REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST UNIT 2 - SECOND PERIODIC

Vogtle Electric Generating Plant
Georgia Power Company

Georgia Power
the southern electric system

GEORGIA POWER COMPANY

VOGTLE ELECTRIC GENERATING PLANT

UNIT 2

SECOND PERIODIC REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

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FINAL REPORT

Prepared by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

The Second Periodic Integrated Leakage Rate Test (ILRT) at Georgia Power Company's Vogtle Electric Generating Plant (VEGP) Unit 2 was performed on March 4-5, 1995. The ILRT was performed as required by 10CFR50 Appendix J (reference 1) and the VEGP Unit 1 and Unit 2 Final Safety Analysis Report (FSAR) (reference 4) to demonstrate that leakage through the containment boundary at design basis accident pressure does not exceed the VEGP Technical Specification (reference 2) limit. The test was performed in accordance with Procedure VEGP 28329-2 Revision 9 (reference 3). The following documentation is retained at the site along with the Official Test Copy of the procedure:

- o systems status (lineup)
- o event log
- o instrumentation validation (calibrations, Instrument Selection Guide (ISG), etc.)
- o temperature stabilization data
- o integrated leakage rate data
- o verification leakage rate data
- o quality assurance
- 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 Second Periodic Integrated Leakage Rate Test for the VEGP Unit 2 containment was successfully completed at 7:30 a.m. on March 5, 1995. The duration of the test was 8 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-percent upper confidence level (UCL) plus any penalty addition is referred to as the final leakage rate.)

Leakage Rate (weight % per day)		
Total Time Analysis		
	Determined Value	Acceptance Limit
95% Upper Confidence Limit	0.0938	0.1500
Extrapolated Leakage Rate	< 0.0500	0.1500
Mean of Measured Leakage Rates	0.0574	0.2000

Leakage penalties are added to the above 95-percent UCL total time leakage rate to account for penetrations in nonstandard alignment and for water inventory change. Total penalties amounted to a leakage of 0.0001 weight percent /day. This results in a final as-left leakage rate of 0.0939 weight percent/day, which is less than the acceptance limit of 0.1500 weight percent/day.

To determine the as-found leakage rate, minimum pathway improvements made during the local leakage rate testing program previous to the Type A test are added to the sum of the 0.0938 weight percent/day UCL and the 0.0001 weight percent/day penalties. Since the minimum pathway improvements amounted to zero, the final as-found leakage rate is 0.0939 weight percent/day which is less than the acceptance limit of 0.2000 weight percent/day.

3.0 METHODOLOGY

3.1 Leakage Rate Calculations

Test methods and procedures are specified in ANSI N45.4-1972 (reference 6) and in Bechtel Topical Report BN-TOP-1 (reference 7). ANSI N45.4 and BN-TOP-1 are cited in the VEGP FSAR. ANSI N45.4 is cited in 10CFR50 Appendix J. BN-TOP-1 is an alternative method acceptable to the USNRC.

Reference 7 describes the total time test which is used for Type A tests of a duration less than 24 hours. Since the Type A test described in this report was less than 24 hours, the total time calculations as described in reference 7 were used to determine leakage rate.

Reference 1 allows leakage rate calculations to be performed using the mass point method defined in ANSI/ANS 56.8 (reference 5). The Type A test must have a duration of at least 24 hours to use this methodology per reference 1. Mass point results are provided in this report for information only.

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 total time data analysis technique is based on the premise that the leakage rate varies with time. A measured leakage rate is calculated as the initial air mass minus current air mass divided by current time minus initial time. A straight line is then fitted to the measured rate versus time data. The calculated leakage rate is defined as the ordinate of this line at the end of the test.

The total time test has three acceptance criteria. First, the end-of-test leakage rate 95-percent UCL must be less than the acceptance leakage rate (0.75 La). Second, the calculated leakage rate extrapolated to a 24-hour test duration must be less than the acceptance leakage rate (0.75 La). Third, the mean of the measured leakage rates over the final 5 hours of the test must be less than the maximum allowable leakage rate (La).

3.2 Test Measurements

Thirty dry-bulb and six dew point temperature sensors located inside containment at approximately equally spaced elevations were used to collect information for leakage rate calculations. Sensor locations and volume fractions (table 1) were established by considering temperature distributions in past tests, previous temperature surveys, and the containment free volume.

Since both dry-bulb and dew point temperatures tend to exhibit a vertical stratification at the completion of pressurization and throughout the test, sensors were set at approximately equally spaced elevations. The volume associated with each sensor was taken as a horizontal slice through the containment with the sensor at its approximate vertical

vertical centroid. Sensor support points were created by ropes hung from spray rings, the polar crane, and structural steel. The bearing of each sensor was advanced to the next support point from that of the sensor above it, creating a downward spiral. Above the refueling floor, the radius was set such that one-half of the horizontal area was inside the spiral surface and the other half outside. Below the refueling floor, sensors were positioned about midway between the secondary shield wall and the containment liner. One dry-bulb sensor was suspended in the refueling cavity. Sensors above the refueling floor were suspended from spray rings, the polar crane, and structural steel. Those below the refueling floor were suspended from grating, piping and structural steel.

Dry-bulb temperatures were measured using 100-Ohm platinum resistance temperature detectors (RTDs). Dew point temperatures were measured using optical chilled mirror dew point hygrometers. These dew point 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 modified electrical 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 percent RDG, +/- 0.002 percent F.S. and a repeatability of +/- 0.001 percent F.S.

A data logger was used to collect data at 15-minute intervals. Information from the RTDs, dew point sensors, and pressure indicators was transferred from the data logger to the ILRT computer for analysis. The data system generated a printed tape and floppy disk 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 within 6 months of the ILRT. Instrumentation characteristics and calibration information are summarized in appendix III. Calibration documents are included with the site procedure.

4.0 TEST PROCEDURE

4.1 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. Since the Type A test was performed at the beginning of the outage, the Type B and C local leakage rate testing (LLRT) was only partially completed prior to the inspection. All Type B and C as-found tests were completed before the ILRT.

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. Any penetrations deviating from the FSAR positions are listed and justified in the ILRT procedure.

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 ILRT Pressurization (#68), ILRT Pressurization (#87), ILRT Sensing (#31), and Containment Sump Discharge (#78).

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.

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. Dew point in-situ tests were done using a calibrated dew point instrument (spare dew cell) or a calibrated sling psychrometer to measure dew point temperature at each sensor and comparing the results with dew point temperature at the data system. The in-situ checks that all RTDs were operating within +/- 1 degree of the standard and all dew cells were operating within +/- 5 degrees of the standard.

The site procedure documents the completion of the prerequisites for the test, including all exceptions to specified conditions.

4.2 Pressurization

The containment was pressurized using oil free compressors discharging through an after cooler/moisture separator and refrigerated air dryer. A total compressor capacity of

approximately 18,000 SCFM was used. Compressor discharge to containment was routed through temporary piping to containment penetrations 68 and 87. Start of pressurization occurred at 8:35 a.m. on March 4, 1995. Pressurization was terminated when containment pressure reached 37.8 psig at 5:00 p.m. on March 4, 1995. This allowed a 0.8-psi margin for pressure drop to ensure the gage pressure would be at or above the 37-psig minimum pressure required for the test.

Containment lights were turned off and temporary power to containment was isolated for the test. In addition, permanent plant instrumentation that was not qualified to 37 psig was removed from containment.

4.3 Stabilization

Upon reaching ILRT test pressure, the containment was allowed to stabilize. An initial drop in pressure was observed and then stabilized at approximately 37.4 psig. The stabilization period was not started until 6:45 p.m. on March 4 in order to verify the containment pressure was going to stabilize above 37 psig. Data was recorded at 15-minute intervals. The last stabilization data point was taken at 11:30 p.m. on March 4, 1995. All stabilization criteria were met for this point (table 2). Actual change rates and maximum allowable change rates are listed below:

Stabilization Rate		
Rate	Actual	Maximum Allowable
Rate of change of average temperature averaged over the last 2 hours	-0.238 degrees F / hour	1.0 degrees F / hour
Rate of change of temperature changes averaged over the last 2 hours	0.052 degrees F /hour /hour	0.5 degrees F /hour /hour

Containment temperature stabilization data is shown graphically in figure 1.

4.4 Type A Test

The Type A test was started at 11:30 p.m. on March 4. Containment conditions were recorded at 15-minute intervals. The test was successfully concluded at 7:30 a.m. on

March 5. 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 BN-TOP-1 (reference 7).

During the acquisition of Type A test data, a momentary loss of signal was experienced for dew cell #1 at the 12:45 a.m. data point. The data acquisition paper tape recorded a negative value indicating a loss of signal. A visual reading of the LED display for this sensor immediately after 12:45 indicated a correct reading of 45.12 degrees. The data points before and after this data point both recorded correct values. No further incorrect values were recorded. Based on the negative value (the 12:45 a.m. data point for dew cell #1) being attributed to a momentary loss of signal, the visually observed value was manually inserted for the data point in question.

To further demonstrate the validity of this approach, another method of disposition of this data would be to reject the data point. (The data point with the negative temperature value meets data rejection criteria). By removing the data set, the net effect on the final leakage rate would be 0.0005 weight percent / day; i.e., no effect.

Thus, it is concluded that insertion of the visually recorded value is reasonable. The details of the action are recorded in the test log.

4.5 Verification

Following completion of the Type A test, a 13.04 SCFM (0.1966 weight percent / day) verification leak was imposed, which is between the limits of 0.75 La and 1.25 La specified in reference 7. Containment atmospheric conditions were allowed to stabilize for 1 hour. The verification test was then started at 8:45 a.m. on March 5 and successfully completed at 12:45 p.m. on March 5. 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 4.3, 4.4, and 4.5.

4.6 Depressurization

Containment depressurization was started at 1:00 p.m. on March 5 at an average rate of no more than 10-psi per hour. Depressurization was completed at 6:50 p.m. on March 5. Containment and other plant systems modified for the ILRT were restored following depressurization to support the outage schedule.

5.0 RESULTS AND ANALYSIS

5.1 Total Time Results

The end of test leakage rate was well within the acceptance criteria stated in references 2 and 3. This includes the 95-percent 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 is presented below:

Penalty Additions		
Penetration	Description	As-left leakage (SCCM
31	ILRT Sensing	0.0
68	ILRT Pressurization	6.0
78	Containment Sump Discharge	180.6
87	ILRT Pressurization	6.0
Total Leakage (SCCM)		192.6
Total Leakage (wt %/day)		0.0001

Other test result adjustments consider water inventory corrections. The overall water inventory correction review yielded a slight reduction in leakage rate and thus, being conservative, no adjustment was made. Details of the documentation are included in the plant procedure.

