Containment lights were turned off when the pressure reached 10 psi.

4.4 Stabilization

Upon reaching ILRT test pressure the containment was allowed to stabilize. The start time was 1:00 a.m. on March 9, 1994. Containment conditions were recorded at fifteen minute intervals. Containment conditions during stabilization were somewhat different than previous Farley ILRTs. Containment pressure and temperature continued to rise after the completion of pressurization. (Containment pressure did not exceed the 51 psig procedural limit).

It is not fully known why this phenomena occurred. Because of a front-end test, warm containment components had less time to expel their excess heat which may have created a heat source. The pressurized air was somewhat cooler than the air of previous tests. Thus it is reasonable that equalization of temperature would take longer time.

Data received during this period indicated that the final leakage rate may result in a large leakage rate. It was not certain as to whether the indicated large leakage was the result of containment conditions described above or if it may be the result of a leaking valve. It was determined to isolate two penetrations, #32 Service Water Return from Coolers and #60

Service Water Supply to Coolers. This was done by closing the vent valve downstream of the outboard isolation valve for each penetration. (A penalty for these isolated penetrations is included in the final leakage rate provided in this report.) This adjustment occurred at 8:45 a.m. on March 9, 1994.

As data collection continued, indications were that the final leakage would result in a lower number than previously indicated. The last data stabilization point was taken at 12:45 p.m. on March 9, 1994. All stabilization criteria were met for this point (see Table 2). Actual change rates and maximum allowable change rates are listed below:

Stabilization Rate		
Rate	Actual	Maximum Allowable
Difference between rate of temperature change average over the last hour and the rate of temperature change averaged over the last four hours	dT = 0.073 dT = 0.096 dT1 - dT4 = -0.023 degrees	0.5 degrees (-0.023<0.5)

Containment temperature stabilization data is shown graphically in Figure 1.

4.5 Type A Test

Upon meeting stabilization criteria, the start of the Type A test was declared. The Type A test was started at 12:45 p.m. on March 9. Containment conditions were recorded at fifteen minute intervals. The test was successfully concluded at 12:45 p.m. on March 10. Results of the test are recorded in section 5.1 of this report. The Type A test was conducted in accordance with the provisions of ANS N45.4-1972 (Reference 6).

4.6 Verification

Following completion of the Type A test a 9.05 SCFM (0.1514 wt.%/day) verification leak was imposed. The verification test was then started at 1:45 p.m. on March 10 and successfully completed at 5:45 p.m. on March 10. Results of the test are recorded in section 5.2.

Table 3 provides a summary of data collected during the stabilization, the Type A test, and the verification as discussed in sections 4.4, 4.5, and 4.6.

5.0 RESULTS AND ANALYSIS

5.1 Mass Point Results

The end of test leakage rate was well within the acceptance criteria stated in Reference 2 and 3. This includes the 95% UCL plus any penalty additions. Penalty additions are the sum of the minimum pathway leakages determined for those penetrations which were not in a normal post-LOCA position. A summary of these penetrations and their contribution to the penalty addition are presented below:

Penalty Additions		
Penetration	Description	As-left leakage (SCCM)
24	Normal Charging	4.7
28	RCP Seal Return	2.3
32	Service Water Return from Coolers	19,483.9
42	RCP Cooling Water	194.9
45	Excess Letdown CCW	74.6
46	Component Cooling Water	4.9
56	Pressurizer Steam Sample	4.0
57	Pressurizer Liquid Sample	2.4
59	Relief Valve Discharge to PRT	27.7
60	Service Water Supply to Coolers	231.5
61A	ILRT Post Accident Containment Sample / Pressure Sensing Line	4.4
Total Leakage (SCCM)		20,035.3
Total Leakage (wt.%/day)		0.0118

The FNP Technical Specifications specify a maximum allowable leakage rate of 0.1500 wt.%/day. To allow a margin for deterioration of the leakage boundary the as left leakage rate must be less than 75% of the maximum allowable rate (0.1125 wt,%/day). UCL leakage rate, penalty addition, final leakage rate and acceptance limit are listed below:

Final Leakage Rate	
95% UCL Leakage Rate	0.0361 wt.%/day
Penalty Addition	0.0118 wt.%/day
Final Leakage Rate	**0.0479 wt.%/day**
Acceptance Limit (0.75 La)	0.1125 wt.%/day

Figures 2 through 6 present a graphic demonstration of the data collected during the Type A test. The air mass plot (Figure 2) shows lines whose slopes represent leakage rates. A least squares fit line is plotted through the actual test data which must lie above a line representing the acceptance limit. As seen in the graph the actual leakage rate was easily less than the allowable rate. The temperature plot (Figure 3) shows the weighted average drybulb temperature of the containment air mass. The total temperature change was 0.4257 degrees F over the 24 hour test period. The pressure plot (Figure 4) shows the containment total pressure and a total change of 0.0374 psi. Both temperature and pressure increased for a period and then began to decrease. The total change values stated reflect the increase in value to the peak value plus the decrease from the peak to the final value. The vapor pressure plot (Figure 5) shows a change in vapor pressure of 0.0010 psi. Figure 6 shows a plot of mass point leakage rate data from Table 4. The leakage rate UCL must be below a line representing the acceptance limit. As seen from the graph the UCL is well below the allowable limit.

5.2 Verification Results

The verification test introduced an additional leak of 9.05 SCFM (0.1514 wt.%/day). Verification test results are listed in Table 5 and graphed in Figures 7 and 8. The results of the verification are acceptable if the leakage rate calculated after imposition of the additional leak falls within the limits of (Lam + Lo) +/- 0.25 La, where Lam is the previously calculated leakage rate; Lo is the imposed leakage; and La is the maximum allowable leakage rate. The final results and acceptance limits are listed below:

Verification Results	
Upper Limit Rate	0.2234 wt.%/day
Mass Point Calculated Rate	0.1697 wt.%/day
Lower Limit Rate	0.1484 wt.%/day

5.3 Total Time Results

For information purposes, total time results are included in Table 6. Accounting for penalty additions the BN-TOP-1 short duration test would have passed leakage criteria at an elapsed time of 7 hours.

6.0 REFERENCES

1. Code of Federal Regulations, Title 10, Part 50, Appendix J, Reactor Containment Leakage Testing for Water Cooled Power Reactors.

2. Joseph M. Farley Nuclear Plant, Unit 1, Technical Specifications 3/4.6.1

3. Farley Nuclear Plant, Surveillance Test Procedure FNP-1-STP117.0 revision 12, Containment Integrated Leak Rate Test, Official Test Copy #940304-1

4. Farley Nuclear Plant, Units 1 and 2, Final Safety Analysis Report. (Sections 3.1.45, 6.2.1.4)

5. ANSI/ANS 56.8-1987, Containment System Leakage Testing Requirements.

6. ANSI N45.4-1972, Leakage Rate Testing of Containment Structures for Nuclear Reactors.

TABLES AND FIGURES

TABLE 1

DRYBULB AND DEWPOINT TEMPERATURE SENSOR LOCATIONS

DRYBULB SENSORS

Sensor Number	Elevation (feet)	Azimuth (degrees)	Distance From Ctr of Ctmt (ft)	Volume Fractions
1	247	275	40	0.0456
2	240	145	48	0.0461
3	265	85	30	0.0507
4	232	95	48	0.0460
5	211	145	45	0.0460
6	197	325	45	0.0460
7	218	300	45	0.0460
8	255	325	40	0.0507
9	190	275	45	0.0456
10	226	45	48	0.0460
11	176	95	45	0.0508
12	183	145	45	0.0447
13	168	325	45	0.0494
14	152	30	55	0.0368
15	143	175	55	0.0411
16	125	25	55	0.0323
17	118	130	55	0.0216
18	108	205	55	0.0278
19	272	325	8	0.0525
20	138	75	25	0.0200
21	160	275	45	0.0464
22	204	95	45	0.0460
23	134	310	55	0.0403
24	113	310	55	0.0216
				1.0000

DEWPOINT SENSORS

1	204	325	45	0.1836
2	232	95	48	0.1841
3	262	325	8	0.1995
4	175	30	60	0.1449
5	143	175	55	0.1746
6	116	250	55	0.1133
				1.0000

TABLE 2

TEMPERATURE STABILIZATION REPORT
Start Time = 100 309
* = stabilization criterion satisfied

data set	elapsed time, hr	temperature T, deg F	dT1 avg dT (1 hr)	dT4 avg dT (4 hr)	dT1-dT4	
1	0.00	79.544				
2	0.25	80.657				
3	0.50	81.426				
4	0.75	81.910				
5	1.00	82.300	2.756			
6	1.25	82.589	1.932			
7	1.50	82.794	1.368			
8	1.75	82.993	1.083			
9	2.00	83.159	0.859			
10	2.25	83.301	0.712			
11	2.50	83.432	0.638			
12	2.75	83.559	0.566			
13	3.00	83.670	0.511			
14	3.25	83.756	0.455			
15	3.50	83.851	0.419			
16	3.75	83.932	0.373			
17	4.00	84.006	0.336	1.116	-0.780	
18	4.25	84.074	0.318	0.854	-0.536	
19	4.50	84.139	0.288	0.678	-0.390	*
20	4.75	84.199	0.267	0.572	-0.305	*
21	5.00	84.263	0.257	0.491	-0.234	*
22	5.25	84.316	0.242	0.432	-0.190	*
23	5.50	84.366	0.227	0.393	-0.166	*
24	5.75	84.418	0.219	0.356	-0.137	*
25	6.00	84.449	0.186	0.322	-0.136	*
26	6.25	84.496	0.180	0.299	-0.119	*
27	6.50	84.547	0.181	0.279	-0.098	*
28	6.75	84.577	0.159	0.255	-0.096	*
29	7.00	84.619	0.170	0.237	-0.067	*
30	7.25	84.651	0.155	0.224	-0.069	*
31	7.50	84.689	0.142	0.209	-0.067	*
32	7.75	84.718	0.141	0.197	-0.056	*
33	8.00	84.747	0.128	0.185	-0.057	*
34	8.25	84.777	0.126	0.176	-0.050	*
35	8.50	84.804	0.115	0.166	-0.051	*
36	8.75	84.836	0.118	0.159	-0.041	*
37	9.00	84.865	0.118	0.150	-0.032	*
38	9.25	84.890	0.113	0.144	-0.031	*
39	9.50	84.908	0.104	0.136	-0.032	*
40	9.75	84.934	0.098	0.129	-0.031	*
41	10.00	84.959	0.094	0.128	-0.034	*
42	10.25	84.975	0.085	0.120	-0.035	*
43	10.50	85.000	0.092	0.113	-0.021	*

44	10.75	85.022	0.088	0.111	-0.023 *
45	11.00	85.037	0.078	0.105	-0.027 *
46	11.25	85.058	0.083	0.102	-0.019 *
47	11.50	85.073	0.073	0.096	-0.023 *
48	11.75	85.092	0.070	0.093	-0.023 *

TABLE 3 (STABILIZATION)

DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	100	309	79.5438	64.6789	0.2689	644837.27
2	115	309	80.6568	64.8609	0.2716	645300.98
3	130	309	81.4261	64.9443	0.2743	645188.11
4	145	309	81.9104	64.9994	0.2751	645152.52
5	200	309	82.2997	65.0395	0.2760	645079.73
6	215	309	82.5893	65.0698	0.2760	645037.33
7	230	309	82.7937	65.0934	0.2757	645031.96
8	245	309	82.9926	65.1135	0.2755	644997.32
9	300	309	83.1591	65.1315	0.2756	644977.12
10	315	309	83.3007	65.1471	0.2758	644961.94
11	330	309	83.4319	65.1608	0.2758	644942.14
12	345	309	83.5588	65.1731	0.2755	644916.77
13	400	309	83.6700	65.1842	0.2757	644893.51
14	415	309	83.7559	65.1941	0.2757	644889.68
15	430	309	83.8513	65.2033	0.2758	644867.10
16	445	309	83.9322	65.2118	0.2756	644857.15
17	500	309	84.0060	65.2196	0.2756	644847.15
18	515	309	84.0744	65.2272	0.2758	644840.24
19	530	309	84.1392	65.2339	0.2757	644830.08
20	545	309	84.1985	65.2401	0.2758	644820.54
21	600	309	84.2627	65.2457	0.2757	644801.38
22	615	309	84.3164	65.2507	0.2757	644787.04
23	630	309	84.3656	65.2554	0.2755	644777.47
24	645	309	84.4179	65.2600	0.2756	644760.22
25	700	309	84.4487	65.2641	0.2758	644761.78
26	715	309	84.4957	65.2682	0.2757	644748.68
27	730	309	84.5475	65.2720	0.2757	644724.13
28	745	309	84.5774	65.2756	0.2758	644723.63
29	800	309	84.6189	65.2791	0.2756	644711.66
30	815	309	84.6508	65.2825	0.2760	644702.93
31	830	309	84.6888	65.2855	0.2759	644689.20
32	845	309	84.7183	65.2885	0.2759	644683.80
33	900	309	84.7465	65.2914	0.2758	644680.10
34	915	309	84.7766	65.2940	0.2761	644667.75
35	930	309	84.8045	65.2966	0.2759	644661.96
36	945	309	84.8363	65.2992	0.2759	644650.24
37	1000	309	84.8647	65.3016	0.2762	644637.32
38	1015	309	84.8895	65.3039	0.2760	644633.20
39	1030	309	84.9084	65.3059	0.2760	644630.00
40	1045	309	84.9342	65.3080	0.2762	644618.60
41	1100	309	84.9591	65.3101	0.2761	644610.85
42	1115	309	84.9747	65.3120	0.2762	644609.79
43	1130	309	84.9995	65.3140	0.2762	644600.91
44	1145	309	85.0219	65.3159	0.2761	644594.13
45	1200	309	85.0367	65.3177	0.2762	644593.82
46	1215	309	85.0576	65.3194	0.2763	644584.23
47	1230	309	85.0732	65.3209	0.2764	644579.91
48	1245	309	85.0923	65.3226	0.2766	644572.55

