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10 CFR 50 App J V.B.3

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Gentlemen:

Re: St. Lucie Unit 1
Docket 50-335
Reactor Containment Building
Integrated Leak Rate Test (ILRT)

In accordance with the requirements of Appendix J to 10 CFR 50, the subject report is enclosed.

If you have any questions about this submittal, please contact us.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS:JWH:kw

cc: Stewart D. Ebneter, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

DAS/PSL #186

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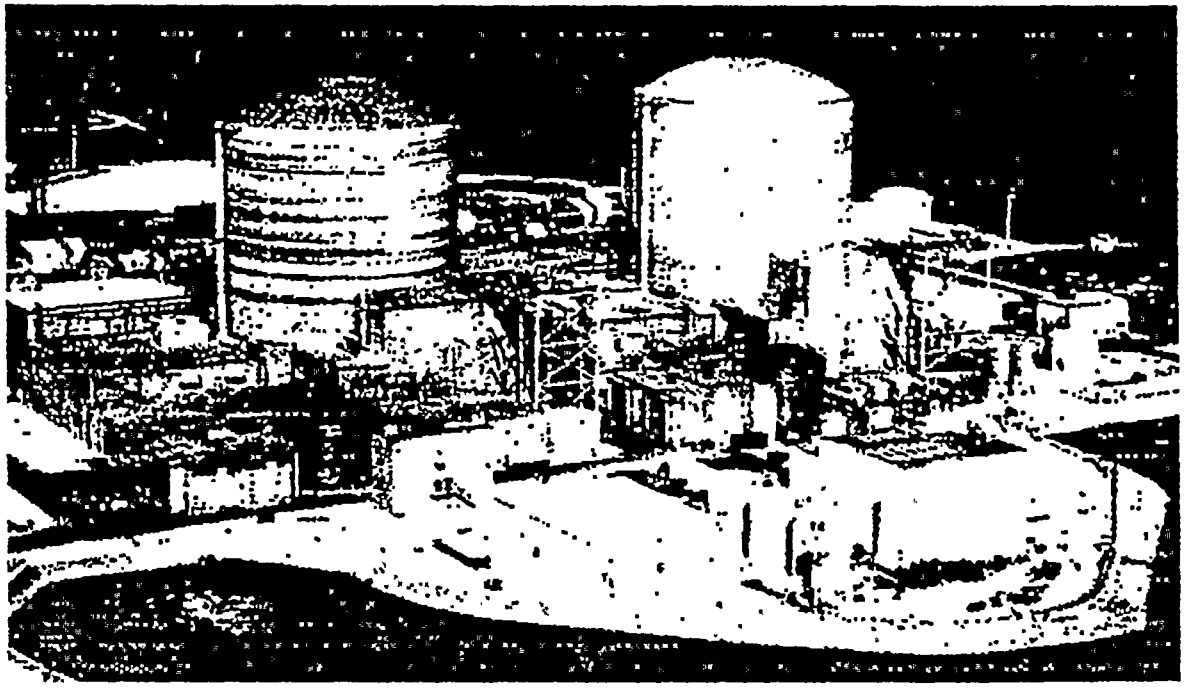
REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST FINAL REPORT

ST. LUCIE UNIT NO.1
NUCLEAR POWER PLANT
FT. PIERCE FL.
DOCKET NO. 50-335



ST. LUCIE PLANT UNIT NO. 1
NUCLEAR POWER PLANT
FT. PIERCE, FLORIDA

DOCKET NO. 50-335

REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST

Prepared By:

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Reviewed By:

Jim Connor Performance Engineer

Approved by:

Duane Mumper Lead Test Engineer

D. H. West Technical Supervisor

Date of Test Completion:
April 6, 1990

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I. INTRODUCTION AND SUMMARY

A periodic Type "A" Integrated Leakage Rate Test (ILRT) was successfully conducted on the primary containment structure of the Florida Power & Light Company St. Lucie Plant Unit No. 1 Pressurized Water Reactor. This test was performed at full pressure in accordance with the facility Technical Specifications.

This ILRT test was performed using the "Absolute Method" of testing in accordance with the Code of Federal Regulations, Title 10, Part 50 Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," in accordance with ANSI N45.4 - 1972, American National Standard, "Leakage Rate Testing of Containment Structures for Nuclear Reactors," and the methodology and calculational requirements of Topical Report BN-TOP-1, Revision 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants." The ILRT was performed at a pressure in excess of the calculated peak containment internal pressure related to the design basis accident as specified in the Final Safety Analysis Report (FSAR) and the Technical Specifications.

This report describes and presents the results of the periodic Type "A" leakage rate testing, including the supplemental test method utilized for verification. In addition, Florida Power & Light Company performs types "B" and "C" testing in accordance with the requirements of 10CFR50, Appendix J, and the Technical Specifications. The results of types "B" and "C" testing performed since the last ILRT are provided in this report.

The resulting reported "as-found" Type "A" containment leakage at 40.2 psig is 0.195 percent of the contained mass per day. This value includes the difference between the as-found and as-left minimum pathway Types "B" and "C" local leakage measurements as required by the NRC I&E Information Notice 85-71. The resulting reported "as-left" Type "A" containment leakage at 40.2 psig is 0.181 percent of the contained mass per day. The acceptance criteria for this test as contained in the facility Technical Specifications is that leakage cannot exceed 0.375 percent of the contained

air mass per day at 39.6 psig for either the "as-found" or "as-left" case.

II. TEST DISCUSSION

A. Description of the Containment

The containment vessel completely encloses the entire reactor and reactor coolant system to ensure no leakage of radioactive materials to the environment in the unlikely event of a loss of coolant accident.

The containment system design incorporates a free-standing containment vessel surrounded by a low-leakage concrete shield building. A four-foot annular space is provided between the outer wall of the containment vessel and the inner wall of the shield building to allow filtration of containment vessel leakage during accident conditions to minimize off-site doses.

The free-standing containment vessel is a two-inch thick right circular cylinder with a one-inch thick hemispherical dome and two-inch thick ellipsoidal bottom. The overall vessel dimensions are 140-foot diameter by 232-foot high. The vessel wall thickness is increased to a minimum of four inches adjacent to all penetrations and openings. The vessel is fabricated of ASME-SA 516 Grade 70 fully killed pressure vessel quality steel plate. The net free volume of the containment vessel is 2.5×10^6 cubic feet.

The containment vessel structure includes one personnel airlock, one emergency escape lock, one fuel transfer tube, one equipment maintenance hatch and one seal-welded construction hatch. All process piping and electrical penetrations are welded directly to the containment vessel nozzles with the exception of the main steam, main feed water, and fuel transfer tube penetrations. These penetrations are provided with testable multiple ply expansion bellows to allow for thermal growth or building differential motion.

The containment vessel is designed and constructed in accordance with the requirements for Class MC vessels contained in Section III of the ASME Code (1971 Edition). The containment vessel is code stamped for a design internal containment pressure of 44 psig at a temperature of 264 ^{0}F. The containment vessel and all penetrations are designed to limit leakage to less than 0.5 percent by weight of the contained air per day at the above design conditions. The calculated peak accident pressure for the design basis accident for the St. Lucie Plant No. 1 is 39.6 psig, in accordance with Technical Specification 3.6.1.2.a.1.

B. Description of ILRT Instrumentation

The containment system was equipped with instrumentation to permit leakage rate determination by the "absolute method." Utilizing this method, the actual mass of dry air within the containment is calculated. The leakage rate becomes the time rate of change of this value. The mass of air (Q) is calculated according to the Perfect Gas Law as follows:

$$Q = \frac{(P-Pv)\ V}{RT}$$

where: P - Containment Total Absolute Pressure
Pv - Containment Water Vapor Pressure (Average)
V - Containment Net Free Volume
R - Gas Constant
T - Containment Absolute Temperature (Average)

The primary measurement variables required are containment absolute pressure, containment relative humidity, and containment temperature as a function of time. During the supplementary verification test, containment bleed-off flow is also recorded.

Average containment absolute temperature is determined by measuring discrete local temperatures throughout the containment and applying a mass and volume weighted averaging technique.

The volume fraction for each sensor is determined based upon solid geometrical calculations:

$$\frac{1}{T} = \sum_i \frac{Vf_i}{T_i}$$

where: T - Containment Absolute Temperature (Average)
T_i - Local Temperature for sensor i
Vf_i - Volume Fraction for sensor i

Average containment water vapor pressure is determined by measuring discrete local relative humidities throughout the containment, converting these to local vapor pressures using local group temperatures and applying a mass and volume weighted averaging technique. The volume fractions for the relative humidity sensors are determined in the same manner as the temperature sensors above.

$$(\%RH_j) \times (Psat \text{ for } T_j) = Pv_j$$

$$Pv = T \sum_j (Pv_j * Vf_j) / T_j$$

where: $\%RH_j$ - Relative Humidity for Sensor j
$Psat$ for T_j - Steam Table Saturation Pressure for local group average temperature near sensor j
Pv_j - Calculated local vapor pressure for sensor j
Pv - Containment Water vapor pressure (Average)
T - Containment Absolute Temperature (Average)
Vf_j - Volume Fraction for sensor j
T_j - Local temperature for sensor j

The Instrument Selection Guide or ISG is used to determine the ability of the instrumentation system to measure the leakage rate. The calculated ISG for this test met all acceptance criteria for all test instrumentation systems.