The VEGP Technical Specifications specify a maximum allowable leakage rate of 0.2000 weight percent / day. To allow a margin for deterioration of the leakage boundary the as-left leakage rate must be less than 75-percent of the maximum allowable rate (0.1500 weight percent / day). UCL leakage rate, penalty addition, final as left leakage rate and acceptance limit are listed below:

As-left Leakage Rate	
95% UCL Leakage Rate	0.0938 wt %/day
Penalty Addition	0.0001 wt %/day
Final As-left Leakage Rate	**0.0939 wt %/day**
Acceptance Limit (0.75 La)	0.1500 wt %/day

The as-found leakage rate is calculated by adding the 95-percent UCL, the penalties for non-standard alignment, the adjustments for water level inventory, and the penetration minimum pathway improvements made during the local leakage rate testing program previous to the Type A test. As stared above, no correction was included for the water inventory adjustment since it yielded a slight reduction in the leakage rate. The minimum pathway improvement was zero. Thus the as-found leakage rate is as follows:

As-found Leakage Rate	
95% UCL Leakage Rate	0.0938 wt %/day
Penalty Addition	0.0001 wt %/day
Final As-found Leakage Rate	**0.0939 wt %/day**
Acceptance Limit (La)	0.2000 wt %/day

To demonstrate meeting the Type A test acceptance criteria of BN-TOP-1(reference 7), the table below shows how all three acceptance criteria of the total time methodology are met. The extrapolated leakage rate is determined by extrapolating the calculated leakage

rates out to 24 hours. These points show a falling rate trend. The mean of the measured leakage rates is the mean of the fina. 21 leakage rate points.

Leakage Rate (weight % per day)		
Total Time Analysis		
	Determined Value	Acceptance Limit
95% Upper Confidence Limit	0.0938	0.1500
Extrapolated Leakage Rate	< 0.0500	0.1500
Mean of Measured Leakage Rates	0.0574	0.2000

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 dry-bulb temperature of the containment air mass. The total temperature change was 0.9305 degrees F over the 8-hour test period. The pressure plot (figure 4) shows the containment total pressure and a total change of 0.0952 psi. The vapor pressure plot (figure 5) shows a change in vapor pressure of 0.0032 psi. Figure 6 shows a plot of total time 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 13.04 SCFM (0.1966 weight percent / day). Verification test results are listed in table 5 and graphed in figures 7 and 8. The results of the verification test 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 (0.0497), Lo is the imposed leakage (0.1966), and La is the maximum allowable leakage rate (0.2000). The final results and acceptance limits are listed below:

Verification Results	
Upper Limit Rate	0.2963 wt %/day
Total Time Calculated Rate	0.2735 wt %/day
Lower Limit Rate	0.1963 wt %/day

6.0 REFERENCES

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

2. Vogtle Electric Generating Plant, Units 1 and 2, Technical Specifications.

3. Vogtle Electric Generating Plant, Procedure No. VEGP 28329-2 Revision 9, Containment Integrated Leak Rate Test.

4. Vogtle Electric Generating Plant, Units 1 and 2, Final Safety Analysis Report Update.

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.

7. Bechtel Topical Report BN-TOP-1, Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear power Plants, Revision 1, 1972.

TABLES AND FIGURES

TABLE 1

DRY-BULB AND DEW POINT TEMPERATURE SENSOR LOCATIONS

DRY-BULB SENSORS

Sensor Number	Elevation (feet)	Azimuth (degrees)	Distance From Ctr of Ctmt (ft)	Volume Fractions
1	387	135	24	0.018
2	377	225	24	0.026
3	368	315	24	0.032
4	359	45	24	0.037
5	351	135	24	0.038
6	343	225	24	0.039
7	336	315	24	0.037
8	329	345	49	0.037
9	322	165	49	0.038
10	315	325	49	0.038
11	308	20	49	0.038
12	301	145	49	0.038
13	294	200	49	0.038
14	287	325	49	0.038
15	280	20	24	0.038
16	273	145	24	0.038
17	266	200	49	0.037
18	259	325	49	0.036
19	252	20	49	0.03
20	245	145	49	0.033
21	238	200	49	0.033
22	231	325	49	0.033
23	224	20	49	0.036
24	202	270	12	0.017
25	216	180	58	0.022
26	208	285	56	0.029
27	200	0	59	0.029
28	192	90	63	0.029
29	184	195	60	0.029
30	176	310	62	0.035
				1.000

DEW POINT SENSORS

1	386	225	24	0.151
2	329	345	49	0.189
3	294	145	49	0.190
4	259	325	49	0.178
5	227	20	49	0.119
6	196	195	59	0.173
				1.000

Table 2

TEMPERATURE STABILIZATION REPORT
Start Time = 1845 304
* = stabilization criterion satisfied

data set	elapsed time, hr	temperature T, deg F	dT1 avg dT (1 hr)	dT4 avg dT (4 hr)	- ANSI - dT1-dT4	--- BN-TOP-1 --- dT avg (2 hr)	or d(dT) avg (2 hr)
1	0.00	79.485					
2	0.25	79.312					
3	0.50	79.140					
4	0.75	79.005					
5	1.00	78.877	-0.607				
6	1.25	78.765	-0.548				
7	1.50	78.658	-0.482				
8	1.75	78.561	-0.443				
9	2.00	78.464	-0.414			-0.510*	0.150*
10	2.25	78.400	-0.365			-0.456*	0.216*
11	2.50	78.324	-0.334			-0.408*	0.119*
12	2.75	78.230	-0.331			-0.387*	0.067*
13	3.00	78.159	-0.305			-0.359*	0.083*
14	3.25	78.095	-0.305			-0.335*	0.085*
15	3.50	78.039	-0.286			-0.310*	0.081*
16	3.75	77.968	-0.263			-0.297*	0.053*
17	4.00	77.920	-0.239	-0.391	0.152*	-0.272*	0.033*
18	4.25	77.857	-0.238	-0.364	0.126*	-0.272*	0.025*
19	4.50	77.800	-0.238	-0.335	0.097*	-0.262*	0.075*
20	4.75	77.755	-0.213	-0.312	0.100*	-0.238*	0.052*

Table 3 (STABILIZATION)

DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	1845	304	79.4846	52.2854	0.1403	717895.59
2	1900	304	79.3122	52.2671	0.1402	717873.75
3	1915	304	79.1402	52.2509	0.1400	717882.82
4	1930	304	79.0050	52.2365	0.1399	717865.98
5	1945	304	78.8774	52.2234	0.1403	717850.35
6	2000	304	78.7645	52.2117	0.1400	717842.88
7	2015	304	78.6581	52.2008	0.1400	717835.00
8	2030	304	78.5615	52.1906	0.1401	717822.25
9	2045	304	78.4638	52.1811	0.1399	717823.14
10	2100	304	78.3999	52.1721	0.1402	717780.57
11	2115	304	78.3243	52.1636	0.1403	717763.41
12	2130	304	78.2302	52.1556	0.1404	717776.25
13	2145	304	78.1587	52.1481	0.1403	717769.99
14	2200	304	78.0949	52.1409	0.1405	717753.06
15	2215	304	78.0387	52.1345	0.1404	717741.03
16	2230	304	77.9675	52.1283	0.1406	717748.30
17	2245	304	77.9199	52.1224	0.1405	717731.35
18	2300	304	77.8569	52.1166	0.1408	717731.28
19	2315	304	77.8005	52.1113	0.1408	717733.14
20	2330	304	77.7550	52.1064	0.1411	717722.04

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	2330	304	77.7550	52.1064	0.1411	717722.04
2	2345	304	77.7053	52.1014	0.1410	717720.92
3	0	305	77.6674	52.0967	0.1413	717702.04
4	15	305	77.6123	52.0921	0.1412	717714.41
5	30	305	77.5683	52.0876	0.1420	717699.12
6	45	305	77.5314	52.0833	0.1415	717696.78
7	100	305	77.5104	52.0794	0.1417	717667.36
8	115	305	77.4614	52.0753	0.1417	717676.12
9	130	305	77.4259	52.0716	0.1415	717675.33
10	145	305	77.3922	52.0682	0.1419	717667.70
11	200	305	77.3627	52.0647	0.1419	717658.96
12	215	305	77.3179	52.0615	0.1421	717672.04
13	230	305	77.2916	52.0583	0.1422	717661.19
14	245	305	77.2596	52.0552	0.1424	717658.08
15	300	305	77.2279	52.0521	0.1426	717655.60
16	315	305	77.1989	52.0491	0.1427	717650.59
17	330	305	77.1721	52.0465	0.1426	717653.21
18	345	305	77.1489	52.0436	0.1428	717640.79
19	400	305	77.1141	52.0410	0.1430	717649.05
20	415	305	77.1034	52.0385	0.1431	717626.84
21	430	305	77.0600	52.0360	0.1432	717648.90
22	445	305	77.0540	52.0335	0.1432	717622.83
23	500	305	77.0348	52.0311	0.1432	717615.28
24	515	305	77.0056	52.0289	0.1435	717619.24
25	530	305	76.9878	52.0267	0.1436	717611.78
26	545	305	76.9615	52.0247	0.1435	717619.84
27	600	305	76.9322	52.0226	0.1437	717627.79
28	615	305	76.9251	52.0205	0.1438	717606.98
29	630	305	76.8930	52.0186	0.1439	717621.92
30	645	305	76.8893	52.0166	0.1441	717596.94
31	700	305	76.8587	52.0149	0.1440	717614.92
32	715	305	76.8463	52.0130	0.1443	717601.34
33	730	305	76.8245	52.0112	0.1443	717606.18

Table 3 (Verification)

DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
5	845	305	76.7349	51.9960	0.1448	717507.49
6	900	305	76.7339	51.9930	0.1448	717468.18
7	915	305	76.7114	51.9901	0.1449	717456.13
8	930	305	76.7046	51.9872	0.1452	717421.35
9	945	305	76.6831	51.9844	0.1451	717412.74
10	1000	305	76.6642	51.9815	0.1452	717396.85
11	1015	305	76.6549	51.9785	0.1452	717367.72
12	1030	305	76.6475	51.9759	0.1454	717338.48
13	1045	305	76.6347	51.9731	0.1456	717314.85
14	1100	305	76.6202	51.9704	0.1458	717293.81
15	1115	305	76.5961	51.9676	0.1457	717288.74
16	1130	305	76.5837	51.9648	0.1458	717264.57
17	1145	305	76.5794	51.9623	0.1458	717235.19
18	1200	305	76.5680	51.9597	0.1459	717213.19
19	1215	305	76.5623	51.9570	0.1462	717179.61
20	1230	305	76.5474	51.9546	0.1463	717165.86
21	1245	305	76.5289	51.9518	0.1462	717151.90