TABLE 3 (Type A Test)

DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	1245	309	85.0923	65.3226	0.2766	644572.51
2	1300	309	85.1125	65.3242	0.2767	644562.99
3	1315	309	85.1280	65.3256	0.2765	644560.57
4	1330	309	85.1623	65.3270	0.2766	644532.80
5	1345	309	85.1652	65.3282	0.2767	644540.45
6	1400	309	85.1847	65.3293	0.2767	644528.28
7	1415	309	85.1931	65.3306	0.2765	644533.09
8	1430	309	85.2129	65.3317	0.2768	644517.54
9	1445	309	85.2266	65.3328	0.2768	644512.64
10	1500	309	85.2347	65.3339	0.2770	644511.80
11	1515	309	85.2496	65.3349	0.2768	644505.69
12	1530	309	85.2573	65.3359	0.2768	644507.11
13	1545	309	85.2723	65.3368	0.2769	644496.84
14	1600	309	85.2848	65.3376	0.2767	644492.11
15	1615	309	85.2943	65.3384	0.2769	644486.60
16	1630	309	85.3015	65.3392	0.2770	644485.53
17	1645	309	85.3147	65.3398	0.2770	644475.82
18	1700	309	85.3234	65.3405	0.2769	644473.73
19	1715	309	85.3261	65.3412	0.2769	644476.52
20	1730	309	85.3392	65.3418	0.2770	644466.81
21	1745	309	85.3410	65.3423	0.2770	644469.12
22	1800	309	85.3530	65.3429	0.2771	644460.21
23	1815	309	85.3632	65.3433	0.2770	644452.94
24	1830	309	85.3700	65.3439	0.2769	644452.03
25	1845	309	85.3708	65.3443	0.2770	644454.04
26	1900	309	85.3786	65.3447	0.2770	644448.46
27	1915	309	85.3804	65.3452	0.2769	644452.19
28	1930	309	85.3837	65.3455	0.2771	644449.59
29	1945	309	85.3875	65.3457	0.2770	644447.88
30	2000	309	85.4058	65.3459	0.2771	644427.89
31	2015	309	85.4021	65.3460	0.2769	644434.87
32	2030	309	85.4013	65.3462	0.2769	644437.65
33	2045	309	85.4109	65.3465	0.2771	644426.90
34	2100	309	85.4149	65.3466	0.2770	644424.58
35	2115	309	85.4148	65.3465	0.2772	644421.93
36	2130	309	85.4252	65.3468	0.2770	644414.43
37	2145	309	85.4135	65.3468	0.2771	644427.32
38	2200	309	85.4121	65.3469	0.2769	644431.92
39	2215	309	85.4210	65.3470	0.2769	644421.82
40	2230	309	85.4214	65.3470	0.2767	644423.67
41	2245	309	85.4159	65.3469	0.2767	644429.08
42	2300	309	85.4204	65.3470	0.2767	644424.92
43	2315	309	85.4236	65.3470	0.2768	644420.23
44	2330	309	85.4211	65.3468	0.2770	644419.49
45	2345	309	85.4237	65.3468	0.2767	644419.14
46	0	310	85.4362	65.3467	0.2772	644398.00
47	15	310	85.4347	65.3467	0.2772	644400.54
48	30	310	85.4389	65.3468	0.2772	644396.48
49	45	310	85.4388	65.3464	0.2771	644392.93
50	100	310	85.4418	65.3465	0.2773	644388.56
51	115	310	85.4394	65.3463	0.2774	644388.18

52	130	310	85.4376	65.3462	0.2774	644389.83
53	145	310	85.4478	65.3460	0.2772	644377.73
54	200	310	85.4432	65.3458	0.2773	644380.30
55	215	310	85.4372	65.3458	0.2774	644386.23
56	230	310	85.4428	65.3459	0.2773	644381.62
57	245	310	85.4450	65.3459	0.2775	644377.59
58	300	310	85.4560	65.3458	0.2772	644365.57
59	315	310	85.4493	65.3457	0.2774	644371.28
60	330	310	85.4477	65.3457	0.2773	644373.63
61	345	310	85.4586	65.3456	0.2775	644357.68
62	400	310	85.4511	65.3455	0.2775	644365.81
63	415	310	85.4534	65.3452	0.2775	644360.39
64	430	310	85.4555	65.3451	0.2774	644358.11
65	445	310	85.4489	65.3449	0.2773	644364.59
66	500	310	85.4544	65.3448	0.2773	644356.61
67	515	310	85.4554	65.3444	0.2776	644349.19
68	530	310	85.4575	65.3443	0.2776	644345.83
69	545	310	85.4501	65.3440	0.2774	644353.10
70	600	310	85.4529	65.3438	0.2774	644347.75
71	615	310	85.4526	65.3436	0.2774	644345.81
72	630	310	85.4513	65.3433	0.2777	644342.01
73	645	310	85.4435	65.3428	0.2774	644348.89
74	700	310	85.4411	65.3425	0.2774	644349.11
75	715	310	85.4413	65.3422	0.2774	644345.82
76	730	310	85.4383	65.3419	0.2777	644343.86
77	745	310	85.4417	65.3416	0.2774	644338.95
78	800	310	85.4334	65.3414	0.2775	644345.84
79	815	310	85.4176	65.3410	0.2772	644363.97
80	830	310	85.4413	65.3407	0.2775	644330.25
81	845	310	85.4389	65.3404	0.2777	644328.33
82	900	310	85.4322	65.3400	0.2776	644332.58
83	915	310	85.4401	65.3397	0.2778	644318.88
84	930	310	85.4288	65.3394	0.2777	644330.38
85	945	310	85.4158	65.3392	0.2776	644343.97
86	1000	310	85.4100	65.3388	0.2773	644350.17
87	1015	310	85.4060	65.3383	0.2773	644349.62
88	1030	310	85.3934	65.3379	0.2771	644362.98
89	1045	310	85.3918	65.3374	0.2771	644359.61
90	1100	310	85.3961	65.3370	0.2770	644352.10
91	1115	310	85.3972	65.3366	0.2773	644343.95
92	1130	310	85.4173	65.3361	0.2777	644310.94
93	1145	310	85.4121	65.3355	0.2777	644310.61
94	1200	310	85.4055	65.3350	0.2777	644314.04
95	1215	310	85.3998	65.3347	0.2777	644317.76
96	1230	310	85.3995	65.3343	0.2777	644313.74
97	1245	310	85.3992	65.3340	0.2776	644312.28

TABLE 3 (VERIFICATION)

DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	1345	310	85.3873	65.3307	0.2777	644292.54
2	1400	310	85.3841	65.3291	0.2777	644280.55
3	1415	310	85.3826	65.3277	0.2778	644267.89
4	1430	310	85.3814	65.3261	0.2778	644253.15
5	1445	310	85.3776	65.3246	0.2778	644242.85
6	1500	310	85.3834	65.3230	0.2777	644221.10
7	1515	310	85.3744	65.3215	0.2778	644215.50
8	1530	310	85.3687	65.3198	0.2778	644205.42
9	1545	310	85.3596	65.3182	0.2777	644201.58
10	1600	310	85.3592	65.3168	0.2778	644187.56
11	1615	310	85.3610	65.3151	0.2777	644169.29
12	1630	310	85.3574	65.3137	0.2778	644158.79
13	1645	310	85.3469	65.3120	0.2777	644155.61
14	1700	310	85.3499	65.3104	0.2777	644135.54
15	1715	310	85.3417	65.3089	0.2778	644129.42
16	1730	310	85.3336	65.3073	0.2776	644124.97
17	1745	310	85.3348	65.3056	0.2777	644106.10

TABLE 4

MASS POINT LEAKAGE RATE REPORT

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	leakage rate (%/day)	ucl rate (%/day)
1	1245	309	0.00	644572.51	0.0000	0.0000
2	1300	309	0.25	644562.99	0.1418	0.1418
3	1315	309	0.50	644560.57	0.0889	0.3501
4	1330	309	0.75	644532.80	0.1810	0.3426
5	1345	309	1.00	644540.45	0.1404	0.2333
6	1400	309	1.25	644528.28	0.1347	0.1901
7	1415	309	1.50	644533.09	0.1105	0.1570
8	1430	309	1.75	644517.54	0.1105	0.1440
9	1445	309	2.00	644512.64	0.1081	0.1335
10	1500	309	2.25	644511.80	0.1016	0.1226
11	1515	309	2.50	644505.69	0.0976	0.1150
12	1530	309	2.75	644507.11	0.0907	0.1068
13	1545	309	3.00	644496.84	0.0886	0.1022
14	1600	309	3.25	644492.11	0.0867	0.0985
15	1615	309	3.50	644486.60	0.0854	0.0956
16	1630	309	3.75	644485.53	0.0830	0.0922
17	1645	309	4.00	644475.82	0.0826	0.0907
18	1700	309	4.25	644473.73	0.0813	0.0886
19	1715	309	4.50	644476.52	0.0785	0.0856
20	1730	309	4.75	644466.81	0.0774	0.0839
21	1745	309	5.00	644469.12	0.0752	0.0814
22	1800	309	5.25	644460.21	0.0741	0.0799
23	1815	309	5.50	644452.94	0.0737	0.0790
24	1830	309	5.75	644452.03	0.0728	0.0777
25	1845	309	6.00	644454.04	0.0712	0.0759
26	1900	309	6.25	644448.46	0.0700	0.0745
27	1915	309	6.50	644452.19	0.0680	0.0726
28	1930	309	6.75	644449.59	0.0662	0.0709
29	1945	309	7.00	644447.88	0.0645	0.0691
30	2000	309	7.25	644427.89	0.0646	0.0689
31	2015	309	7.50	644434.87	0.0637	0.0678
32	2030	309	7.75	644437.65	0.0623	0.0664
33	2045	309	8.00	644426.90	0.0617	0.0656
34	2100	309	8.25	644424.58	0.0611	0.0648
35	2115	309	8.50	644421.93	0.0604	0.0640
36	2130	309	8.75	644414.43	0.0601	0.0635
37	2145	309	9.00	644427.32	0.0588	0.0622
38	2200	309	9.25	644431.92	0.0571	0.0608
39	2215	309	9.50	644421.82	0.0561	0.0597
40	2230	309	9.75	644423.67	0.0549	0.0585
41	2245	309	10.00	644429.08	0.0534	0.0571
42	2300	309	10.25	644424.92	0.0521	0.0558
43	2315	309	10.50	644420.23	0.0510	0.0548
44	2330	309	10.75	644419.49	0.0500	0.0537
45	2345	309	11.00	644419.14	0.0490	0.0526
46	0	310	11.25	644398.00	0.0488	0.0523
47	15	310	11.50	644400.54	0.0484	0.0518
48	30	310	11.75	644396.48	0.0481	0.0514
49	45	310	12.00	644392.93	0.0479	0.0510
50	100	310	12.25	644388.56	0.0477	0.0507
51	115	310	12.50	644388.18	0.0474	0.0503

52	130	310	12.75	644389.83	0.0470	0.0498
53	145	310	13.00	644377.73	0.0470	0.0497
54	200	310	13.25	644380.30	0.0467	0.0494
55	215	310	13.50	644386.23	0.0463	0.0488
56	230	310	13.75	644381.62	0.0459	0.0484
57	245	310	14.00	644377.59	0.0456	0.0480
58	300	310	14.25	644365.57	0.0455	0.0479
59	315	310	14.50	644371.28	0.0453	0.0475
60	330	310	14.75	644373.63	0.0449	0.0471
61	345	310	15.00	644357.68	0.0449	0.0470
62	400	310	15.25	644365.81	0.0446	0.0467
63	415	310	15.50	644360.39	0.0444	0.0464
64	430	310	15.75	644358.11	0.0442	0.0462
65	445	310	16.00	644364.59	0.0438	0.0458
66	500	310	16.25	644356.61	0.0436	0.0455
67	515	310	16.50	644349.19	0.0434	0.0453
68	530	310	16.75	644345.83	0.0433	0.0451
69	545	310	17.00	644353.10	0.0430	0.0448
70	600	310	17.25	644347.75	0.0428	0.0445
71	615	310	17.50	644345.81	0.0426	0.0443
72	630	310	17.75	644342.01	0.0424	0.0441
73	645	310	18.00	644348.89	0.0421	0.0437
74	700	310	18.25	644349.11	0.0417	0.0433
75	715	310	18.50	644345.82	0.0414	0.0430
76	730	310	18.75	644343.86	0.0411	0.0427
77	745	310	19.00	644338.95	0.0408	0.0424
78	800	310	19.25	644345.84	0.0404	0.0420
79	815	310	19.50	644363.97	0.0398	0.0415
80	830	310	19.75	644330.25	0.0396	0.0413
81	845	310	20.00	644328.33	0.0395	0.0411
82	900	310	20.25	644332.58	0.0392	0.0408
83	915	310	20.50	644318.88	0.0391	0.0407
84	930	310	20.75	644330.38	0.0389	0.0404
85	945	310	21.00	644343.97	0.0385	0.0400
86	1000	310	21.25	644350.17	0.0379	0.0395
87	1015	310	21.50	644349.62	0.0374	0.0391
88	1030	310	21.75	644362.98	0.0368	0.0385
89	1045	310	22.00	644359.61	0.0362	0.0380
90	1100	310	22.25	644352.10	0.0357	0.0375
91	1115	310	22.50	644343.95	0.0353	0.0371
92	1130	310	22.75	644310.94	0.0352	0.0370
93	1145	310	23.00	644310.61	0.0352	0.0369
94	1200	310	23.25	644314.04	0.0350	0.0367
95	1215	310	23.50	644317.76	0.0348	0.0365
96	1230	310	23.75	644313.74	0.0347	0.0363
97	1245	310	24.00	644312.28	0.0345	0.0361