1. Temperature Instrumentation

Forty precision Resistance Temperature Detectors (RTDs) were located throughout the containment to allow measurement of the weighted average air

temperature. The location of the temperature detectors in the containment is depicted in Figure 1. Each RTD sensor was supplied with a calibrated resistance versus temperature curve accurate to ±0.5 °F. The sensitivity and repeatability of each RTD sensor is less than ±0.0126 °F.

The signal conditioning circuit and readout for the RTD sensors was a Fluke 2280B data logger operating in a constant current mode. The operating parameters for the RTD constant current card are accurate to ±0.16 °F and have a resolution of ±0.01 °F.

Each RTD was in-situ calibration checked after installation to verify correct operation. The data logger operating as a total loop with an RTD in the circuit has a repeatability of ±0.01 °F and a resolution of ±0.01 °F.

2. Humidity Instrumentation

Ten Resistance Humidity Detectors (RHDs) were located throughout the containment to allow measurement of the weighted average containment vapor pressure. The location of the RHDs in the containment is depicted in Figure 2. The calibrated accuracy of the RHDs is ±2.5 percent RH, the repeatability of the RHDs is ±0.1 percent RH, and the sensitivity of the RHDs is ±0.01 percent RH.

The readout device used for the RHDs was a Fluke 2280B data logger operating in a voltage measurement mode.

Each RHD was in situ calibration checked after installation to verify correct operation. The repeatability of the loop is ±0.1 percent RH while the resolution of the device is ±0.01 percent RH.

3. Pressure Instrumentation

Two Volumetric precision pressure monitors were used to determine containment absolute pressure. The arrangement of tubing connections

between the monitors and the containment is shown in Figure 3. Either monitor could be used as the primary pressure sensor for leakage rate calculations with the remaining sensor considered as a backup. The calibrated accuracy of the monitor is ±0.015 percent of reading. The sensitivity, repeatability, and resolution of the monitor is ±0.001 psi. Binary Coded Decimal (BCD) output from both monitors was connected to the Fluke 2280B data logger.

4. Flow Instrumentation

A variable area float-type rotameter was used to superimpose leakage during the supplementary CLRT. The piping connection between the rotameter and the containment is shown in Figure 3. The accuracy, repeatability, and sensitivity for the rotameter in units of SCFM and converted to equivalent leakage values is given below:

Peak Pressure Rotameter

	SCFM	Equivalent Leakage
Accuracy	±0.20	±0.0031 %/day
Repeatability	±0.05	±0.0008 %/day
Sensitivity	±0.05	±0.0008 %/day

5. Instrument Selection Guide (ISG) Calculation

The Instrument Selection Guide is a method of compiling the instrumentation sensitivity and resolution for each process measurement variable used during the ILRT and evaluating the total instrumentation system's ability to detect leakage rates in the range required. The ISG formula is described in American National Standard ANSI/ANS 56.8-1987. Although the ISG is a very conservative measure of sensitivity, the general industry practice for this test has been to require sensitivity at least four times better than the containment allowable leakage or ISG $\leq$ 0.25La.

The calculated ISG for the instrumentation used for this test was 0.0083 percent per day, for an 8 hour test. The allowable value for this test is 0.25La or 0.125 percent per day, for an 8 hour test. The ISG calculation met all recommended criteria and demonstrated the ability of the ILRT instrumentation system to measure containment leakage with a sensitivity

exceeding that required by the appropriate industry standards.

C. Containment Pressurization Equipment

The equipment used to pressurize the containment is shown in Figure 4. The thirteen oil-free industrial diesel-driven air compressors had a total nominal capacity of 12,900 SCFM. The compressed air was then routed to water-cooled after-coolers, moisture separators, and refrigerant air dryers. This equipment assured that clean and dry air was used to pressurize the containment.

D. Description of the Computer Program

The Ebasco ILRT computer program is an interactive program written specifically for fast, easy utilization during all phases of the ILRT and CLRT. The program is written in a high-level, compiled, structured language and is operated on a portable MS-DOS personal computer. The program has been verified and meets all requirements of the Ebasco and Florida Power & Light Quality Assurance Programs.

As necessary, data entry and modifications are readily accomplished by the data acquisition team. In addition to extensive data verification routines, the program calculates, on demand, total time and mass point leak rates as well as the 95 percent Upper Confidence Level for these leakage rate calculations. Calculations and methodology of the program are derived from American National Standard ANSI N45.4-1972 and Topical Report BN-TOP-1, Revision 1.

Input data may be deleted for a given instrument in the case of a sensor malfunction. The deletion of a given instrument is performed on all samples in the data base. Weighing factors, if applicable, are then recalculated for the remaining instrument sensors of that type (see section III.A).

Data evaluations are enhanced by the flexible display of either sensor variables or various computed values in tabular or graphical form on the computer screen or printer. Data are recorded on magnetic media to prevent

loss during the testing. All data are stored on the computer system in use, with retrieval capability to any desired data base throughout the testing.

Ancillary portions of the program assist the user in determining temperature stabilization, determining the ILRT termination criteria, performing ISG calculations, performing in situ instrument loop performance calculations and determining acceptable superimposed CLRT leakage verification.

Temperature, pressure and humidity data are transmitted from the ILRT instrumentation system to the computer via an RS-232 link at 20 minute intervals (see Figure 5). Computer verification and checking routines supplement data verification by the data acquisition team. Modifications can be promptly made if errors are detected.

E. Description of the Testing Sequence

Preparations to pressurize the containment for the conduction of the ILRT included internal and external inspections of the containment structure; installation and check out of the ILRT instrumentation; Types "B" and "C" Local Leakage Rate Tests; alignment of valves and breakers for test conditions; and the installation and check out of the temporary pressurization facilities. These preparations were completed on April 5, 1990.

All ILRT instrumentation was declared operable with performance within manufacturers' tolerances. Pressure sensor No. 1 was selected to be the primary pressure instrument, as it had exhibited better repeatability and stability during the in situ testing.

Three penetrations were required to be in service during the ILRT and were not lined up to simulate accident conditions; P-52D (ILRT Pressure Sensing Line), P-52E (ILRT Controlled Bleed-off Line), and P-54 (ILRT Pres-

surization Line). The three ILRT penetrations are used to conduct the test. The minimum pathway leakage for those penetrations, determined during Type "C" local testing, is added to the measured ILRT leakage to account for these penetrations being in service during the test.

Pressurization of the containment started at 0314 hours on April 5, 1990. Figure 6 pictorially depicts the sequence of testing. The pressurization rate was maintained at 4 psi/hr. Early in the pressurization mode, the Assistant Nuclear Plant Supervisor (ANPS) requested that the test be stopped due to PDIS-25-1B (Containment dP sensor) failing low, which caused FCV-25-8 (Containment Vacuum Breaker) to open on high vacuum. The fuses for FCV-25-8 were pulled, shutting the valve, and pressurization was restarted. Subsequent to completion of the ILRT the PDIS was repaired.

The target pressure of 55.165 psia was achieved at 1308 hours on 4/5/89. This target pressure was 0.865 psi above the minimum test pressure to account for the expected pressure decrease due to temperature stabilization and to allow for some leakage margin during the test sequence. Data acquisition and analysis during the temperature stabilization phase began at 1310 hours at 20 minute intervals.

The containment temperature stabilization criteria was met at 1710 hours on April 5, 1990, after acquisition of four hours of data. During this period, the temperature and pressure decreases followed predictable trends, and the trend of vapor pressure was stable.

Six hours into the ILRT hold time, leakage had increased to greater than .375 %/day in magnitude. Two valves were found to be leaking, MV-07-2A and MV-07-2B (Containment Sump Valves). Both of these valves are in service and covered with water during the design basis accident. They are boundary valves for the ILRT (see sect. III.C). These valves were checked shut, MV-07-2A received two turns and MV-07-2B received three turns. The ILRT hold time was restarted at 2310.

The 8 hour period of leakage measurements started at 2310 hours on April 5, 1990, and was successfully terminated at 0710 hours on April 6, 1990, all other acceptance criteria contained in Bn-Top were met and the ILRT was shown to be successful. The data accumulated displayed the following leakage rates:

Simple BN-TOP-1 Leakage Rate	=	0.0694 %/day
Fitted BN-TOP-1 Leakage Rate	=	0.0826 %/day
95% Upper Confidence Level (UCL)	=	0.1810 %/day

Since leakage plot had a negative skew (tending to decrease) after 8 hours, the leakage rate was not extrapolated linearly to 24 hours, using the last 20 data points. The acceptance criteria for this test is 0.75 La or 0.375 %/day.