Table 4

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	2330	304	0.00	717722.04	0.0000	0.0000	0.0000
2	2345	304	0.25	717720.92	0.0150	0.0150	0.0150
3	0	305	0.50	717702.04	0.1338	0.1338	0.1338
4	15	305	0.75	717714.41	0.0340	0.0704	0.9348
5	30	305	1.00	717699.12	0.0767	0.0776	0.3946
6	45	305	1.25	717696.78	0.0676	0.0750	0.2765
7	100	305	1.50	717667.36	0.1219	0.1019	0.2612
8	115	305	1.75	717676.12	0.0877	0.1011	0.2339
9	130	305	2.00	717675.33	0.0781	0.0963	0.2136
10	145	305	2.25	717667.70	0.0808	0.0939	0.1990
11	200	305	2.50	717658.96	0.0844	0.0933	0.1888
12	215	305	2.75	717672.04	0.0608	0.0853	0.1764
13	230	305	3.00	717661.19	0.0678	0.0814	0.1668
14	245	305	3.25	717658.08	0.0658	0.0779	0.1584
15	300	305	3.50	717655.60	0.0635	0.0745	0.1509
16	315	305	3.75	717650.59	0.0637	0.0719	0.1445
17	330	305	4.00	717653.21	0.0575	0.0685	0.1380
18	345	305	4.25	717640.79	0.0639	0.0671	0.1336
19	400	305	4.50	717649.05	0.0542	0.0640	0.1280
20	415	305	4.75	717626.84	0.0670	0.0639	0.1255
21	430	305	5.00	717648.90	0.0489	0.0605	0.1203
22	445	305	5.25	717622.83	0.0632	0.0602	0.1180
23	500	305	5.50	717615.28	0.0649	0.0602	0.1163
24	515	305	5.75	717619.24	0.0598	0.0595	0.1138
25	530	305	6.00	717611.78	0.0615	0.0591	0.1119
26	545	305	6.25	717619.84	0.0547	0.0577	0.1091
27	600	305	6.50	717627.79	0.0485	0.0556	0.1059
28	615	305	6.75	717606.98	0.0570	0.0550	0.1041
29	630	305	7.00	717621.92	0.0478	0.0533	0.1012
30	645	305	7.25	717596.94	0.0577	0.0530	0.1000
31	700	305	7.50	717614.92	0.0478	0.0516	0.0975
32	715	305	7.75	717601.34	0.0521	0.0508	0.0958
33	730	305	8.00	717606.18	0.0484	0.0497	0.0938

Allowable leakage rate, La = 0.2000 %/day
75% La = 0.1500 %/day
Total time leakage rate = 0.0497 %/day
Total time UCL = 0.0938 %/day

Table 5
TOTAL TIME LEAKAGE RATE REPORT

VERIFICATION

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	measured rate (%/day)	leakage rate (%/day)
5	845	305	0.00	717507.49	0.0000	0.0000
6	900	305	0.25	717468.18	0.5260	0.5260
7	915	305	0.50	717456.13	0.3436	0.3436
8	930	305	0.75	717421.35	0.3842	0.3471
9	945	305	1.00	717412.74	0.3170	0.3047
10	1000	305	1.25	717396.85	0.2961	0.2761
11	1015	305	1.50	717367.72	0.3117	0.2716
12	1030	305	1.75	717338.48	0.3230	0.2758
13	1045	305	2.00	717314.85	0.3222	0.2793
14	1100	305	2.25	717293.81	0.3177	0.2807
15	1115	305	2.50	717288.74	0.2927	0.2737
16	1130	305	2.75	717264.57	0.2955	0.2700
17	1145	305	3.00	717235.19	0.3036	0.2702
18	1200	305	3.25	717213.19	0.3029	0.2705
19	1215	305	3.50	717179.61	0.3134	0.2737
20	1230	305	3.75	717165.86	0.3047	0.2744
21	1245	305	4.00	717151.90	0.2974	0.2735

Upper limit on leakage rate = 0.2963 %/day
Total time leakage rate = 0.2735 %/day
Lower limit on leakage rate = 0.1963 %/day

Table 6

MASS POINT LEAKAGE RATE REPORT

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	leakage rate (%/day)	ucl rate (%/day)
1	2330	304	0.00	717722.04	0.0000	0.0000
2	2345	304	0.25	717720.92	0.0150	0.0150
3	0	305	0.50	717702.04	0.1338	0.7206
4	15	305	0.75	717714.41	0.0559	0.2160
5	30	305	1.00	717699.12	0.0700	0.1465
6	45	305	1.25	717696.78	0.0685	0.1139
7	100	305	1.50	717667.36	0.1028	0.1529
8	115	305	1.75	717676.12	0.0988	0.1351
9	130	305	2.00	717675.33	0.0910	0.1197
10	145	305	2.25	717667.70	0.0877	0.1104
11	200	305	2.50	717658.96	0.0872	0.1055
12	215	305	2.75	717672.04	0.0768	0.0954
13	230	305	3.00	717661.19	0.0728	0.0889
14	245	305	3.25	717658.08	0.0694	0.0835
15	300	305	3.50	717655.60	0.0662	0.0788
16	315	305	3.75	717650.59	0.0642	0.0753
17	330	305	4.00	717653.21	0.0608	0.0711
18	345	305	4.25	717640.79	0.0603	0.0695
19	400	305	4.50	717649.05	0.0572	0.0659
20	415	305	4.75	717626.84	0.0584	0.0663
21	430	305	5.00	717648.90	0.0547	0.0628
22	445	305	5.25	717622.83	0.0554	0.0627
23	500	305	5.50	717615.28	0.0564	0.0632
24	515	305	5.75	717619.24	0.0561	0.0623
25	530	305	6.00	717611.78	0.0563	0.0620
26	545	305	6.25	717619.84	0.0550	0.0604
27	600	305	6.50	717627.79	0.0527	0.0582
28	615	305	6.75	717606.98	0.0526	0.0576
29	630	305	7.00	717621.92	0.0507	0.0558
30	645	305	7.25	717596.94	0.0510	0.0557
31	700	305	7.50	717614.92	0.0495	0.0542
32	715	305	7.75	717601.34	0.0490	0.0534
33	730	305	8.00	717606.18	0.0480	0.0522

Allowable leakage rate, La = 0.2000 %/day
75% La = 0.1500 %/day
Mass point leakage rate = 0.0480 %/day
Mass point UCL = 0.0522 %/day