Allowable leakage rate, La = 0.1500 %/day
75% La = 0.1125 %/day
Mass point leakage rate = 0.0345 %/day
Mass point UCL = 0.0361 %/day

TABLE 5
MASS POINT LEAKAGE RATE REPORT

VERIFICATION

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	leakage rate (%/day)
1	1345	310	0.00	644292.54	0.0000
2	1400	310	0.25	644280.55	0.1787
3	1415	310	0.50	644267.89	0.1837
4	1430	310	0.75	644253.15	0.1949
5	1445	310	1.00	644242.85	0.1889
6	1500	310	1.25	644221.10	0.2065
7	1515	310	1.50	644215.50	0.1996
8	1530	310	1.75	644205.42	0.1926
9	1545	310	2.00	644201.58	0.1803
10	1600	310	2.25	644187.56	0.1756
11	1615	310	2.50	644169.29	0.1774
12	1630	310	2.75	644158.79	0.1777
13	1645	310	3.00	644155.61	0.1735
14	1700	310	3.25	644135.54	0.1745
15	1715	310	3.50	644129.42	0.1731
16	1730	310	3.75	644124.97	0.1698
17	1745	310	4.00	644106.10	0.1697

Upper limit on leakage rate = 0.2234 %/day
Mass point leakage rate = 0.1697 %/day
Lower limit on leakage rate = 0.1484 %/day

TABLE 6

TOTAL TIME LEAKAGE RATE REPORT

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	measured rate (%/day)	leakage rate (%/day)	ucl rate (%/day)
1	1245	309	0.00	644572.51	0.0000	0.0000	0.0000
2	1300	309	0.25	644562.99	0.1418	0.1418	0.1418
3	1315	309	0.50	644560.57	0.0889	0.0889	0.0889
4	1330	309	0.75	644532.80	0.1971	0.1703	0.8074
5	1345	309	1.00	644540.45	0.1194	0.1429	0.4221
6	1400	309	1.25	644528.28	0.1317	0.1379	0.3151
7	1415	309	1.50	644533.09	0.0978	0.1174	0.2591
8	1430	309	1.75	644517.54	0.1169	0.1146	0.2306
9	1445	309	2.00	644512.64	0.1115	0.1108	0.2103
10	1500	309	2.25	644511.80	0.1005	0.1042	0.1924
11	1515	309	2.50	644505.69	0.0995	0.0996	0.1791
12	1530	309	2.75	644507.11	0.0886	0.0929	0.1659
13	1545	309	3.00	644496.84	0.0939	0.0897	0.1575
14	1600	309	3.25	644492.11	0.0921	0.0869	0.1504
15	1615	309	3.50	644486.60	0.0914	0.0848	0.1448
16	1630	309	3.75	644485.53	0.0864	0.0819	0.1389
17	1645	309	4.00	644475.82	0.0900	0.0806	0.1352
18	1700	309	4.25	644473.73	0.0865	0.0789	0.1313
19	1715	309	4.50	644476.52	0.0794	0.0761	0.1264
20	1730	309	4.75	644466.81	0.0829	0.0746	0.1232
21	1745	309	5.00	644469.12	0.0770	0.0723	0.1193
22	1800	309	5.25	644460.21	0.0796	0.0709	0.1166
23	1815	309	5.50	644452.94	0.0809	0.0700	0.1146
24	1830	309	5.75	644452.03	0.0780	0.0688	0.1124
25	1845	309	6.00	644454.04	0.0735	0.0671	0.1096
26	1900	309	6.25	644448.46	0.0739	0.0657	0.1073
27	1915	309	6.50	644452.19	0.0689	0.0638	0.1044
28	1930	309	6.75	644449.59	0.0678	0.0621	0.1018
29	1945	309	7.00	644447.88	0.0663	0.0604	0.0992
30	2000	309	7.25	644427.89	0.0743	0.0600	0.0985
31	2015	309	7.50	644434.87	0.0683	0.0589	0.0968
32	2030	309	7.75	644437.65	0.0648	0.0575	0.0948
33	2045	309	8.00	644426.90	0.0678	0.0567	0.0935
34	2100	309	8.25	644424.58	0.0668	0.0559	0.0923
35	2115	309	8.50	644421.93	0.0660	0.0551	0.0910
36	2130	309	8.75	644414.43	0.0673	0.0545	0.0902
37	2145	309	9.00	644427.32	0.0601	0.0532	0.0884
38	2200	309	9.25	644431.92	0.0566	0.0518	0.0864
39	2215	309	9.50	644421.82	0.0591	0.0507	0.0849
40	2230	309	9.75	644423.67	0.0568	0.0495	0.0833
41	2245	309	10.00	644429.08	0.0534	0.0481	0.0815
42	2300	309	10.25	644424.92	0.0536	0.0469	0.0799
43	2315	309	10.50	644420.23	0.0540	0.0458	0.0784
44	2330	309	10.75	644419.49	0.0530	0.0448	0.0771
45	2345	309	11.00	644419.14	0.0519	0.0437	0.0757
46	0	310	11.25	644398.00	0.0578	0.0433	0.0752
47	15	310	11.50	644400.54	0.0557	0.0427	0.0745
48	30	310	11.75	644396.48	0.0558	0.0422	0.0739
49	45	310	12.00	644392.93	0.0557	0.0418	0.0734
50	100	310	12.25	644388.56	0.0559	0.0414	0.0729
51	115	310	12.50	644388.18	0.0549	0.0409	0.0725
52	130	310	12.75	644389.83	0.0533	0.0404	0.0718

53	145	310	13.00	644377.73	0.0558	0.0402	0.0716
54	200	310	13.25	644380.30	0.0540	0.0398	0.0712
55	215	310	13.50	644386.23	0.0514	0.0392	0.0705
56	230	310	13.75	644381.62	0.0517	0.0388	0.0699
57	245	310	14.00	644377.59	0.0518	0.0384	0.0695
58	300	310	14.25	644365.57	0.0541	0.0382	0.0693
59	315	310	14.50	644371.28	0.0517	0.0378	0.0689
60	330	310	14.75	644373.63	0.0502	0.0374	0.0683
61	345	310	15.00	644357.68	0.0533	0.0372	0.0682
62	400	310	15.25	644365.81	0.0505	0.0368	0.0678
63	415	310	15.50	644360.39	0.0510	0.0365	0.0675
64	430	310	15.75	644358.11	0.0507	0.0363	0.0672
65	445	310	16.00	644364.59	0.0484	0.0359	0.0667
66	500	310	16.25	644356.61	0.0495	0.0356	0.0663
67	515	310	16.50	644349.19	0.0504	0.0353	0.0661
68	530	310	16.75	644345.83	0.0504	0.0351	0.0659
69	545	310	17.00	644353.10	0.0481	0.0348	0.0655
70	600	310	17.25	644347.75	0.0485	0.0345	0.0652
71	615	310	17.50	644345.81	0.0482	0.0343	0.0649
72	630	310	17.75	644342.01	0.0484	0.0340	0.0646
73	645	310	18.00	644348.89	0.0463	0.0337	0.0642
74	700	310	18.25	644349.11	0.0456	0.0334	0.0638
75	715	310	18.50	644345.82	0.0456	0.0330	0.0634
76	730	310	18.75	644343.86	0.0454	0.0327	0.0630
77	745	310	19.00	644338.95	0.0458	0.0324	0.0627
78	800	310	19.25	644345.84	0.0438	0.0321	0.0623
79	815	310	19.50	644363.97	0.0398	0.0316	0.0616
80	830	310	19.75	644330.25	0.0457	0.0313	0.0614
81	845	310	20.00	644328.33	0.0455	0.0311	0.0611
82	900	310	20.25	644332.58	0.0441	0.0309	0.0608
83	915	310	20.50	644318.88	0.0461	0.0307	0.0607
84	930	310	20.75	644330.38	0.0434	0.0305	0.0604
85	945	310	21.00	644343.97	0.0405	0.0301	0.0599
86	1000	310	21.25	644350.17	0.0390	0.0296	0.0594
87	1015	310	21.50	644349.62	0.0386	0.0292	0.0588
88	1030	310	21.75	644362.98	0.0359	0.0287	0.0581
89	1045	310	22.00	644359.61	0.0360	0.0282	0.0575
90	1100	310	22.25	644352.10	0.0369	0.0277	0.0570
91	1115	310	22.50	644343.95	0.0378	0.0274	0.0565
92	1130	310	22.75	644310.94	0.0428	0.0272	0.0564
93	1145	310	23.00	644310.61	0.0424	0.0271	0.0563
94	1200	310	23.25	644314.04	0.0414	0.0269	0.0561
95	1215	310	23.50	644317.76	0.0404	0.0267	0.0558
96	1230	310	23.75	644313.74	0.0406	0.0265	0.0556
97	1245	310	24.00	644312.28	0.0404	0.0263	0.0311

Allowable leakage rate, La = 0.1500 %/day
75% La = 0.1125 %/day
Total time leakage rate = 0.0263 %/day
Total time UCL = 0.0311 %/day