To verify the results of the ILRT, a verification Controlled Leakage Rate Test (CLRT) was conducted. Using the variable area full-pressure rotameter, a superimposed flow of 19.4 SCFM was added to the leakage already present in the containment. This superimposed flow is equivalent to leakage of 0.299 percent per day. A one-hour stabilization period was allowed to lapse after addition of this leakage in accordance with the requirements of Topical Report BN-TOP-1. Data accumulation for the CLRT was started at 0810 hours on April 6, 1990 and the CLRT was conducted for a four-hour period. The measured CLRT leakage rates for this period were:

Simple BN-TOP-1 Leakage Rate	=	0.3294 %/day
Fitted BN-TOP-1 Leakage Rate	=	0.3336 %/day

The target CLRT leakage for this test was 0.382 $\pm$0.125 percent per day, or within the criteria as measured. The ILRT and CLRT were declared successful at 1210 hours on April 6, 1990.

At 1216 hours on April 6, 1990, depressurization of the containment was initiated at a rate of 6 psi/hr. Containment entry for post-test inspection purposes occurred when the containment pressure was approximately 0.5 psig at 2000 hours on April 6, 1990. The post-test inspection detected no anomalies or damage other than several crane rail

lights were out and some paint blisters on the shield wall.

Corrections were made to the measured ILRT leakage to account for the three penetrations which were in service during the ILRT and to account for the difference between the as-found and as-left minimum pathway local leakage values as required by NRC I&E Information Notice 85-71.

95% Upper Confidence Level (UCL) during ILRT	= 0.181 %/day
Corrections for Local Leakage Measurements	= 0.0137 %/day
Total Reported Containment UCL	= 0.1947 %/day

This value satisfies the acceptance criteria for the test of being less than 0.375 percent per day.

III. ANALYSIS AND INTERPRETATION

A. Instrumentation System Performance

All of the forty temperature detectors performed as expected with no anomalous behavior detected by data trend analysis or by the Ebasco ILRT computer program error checking routines. The computer program also determines the in situ temperature loop repeatability which consists of process measurement variations as well as sensor noise. The average in situ loop repeatability for the forty operating temperature sensors was 0.013 ^{0}F. This performance compares well with the vendor-claimed temperature sensor loop repeatability, excluding process variations, as given in Section II.B1.

Ten relative humidity sensors were installed in the containment for the ILRT. All operated as expected with no anomalous behavior detected by data trend analysis or by the ILRT computer program error checking routines. The average in situ loop repeatability for the relative humidity sensors was 0.1 percent RH. This performance compares well with the vendor-claimed humidity sensor loop repeatability, excluding process variations, as given in Section II.B2.

Two pressure sensors were installed for the ILRT, with one utilized for testing and one considered as a spare. Prior to containment pressurization, analysis demonstrated that pressure sensor 1 was more stable over an eight hour period than the other sensor. During the ILRT, the in situ pressure loop repeatability for both sensors was 0.001 psi. This performance compares well with the vendor-claimed pressure sensor loop repeatability, excluding process variations, given in Section II.B.3.

The variable area rotameter performed as expected with no evidence of unstable reading, float sticking, or moisture in the float tube.

In summary, all of the ILRT test instrumentation performed in an adequate manner to allow determination of containment leakage rates to the sensitivity required.

B. Temperature Stabilization Phase

Prior to pressurization of the containment, the atmosphere was very stable with an average temperature of 82.1 ^{0}F and a maximum spread of temperature from the highest reading sensor to lowest reading sensor of 3.9 ^{0}F. During pressurization, the heat of compression of the air occurs mainly at the top of the containment with colder pressurization air being added at the bottom. At the end of pressurization, the average temperature was 96.4 ^{0}F with a maximum spread of temperature from the highest reading sensor to lowest reading sensor of 24.4 ^{0}F.

The results of the four-hour temperature stabilization phase are presented in Appendix B.1. The acceptance criteria given in Topical Report BN-TOP-1, Revision 1, are described in Note 2 in that appendix. The data presented shows that a smooth and predictable temperature stabilization occurred. At the end of stabilization, the average temperature was 88.8 ^{0}F and the maximum spread of temperature from the highest reading sensor to the lowest reading sensor was 13.1 ^{0}F. This demonstrates that the heat sinks of concrete and steel in the containment were quickly returning the containment atmosphere to a stable condition.

C. Leakage Survey Phase

Leakage in excess of .375 La was noted after the temperature stabilization phase criteria had been met. Leakage survey teams were dispatched to investigate the source of leakage. Leakage was found on penetrations 32 and 33 (Containment Sump Suction). While checking the boundary valves shut it was noted that MV-07-2A required two full turns and MV-07-2B required three full turns to be fully closed. These two isolation valves are not considered as potential leakage barriers in the Final Safety Analysis Report (FSAR) sections 6.2.4.2 and 6.2.4.4 and thus are not subject to type C or Bypass leakage testing as they will be water covered in a loss of coolant accident and open during the recirculation phase of the transient. Any water leakage through these valves in the closed position will be returned to the containment by the Safety Injection System pumps. No potential containment leakage or off-site dose is credible due to seat leakage of these valves in the closed position. Leakage rate measurements on the containment were restarted after the leakage survey phase using the total time leakage rate methods of Topical Report BN-TOP-1, Revision 1. As an additional diagnostic tool, mass point leakage rate measurements, as described in ANSI/ANS 56.8-1981, were conducted in parallel. The mass point leakage calculations are not sensitive to the starting point of the test and will detect changes in containment leakage more rapidly than the total time method.

D. Integrated Leakage Rate Phase

Leakage measurements were started at 2310 hours on April 5, 1990. The total time BN-TOP-1 results for eight hours of leakage measurements are presented in Appendix B.3. A summary of the measured leakage after eight hours is:

	BN-TOP-1 Total Time
Simple Leakage Rate	0.069 %/day
Fitted Leakage Rate	0.083 %/day
Upper Confidence Level	0.181 %/day

The higher Upper Confidence Level of the BN-TOP-1 measurements is due

to the nature of performing regression analysis on simple leakage rates instead of regression analysis on masses and the more conservative statistics utilized by BN-TOP-1.

As all acceptance criteria for a Reduced Duration BN-TOP-1 ILRT were met at eight hours as presented in Appendix B.2, the ILRT was declared acceptable. Appendix A presents the corrections to the measured ILRT leakage rates for local leakage rate measurements for both the "as-found" and "as-left" cases.

E. Verification of Controlled Leakage Rate Phase

Subsequent to the acceptance of the ILRT results, a superimposed leakage equivalent to 0.299 percent per day was added to the existing containment leakage using the variable area rotameter. A one-hour stabilization period was allowed to lapse after addition of this leakage in accordance with the requirements of Topical Report BN-TOP-1.

Leakage measurements were initiated to verify the results of the ILRT. The minimum duration for the Controlled Leakage Rate Phase was determined to be four hours in accordance with Topical Report BN-TOP-1. As presented in Appendix B.3, the leakage measurements met the acceptance criteria for the verification phase.

	BN-TOP-1 Total Time
Simple Leakage Rate	0.362 %/day
Fitted Leakage Rate	0.340 %/day