VOGTLE UNIT 2 1995 ILRT Temperature During Stabilization

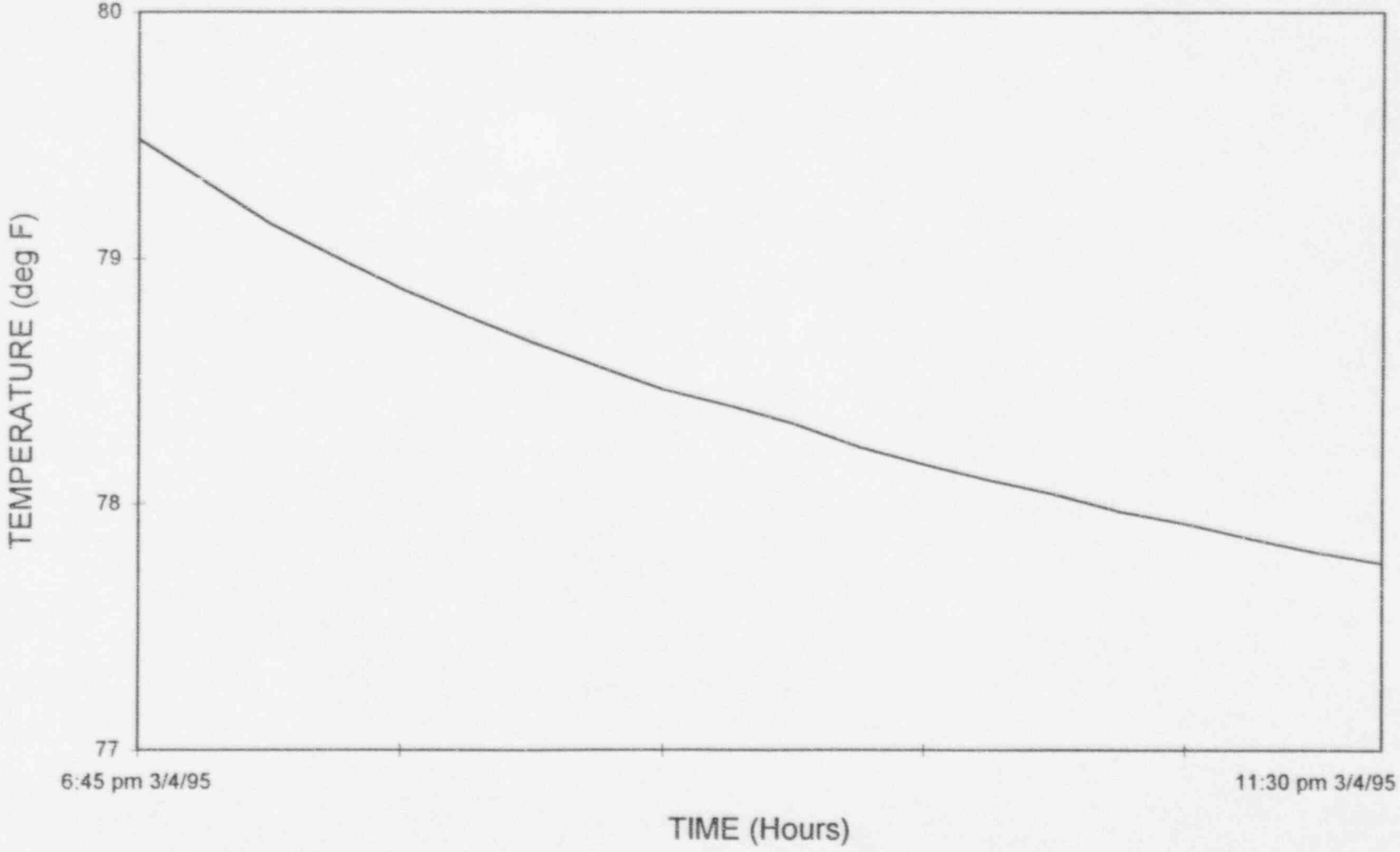

FIGURE 1

VOGTLE UNIT 2 1995 ILRT Air Mass - Type A Test

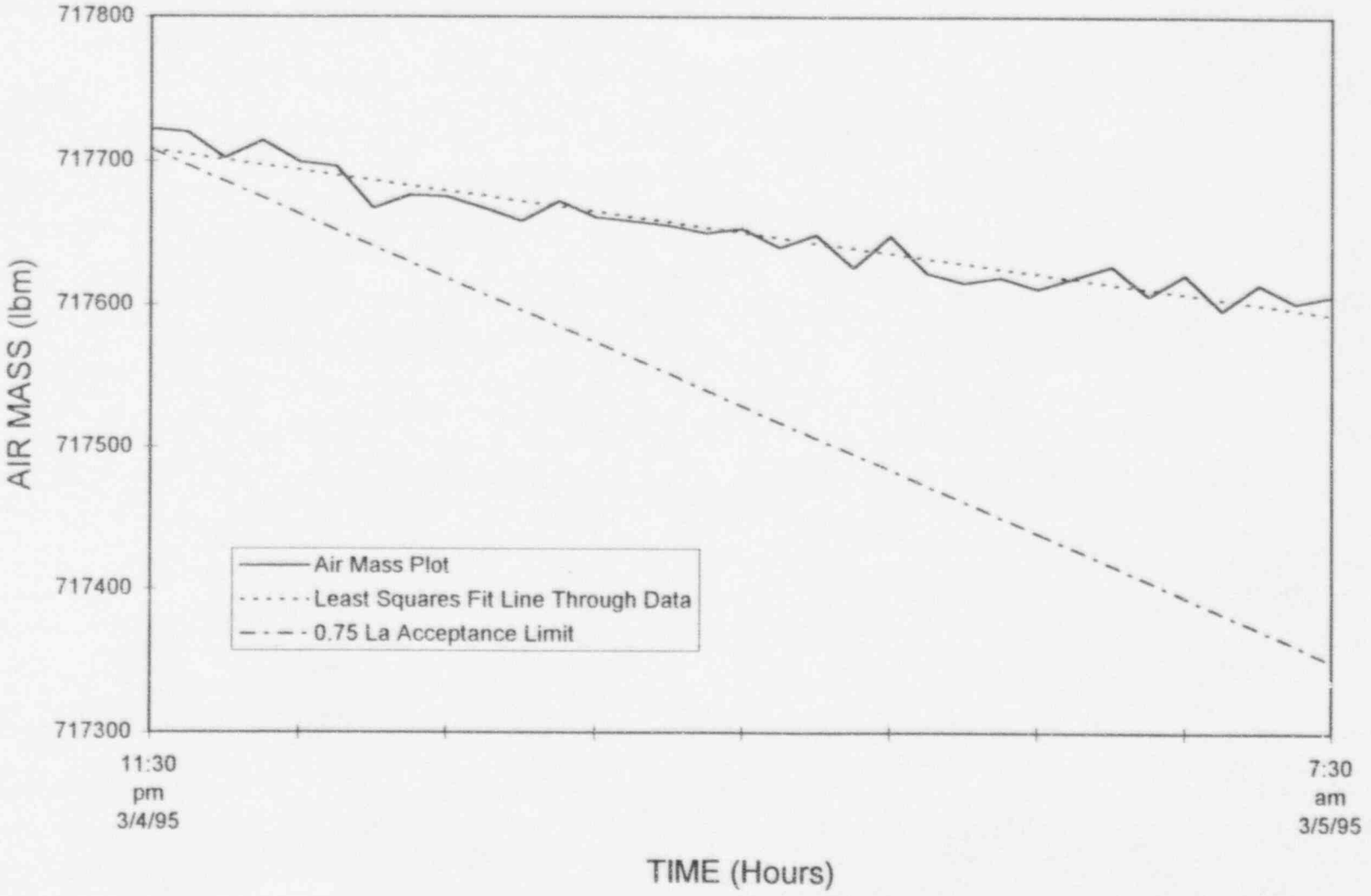

FIGURE 2

VOGTLE UNIT 2 1995 ILRT Mean Temperature - Type A Test

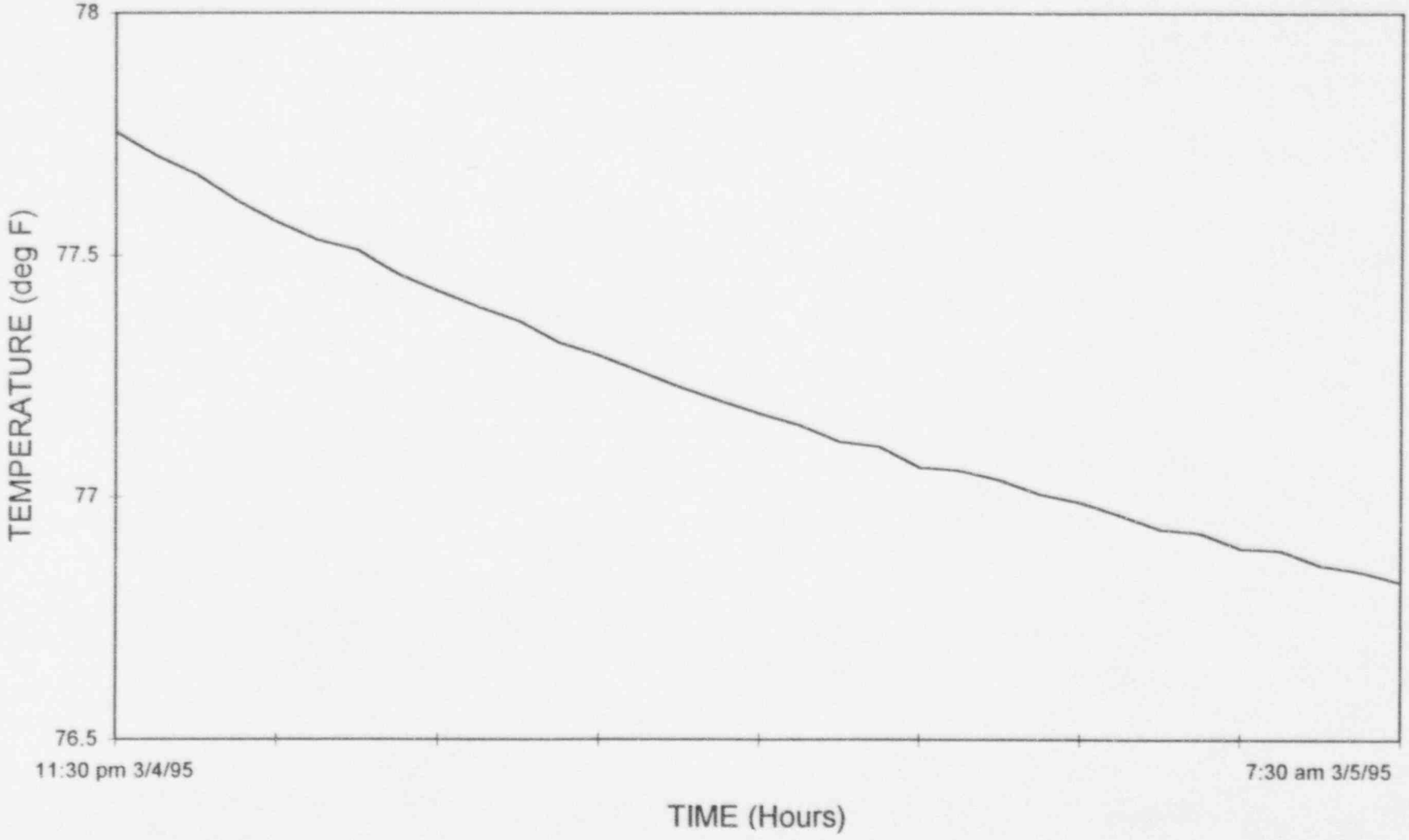

FIGURE 3

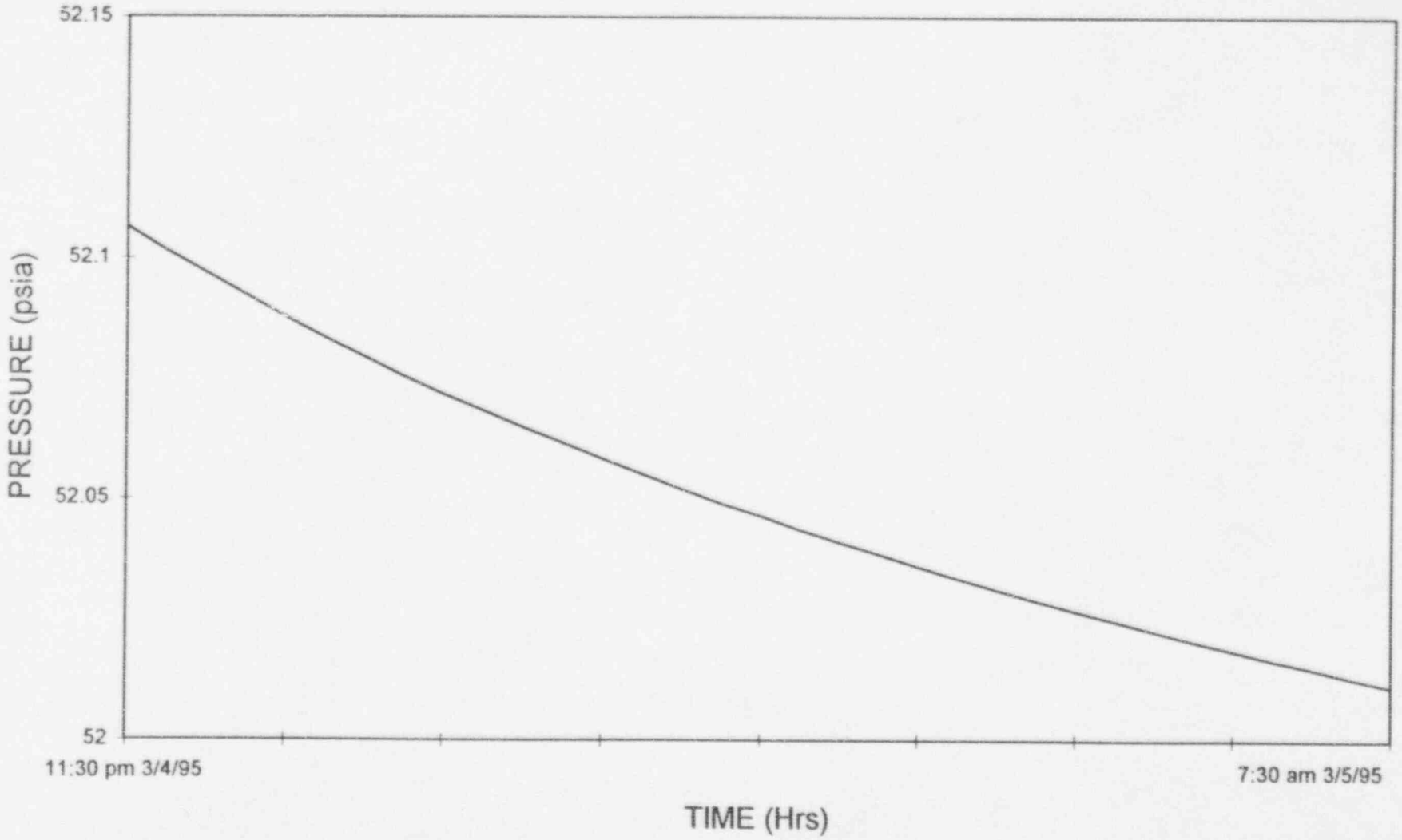
VOGTLE UNIT 2 1995 ILRT Total Pressure - Type A Test
52.15
52.1
52.05
52
PRESSURE (psia)
11:30 pm 3/4/95
7:30 am 3/5/95
TIME (Hrs)