FARLEY UNIT 1 1994 ILRT Temperature During Stabilization

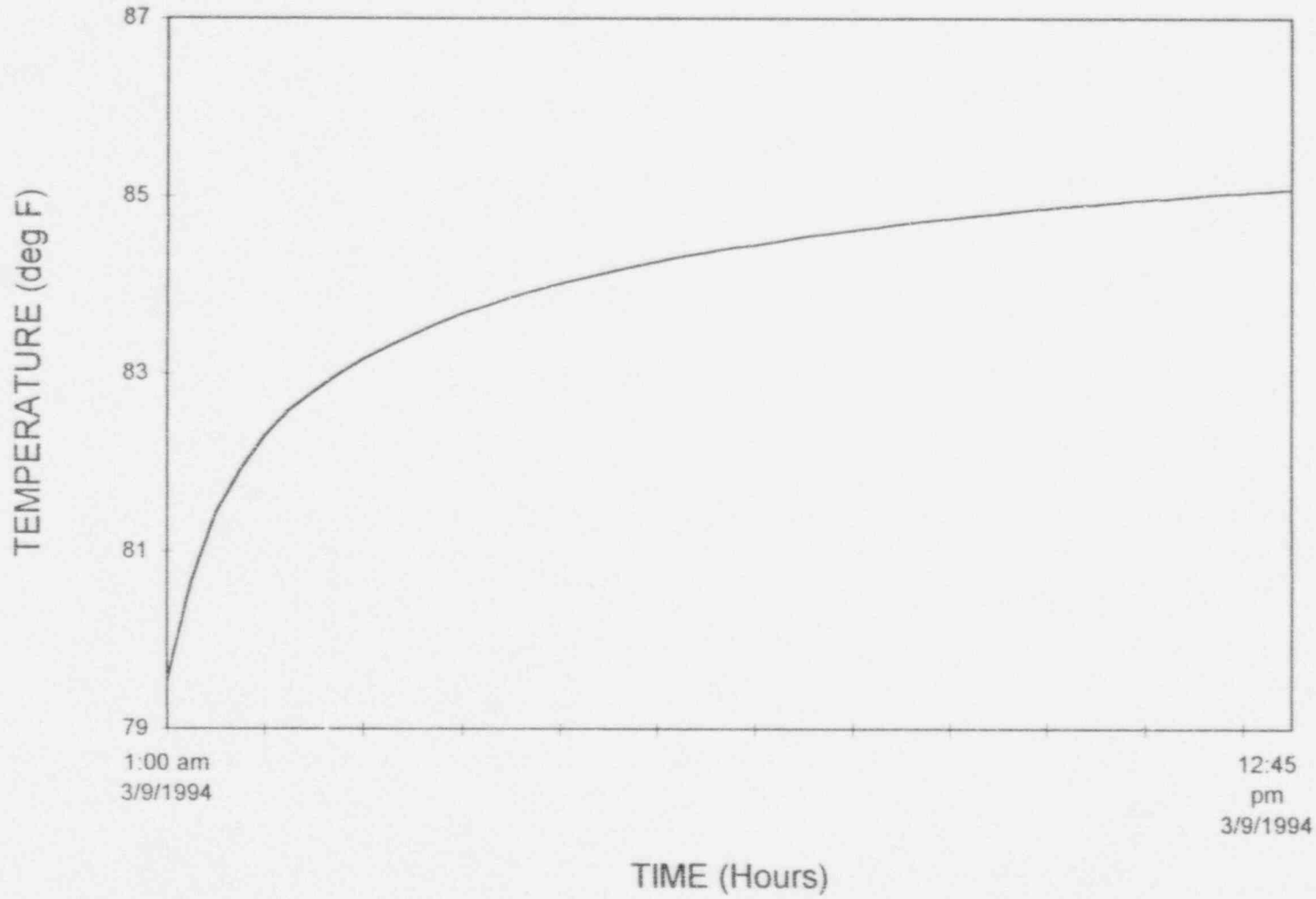

FIGURE 1

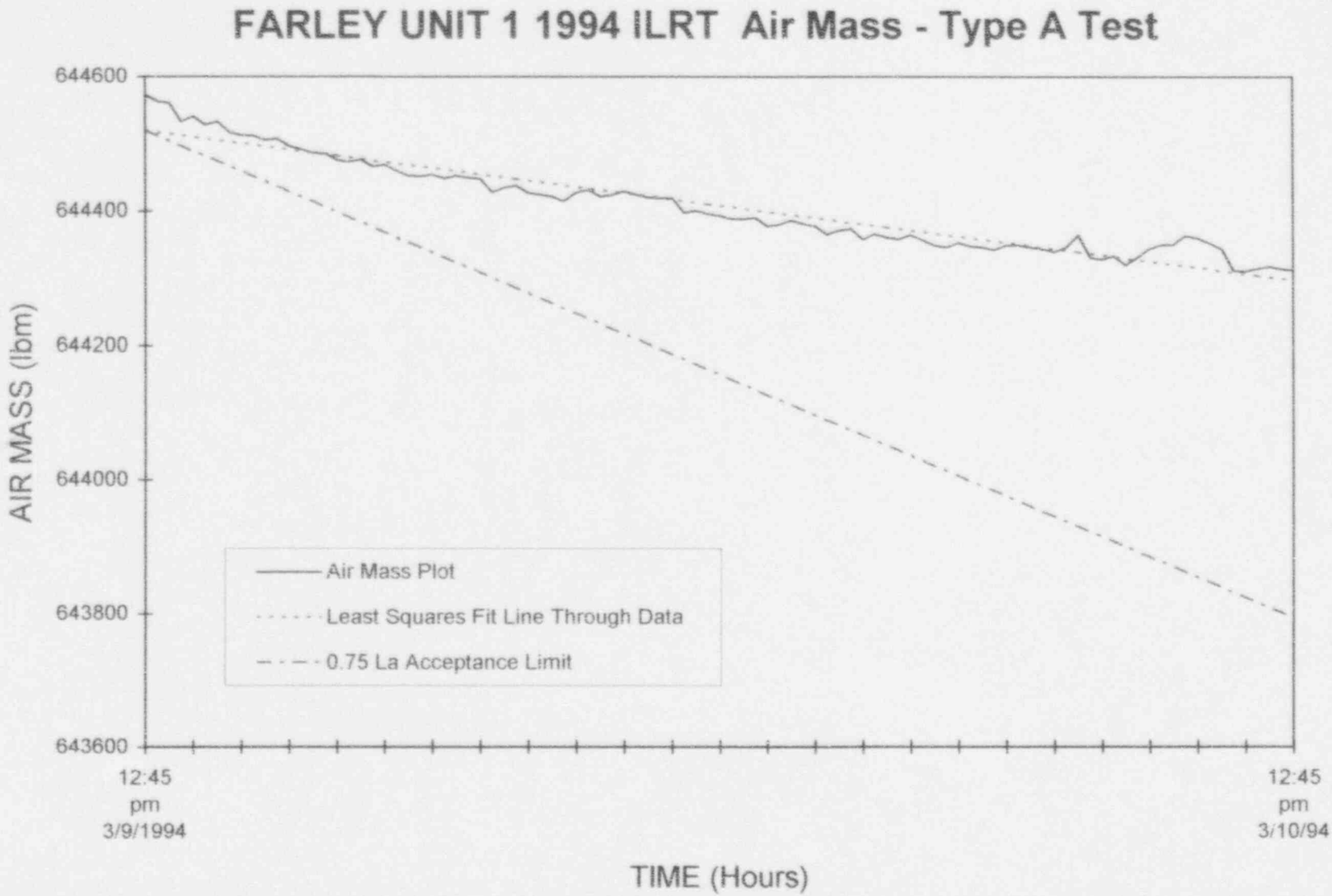
FARLEY UNIT 1 1994 ILRT Air Mass - Type A Test
644600
644400
644200
644000
643800
643600
AIR MASS (lbm)
Air Mass Plot
Least Squares Fit Line Through Data
0.75 La Acceptance Limit
12:45 pm 3/9/1994
12:45 pm 3/10/94
TIME (Hours)