SECTION IV
FIGURES

RTD LOCATIONS AND VOLUMES

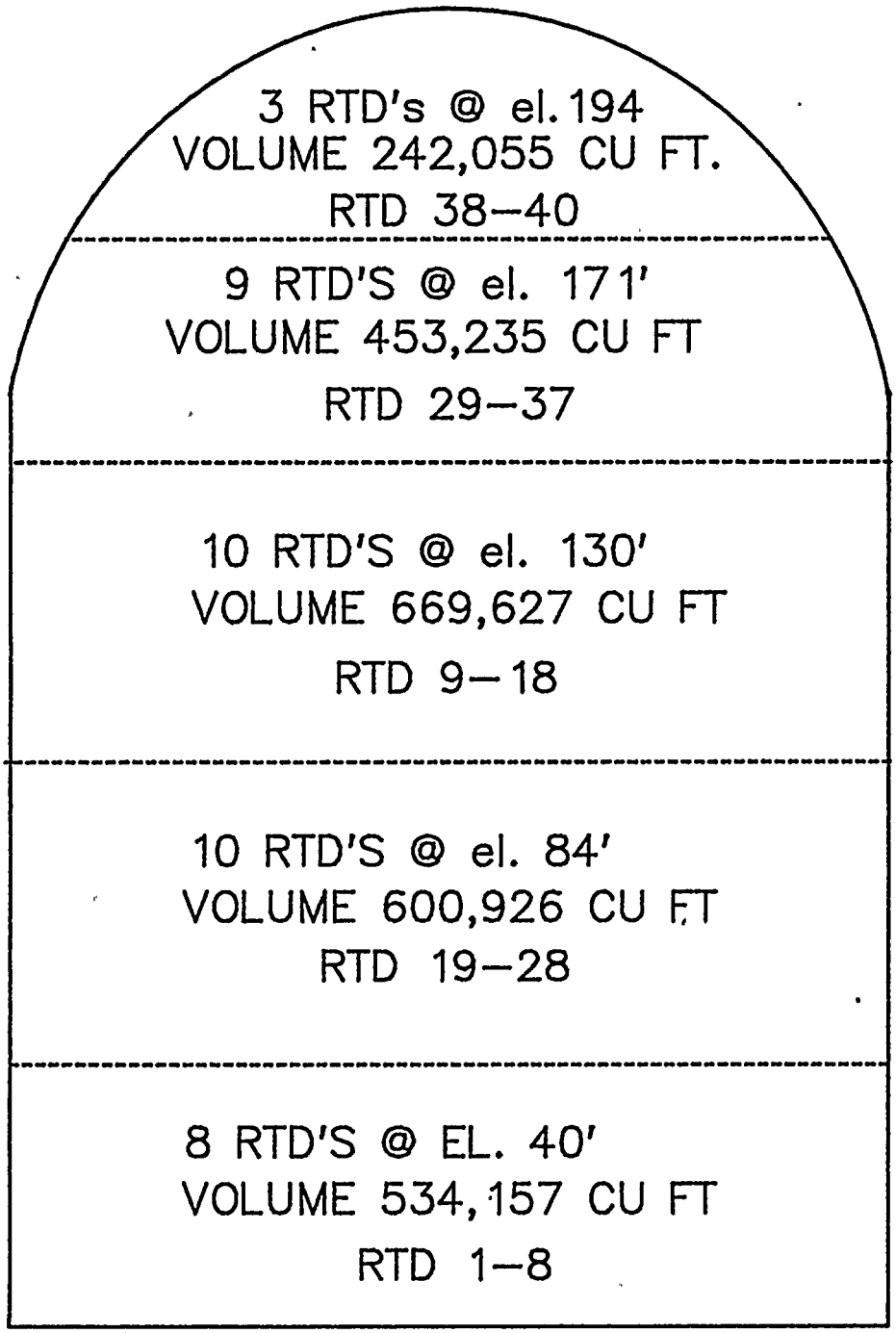


Figure 1

RHD LOCATIONS AND VOLUMES

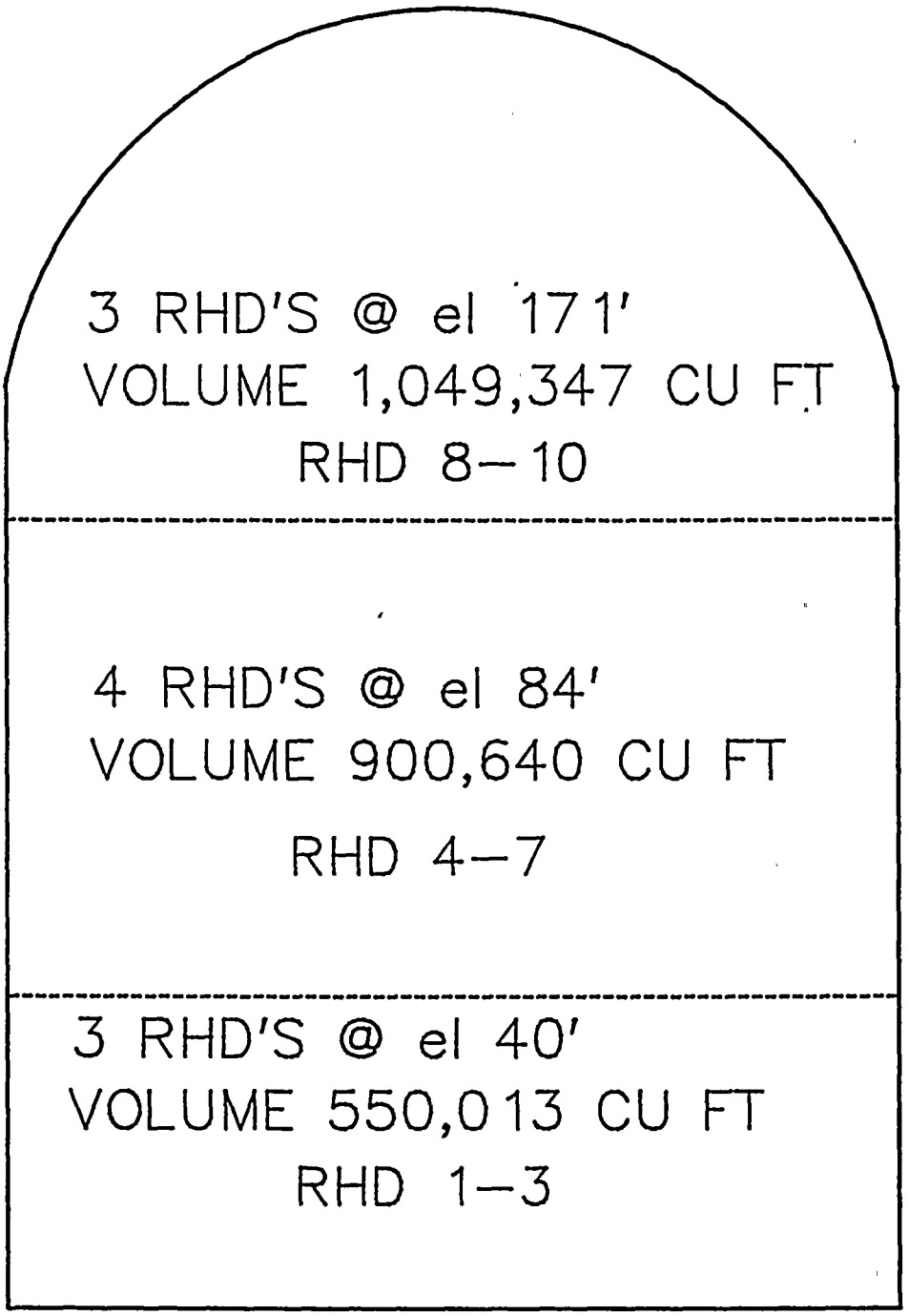


Figure 2

FLOW DIAGRAM

ILRT PRESSURE SENSING & CONTROLLED LEAKAGE INSTRUMENTS

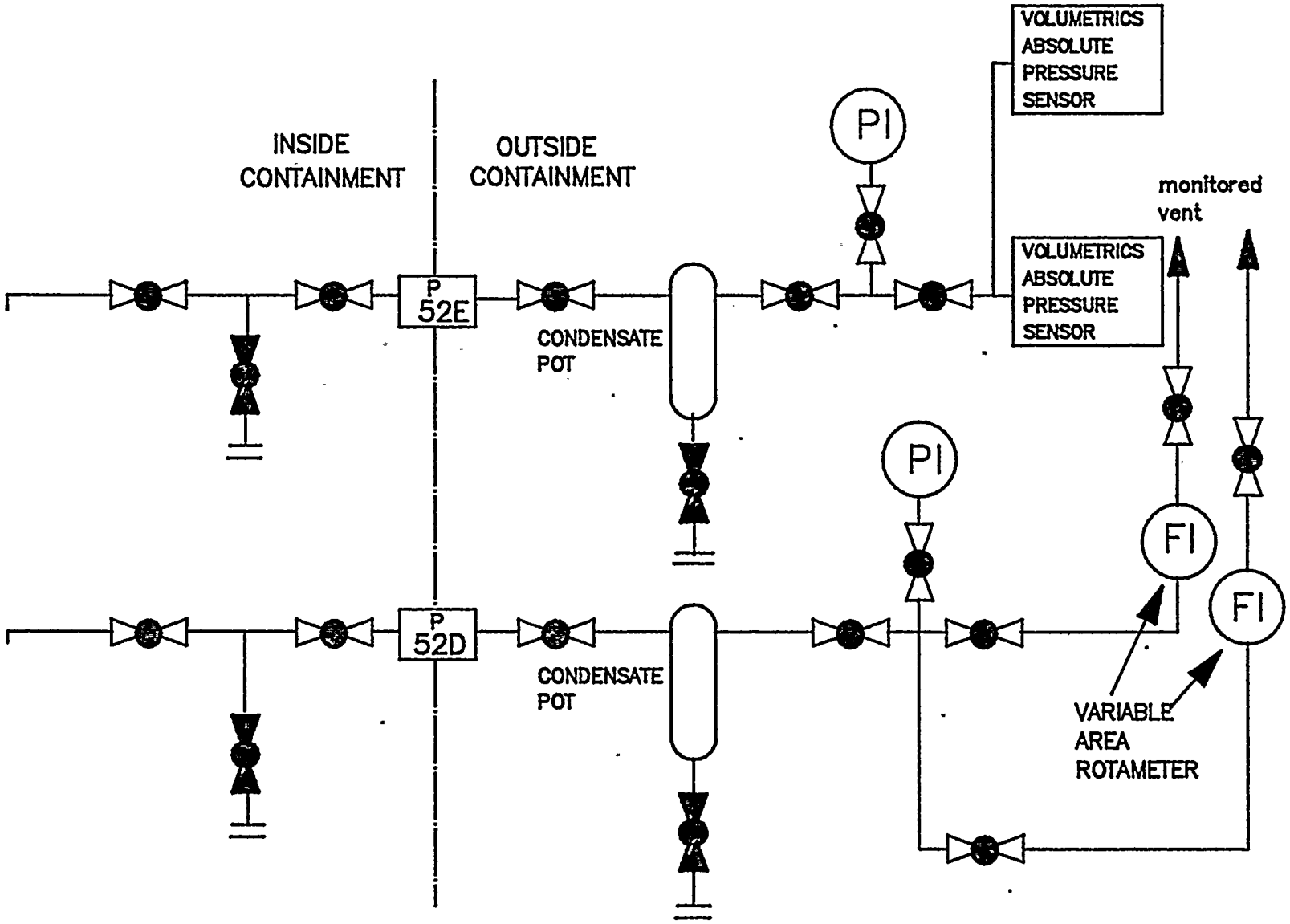


Figure 3

ILRT PRESSURIZATION & DEPRESSURIZING SYSTEM

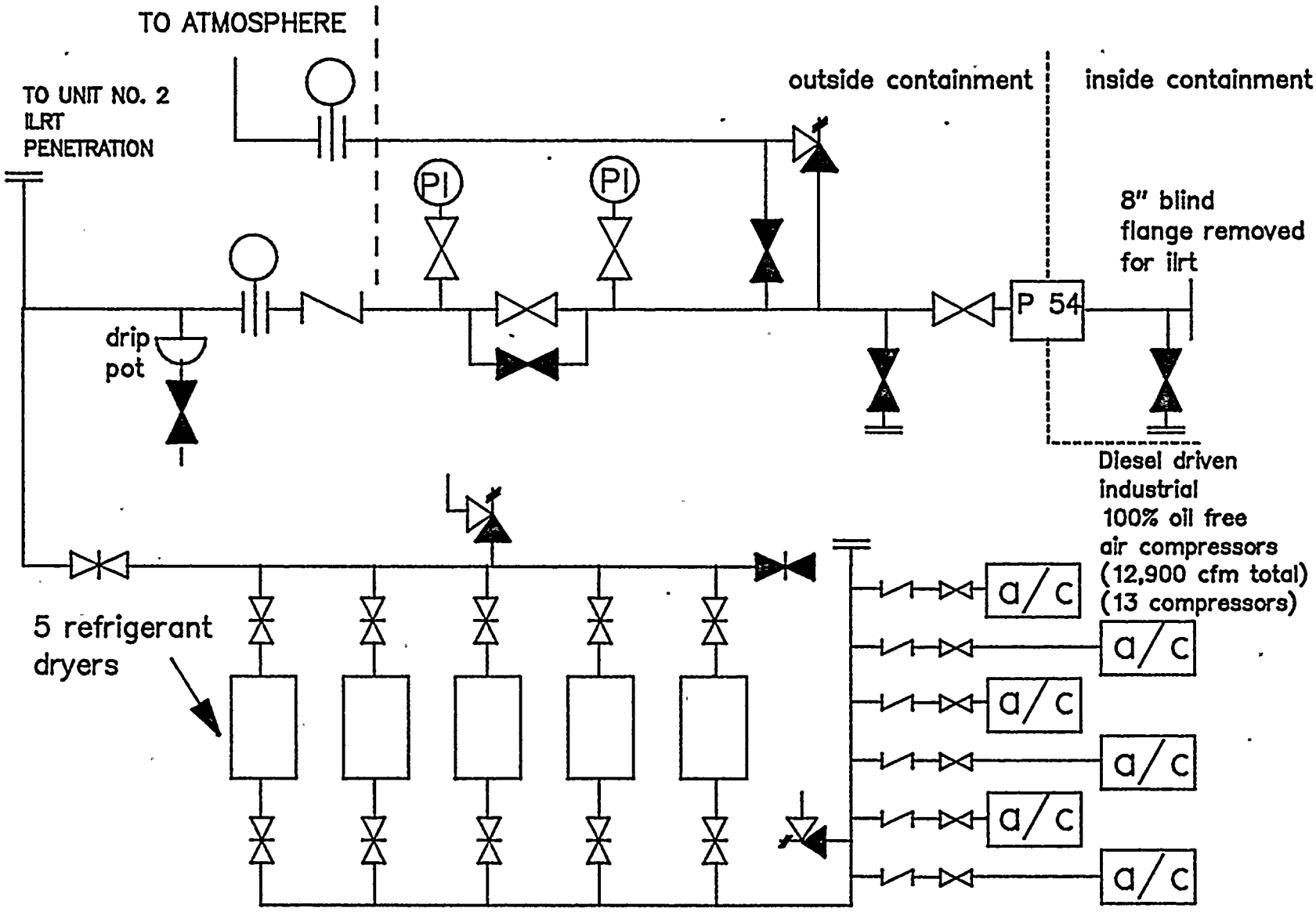


Figure 4

ILRT INSTRUMENTATION DIAGRAM
DATA COLLECTION, OUTPUT, AND STORAGE

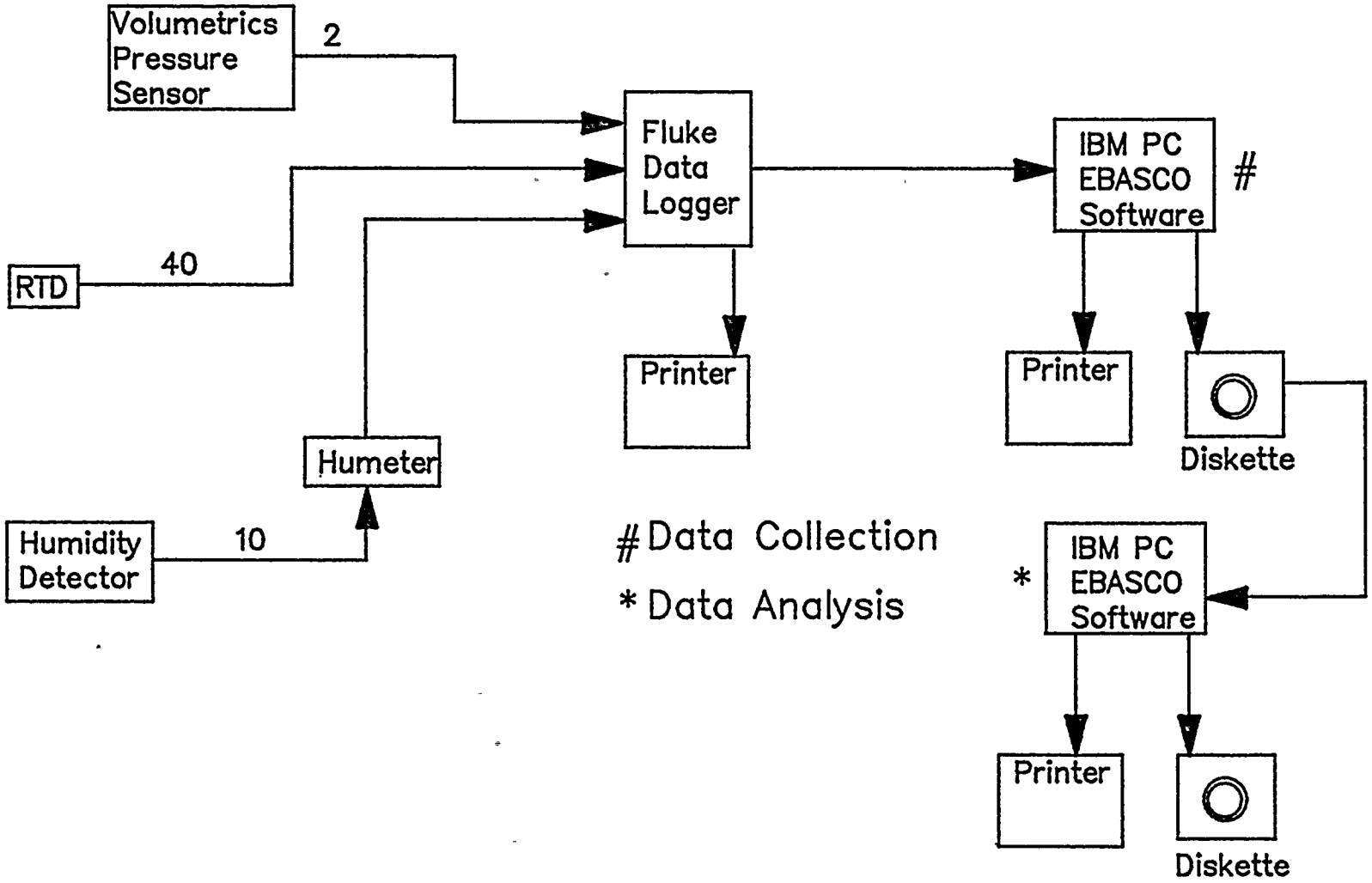


Figure 5

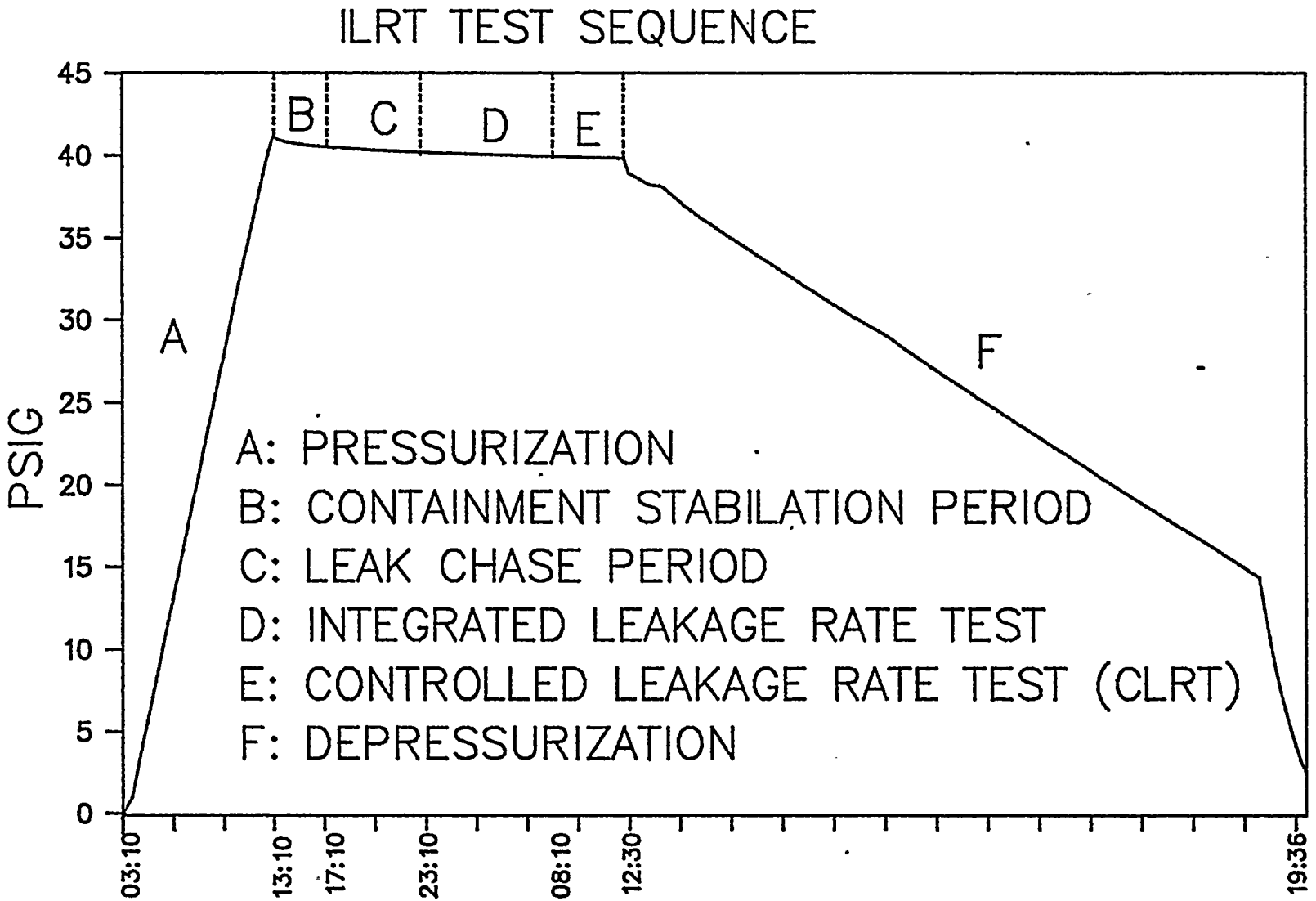

ILRT TEST SEQUENCE
PSIG
45
40
35
30
25
20
15
10
5
0
A
B
C
D
E
F
A: PRESSURIZATION
B: CONTAINMENT STABILATION PERIOD
C: LEAK CHASE PERIOD
D: INTEGRATED LEAKAGE RATE TEST
E: CONTROLLED LEAKAGE RATE TEST (CLRT)
F: DEPRESSURIZATION
03:10
13:10
17:10
23:10
08:10
12:30
19:36

Figure 6

SECTION V
APPENDICES

APPENDIX A

TABULATION OF "AS-FOUND" AND "AS-LEFT" ILRT RESULTS

TABULATION OF "AS-FOUND" AND "AS-LEFT" ILRT RESULTS

A. Correction of ILRT Results for "AS -FOUND" Case

In accordance with NRC I&E Information Notice 85-71, additions are required to the ILRT results due to repairs and/or adjustments made due to Local Leakage rate testing during an outage in which an ILRT is conducted. The corrections include only repairs or adjustments made to containment leakage boundaries which were made prior to the ILRT. These corrections are the difference between the pre-repair and post-repair leakages calculated in the minimum pathway case and corrected for uncertainties in the measurements.