FIGURE 4

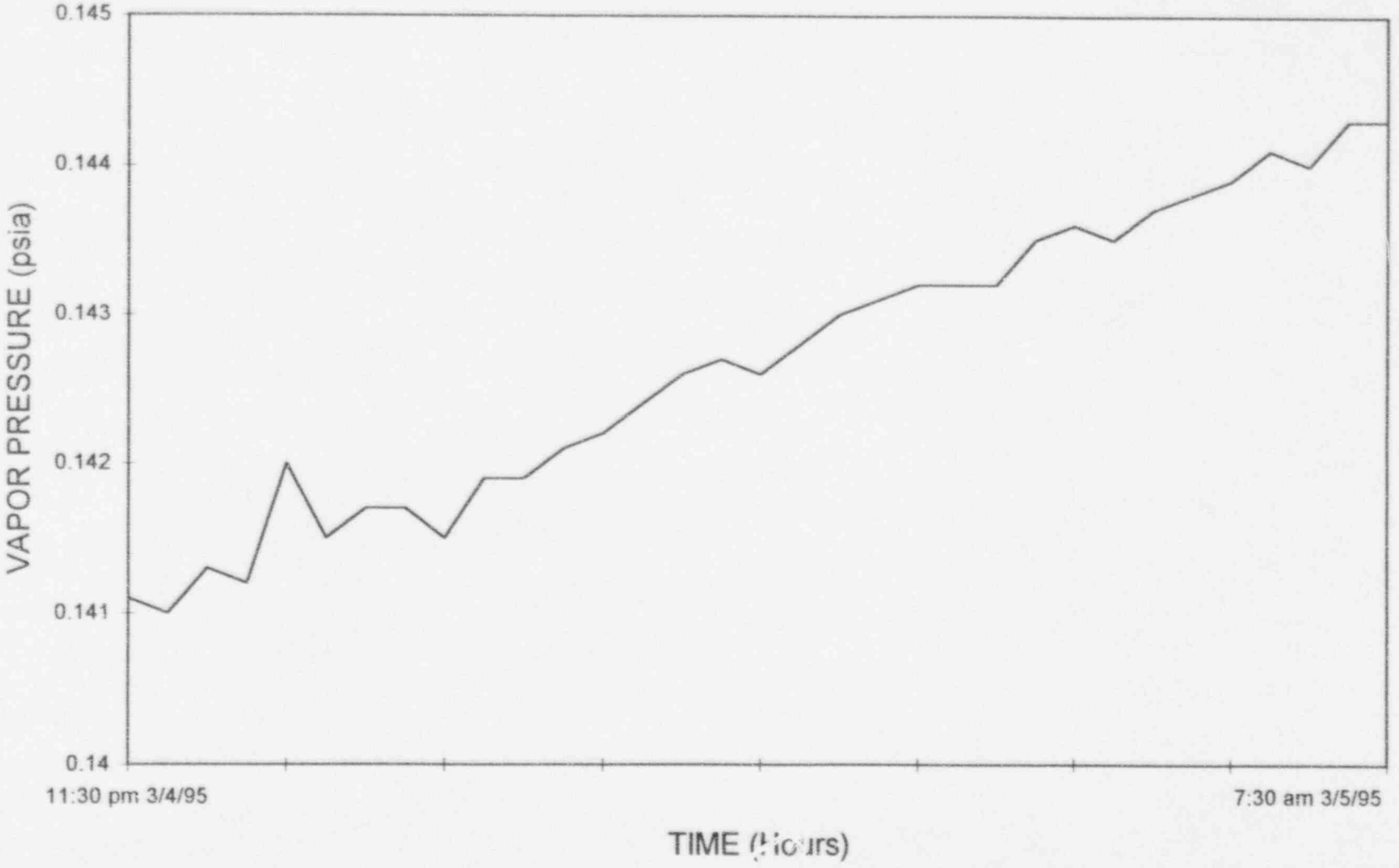
VOGTLE UNIT 2 1995 ILRT Vapor Pressure - Type A test
0.145
0.144
0.143
0.142
0.141
0.14
VAPOR PRESSURE (psia)
11:30 pm 3/4/95
7:30 am 3/5/95
TIME (Hours)