FIGURE 2

FARLEY UNIT 1 1994 ILRT Mean Temperature - Type A Test

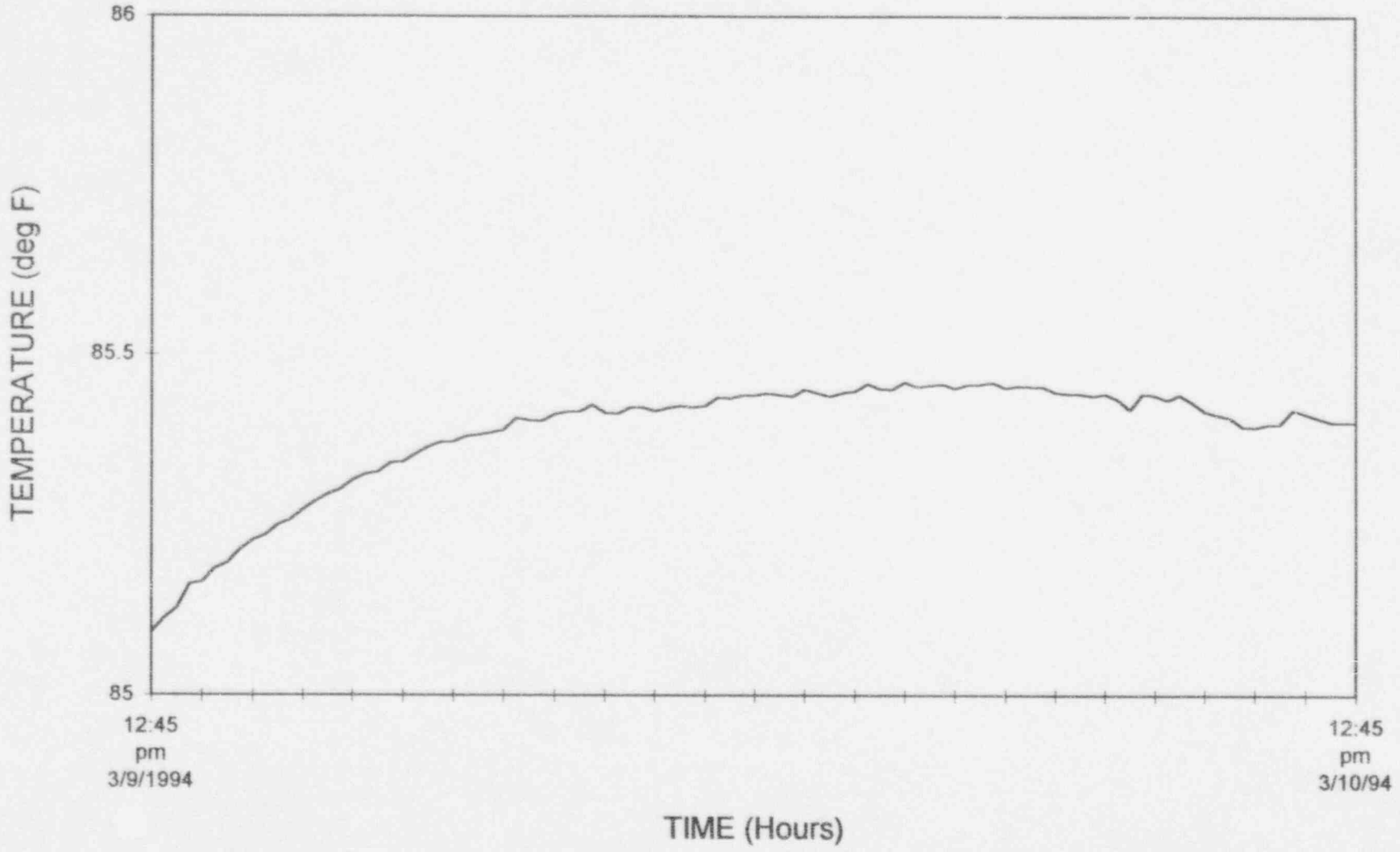

FIGURE 3

FARLEY UNIT 1 1994 ILRT Total Pressure - Type A Test

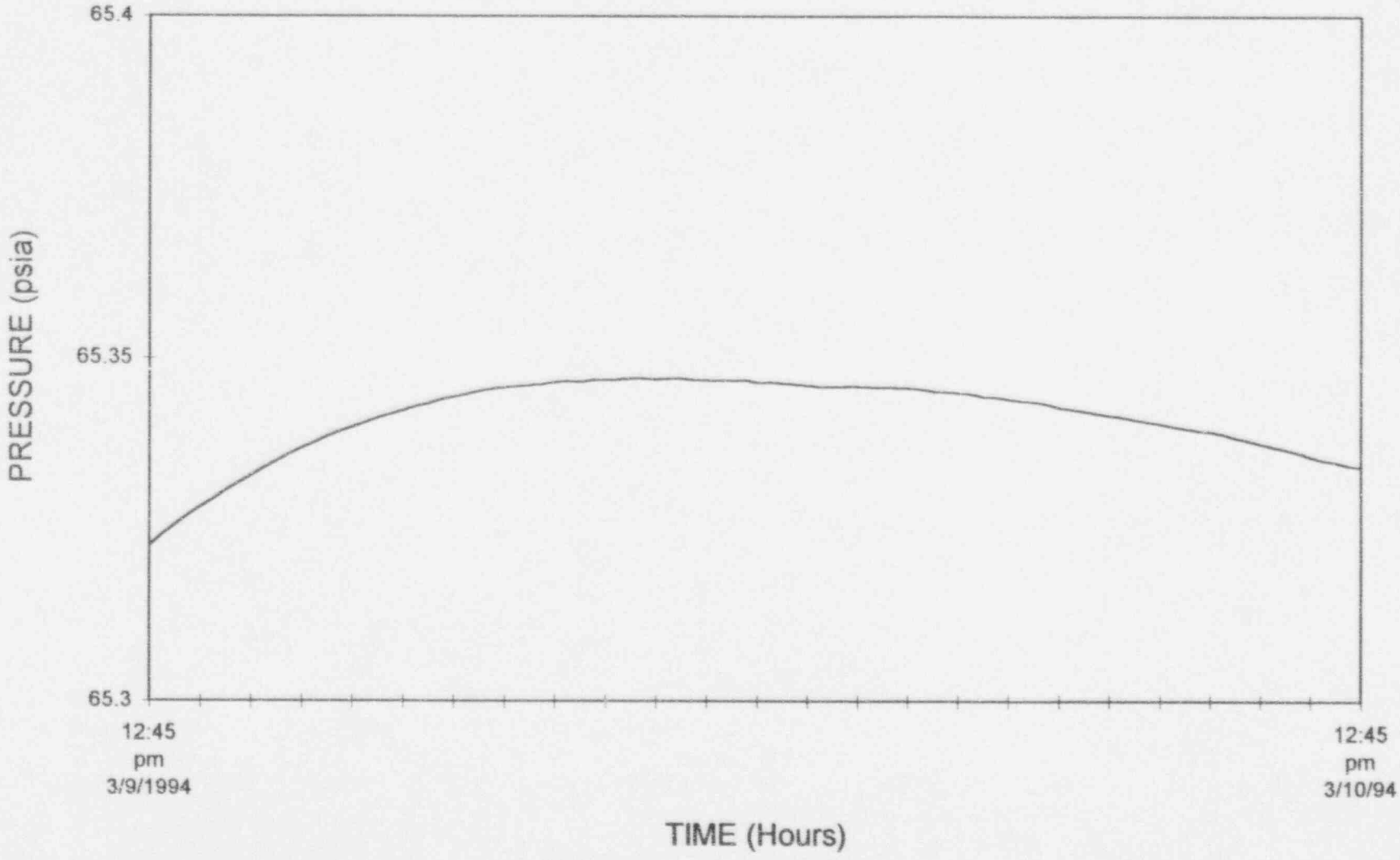

FIGURE 4

FARLEY UNIT 1 1994 ILRT Vapor Pressure - Type A Test

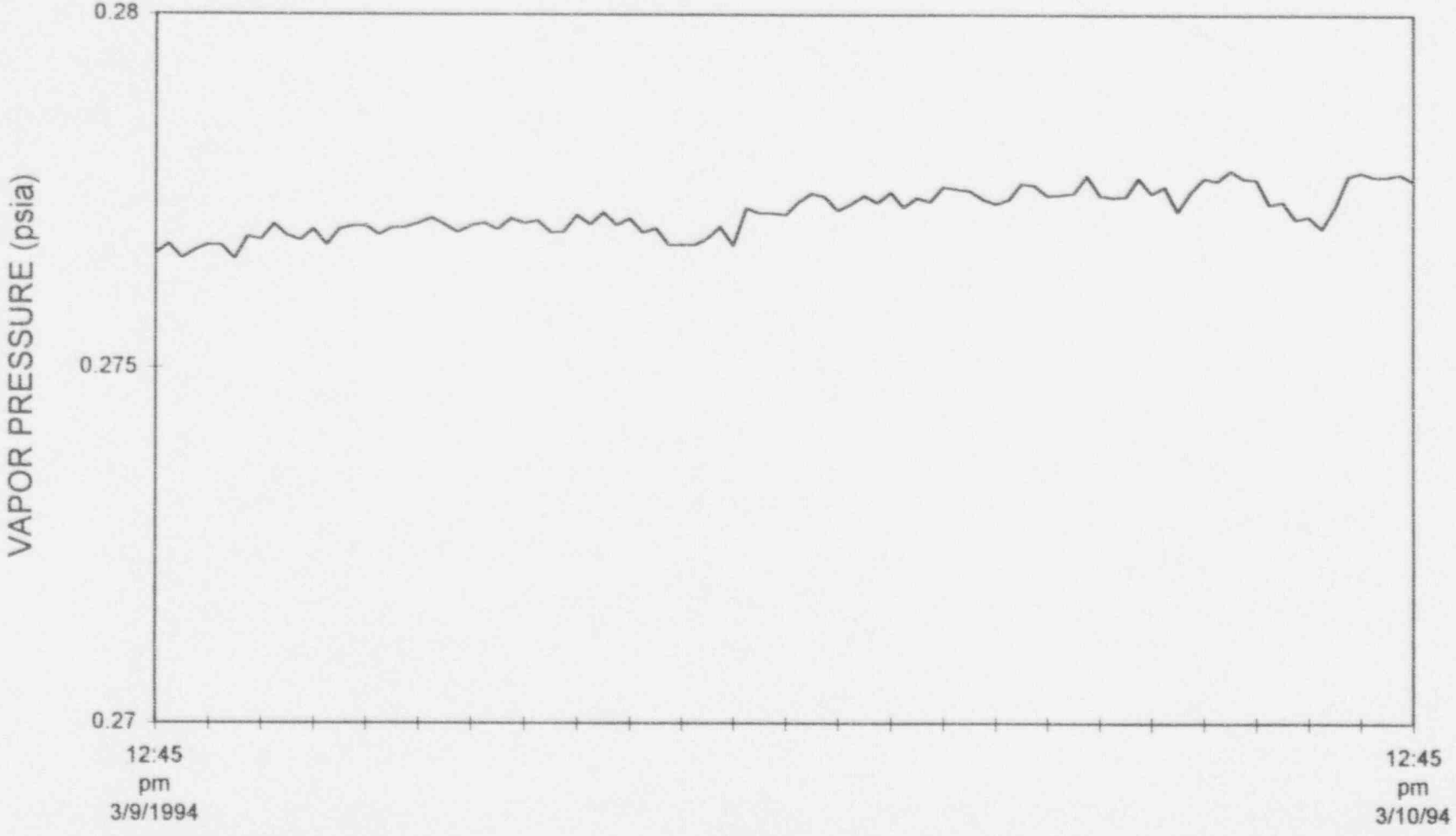

FIGURE 5

FARLEY UNIT 1 1994 ILRT
Mass Point Leakage Rate - Type A Test

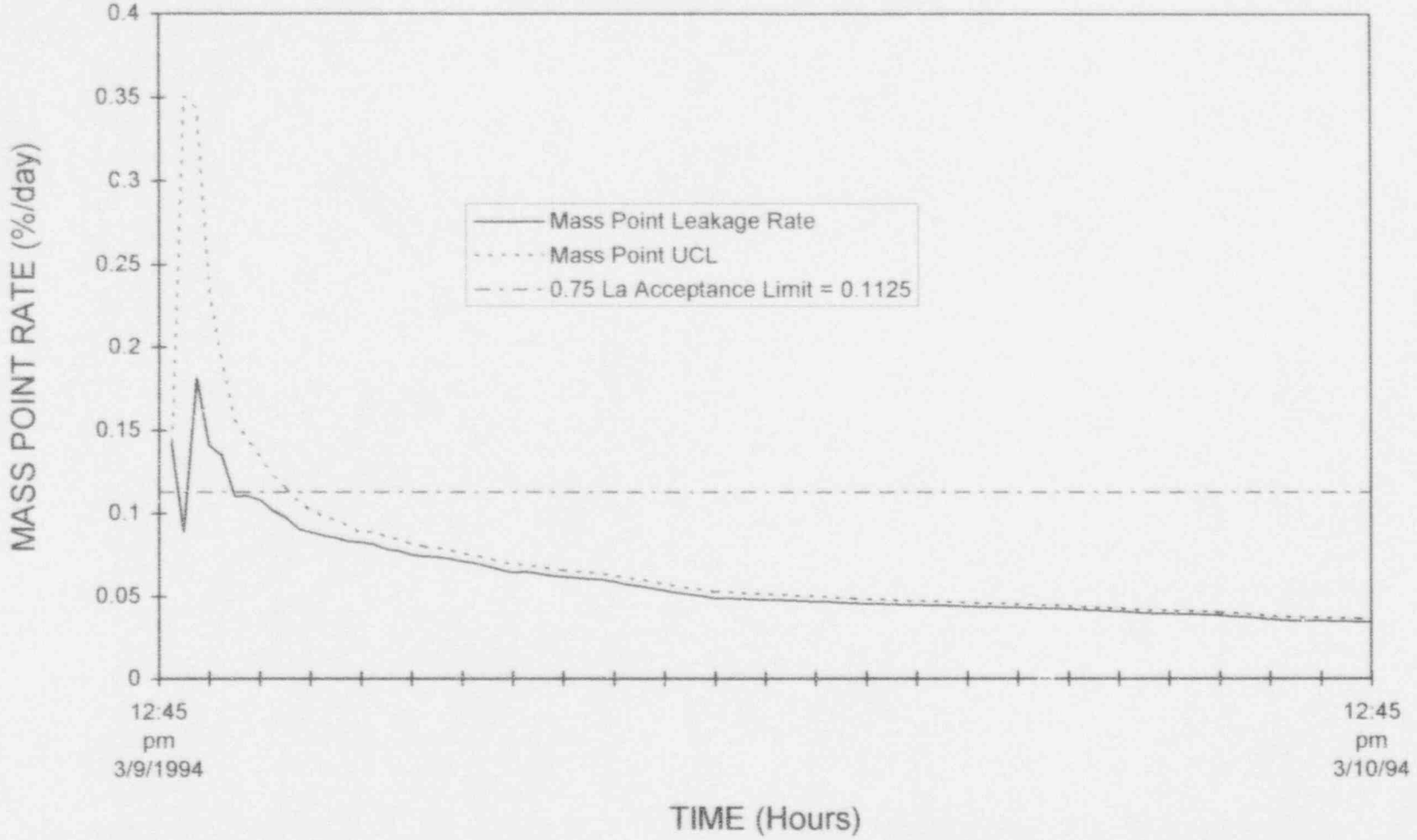

FIGURE 6

FARLEY UNIT 1 1994 ILRT Air Mass - Verification

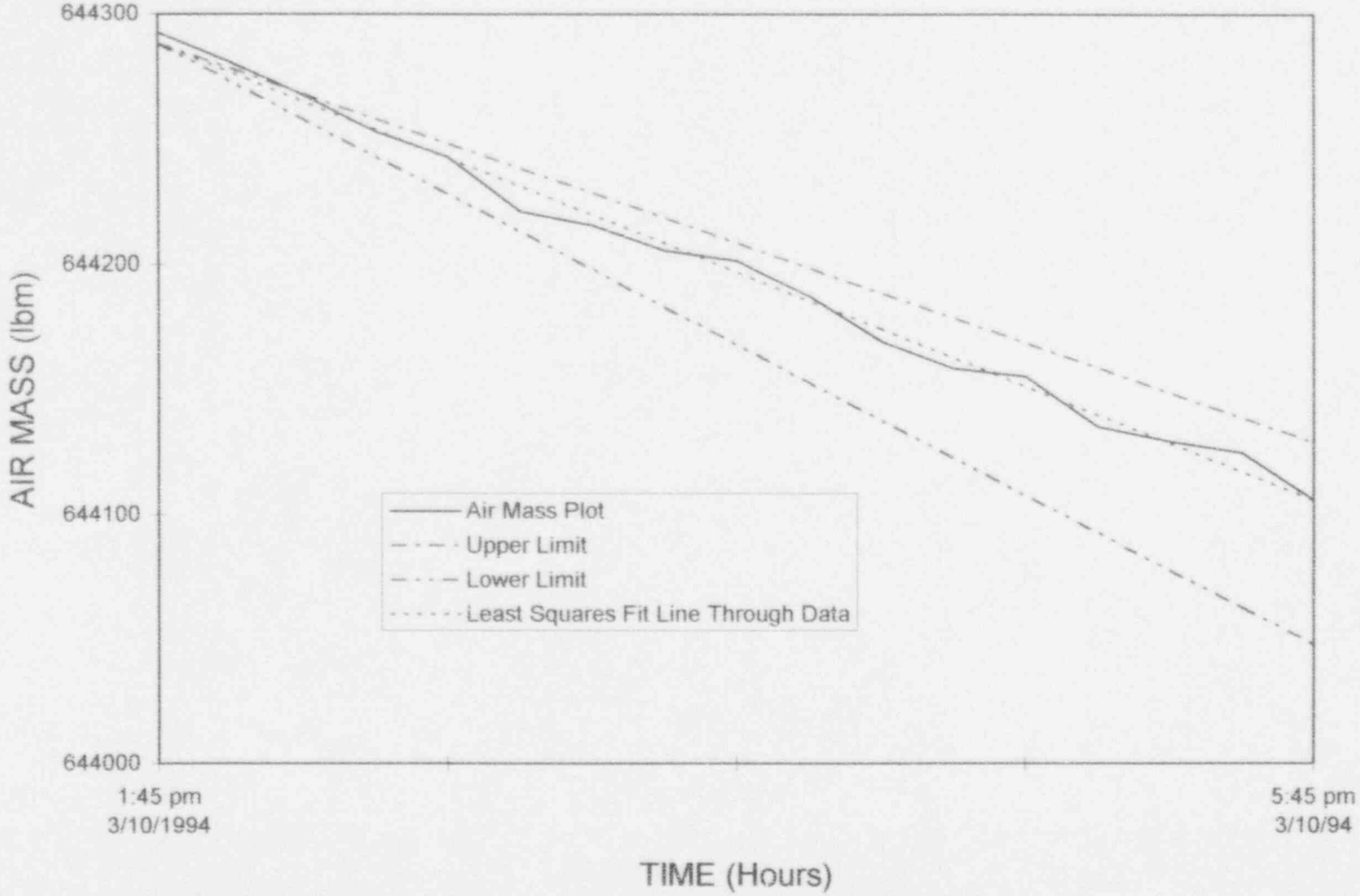

FIGURE 7

FARLEY UNIT 1 1994 ILRT
Mass Point Leakage Rate - Verification

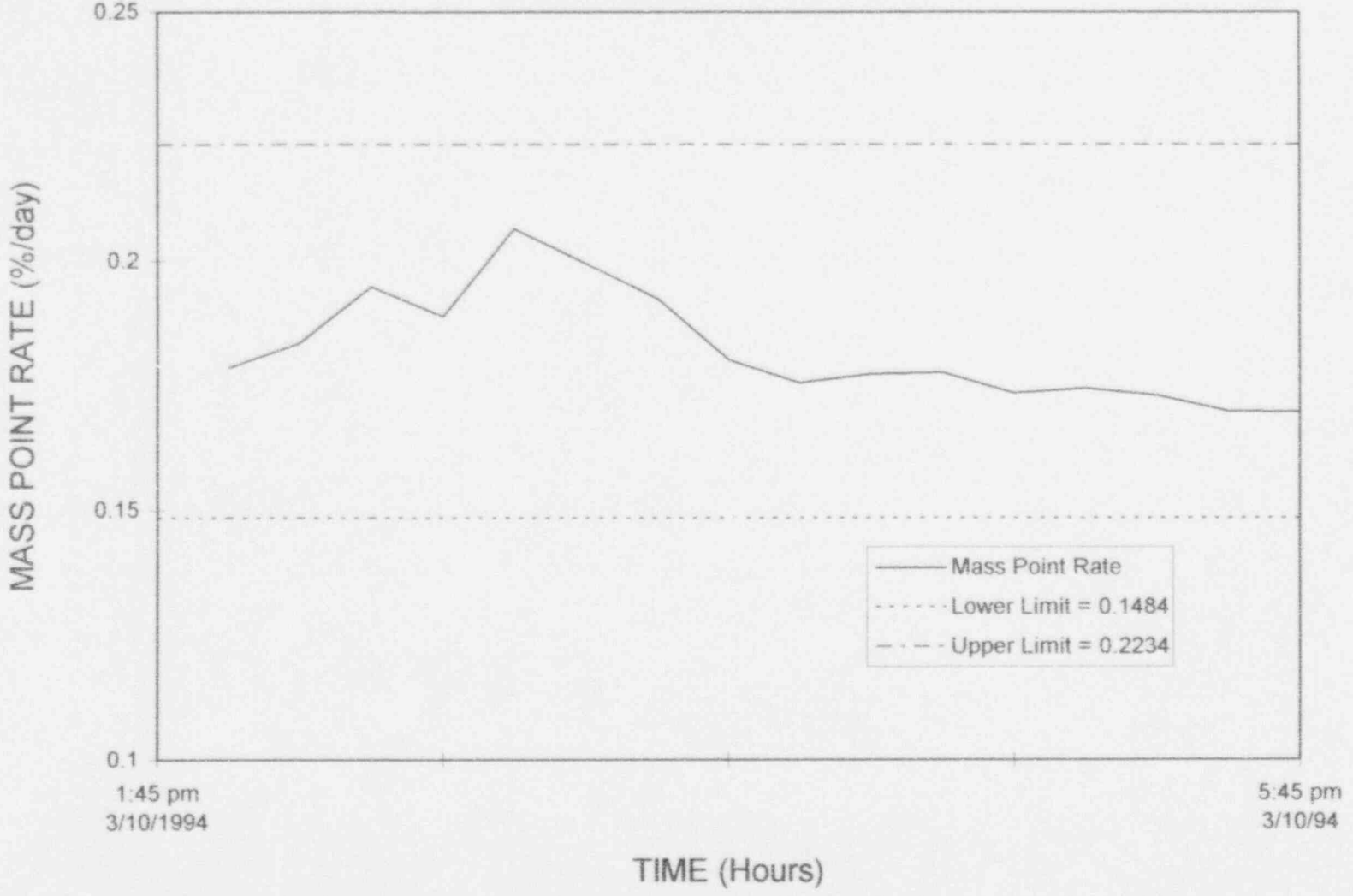

FIGURE 8

APPENDIX I

ILRT COMPUTER PROGRAM DESCRIPTION

The ILRT computer program used in this test was a program purchased by Southern Company Services (SCS) from BCP Technical Services. The program is a modified version of the BCP standard ILRT program prepared for specific use at FNP. Complete verification of the FNP version has been performed and documented. The program source code was included in the purchase of the software should there be the need to review the routines used to calculate the various ILRT parameters. The BCP ILRT program is written in Microsoft QuickBASIC, Version 4.5, for IBM Personal Computers and Compatibles.