Penetration	Total Minimum Pathway Leakage	Uncertainty	ILRT Correction
P-11 Purge Supply	8200 sccm	109 sccm	8309 sccm
P-43 Rx Drn Tnk pmp suction	150 sccm	12.8 sccm	163 sccm
P-67 Cntnmnt Vacuum Relief	350 sccm	1.8 sccm	352 sccm
P-68 Cntnmnt Vacuum Relief	140 sccm	1.8 sccm	142 sccm
Personnel Air Lock	16200 sccm	109 sccm	16309 sccm

The total local minimum pathway leakage plus uncertainty must be added for the penetrations which are in use during the ILRT and whose containment isolation valves are not tested:

Penetration	Total Minimum Pathway Leakage	Uncertainty	ILRT Correction
P-52D ILRT Test	0 sccm	1.8 sccm	1.8 sccm
P-52E ILRT Test	0 sccm	1.8 sccm	1.8 sccm
P-54 ILRT Pressurization	0 sccm	1.8 sccm	1.8 sccm

The total "as-found" correction can be found adding the above ILRT corrections.

Correction of ILRT results for "as-found" case		25281 sccm
	or	.0137 %/day
Measured ILRT leakage at a 95% UCL	+	0.181 %/day
Reported "as-found" ILRT results		0.1947 %/day
Acceptance Criteria (75% La)		0.375 %/day

B. Correction of ILRT Results for "AS-LEFT" Case

The only correction for the "as-left" ILRT case involves the penetrations which were in use during the test: P-52D, P-52E and P-54. From the above section, the ILRT "as-left" correction can be determined. (Note: A conservative implication was made by not performing a root-mean-square summation of the local uncertainties.)