FIGURE 5

VOGTLE UNIT 2 1995 ILRT Total Time Leakage Rate
Type A Test

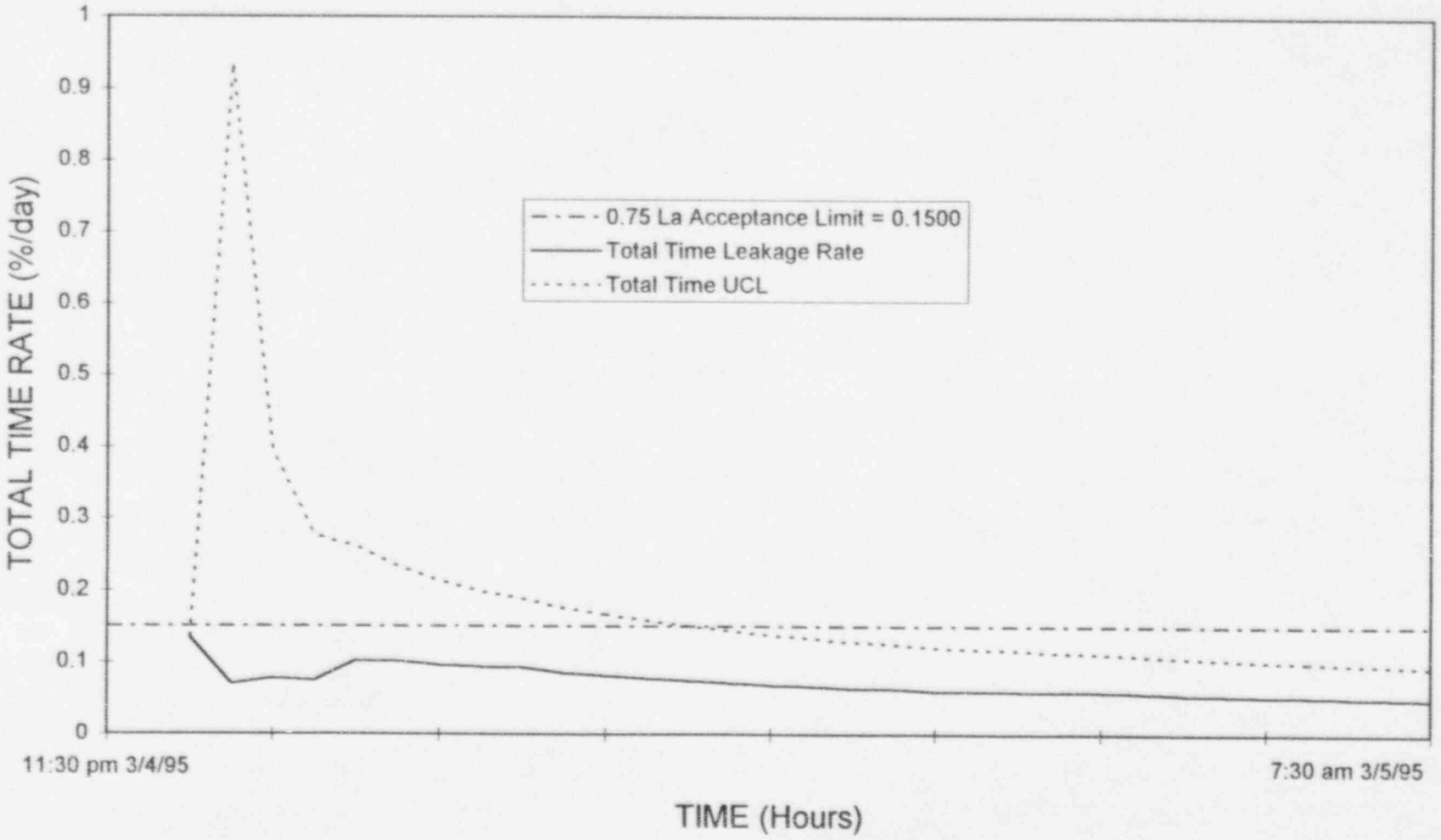

FIGURE 6

VOGTLE UNIT 2 1995 ILRT Air Mass - Verification

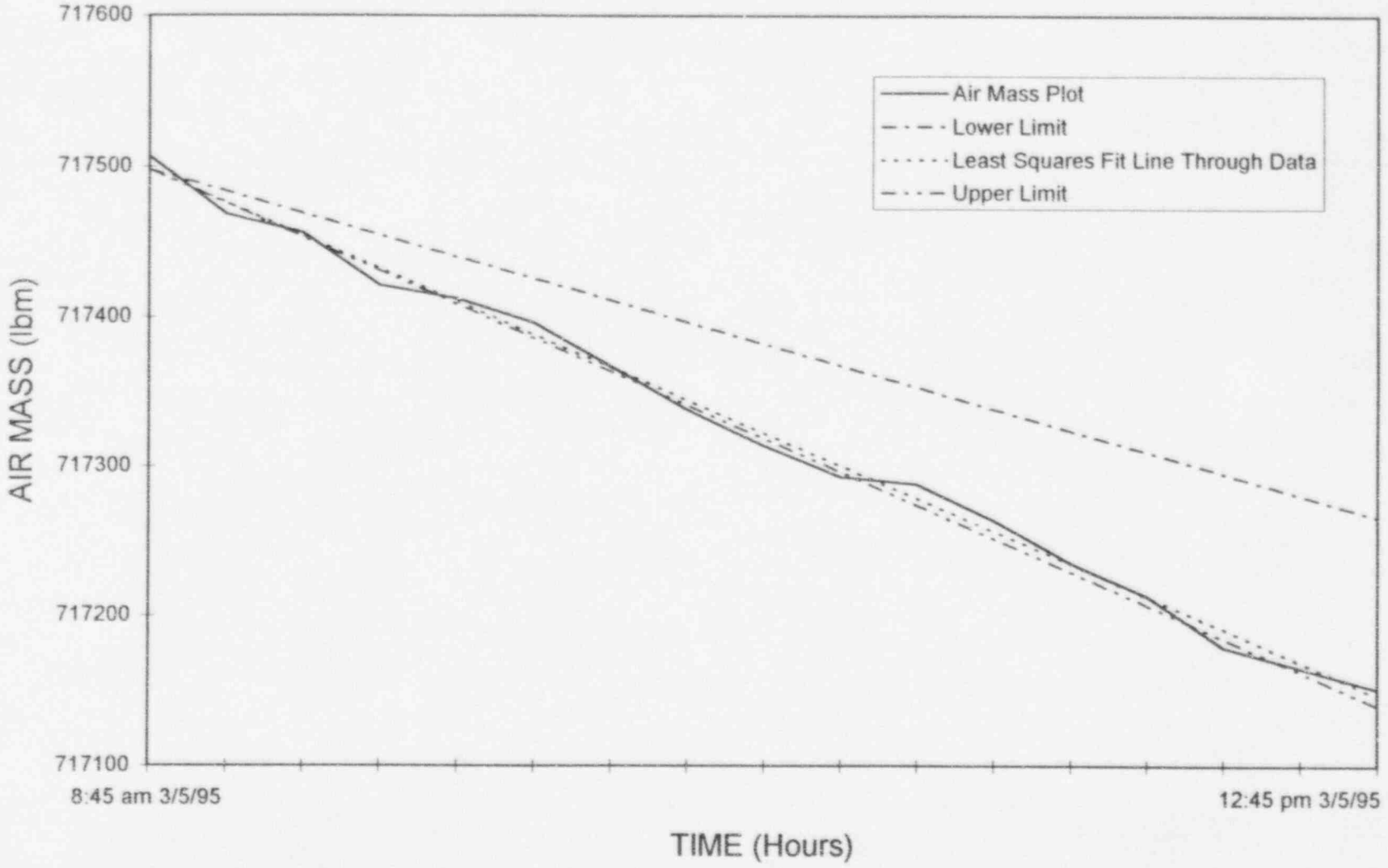

FIGURE 7

VOGTLE UNIT 2 1995 ILRT Total Time - Verification

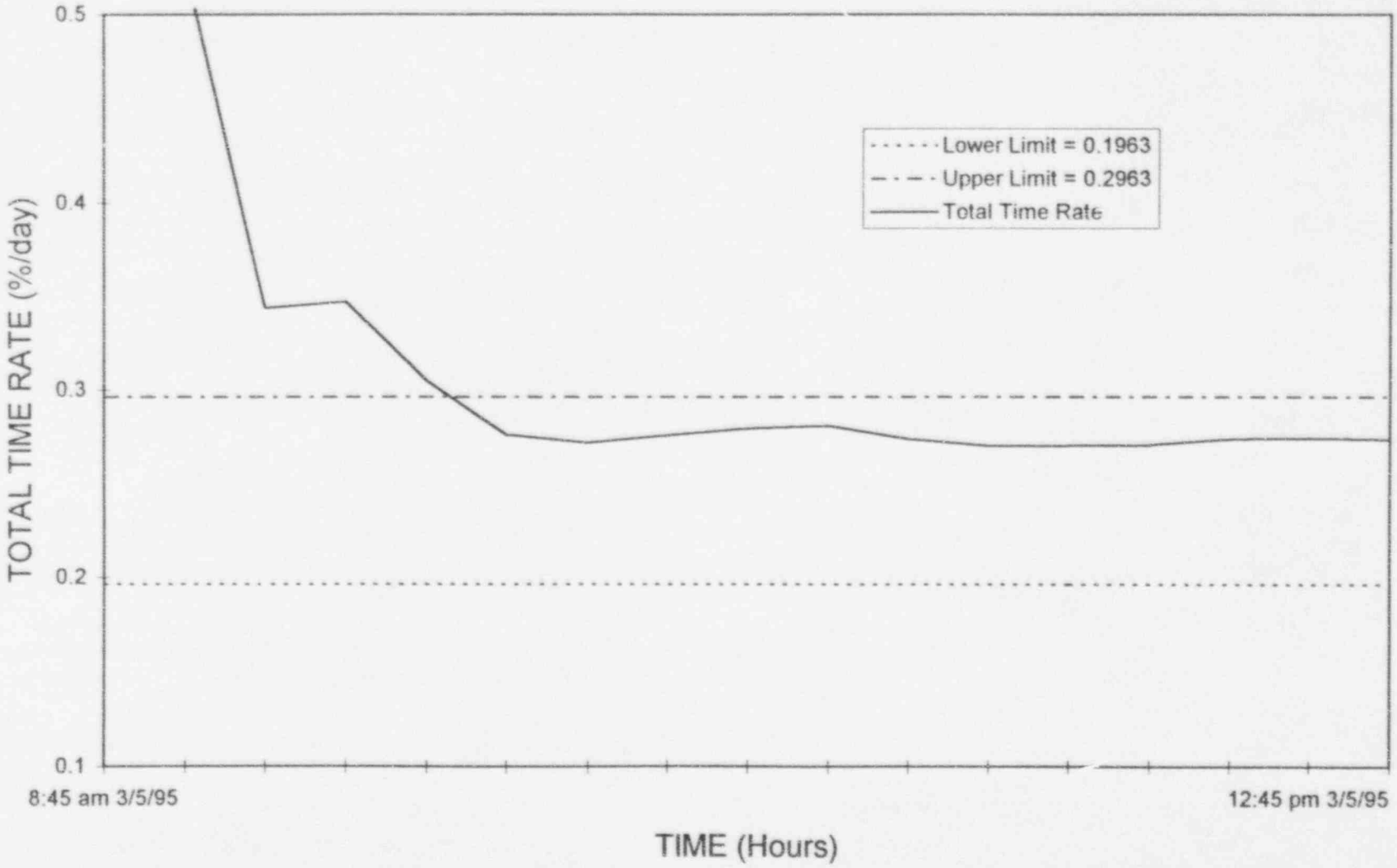

FIGURE 8

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 VEGP. Complete verification of the VEGP 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 1992 ILRT and the start of the 1995 ILRT are presented herein.

TYPE B AND C RESULTS

Table of Contents

TYPE B AND C RESULTS

REFUELING OUTAGE TESTS

PEN	DESCRIPTION	EQUIPMENT	2R3 LEAKAGE -- SCCM				2R4 LEAKAGE -- SCCM				COMMENTS
			AS FOUND		AS LEFT		AS FOUND		AS LEFT		
			DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	
5	ISI Penetration	Blind Flange	09/09/93	8.2	10/09/93	14.2	02/26/95	22	03/24/95	23.7	
11A	Chemical Addition	2-1411-U4-676	09/11/93	----	10/04/93	821	02/28/95	6.1	02/28/95	6.1	Note 1,Note 2
		2HV-5280	09/11/93	42.6	10/04/93	46.3	02/28/95	148.5	02/28/95	148.5	
12A	Chemical Addition	2-1411-U4-677	09/11/93	105	10/03/93	45.3	02/28/95	101.3	02/28/95	101.3	Note 2
		2HV-5281	09/11/93	258	10/03/93	257	02/28/95	122.7	02/28/95	122.7	
13A	Containment Radiation Monitor	2HV-12975	09/12/93	141.8	09/12/93	141.8	02/27/95	96.2	02/27/95	96.2	
		2HV-12976	09/12/93	180.8	09/12/93	180.8	02/27/95	112.2	02/27/95	112.2	
13B	Containment Radiation Monitor	2HV-12978	09/12/93	6.0	09/12/93	6.0	02/27/95	6.0	02/27/95	6.0	
		2HV-12977	09/12/93	8.9	09/12/93	8.9	02/27/95	6.0	02/27/95	6.0	
15	Demin Water to Cavity	2-1213-U6-051	09/12/93	12.3	09/14/93	392	03/01/95	8.0	03/01/95	8.0	
		2-1213-U6-050	09/12/93	18	09/14/93	22.1	03/01/95	52.1	03/01/95	52.1	
22	Demin Water	2-1418-U4-038	09/10/93	88.7	09/10/93	88.7	03/01/95	18.5	03/01/95	18.5	
		2-1418-U4-005	09/10/93	86.4	09/10/93	86.4	03/01/95	6.0	03/01/95	6.0	
23	Breathing Air	2-2401-U4-184	09/11/93	33.6	09/11/93	33.6	01/31/95*	41.5	01/31/95*	41.5	
		2-2401-U4-211	09/11/93	222	09/11/93	222	01/31/95*	29.3	01/31/95*	29.3	
24	Hot Leg Sample	2HV-3548	09/13/93	59.3	10/07/93	8.6	03/01/95	78.5	03/12/95	84.3	
		[2HV-3502]	09/13/95	14,320	10/07/93	13.8	03/01/95	11,310	03/12/95	90.7	
		[2HV-8220]									
28	ACCW Supply	2HV-1978	09/26/93	5.4	09/26/93	5.4	03/02/95	6.7	03/08/95	10.1	
		2HV-1979	09/26/93	4.2	09/26/93	4.2	03/02/95	12.2	03/08/95	18.3	

* Performed just prior to refueling outage

Brackets denote these valves are tested in parallel

TYPE B AND C RESULTS

REFUELING OUTAGE TESTS

PEN	DESCRIPTION	EQUIPMENT	2R3 LEAKAGE -- SCCM				2R4 LEAKAGE -- SCCM				COMMENTS
			AS FOUND		AS LEFT		AS FOUND		AS LEFT		
			DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	
29	ACCW Return	[2HV-1974 2-1217-U4-113]	09/26/93	8.1	09/26/93	8.1	03/02/95	25.7	03/02/95	25.7	
		2HV-1975	09/26/93	4.2	09/26/93	4.2	03/02/95	165.3	03/02/95	165.3	
34	Containment Spray	2-1206-U6-016	09/11/93	393	09/13/93	418	02/28/95	288	02/28/95	288	
		2HV-9001B	09/11/93	32.8	09/13/93	53.7	02/28/95	400	02/28/95	400	
35	Containment Spray	2-1206-U6-015	09/12/93	451	09/14/93	1870	02/28/95	33.7	03/14/95	181.0	
		2HV-9001A	09/12/93	738	09/14/93	6.0	02/28/95	6.0	03/14/95	26.8	
36	RHR Encap Vessel	2-1205-V4-002	09/10/93	80.3	09/16/93	17.3	02/16/95*	195	03/24/95	164.3	
37	RHR Encap Vessel	2-1205-V4-001	08/31/93*	650	09/02/93*	93.5	02/20/95*	242	03/25/95	701.0	
38	CS Encap Vessel	2-1206-V4-001	09/10/93	77.4	09/16/93	89.3	02/21/95*	177	03/21/95	162.0	
39	CS Encap Vessel	2-1206-V4-002	09/07/93*	356	09/11/93	54.0	02/17/95*	36.2	03/21/95	16.7	
40	Fire Protection	2-2301-U4-036	09/12/93	2400	09/12/93	2400	02/28/95	1180	02/28/95	1180	
		2HV-27901	09/12/93	1430	09/12/93	1430	02/28/95	552	02/28/95	552	
41	Accumulator Fill & Test	2HV-8871	09/13/93	6.0	09/13/93	6.0	02/28/95	6.0	02/28/95	6.0	
		[2HV-8964 2HV-8988]	09/13/93	16.7	09/13/93	16.7	02/28/95	66.5	02/28/95	66.5	
42	Accumulator N2 Supply	2-2402-U4-017	09/12/93	108	09/12/93	108	02/27/95	133.4	02/27/95	133.4	
		2HV-8880	09/12/93	5.8	09/12/93	5.8	02/27/95	785	02/27/95	785	