Upon starting the program the user is prompted for the following predata:

- Number of temperature sensors
- Number of dewpoint sensors
- Number of pressure sensors
- Containment free air volume
- Allowable leakage rate, La
- Sensor volume fractions

Once the test is started the following data is received from the data acquisition system during the test:

- Time and date
- Containment atmosphere drybulb temperatures
- Containment atmosphere pressure
- Containment atmosphere dewpoint temperatures

Program options provide calculation of the following reports:

DATA SUMMARY REPORT. Displays data set number, time, date, temperature, pressure, vapor pressure and dry air mass for all data sets.

DATA SET REPORT. Displays data set number, time, date, sensor data (raw data and calibrated values), weighted average temperature, pressure and vapor pressure, and volume and dry air mass.

MASS POINT LEAKAGE RATE REPORT. (ANSI/ANS 56.8 - 1987). Displays data set number, time, date, elapsed time, dry air mass, mass point leakage rate and UCL for all data sets.

TOTAL TIME LEAKAGE RATE REPORT. (BN-TOP-1, rev. 1). Displays data set number, time, date, elapsed time, dry air mass, total time measured leakage rate, leakage rate (calculated) and UCL for all data sets.

TREND REPORT. Displays data set number, time, date, elapsed time, total time measured leakage rate, leakage rate (calculated) and UCL, and mass point leakage rate and UCL for all data sets.

DATA REJECTION REPORT. (ANSI/ANS 56.8 - 1987). Displays data set number, time, air mass, linear least square fit (air mass), residual from least square fit, standard error of residual and standardized residual for all data sets.

TEMPERATURE STABILIZATION REPORT. (ANSI/ANS 56.8 - 1987 and BNTOP-1, rev. 1). Displays start time and date, data set number, elapsed time, temperature, 1 hour and 4 hour average rates of temperature change and difference (ANSI criteria), and 2 hour average rate of temperature change and 2 hour average change in rate of temperature change, i.e., second derivative, (BNTOP-1 criteria) for all data sets.

The following plots are available:
AIR MASS. Plots the air mass, regression line and 75% La line.
LEAK RATES. Plots the mass point and total time leakage rate, UCLs and 75% La line.
TEMPERATURE. Plots the weighted average temperature, temperature for one sensor, or temperature for all sensors.
PRESSURE. Plots the weighted average pressure, pressure for one sensor, or pressure for all sensors.
DEWPOINT/VAPOR PRESSURE. Plots the weighted average vapor pressure, dewpoint temperature for one sensor, or dewpoint temperature for all sensors.

In addition the program allows for manual data entry, data correction, data set insertion, and deletion of a data set.

APPENDIX II

TYPE B AND C LOCAL LEAKAGE RATE TEST RESULTS

Results for Type B and C local leakage rate tests performed between the completion of the 1991 ILRT and the start of the 1994 ILRT are presented herein.

LOCAL LEAK RATE TEST

The following data is a summary of the leakage for Unit 1 12th Refueling Outage.

"As Found" (Min)

Electrical Penetration Total	328.14	sccm
Type B test (less Elec. Pene.) Total (Hatches, etc.)	3289.6	sccm
Type C "As Found" Min. Path Leakage	99,596.15	sccm
Total	103,213.89	sccm

"As Found" Min. $\frac{103,213.89}{150,975} \times 100 = 68.36\%$ of allowable leakage

Max. Allowable Leakage (.6 La) = 150,975 sccm

"As Left" (Min)

Electrical Penetration Total	8.44	sccm
Type B test (less Elec. Pene.) Total (Hatches, etc.)	3626	sccm
Type C Min. Path Leakage	4081.15	sccm
Total	7,715.59	sccm

"As Left" Min. $\frac{7,715.59}{150,975} \times 100 = 5.12\%$ of allowable leakage

"As Left" (Max)

Electrical Penetration Total	8.44	sccm
Type B test (less Elec. Pene.) Total (Hatches, etc.)	3626	sccm
Type C Max. Path Leakage	8389.6	sccm
Total	12,024.04	sccm

"As Left" Max. $\frac{12,024.04}{150,975} \times 100 = 7.97\%$ of allowable leakage

UNIT 1
TYPE B TEST SUMMARY - 12TH REFUELING

	PENE NO.	TPNS NO.	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
	EA01	Q1T52A003-A	3-16-94	0.56	3-16-94	0.56
	EA02	Q1T52A004-A	3-16-94	0.00	3-16-94	0.00
	EA03	Q1T52B014-A	3-16-94	0.39	3-16-94	0.39
	EA05	Q1T52B001-A	3-17-94	0.09	3-17-94	0.09
	EA06	Q1T52B005-A	3-17-94	0.23	3-17-94	0.23
	EA09	Q1T52B002-A	3-17-94	0.08	3-17-94	0.08
	EA10	Q1T52A001-A	3-17-94	0.05	3-17-94	0.05
	EA11	Q1T52A002-A	3-17-94	0.10	3-17-94	0.10
	EB01	Q1T52B019-A	3-17-94	0.46	3-17-94	0.46
	EB05	Q1T52B007-A	3-17-94	0.00	3-17-94	0.00
	EB09	Q1T52B006-A	3-17-94	0.15	3-17-94	0.15
	EC01	Q1T52B013-1	3-16-94	0.21	3-16-94	0.21
#	EC03	Q1T52B012-1	3-16-94	0.00	3-30-94	0.00
	EC07	Q1T52B009-A	3-17-94	0.09	3-17-94	0.09
	EC08	Q1T52B010-4	3-17-94	0.08	3-17-94	0.08
	EC10	Q1T52B008-4	3-17-94	0.05	3-17-94	0.05
	WA02	Q1T52B015-B	3-16-94	0.12	3-16-94	0.12
#*	WA03	Q1T52B023-B	3-16-94	320	3-26-94	0.30
	WA05	Q1T52B046-B	3-15-94	0.00	3-15-94	0.00
	WA06	Q1T52B047-B	3-15-94	0.24	3-15-94	0.24
	WA07	Q1T52A005-B	3-15-94	0.10	3-15-94	0.10
	WA08	Q1T52A006-B	3-15-94	0.19	3-15-94	0.19
	WA09	Q1T52B018-B	3-14-94	0.08	3-14-94	0.08
	WA10	Q1T52B016-B	3-15-94	0.00	3-15-94	0.00

*** Failed as found LLRT**
 # Module Replaced

UNIT 1
TYPE B TEST SUMMARY - 12TH REFUELING

PENE NO.	TPNS NO.	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
WA11	Q1T52B017-B	3-14-94	0.08	3-14-94	0.08
WA21	Q1T52B032-N	3-14-94	0.58	3-14-94	0.58
WA22	Q1T52B033-N	3-14-94	0.39	3-14-94	0.39
WA23	Q1T52B034-N	3-14-94	0.58	3-14-94	0.58
WA24	Q1T52B035-N	3-14-94	0.20	3-14-94	0.20
WB03	Q1T52B020-B	3-15-94	0.23	3-15-94	0.23
WB07	Q1T52B022-B	3-15-94	0.00	3-15-94	0.00
# WB09	Q1T52B025-B	3-15-94	0.00	3-29-94	0.00
WB11	Q1T52B038-B	3-14-94	0.29	3-14-94	0.29
WB21	Q1T52B037-N	3-14-94	0.20	3-14-94	0.20
WB24	Q1T52B039-N	3-14-94	0.20	3-14-94	0.20
WC01	Q1T52B026-3	3-16-94	0.13	3-16-94	0.13
WC03	Q1T52B024-3	3-15-94	0.11	3-15-94	0.11
WC05	Q1T52B028-3	3-15-94	0.00	3-15-94	0.00
WC07	Q1T52B030-2	3-16-94	0.55	3-16-94	0.55
WC08	Q1T52B011-B	3-15-94	0.02	3-15-94	0.02
WC09	Q1T52B042-2	3-14-94	0.24	3-14-94	0.24
WC11	Q1T52B031-2	3-14-94	0.19	3-14-94	0.19
WC21	Q1T52B040-N	3-14-94	0.34	3-14-94	0.34
WC23	Q1T52B041-N	3-14-94	0.00	3-14-94	0.00
WC02	Q1T52B053-B	3-16-94	0.24	3-16-94	0.24
EB10	Q1T52B052-4	3-17-94	0.30	3-17-94	0.30
EB02	Q1T52B055-N	3-16-94	0.00	3-16-94	0.00
EC05	Q1T52B056-N	3-17-94	0.00	3-17-94	0.00
EB04	Q1T52B054-N	3-17-94	0.00	3-17-94	0.00

UNIT 1
TYPE B TEST SUMMARY FOR 12TH REFUELING

PENE NO	DESCRIPTION	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
84	Equip Hatch	3-6-94	44.6	4-18-94	219
86	Personnel Hatch	4-15-94	1809	4-15-94	1809
87	Aux Hatch	4-16-94	1168	4-16-94	1168
14	Fuel Transfer Tube - Bellows	3-21-94	197.9	3-21-94	197.9
14	Fuel Transfer Tube-Blind Flange	3-11-94	17.0	4-14-94	51.4
90	Spare Penetration for S/G Outage Activities	3-11-94	36.0	4-14-94	111.0
92	Spare Penetration for S/G Outage Activities	3-11-94	17.1	4-14-94	69.7
TOTAL			3289.6		3626

UNIT 1 - TYPE C TEST SUMMARY FOR 12TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
10	Q1E11V025B	3-21-94	240#	120	3-24-94	246#	123	246
	Q1E11V026B	3-21-94	240#		3-24-94	246#		
11	Q1E11V025A	3-18-94	78.6#	39.3	4-1-94	454#	227	454
	Q1E11V026A	3-18-94	78.6#		4-1-94	454#		
12	Q1P13V282	3-2-94	414*	414	4-17-94	1039*	604.3	1208.6
	Q1P13V281	3-2-94	414*		4-17-94	1039*		
	Q1P13V301	3-2-94	414*		4-17-94	1039*		
	Q1P13V302	3-6-94	68,100		4-14-94	169.6		
13	Q1P13V283	3-2-94	402*	266.45	4-17-94	928*	468	936
	Q1P13V284	3-2-94	402*		4-17-94	928*		
	Q1P13V304	3-6-94	130.9		4-14-94	8.0		
	Q1P13V303	3-2-94	402*		4-17-94	928*		
16	Q1E11V001A	3-18-94	75,400	75,400	4-18-94	85.0	85.0	85.0
18	Q1E11V001B	3-21-94	72.5	72.5	3-21-94	72.5	72.5	72.5
23	Q1E21V253A	3-22-94	2.2*	5.0	3-22-94	2.2*	9.4	38.7
	Q1E21V253B	3-22-94	2.2*		3-22-94	2.2*		
	Q1E21V253C	3-22-94	2.2*		3-22-94	2.2*		
	Q1E21V254	3-22-94	9.4		3-22-94	9.4		
	Q1E21V255	3-22-94	2.8		4-16-94	36.5		
24	Q1E21V257	3-23-94	349**	4.7	3-30-94	177.1	4.7	16.2
	Q1E21V258	3-28-94	4.7		3-28-94	4.7		
	Q1E21V119	3-23-94	7.4		3-29-94	16.2		

*Values represent total leakage from group sets of valves as physically tested.
#Leakage represents total leakage for the Penetration from a group set of valves.
**This data was taken after Maintenance was performed on the valve by MOVATS, but prior to all Maintenance being complete

UNIT 1 - TYPE C TEST SUMMARY FOR 12TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
28	Q1E21V213	3-22-94	59.3*	2.3	3-22-94	59.3*	59.3	298
	Q1E21V249A	3-22-94	59.3*		3-22-94	59.3*		
	Q1E21V249B	3-22-94	2.3		3-31-94	298		
29	Q1E21V049	3-14-94	7.3	7.3	3-14-94	7.3	7.3	11.1
	Q1E21V050	3-14-94	11.1		3-14-94	11.1		
30	Q1B13V040	3-14-94	32.4	32.4	3-14-94	32.4	32.4	66.9
	Q1B13V038	3-14-94	66.9		3-14-94	66.9		
31	Q1G21V005	3-8-94	193.4	240	3-8-94	193.4	240	486.4
	Q1G21V006	3-7-94	240		3-7-94	240		
	Q1G21V064	3-8-94	226		4-9-94	293		
32	Q1P16V081	3-7-94	52,200	19,483.9	4-15-94	34.8	34.8	573.9
	Q1P16V072	3-7-94	19,400		4-8-94	490		
	Q1P16V203	3-7-94	83.9		3-7-94	83.9		
33	Q1G21HV3380	3-7-94	109.4	109.4	3-7-94	109.4	109.4	238
	Q1G21V204	3-7-94	160,200		4-4-94	238		
42	Q1P17V083	3-21-94	194.9	194.9	3-21-94	194.9	194.9	236
	Q1P17V082	3-22-94	219		3-22-94	219		
	Q1P17V158	3-22-94	17.0		3-22-94	17.0		
43	Q1P17HV3045	3-22-94	143.0	18.3	3-22-94	143.0	18.3	143.0
	Q1P17HV3184	3-22-94	18.3		3-22-94	18.3		

*Values represent total leakage from group sets of valves as physically tested.