Correction of ILRT results for "as-left" case		5.37 sccm
	or	2.95×10^{-6} %/day
Measured ILRT Leakage at a 95 % UCL	+	0.181 %/day
Reported "as-left" ILRT results		0.181 %/day
Acceptance Criteria (75% La)		0.375 %/day

APPENDIX B
COMPUTER GENERATED REPORT

CONTAINMENT INTEGRATED LEAKAGE RATE
FINAL TEST REPORT

PSL 1 SPRING 90

ILRT TEST SEQUENCE

PSL 1 SPRING 90

Sequence Started 03:10 4/05/90

Sequence Ended 19:36 4/06/90

Appendix B.1

TEMPERATURE STABILIZATION MODE

PSL 1 SPRING 90

Sequence Started 13:10 4/05/90

Sequence Ended 17:10 4/05/90

PSL 1 SPRING 90

STABILIZATION PERIOD STARTED AT 13:10 ON 4/05/90

TEMPERATURE STABILIZATION

SAMPLE NUMBER	TIME HOURS	AVE TEMP DEG F	DELTA T/HR LAST 2 HRS	DELTA T/HR LAST 1 HR	DELTA T/HR CHANGE
1	0.00	95.964	0.000	0.000	0.000
2	0.33	93.790	0.000	0.000	0.000
3	0.67	92.611	0.000	0.000	0.000
4	1.00	91.840	0.000	-4.124	0.000
5	1.33	91.279	0.000	-2.511	0.000
6	1.67	90.833	0.000	-1.778	0.000
7	2.00	90.462	-2.751	-1.378	1.373
8	2.33	90.127	-1.831	-1.152	0.679
9	2.67	89.834	-1.389	-0.999	0.389
10	3.00	89.547	-1.146	-0.915	0.231
11	3.33	89.300	-0.990	-0.827	0.163
12	3.67	89.060	-0.887	-0.774	0.113
13	4.00	88.842	-0.810	-0.705	0.105 *

NOTES

1) THE 1 HOUR AND 2 HOUR DELTA TEMPERATURE VALUES ARE NOT VALID UNTIL 1 HOUR AND 2 HOURS, RESPECTIVELY, HAVE PASSED IN THE TEST