* Performed just prior to refueling outage

Brackets denote these vaives are tested in parallel

TYPE B AND C RESULTS

REFUELING OUTAGE TESTS

PEN	DESCRIPTION	EQUIPMENT	2R3 LEAKAGE -- SCCM				2R4 LEAKAGE -- SCCM				COMMENTS
			AS FOUND		AS LEFT		AS FOUND		AS LEFT		
			DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	
48	Letdown	2HV-8160	09/17/93	7.2	09/17/93	7.2	03/02/95	11.8	03/02/95	11.8	
		2HV-8152	09/17/93	6.0	09/17/93	6.0	03/02/95	7.2	03/02/95	7.2	
49	Seal Water Leak-off	[2HV-8112] [2-1208-U4-021]	09/19/93	42.1	09/19/93	42.1	03/02/95	85.6	03/17/95	79.3	
		2HV-8100	09/19/93	8.0	09/19/93	8.0	03/02/95	49.4	03/17/95	44.9	
50	Charging	2-1208-U6-038	09/22/93	1390	09/28/93	1289	03/02/95	544	03/02/95	544	
		2HV-8105	09/22/93	64	09/28/93	17.2	03/02/95	11.2	03/02/95	11.2	
55	ISI Penetration	Blind Flange	09/09/93	19.1	10/09/93	10.5	02/26/95	11.2	02/26/95	11.2	
62	PRT Vent	2HV-8047	09/12/93	6.0	09/12/93	6.0	03/02/95	6.0	03/02/95	6.0	
		2HV-8033	09/12/93	6.1	09/12/93	6.1	03/02/95	6.0	03/02/95	6.0	
63	PRT Make-up	2-1201-U6-112	09/17/93	6.0	09/17/93	6.0	03/02/95	247	03/12/95	6.0	
		2HV-8028	09/17/93	6.2	09/17/93	6.2	03/02/95	114.2	03/12/95	17.3	
64A	ILRT Test	Blind Flange	09/10/93	7.5	09/10/93	7.5	02/26/95	7.5	02/26/95	7.5	
64B	ILRT Test	Blind Flange	09/09/93	6.0	09/09/93	6.0	02/26/95	12	02/26/95	12	
67A	PZR Steam Space Sample	2HV-3513	09/16/93	6.0	09/16/93	6.0	03/02/95	6.0	03/02/95	6.0	
		2HV-3514	09/16/93	6.0	09/16/93	6.0	03/02/95	6.0	03/02/95	6.0	
67B	PZR Liquid Space Sample	2HV-3507	09/16/93	6.0	09/16/93	6.0	03/02/95	6.0	03/02/95	6.0	
		2HV-3508	09/16/93	6.0	09/16/93	6.0	03/02/95	6.0	03/02/95	6.0	
68	ILRT Test	Blind Flange	09/10/93	6.0	09/10/93	6.0	02/26/95	6.0	02/26/95	6.0	

Brackets denote these valves are tested in parallel

TYPE B AND C RESULTS

REFUELING OUTAGE TESTS

PEN	DESCRIPTION	EQUIPMENT	2R3 LEAKAGE -- SCCM				2R4 LEAKAGE -- SCCM				COMMENTS
			AS FOUND		AS LEFT		AS FOUND		AS LEFT		
			DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	
69A	Chemical	2-1411-U4-678	09/11/93	847	10/03/93	6.0	02/28/95	8.2	02/28/95	8.2	Note 2
	Addition	2HV-5278	09/11/93	37	10/03/93	6.0	02/28/95	730	02/28/95	730	
69B	Chemical	2-1411-U4-679	09/11/93	55.7	10/03/93	6.0	02/28/95	6.0	02/28/95	6.0	Note 2
	Addition	2HV-5279	09/11/93	19.2	10/03/93	8.3	02/28/95	63.5	02/28/95	63.5	
70A	Containment H2	2HV-2790A	09/12/93	4.2	09/12/93	4.2	02/26/95	6.0	02/26/95	6.0	
	Monitor	2HV-2790B	09/12/93	4.2	09/12/93	4.2	02/26/95	6.0	02/26/95	6.0	
		2HV-2791A	09/12/93	5.0	09/12/93	5.0	02/26/95	7.9	02/26/95	7.9	
70B	Containment H2	2-1513-U4-001	09/12/93	43.3	09/12/93	43.3	02/26/95	12.0	02/26/95	12.0	
	Monitor	2HV-2793A	09/12/93	4.6	09/12/93	4.6	02/26/95	6.0	02/26/95	6.0	
71A	Containment H2	2HV-2792A	09/12/93	6.0	09/12/93	6.0	02/27/95	6.0	02/27/95	6.0	
	Monitor	2HV-2792B	09/12/93	7.5	09/12/93	7.5	02/27/95	6.3	02/27/95	6.3	
		2HV-2791B	09/12/93	25.1	09/12/93	25.1	02/27/95	12.9	02/27/95	12.9	
71B	Containment H2	2-1513-U4-002	09/12/93	107.5	09/12/93	107.5	02/27/95	98.2	02/27/95	98.2	
	Monitor	2HV-2793B	09/12/93	76.5	09/12/93	76.5	02/27/95	19.5	02/27/95	19.5	
72A	Accumulator	2HV-10950	09/12/93	152	09/12/93	152	02/27/95	75.2	02/27/95	75.2	
	Sample	2-1204-U4-159	09/12/93	6.0	09/12/93	6.0	02/27/95	6.0	02/27/95	6.0	
72B	Accumulator	2HV-10952	09/11/93	149	09/11/93	149	02/27/95	62.2	02/27/95	62.2	
	Sample	2-1204-U4-161	09/11/93	6.0	09/11/93	6.0	02/27/95	22.8	02/27/95	22.8	
73A	Accumulator	2HV-10951	09/12/93	10.2	09/12/93	10.2	02/27/95	117.5	02/27/95	117.5	
	Sample	2-1204-U4-160	09/12/93	10.3	09/12/93	10.3	02/27/95	51.7	02/27/95	51.7	
73B	Accumulator	2HV-10953	09/12/93	351	09/12/93	351	02/27/95	571	02/27/95	571	
	Sample	2-1204-U4-162	09/12/93	6.0	09/12/93	6.0	02/27/95	6.0	02/27/95	6.0	
77	RCDT Discharge	2HV-7699	09/09/93	37.0	10/11/93	16.0	02/28/95	18.3	02/28/95	18.3	
		2HV-7136	09/09/93	5.2	10/11/93	22.2	02/28/95	30.4	02/28/95	30.4	

TYPE B AND C RESULTS

REFUELING OUTAGE TESTS

PEN	DESCRIPTION	EQUIPMENT	2R3 LEAKAGE -- SCCM				2R4 LEAKAGE -- SCCM				COMMENTS
			AS FOUND		AS LEFT		AS FOUND		AS LEFT		
			DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	DATE	LEAKAGE	
78	Containment Sump Discharge	2HV-0780	09/10/93	10.1	09/10/93	10.1	03/02/95	3240	03/06/95	375	
		2HV-0781	09/10/93	88.4	09/10/93	88.4	03/02/95	180.6	03/06/95	136.2	
79	RCDT Vent & H2 Supply	2HV-7126	09/11/93	6.0	09/13/93	6.0	02/26/95	6.0	02/26/95	6.0	
		2HV-7150	09/11/93	6.0	09/13/93	6.0	02/26/95	14.8	02/26/95	14.8	
80	Service Air	2-2401-U4-034	09/10/93	1032	09/10/93	1032	01/31/95*	597	01/31/95*	597	
		2HV-9385	09/10/93	284	09/10/93	284	01/31/95*	395	01/31/95*	395	
81	Instrument Air	2-2420-U4-049	09/24/93	1912	09/27/93	301	03/03/95	4540	03/17/95	657	
		2HV-9378	09/24/93	17.5	09/27/93	12.2	03/03/95	356	03/17/95	21.7	
86A	Pass Accident Sample	2HV-8211	09/13/93	6.0	09/13/93	6.0	03/17/95	6.0	03/17/95	6.0	
		2HV-8212	09/13/93	17.2	09/13/93	17.2	03/17/95	20.8	03/17/95	20.8	
86C	Post Accident Sample	2HV-8209	09/12/93	17.9	09/12/93	17.9	02/28/95	6.0	02/28/95	6.0	
		2HV-8208	09/12/93	18.0	09/12/93	18.0	02/28/95	6.0	02/28/95	6.0	
87	ILRT Test	Blind Flange	09/09/93	6.0	09/09/93	6.0	02/26/95	6.0	03/09/95	6.0	
89	Fuel Xfer Canal	Blind Flange	09/09/93	9.3	10/11/93	6.0	02/26/95	6.0	03/26/95	11.3	
90	ISI Penetration	Blind Flange	09/09/93	14.8	10/09/93	17.2	02/26/95	13.4	03/24/95	13.4	
100	Containment Post LOCA Purge	2HV-2626A	09/12/93	53.2	09/13/93	89	03/01/95	107.7	03/01/95	107.7	
		2HV-2626B	09/12/93	81.8	09/13/93	83	03/01/95	79.8	03/01/95	79.8	
		⌈2HV-2627A ⌉ ⌊2HV-2627B ⌋	09/12/93	77.2	09/13/93	82	03/01/95	73.1	03/01/95	73.1	
--	Equipment Hatch	----	09/09/93	8.8	10/15/93	9.2	02/26/95	9.9	03/27/95	10.2	