UNIT 1 - TYPE C TEST SUMMARY FOR 12TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	MAX.
44	Q1P17V097	3-22-94	209	92.4	3-22-94	209	92.4	209
	Q1P17V099	3-22-94	46.4		3-22-94	46.4		
	Q1P17V155	3-22-94	46.0		3-22-94	46.0		
45	Q1P17HV3095	3-22-94	37.1	74.6	3-22-94	37.1	53.2	74.6
	Q1P17V159	3-21-94	705		4-9-94	53.2		
	Q1P17V153	3-22-94	37.5		3-22-94	37.5		
46	Q1P17HV3443	3-23-94	4.9	4.9	3-23-94	4.9	4.9	90.4
	Q1P17VHV3067	3-22-94	46.6		3-22-94	46.6		
	Q1P17V154	3-22-94	43.8		3-22-94	43.8		
47	Q1P18V001	3-11-94	52.9	52.9	3-11-94	52.9	52.9	230
	Q1P18V002	3-26-94	230		3-26-94	230		
48	Q1P19HV3611	3-25-94	260	260	3-25-94	260	226	260
	Q1P19V002	3-25-94	1221		3-29-94	226		
49	Q1E21V052	3-18-94	51.8	8.8	3-18-94	51.8	8.8	51.8
	Q1E21V091	3-18-94	8.8		3-18-94	8.8		
50	Q1P15HV3766	3-19-94	7.0	7.0	3-19-94	7.0	7.0	11.0
	Q1P15HV3334	3-19-94	11.0		3-19-94	11.0		
54	Q1E14V002	4-2-94	10.4	5.0	4-8-94	4.0	4.0	5.0
	Q1E14HV3658	4-2-94	5.0		4-2-94	5.0		
55	Q1E14HV3657	4-2-94	7.1	7.1	4-2-94	7.1	7.1	17.3
	Q1E14V001	4-2-94	815		4-9-94	17.3		
56	Q1P15HV3104	4-8-94	10.8	4.0	4-8-94	10.8	4.0	10.8
	Q1P15HV3331	4-8-94	4.0		4-8-94	4.0		

UNIT 1 - TYPE C TEST SUMMARY FOR 12TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
57	Q1P15HV3103	3-7-94	3.0	2.4	3-7-94	3.0	2.4	3.0
	Q1P15HV3332	3-7-94	2.4		3-7-94	2.4		
58	Q1P15HV3765	3-19-94	6.9	5.7	3-19-94	6.9	5.7	6.9
	Q1P15HV3333	3-19-94	5.7		3-19-94	5.7		
59	Q1E11V039B	3-19-94	27.7*	27.7	3-30-94	15.5*	7.0	15.5
	Q1E11V039A	3-19-94	27.7*		3-30-94	15.5*		
	Q1E21V263A	3-19-94	27.7*		3-30-94	15.5*		
	Q1E21V263B	3-19-94	27.7*		3-30-94	15.5*		
	Q1B13V054	3-19-94	1389		3-30-94	7.0		
	Q1E11V040	3-19-94	27.7*		3-30-94	15.5*		
60	Q1P16V075	3-7-94	206,100	231.5	4-9-94	108.4	108.4	252.6
	Q1P16V071	3-7-94	181.9		4-9-94	203		
	Q1P16V204	3-7-94	49.6		3-7-94	49.6		
61A	Q1E23V022C	3-6-94	8.8#	4.4	3-26-94	4.8#	2.4	4.8
	Q1E23V022D	3-6-94	8.8#		3-26-94	4.8#		
	Q1E23V023B	3-6-94	8.8#		3-26-94	4.8#		
61B	Q1E23V024B	3-6-94	3.8#	1.9	3-26-94	5.0	2.5	5.0
	Q1E23V025B	3-6-94	3.8#		3-26-94	5.0		
62	Q1G21V082	3-11-94	10.2	10.2	3-11-94	10.2	10.2	12.4
	Q1G21V001	3-11-94	12.4		3-11-94	12.4		
63	Q1E21V058	3-14-94	1505	833	4-17-94	48.8	4.6	48.8
	Q1E21V059	3-14-94	833		4-6-94	4.6		
64A	Q1B13V039	3-23-94	6.4	3.4	3-23-94	6.4	3.4	6.4
	Q1B13V037	3-23-94	3.4		3-23-94	3.4		

*Values represent total leakage from group sets of valves as physically tested.
#Leakage represents total leakage for the Penetration from a group set of valves.

UNIT 1 - TYPE C TEST SUMMARY FOR 12TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	MAX.
66	Q1E23V025A	3-12-94	6.6#	3.3	3-24-94	108.9#	54.45	108.9
	Q1E23V024A	3-12-94	6.6#		3-24-94	108.9#		
67	Q1E23V022A	3-12-94	5.2#	2.6	3-24-94	9.5#	4.75	9.5
	Q1E23V022B	3-12-94	5.2#		3-24-94	9.5#		
	Q1E23V023A	3-12-94	5.2#		3-24-94	9.5#		
70	Q1E14V004	3-19-94	6.0	6.0	3-24-94	6.2	6.2	24.3
	Q1E14V003	3-19-94	24.3		3-19-94	24.3		
71	Q1P23V002A	3-6-94	315	315	4-16-94	216	216	216
72	Q1P23V002B	3-6-94	271	271	4-16-94	224	224	224
78	Q1G21HV3377	3-8-94	30.3	30.3	3-8-94	30.3	30.3	68.0
	Q1G21V291	3-8-94	331		4-6-94	68.0		
	Q1G21HV3376	3-8-94	331		4-6-94	68.0		
82	Q1P11HV3659	3-25-94	16.0	5.3	3-25-94	16.0	5.3	16.0
	Q1P11V002	3-25-94	5.3		3-25-94	5.3		
93	Q1E13V003B	3-14-94	185.1#	92.55	4-1-94	715#	357.5	715
	Q1E13V004B	3-14-94	185.1#		4-1-94	715#		
94	Q1E13V003A	3-14-94	1524#	762	4-4-94	483#	241.5	483
	Q1E13V004A	3-14-94	1524#		4-4-94	483#		
95	Q1G31V012	3-18-94	15.0	15.0	3-18-94	15.0	15.0	21.4
	Q1G31V013	3-18-94	21.4		3-18-94	21.4		
97B	Q1P19V004	3-18-94	5.5	5.5	3-18-94	5.5	5.5	31.0
	Q1P19HV2228	3-18-94	31.0		3-18-94	31.0		
103	Q1E23V003	3-17-94	80.5#	40.25	3-24-94	46.9#	23.45	46.9
	Q1E23V002	3-17-94	80.5#		3-24-94	46.9#		

#Leakage represents total leakage for the Penetration from a group set of valves.

LOCAL LEAK RATE TEST

The following data is a summary of the leakage for Unit 1 11th Refueling Outage.

"As Found" (Min)

Electrical Penetration Total	41.76	sccm
Type B test (less Elec. Pene.) Total (Hatches, etc.)	2,260.4	sccm
Type C "As Found" Min. Path Leakage	76,779.65	sccm
Total	79,081.81	sccm

"As Found " Min. $\frac{79081.81}{150,975} \times 100 =$ 52.38% of allowable leakage

Max. Allowable Leakage (.6 La) = 150,975 sccm

"As Left" (Min)

Electrical Penetration Total	10.2	sccm
Type B Test (less Elec. Pene.) Total (Hatches, etc.)	1,588.6	sccm
Type C Min. Path Leakage	3,879.45	sccm
Total	5,478.25	sccm

"As Left" Min. $\frac{5,478.25}{150,975} \times 100 =$ 3.63% of Allowable Leakage

"As Left" (Max)

Electrical Penetration Total	10.2	sccm
Type B Test (Less Elec. Pene.) Total (Hatches, etc.)	1,588.6	sccm
Type C Max. Path Leakage	6,852.6	sccm
Total	8,451.4	sccm

"As Left" Max. $\frac{8,451.4}{150,975} \times 100$ 5.60% of Allowable Leakage

UNIT 1
TYPE B TEST SUMMARY - 11th REFUELING

	PENE NO.	TPNS NO.	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
	EA01	Q1T52A003-A	09-29-92	0.56	09-29-92	0.56
	EA02	Q1T52A004-A	09-29-92	0.14	09-29-92	0.14
	EA03	Q1T52P014-A	09-29-92	0.59	09-29-92	0.59
	EA05	Q1T52B001-A	09-28-92	0.09	09-29-92	0.09
*	EA06	Q1T52B005-A	10-01-92	26.06	10-07-92	0.12
#	EA09	Q1T52B002-A	09-28-92	0.30	10-25-92	0.02
	EA10	Q1T52A001-A	09-28-92	0.33	09-28-92	0.33
	EA11	Q1T52A002-A	09-29-92	0.00	09-29-92	0.00
**	EB01	Q1T52B019-A	10-03-92	1.14	10-06-92	1.14
	EB05	Q1T52B007-A	09-28-92	0.23	09-28-92	0.23
	EB09	Q1T52B006-A	09-28-92	0.00	09-28-92	0.00
	EC01	Q1T52B013-1	09-29-92	0.42	09-29-92	0.42
	EC03	Q1T52B012-1	09-29-92	0.34	09-29-92	0.34
	EC07	Q1T52B009-A	09-29-92	0.12	09-29-92	0.12
	EC08	Q1T52B010-4	09-28-92	0.29	09-28-92	0.29
	EC10	Q1T52B008-4	09-28-92	0.09	09-28-92	0.09
	WA02	Q1T52B015-B	09-29-92	0.20	09-29-92	0.20
*	WA03	Q1T52B023-B	10-01-92	5.54	10-07-92	0.13
	WA05	Q1T52B046-B	09-30-92	0.24	09-30-92	0.24
	WA06	Q1T52B047-B	09-30-92	0.00	09-30-92	0.00
	WA07	Q1T52A005-B	09-30-92	0.05	09-30-92	0.05
	WA08	Q1T52A006-B	10-02-92	0.14	10-02-92	0.14
	WA09	Q1T52B018-B	10-02-92	0.20	10-02-92	0.20
#	WA10	Q1T52B016-B	09-28-92	0.12	10-19-92	0.19

* Failed as found LLRT
\# Module Replaced
** Failed as found LLRT but administratively accepted

UNIT 1
TYPE B TEST SUMMARY - 11th REFUELING

PENE. NO.	TPNS NO.	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
WA11	Q1T52B017-B	10-02-92	0.24	10-02-92	0.24
WA21	Q1T52B032-N	10-02-92	0.00	10-02-92	0.00
WA22	Q1T52B033-N	10-02-92	0.00	10-02-92	0.00
WA23	Q1T52B034-N	10-02-92	0.58	10-02-92	0.58
WA24	Q1T52B035-N	10-02-92	0.20	10-02-92	0.20
WB03	Q1T52B020-B	09-30-92	0.00	09-30-92	0.00
WB07	Q1T52B022-B	09-30-92	0.15	09-30-92	0.15
WB09	Q1T52B025-B	10-02-92	0.00	10-02-92	0.00
WB11	Q1T52B038-B	10-02-92	0.29	10-02-92	0.29
WB21	Q1T52B037-N	10-03-92	0.00	10-03-92	0.00
WB24	Q1T52B039-N	10-02-92	0.39	10-02-92	0.39
WC01	Q1T52B026-3	09-29-92	0.21	09-29-92	0.21
WC03	Q1T52B024-3	09-29-92	0.18	09-29-92	0.18
WC05	Q1T52B028-3	09-30-92	0.30	09-30-92	0.30
WC07	Q1T52B030-2	10-01-92	0.00	10-01-92	0.00
WC08	Q1T52B011-B	10-01-92	0.04	10-01-92	0.04
WC09	Q1T52B042-2	10-02-92	0.24	10-02-92	0.24
WC11	Q1T52B031-2	10-02-92	0.19	10-02-92	0.19
WC21	Q1T52B040-N	10-03-92	0.34	10-03-92	0.34
WC23	Q1T52B041-N	10-03-92	0.00	10-03-92	0.00
WC02	Q1T52B053-B	10-02-92	0.00	10-02-92	0.00
EB10	Q1T52B052-4	10-02-92	0.30	10-02-92	0.30
EB02	Q1T52B055-N	09-29-92	0.33	09-29-92	0.33
EC05	Q1T52B056-N	09-28-92	0.42	09-28-92	0.42
EB04	Q1T52B054-N	09-29-92	0.17	09-29-92	0.17

UNIT 1
TYPE B TEST SUMMARY FOR 11TH REFUELING

PENE NO.	DESCRIPTION	DATE	AS FOUND LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)
84	Equip Hatch	09-28-92	30.2	11-22-92	133.0
86	Personnel Lock Interior	11-21-92	547.0	11-21-92	547.0
86	Personnel Lock Outer Door Between Seals	N/A	N/A	11-21-92	0
87	Aux Access Lock Outer Door Between Seals	N/A	N/A	11-24-92	0
87	Aux Access Lock Vol. Between Doors	11-20-92	1467	11-24-92	759.0
14	Fuel Transfer Tube - Bellows	11-16-92	79.8	11-16-92	79.8
14	Fuel Transfer Tube Blind Flange	09-28-92	35.5	11-18-92	17.6
90	Spare Penetration for S/G Outage Activities	10-01-92	35.5	11-18-92	22.9
92	Spare Penetration for S/G Outage Activities	10-01-92	65.4	11-18-92	29.3
TOTAL			2260.4		1588.6