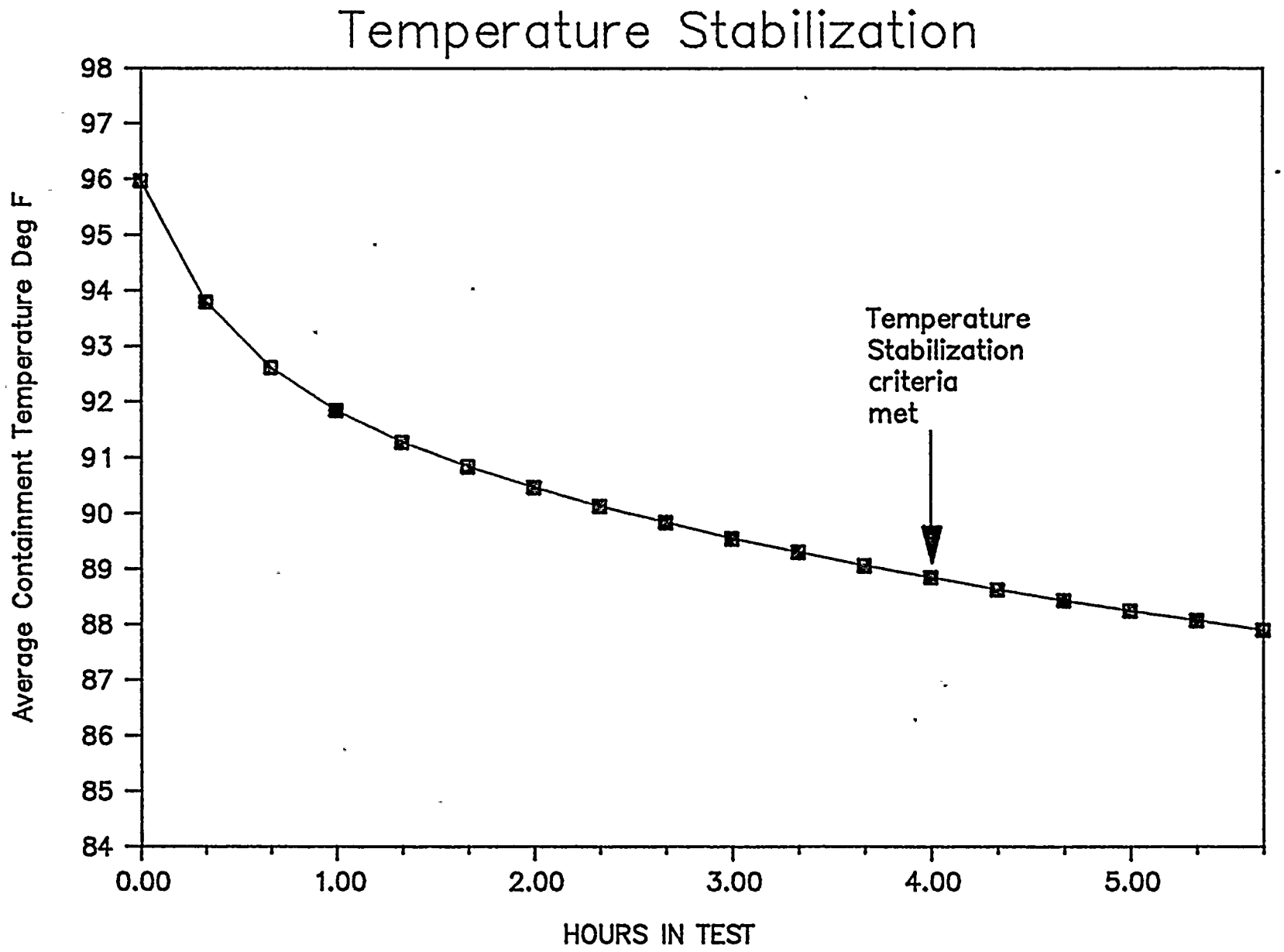
2) THE STABILIZATION CRITERIA IS MET WHEN:

   -THE HOURLY AVERAGE DELTA T FOR THE PRECEDING HOUR DIFFERS FROM THE HOURLY AVERAGE DELTA T FOR THE PRECEDING 2 HOURS BY LESS THAN 0.5 DEGREES F. OR

   -THE HOURLY AVERAGE DELTA T FOR THE PRECEDING 2 HOURS IS LESS THAN 1.0 DEGREES F.

   -THE STABILIZATION PERIOD IS A MINIMUM OF 4 HOURS

3) THE "*" INDICATES THAT THE STABILIZATION CRITERIA HAS BEEN MET.


Temperature Stabilization
Average Containment Temperature Deg F
98
97
96
95
94
93
92
91
90
89
88
87
86
85
84
0.00
1.00
2.00
3.00
4.00
5.00
HOURS IN TEST
Temperature
Stabilization
criteria
met

Appendix B.2

ILRT TEST MODE

PSL 1 SPRING 90

Sequence Started 23:10 4/05/90
Sequence Ended 07:10 4/06/90

PSL 1 SPRING 90

CONTAINMENT INTEGRATED LEAKAGE RATE TEST

LEAKAGE RATE IS MEASURED USING THE ABSOLUTE METHOD AND IS COMPUTED USING THE TOTAL TIME METHOD IN STRICT ACCORDANCE WITH TOPICAL REPORT BN-TOP-1 (REV 1)

TEST PERIOD STARTED AT 23:10 HOURS ON 4/05/90
TEST CONDUCTED FOR 8.00 HOURS

FREESPACE VOLUME OF CONTAINMENT IS 2500000 CU FT
CONTAINMENT WAS PRESSURIZED TO 55.16 PSIA

FITTED TOTAL TIME ILRT LEAKAGE RATE	Lam	= 0.083 % /DAY
UPPER LIMIT OF 95% CONFIDENCE LEVEL	UCL	= 0.181 % /DAY
CONTAINMENT DESIGN LEAKAGE RATE	La	= 0.500 % /DAY
ILRT ACCEPTANCE CRITERIA	75% La	= 0.375 % /DAY

BN-TOP REDUCED DURATION ILRT TERMINATION CRITERIA

-THE TREND OF THE TOTAL TIME CALCULATED LEAKAGE RATE SHALL INDICATE THAT THE MAGNITUDE OF THE LEAKAGE RATE IS TENDING TO STABILIZE AT A VALUE LESS THAN OR EQUAL TO 75% OF La.

La = 0.500 % /DAY
75% La = 0.375 % /DAY
Lam = 0.083 % /DAY with a Negative Skew

-AT THE END OF THE ILRT THE UPPER LIMIT OF THE 95% CONFIDENCE LEVEL SHALL BE LESS THAN OR EQUAL TO 75% OF La.

UCL = 0.181 % /DAY

-THE MEAN OF THE MEASURED LEAKAGE RATES OVER THE LAST 5 HOURS OR 20 DATA SETS, WHICHEVER PROVIDES THE MOST POINTS, SHALL BE LESS THAN OR EQUAL TO 75% OF La.

MEAN OF SIMPLE LEAKAGE FOR SAMPLES = 0.116 % /DAY

DESCRIPTION OF VARIABLES

AVE TEMP - CONTAINMENT MEAN TEMPERATURE CALCULATED FROM VOLUMETRICALLY WEIGHTED RTD SENSOR INDICATIONS.

PRESSURE - PRIMARY CONTAINMENT PRESSURE INDICATION.

VAPOR PRES - CONTAINMENT VAPOR PRESSURE CALCULATED FROM VOLUMETRICALLY WEIGHTED HUMIDITY/DEWPOINT SENSOR INDICATIONS.

LEAK SIM - SIMPLE TOTAL TIME MEASURED LEAKAGE RATE.

LEAK FIT - LEAKAGE RATE CALCULATED FROM FIRST ORDER REGRESSION OF SIMPLE TOTAL TIME LEAKAGE RATE DATA.

95% UCL - UPPER LIMIT OF THE 95% CONFIDENCE LEVEL OF FITTED LEAKAGE RATE DATA.

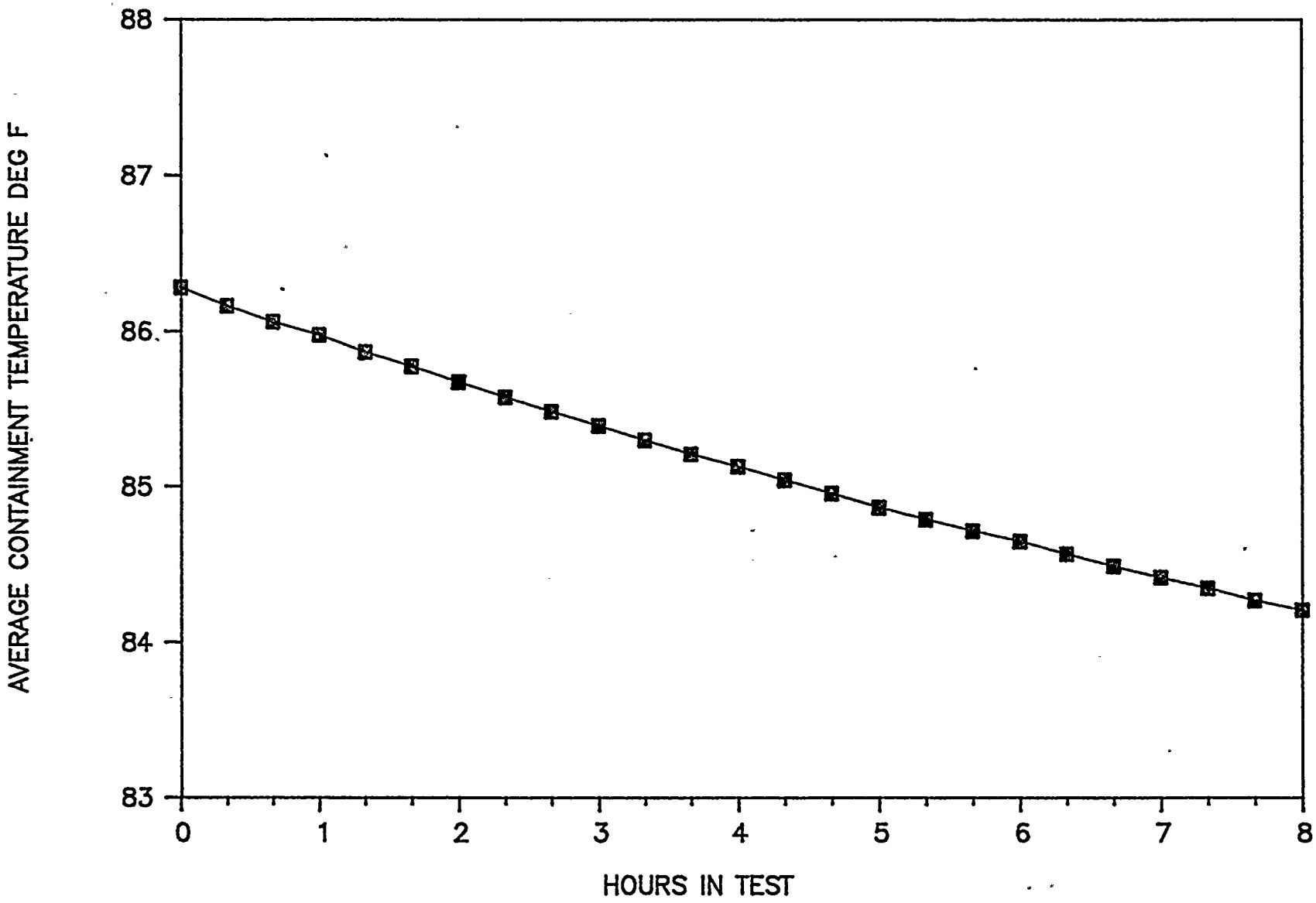
AIR MASS - CONTAINMENT AIR MASS.