* Performed just prior to refueling outage

Brackets denote these valves are tested in parallel

TYPE B AND C RESULTS

QUARTERLY PURGE VALVE SURVEILLANCE

PEN	DESCRIPTION	EQUIPMENT	DATE	LEAKAGE--SCCM	COMMENTS	DATE	LEAKAGE--SCCM	COMMENTS
83	Containment	2HV-2626A	07/07/92	218.0		01/26/94	138.4	
	Purge Supply	2HV-2626B	07/07/92	34.6		01/26/94	9.5	
		2HV-2627A & B	07/07/92	36.5		01/26/94	56.7	
83	Containment	2HV-2626A	09/30/92	275		04/19/94	122	
	Purge Supply	2HV-2626B	09/30/92	33.4		04/19/94	26	
		2HV-2627A & B	09/30/92	187		04/19/94	80.3	
83	Containment	2HV-2626A	12/17/92	6.0		07/07/94	20.0	
	Purge Supply	2HV-2626B	12/17/92	46.1		07/07/94	12.2	
		2HV-2627A & B	12/17/92	168.7		07/07/94	16.6	
83	Containment	2HV-2626A	03/17/93	132.0		10/19/94	6.4	
	Purge Supply	2HV-2626B	03/17/93	27.0		10/19/94	5.5	
		2HV-2627A & B	03/17/93	55.0		10/19/94	36.2	
83	Containment	2HV-2626A	06/02/93	410		01/04/95	60.4	
	Purge Supply	2HV-2626B	06/02/93	623		01/04/95	14.2	
		2HV-2627A & B	06/02/93	582		01/04/95	174	
83	Containment	2HV-2626A	09/09/93	272		02/20/95	14.2	
	Purge Supply	2HV-2626B	09/09/93	659		02/20/95	132	
		2HV-2627A & B	09/09/93	547		02/20/95	122	
83	Containment	2HV-2626A	10/12/93	152		03/26/95	23.9	
	Purge Supply	2HV-2626B	10/12/93	12		03/26/95	36.8	
		2HV-2627A & B	10/12/93	32		03/25/95	70.7	

TYPE B AND C RESULTS

QUARTERLY PURGE VALVE SURVEILLANCE

PEN	DESCRIPTION	EQUIPMENT	DATE	LEAKAGE--SCCM	COMMENTS	DATE	LEAKAGE--SCCM	COMMENTS
84	Containment	2HV-2626A	07/08/92	111.2		01/27/94	10.0	
	Purge Exhaust	2HV-2626B	07/08/92	60.7		01/27/94	13.6	
		2HV-2627A & B	07/08/92	274.0		01/27/94	283	
84	Containment	2HV-2626A	09/30/92	290		04/20/94	46.7	
	Purge Exhaust	2HV-2626B	09/30/92	38		04/20/94	23.3	
		2HV-2627A & B	09/30/92	457		04/20/94	77.6	
84	Containment	2HV-2626A	12/17/92	460		07/06/94	104	
	Purge Exhaust	2HV-2626B	12/17/92	130		07/06/94	93.0	
		2HV-2627A & B	12/17/92	635		07/06/94	54.0	
84	Containment	2HV-2626A	03/18/93	112.0		10/20/94	123	
	Purge Exhaust	2HV-2626B	03/18/93	6.0		10/20/94	79.5	
		2HV-2627A & B	03/18/93	157.0		10/20/94	69.4	
84	Containment	2HV-2626A	06/03/93	114		01/05/95	36.6	
	Purge Exhaust	2HV-2626B	06/03/93	54		01/05/95	53.8	
		2HV-2627A & B	06/03/93	89		01/05/95	708	
84	Containment	2HV-2626A	09/09/93	189		02/20/95	36.8	
	Purge Exhaust	2HV-2626B	09/09/93	27		02/20/95	23.3	
		2HV-2627A & B	09/09/93	460		02/20/95	369	
84	Containment	2HV-2626A	10/12/93	67.2		03/27/95	84.3	
	Purge Exhaust	2HV-2626B	10/12/93	38.5		03/27/95	29.3	
		2HV-2627A & B	10/12/93	65.8		03/27/95	55.2	

TYPE B AND C RESULTS

PERSONNEL AND ESCAPE AIRLOCK SURVEILLANCES

PERSONNEL AIRLOCK	
DATE	LEAKAGE--SCCM
10/02/92	3306
03/20/93	467
09/09/93	3306
10/12/93	905
03/29/94	1273
09/11/94	907.7
02/24/95	517
03/27/95	614

ESCAPE AIRLOCK	
DATE	LEAKAGE--SCCM
08/19/92	3764
01/29/93	1715
07/16/93	321
09/09/93	1003
10/10/93	601
04/05/94	618
09/23/94	10.6
02/23/95	903
03/23/95	263

TYPE B AND C RESULTS

TESTS PERFORMED BETWEEN REFUELING OUTAGES

PEN	DESCRIPTION	EQUIPMENT	AS FOUND		AS LEFT		COMMENTS
			DATE	LEAKAGE*	DATE	LEAKAGE*	
15	Demin Water	2-1213-U6-051	08/01/92	---	08/01/92	25.5	Note 3
	to Cavity	2-1213-U6-050	08/01/92	50.6	08/01/92	50.6	
17	Electrical Pen 17	2-1818-H3-P17	05/12/93	0.0	05/12/93	0.0	Note 4
36	RHR Encap Vessel	2-1205-V4-002	04/09/93	151.2	04/09/93	151.2	Note 5
37	RHR Encap Vessel	2-1205-V4-001	04/08/93	143.9	04/08/93	143.9	Note 5
38	CS Encap Vessel	2-1206-V4-001	04/10/93	68.8	04/10/93	68.8	Note 5
39	CS Encap Vessel	2-1206-V4-002	04/08/93	340	04/08/93	340	Note 5
36	RHR Encap Vessel	2-1205-V4-002	03/21/94	683	03/21/94	683	Note 6
37	RHR Encap Vessel	2-1205-V4-001	04/04/94	1108	04/04/94	1108	Note 6
38	CS Encap Vessel	2-1206-V4-001	03/21/94	77.2	03/21/94	77.2	Note 6
39	CS Encap Vessel	2-1206-V4-002	04/04/94	272	04/04/94	272	Note 6
36	RHR Encap Vessel	2-1205-V4-002	01/19/95	1090	01/26/95	178	Note 7
37	RHR Encap Vessel	2-1205-V4-001	12/11/94	37.0	12/15/94	46.2	Note 7
38	CS Encap Vessel	2-1206-V4-001	01/13/95	8.3	01/18/95	160	Note 7
39	CS Encap Vessel	2-1206-V4-002	12/09/94	737	01/13/95	111.7	Note 7

*All leakage values are in SCCM.

TYPE B AND C RESULTS

NOTES

NOTE 1 Penetration 11A: Check valve 2-1411-U4-031 would not seat initially. While the technician was verifying the leakage was past the check valve, the check valve seated. Reference Deficiency Card 2-93-096. Note that the "As Found" leakage on the outboard valve was within limits (42.6 sccm). In addition, the outboard valve is administratively held closed while in Modes 1-4 (the fuses to the solenoid that operates this fail-closed AOV are removed prior to Mode 4 entry.

NOTE 2 Penetrations 11A, 12A, 69A, and 69B: "As Found" LLRT's for 2R3 were performed on check valves 2-1411-U4-029, -031, -043, and -044. These valves were replaced with manual globe valves under Design Change Package 92-V2N0135 during 2R3. The "As Left" leakage values for 2R3 and subsequent 2R4 leakage values are for the new globe valves. The check valves were replaced due to their history of LLRT failures.

NOTE 3 Penetration 15: The bonnet bolts were tightened on 2-1213-U6-051 prior to performing an "As Found" LLRT. The valve was reported as having water spraying at the valve body and the bonnet bolts were tightened immediately prior to performing the LLRT. The LLRT was being performed to determine the operability of the two containment isolation valves. The LLRT was acceptable on both 2-1213-U6-050 and 2-1213-U6-051. Reference Deficiency Card 2-92-259.

NOTE 4 Electrical Penetration 17: Nitrogen pressure for electrical penetration 2-1818-H3-P17 was found at 12 psig. Reference MWO 29203468.

NOTE 5 Penetrations 36, 37, 38, and 39: Two encapsulation vessels were found to have loose nuts. Reference Deficiency Card (DC) 2-93-027. Those two vessels were retorqued, while the other two had their torques verified.

NOTE 6 Penetrations 36, 37, 38, and 39: Leak Rate Tests performed to check for relaxation of gasket clamping force. Tests were a corrective action based on DC 2-93-027 described in Note 5 above.

NOTE 7 Penetrations 36, 37, 38, and 39: "As Found" and "As Left" LLRT's performed due to performance of Design Change Package 93-V2N0080 for the installation of inspection ports on the encapsulation vessel heads to allow visually observation of valve stroke without requiring removal of vessel head. Only one vessel lid was removed at a time, and each modified vessel was LLRT'd prior to the removal of the next vessel lid.

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: 12-8-94
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: 12-30-94
Dewpoint Temperature/ EG&G Dewtrak Humidity Transmitter	Range: -40 to +140 degrees F Accuracy: +/-1 degrees F Cal. Date: 12-14-94
Flow/ Brooks Rotameter Model GT/1000	Range: 1.34 to 13.4 scfm Accuracy: +/-2.0% F.S. Cal. Date: 1-13-95

APPENDIX IV

GENERAL INFORMATION

General Data

Owner - Georgia Power Company
Plant Name - Vogtle Electric Generating Plant (VEGP)
Unit - 2
Outage Cycle - 4th refueling
Containment Description - steel lined prestressed concrete
Containment net free volume - 2,750,000 cf
Date test was completed - March 5, 1995

Test Data

Test Method - absolute
Test Duration - 8 hours
Data Analysis Technique - total time
Test Pressure - 37.0 psig (+1.0 psig, -0 psig)
Maximum Allowable Leakage Rate (La) 0.20 %/day
Acceptance Limit (0.75La) - 0.15 %/day
Calculated Leakage Rate - 0.0497 %/day
Leakage rate at 95% upper confidence limit (UCL) - 0.0938 %/day
Final leakage rate - as-found (UCL + penalties) - 0.0939 %/day
Final leakage rate - as-left (UCL + penalties) - 0.0939 %/day

Verification Test

Calibrated Leak Superimposed - 0.1966 wt.%/day
Upper limit rate - 0.2963 wt.%/day
Lower limit rate - 0.1963 wt.%/day
Total time calculated rate - 0.2735 wt.%/day

Duration of Test Segments

Pressurization	8.4 hours
Stabilization	6.5 hours
Type A Test	8 hours
Verification	1.25 + 4 hours
Depressurization	6.1 hours
Total	34.25 hours