UNIT 1 - TYPE C TEST SUMMARY FOR 11TH REFUELING

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
10	Q1E11V025B	10-19-92	208#	104	10-19-92	208#	104	208
	Q1E11V026B	10-19-92	208#		10-19-92	208#		
11	Q1E11V025A	10-14-92	86.2#	43.1	10-14-92	86.2#	43.1	86.2
	Q1E11V026A	10-14-92	86.2#		10-14-92	86.2#		
12	Q1P13V282	09-28-92	133.0#	66.5	11-18-92	543#	271.5	543
	Q1P13V281	09-28-92	133.0#		11-18-92	543#		
	Q1P13V301	09-28-92	133.0#		11-18-92	543#		
	Q1P13V302	09-28-92	133.0#		11-18-92	543#		
	Q1P13V287	09-28-92	133.0#		11-18-92	543#		
13	Q1P13V283	09-28-92	221.0#	110.5	11-17-92	557#	278.5	557
	Q1P13V284	09-28-92	221.0#		11-17-92	557#		
	Q1P13V304	09-28-92	221.0#		11-17-92	557#		
	Q1P13V303	09-28-92	221.0#		11-17-92	557#		
	Q1P13V288	09-28-92	221.0#		11-17-92	557#		
16	Q1E11V001A	10-14-92	4,240.0	4,240.0	10-18-92	300	300	300
18	Q1E11V001B	10-19-89	32.0	32.0	10-31-92	74.4	74.4	74.4
23	Q1E21V253A	10-08-92	12.1*	3.1	10-08-92	12.1*	15.2	24.3
	Q1E21V253B	10-08-92	12.1*		10-08-92	12.1*		
	Q1E21V253C	10-08-92	12.1*		10-08-92	12.1*		
	Q1E21V254	10-08-92	3.1		10-17-92	24.3		
	Q1E21V255	10-08-92	3.1		10-08-92	3.1		
24	Q1E21V257	10-09-92	246.0	25.2	10-22-92	122.4	39.8	122.4
	Q1E21V258	10-12-92	58.1		10-22-92	374		
	Q1E21V119	10-09-92	25.2		10-12-92	39.8		

*Values represent total leakage from group sets of valves as physically tested.
#Leakage represents total leakage for the Penetration from a group set of valves.

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
25	Q1E21V115B	10-09-92	10.5	10.5	10-09-92	10.5	10.5	10.5
26	Q1E21V115C	10-09-92	23.9	23.9	10-09-92	23.9	23.9	23.9
27	Q1E21V115A	10-09-92	2.5	2.5	10-09-92	2.5	2.5	2.5
28	Q1E21V213	10-09-92	72.1*	10.6	11-05-92	93.5*	10.6	93.5
	Q1E21V249A	10-09-92	72.1*		11-05-92	93.5*		
	Q1E21V249B	10-09-92	10.6		10-09-92	10.6		
29	Q1E21V049	09-29-92	12.6	12.6	09-29-92	12.6	12.6	25.1
	Q1E21V050	09-29-92	25.1		09-29-92	25.1		
30	Q1B13V040	10-02-92	8.7	8.3	10-02-92	8.7	8.3	8.7
	Q1B13V038	10-02-92	8.3		10-02-92	8.3		
31	Q1G21V005	10-01-92	197.3	178.6	10-01-92	197.3	178.6	363.6
	Q1G21V006	10-01-92	178.6		10-01-92	178.6		
	Q1G21V064	10-01-92	166.3		10-01-92	166.3		
32	Q1P16V081	10-11-92	83,600	68,485.2	10-28-92	228	228	291.2
	Q1P16V072	10-11-92	68,400		10-29-92	206		
	Q1P16V203	10-29-92	85.2		10-29-92	85.2		
33	Q1G21HV3380	09-28-92	73	73	09-28-92	73	73	243
	Q1G21V204	09-28-92	363		11-19-92	243		
42	Q1P17V083	10-13-92	4.2	4.2	10-13-92	4.2	4.2	176.2
	Q1P17V082	10-02-92	121.9		10-13-92	87.4		
	Q1P17V158	10-02-92	88.8		10-02-92	88.8		
43	Q1P17HV3045	10-02-92	76.4	5.8	10-02-92	76.4	5.8	76.4
	Q1P17HV3184	10-02-92	5.8		10-02-92	5.8		

*Values represent total leakage from group sets of valves as physically tested.

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
44	Q1P17V097	10-02-92	102.7	50.9	10-02-92	102.7	102.7	273.6
	Q1P17V099	10-02-92	26.3		10-13-92	249		
	Q1P17V155	10-02-92	24.6		10-02-92	24.6		
45	Q1P17HV3095	10-02-92	67.1	46.8	10-02-92	67.1	46.8	126.7
	Q1P17V159	10-02-92	46.8		10-02-92	46.8		
	Q1P17V153	10-02-92	59.6		10-02-92	59.6		
46	Q1P17HV3443	10-13-92	13.0	13.0	10-13-92	13.0	13.0	25.8
	Q1P17HV3067	10-13-92	12.9		10-13-92	12.9		
	Q1P17V154	10-13-92	12.9		10-13-92	12.9		
47	Q1P18V001	11-17-92	138.5	138.5	11-17-92	138.5	138.5	140.9
	Q1P18V002	11-17-92	140.9		11-17-92	140.9		
48	Q1P19HV3611	10-31-92	205	205	10-31-92	205	205	269
	Q1P19V002	10-31-92	269		10-31-92	269		
49	Q1E21V052	09-29-92	7.7	4.7	09-29-92	7.7	7.7	14.1
	Q1E21V091	09-29-92	4.7		11-04-92	14.1		
50	Q1P15HV3766	10-01-92	3.1	2.3	10-01-92	3.1	2.3	3.1
	Q1P15HV3334	10-01-92	2.3		10-01-92	2.3		
54	Q1E14V002	09-30-92	5.1	5.1	09-30-92	5.1	5.1	7.5
	Q1E14HV3658	09-30-92	7.5		09-30-92	7.5		
55	Q1E14HV3657	09-30-92	10.5	10.5	09-30-92	10.5	10.5	72.1
	Q1E14V001	09-30-92	72.1		09-30-92	72.1		
56	Q1P15HV3104	10-23-92	560	2.9	10-31-92	12.8	2.9	12.8
	Q1P15HV3331	10-23-92	2.9		10-23-92	2.9		

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	AS LEFT PER PENE. MAX.
57	Q1P15HV3103	11-12-92	2.9	1.8	11-24-92	3.5	1.8	3.5
	Q1P15HV3332	11-12-92	1.8		11-12-92	1.8		
58	Q1P15HV3765	10-07-92	8.5	6.7	10-07-92	8.5	6.7	8.5
	Q1P15HV3333	10-07-92	6.7		10-07-92	6.7		
59	Q1E11V039B	10-09-92	11.5*	6.4	10-12-92	8.1*	6.4	8.1
	Q1E11V039A	10-09-92	11.5*		10-12-92	8.1*		
	Q1E21V263A	10-09-92	11.5*		10-12-92	8.1*		
	Q1E21V263B	10-09-92	11.5*		10-12-92	8.1*		
	Q1B13V054	10-09-92	6.4		10-09-92	6.4		
	Q1E11V040	10-09-92	11.5*		10-12-92	8.1*		
60	Q1P16V075	10-11-92	175,500.0	1340.3	10-24-92	9.8	9.8	11.7
	Q1P16V071	10-11-92	1,340.0		10-28-92	11.4		
	Q1P16V204	10-28-92	0.3		10-28-92	0.3		
61A	Q1E23V022C	09-28-92	421#	210.5	11-22-92	7.0#	3.5	7.0
	Q1E23V022D	09-28-92	421#		11-22-92	7.0#		
	Q1E23V023B	09-28-92	421#		11-22-92	7.0#		
61B	Q1E23V024B	09-28-92	4.6#	2.3	09-28-92	4.6#	2.3	4.6
	Q1E23V025B	09-28-92	4.6#		09-28-92	4.6#		
62	Q1G21V082	10-01-92	8.7	3.1	10-01-92	8.7	3.1	8.7
	Q1G21V001	10-01-92	3.1		10-01-92	3.1		
63	Q1E21V058	09-29-92	394	97.5	10-06-92	138.7	97.5	138.7
	Q1E21V059	09-29-92	97.5		09-29-92	97.5		
64A	Q1B13V039	09-30-92	5.5	5.5	09-30-92	5.5	5.5	9.9
	Q1B13V037	09-30-92	9.9		09-30-92	9.9		

*Values represent total leakage from group sets of valves as physically tested.
#Leakage represents total leakage for the Penetration from a group set of valves.

PENE. NO.	VALVE NO.	DATE	AS FOUND LEAKAGE (SCCM)	AS FOUND MIN. PATH LEAKAGE (SCCM)	DATE	AS LEFT LEAKAGE (SCCM)	AS LEFT PER PENE. MIN.	MAX.
66	Q1E23V025A	09-28-92	4.4#	2.2	09-28-92	4.4#	2.2	4.4
	Q1E23V024A	09-28-92	4.4#		09-28-92	4.4#		
67	Q1E23V022A	09-28-92	1.3#	0.65	09-28-92	1.3#	0.65	1.3
	Q1E23V022B	09-28-92	1.3#		09-28-92	1.3#		
	Q1E23V023A	09-28-92	1.3#		09-28-92	1.3#		
70	Q1E14V004	09-29-92	8.0	8.0	09-29-92	8.0	8.0	52.4
	Q1E14V003	09-29-92	52.4		09-29-92	52.4		
71	Q1P23V002A	09-28-92	35.4	35.4	11-19-92	245	245	245
72	Q1P23V002B	09-28-92	204	204	11-19-92	332	332	332
78	Q1G21HV3377	09-28-92	13.2	13.2	09-28-92	13.2	13.2	19.7
	Q1G21V291	09-28-92	17.4*		11-19-92	19.7*		
	Q1G21HV3376	09-28-92	17.4*		11-19-92	19.7*		
82	Q1P11HV3659	10-14-92	38.5	38.5	10-14-92	38.5	38.5	43.1
	Q1P11V002	10-14-92	43.1		10-14-92	43.1		
93	Q1E13V003B	09-30-92	923#	461.5	09-30-92	923 #	461.5	923
	Q1E13V004B	09-30-92	923#		09-30-92	923 #		
94	Q1E13V003A	09-30-92	781#	390.5	09-30-92	781 #	390.5	781
	Q1E13V004A	09-30-92	781#		09-30-92	781 #		
95	Q1G31V012	09-29-92	5.0	5.0	09-29-92	5.0	5.0	29.1
	Q1G31V013	09-29-92	29.1		09-29-92	29.1		
97B	Q1P19V004	09-29-92	9.5	9.5	09-29-92	9.5	9.5	9.8
	Q1P19HV2228	09-29-92	9.8		09-29-92	9.8		
103	Q1E23V003	09-29-92	35.6#	17.8	09-29-92	35.6#	17.8	35.6
	Q1E23V002	09-29-92	35.6#		09-29-92	35.6#		

*Values represent total leakage from group sets of valves as physically tested.
#Leakage represents total leakage for the Penetration from a group set of valves.

APPENDIX III

INSTRUMENT CALIBRATION SUMMARY

Parameter/Instrument	Data
Pressure/ Volumetrics Model PPM-1000 Precision Pressure Gauge	Range: 0 - 100 psia Accuracy: +/-0.015% RDG +/-0.005% F.S. Repeatability: 0.001 PSIA Sensitivity: 0.0001 PSIA Cal. Date: 10-7-93
Drybulb Temperature/ 100 OHM Platinum Resistance Temperature Detectors	Range: 60 - 120 degrees F Accuracy: +/-0.5 degrees F Sensitivity: 0.02 degrees F Repeatability: 0.07 degrees F Cal. Date: 2-9-94
Dewpoint Temperature/ EG&G Dewtrak Humidity Transmitter	Range: -40 to +140 degrees F Accuracy: +/-1 degrees F Cal. Date: 10-8-93
Flow/ Brooks Rotameter Model GT/1000	Range: 1.34 to 13.4 scfm Accuracy: +/-2.0% F.S. Cal. Date: 2-9-94

APPENDIX IV

GENERAL INFORMATION

General Data

Owner - Alabama Power Company
Plant Name - Joseph M. Farley Nuclear Plant (FNP)
Unit - 1
Docket Number - 50-348
Location - Houston County near Dothan AL
Outage Cycle - 12th refueling
Containment Description - steel lined prestressed concrete
Date test was completed - March 10, 1994

Technical Data

Containment net free volume - 2,000,000 cf
Design Pressure - 54 psig
Design Temperature - 280 degrees F
Calculated Accident Peak Pressure - 48 psig
Calculated Accident Peak Temperature - 273.7 degrees F

Test Data

Test Method - absolute
Test Duration - 24 hours
Data Analysis Technique - mass point
Test Pressure - 48.0 psig (+3.0 psig, -0 psig)
Maximum Allowable Leakage Rate (La) 0.15 %/day
Acceptance Limit (0.75La) - 0.1125 %/day
Calculated Leakage Rate (Lam) - 0.0345 %/day
Leakage rate at upper confidence limit (UCL) - 0.0361 %/day
Final leakage rate (UCL + penalties) - 0.0479 %/day

Verification Test

Calibrated Leak Superimposed - 0.1514 wt.%/day
Upper limit rate - 0.2234 wt.%/day
Lower limit rate - 0.1484 wt.%/day
Mass point calculated rate - 0.1697 wt.%/day