NOTES FOR TABULAR DATA -

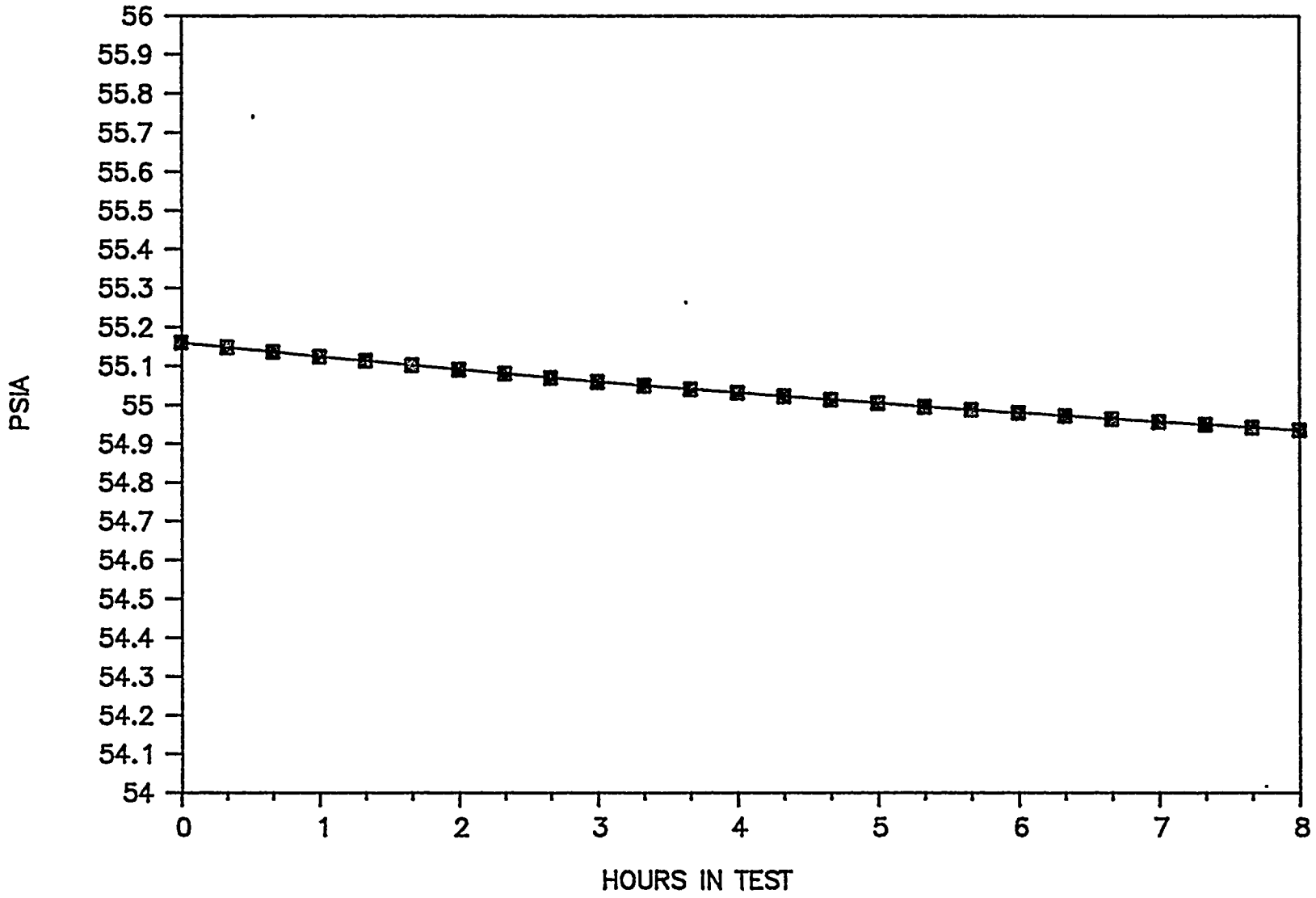
1. TABLE VALUES OF ZERO SIGNIFY THE DATA IS NOT APPLICABLE TO THE CALCULATION.

2. "DELETED" SIGNIFIES THE SENSOR WAS DELETED.

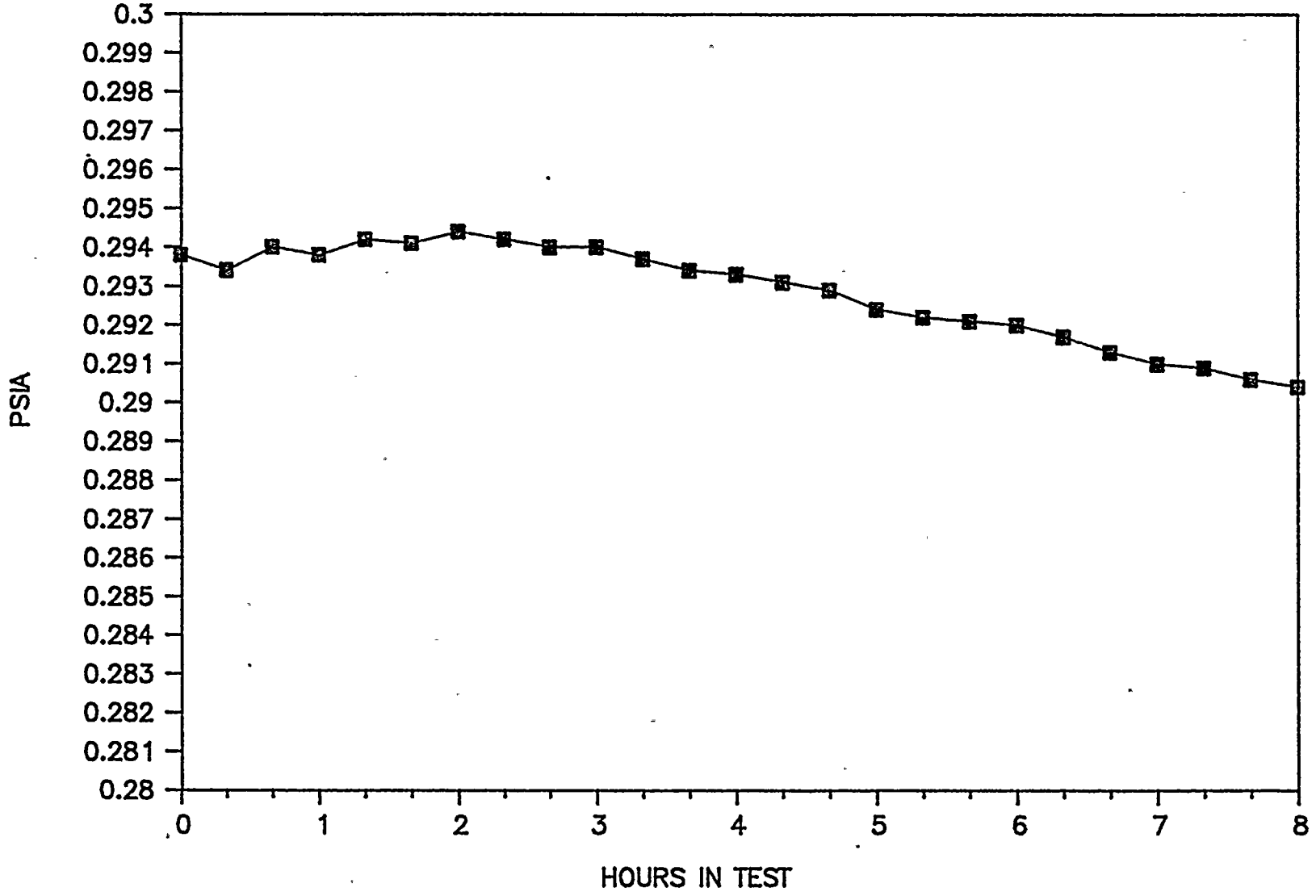
ILRT WEIGHTED AVERAGE TEMPERATURE



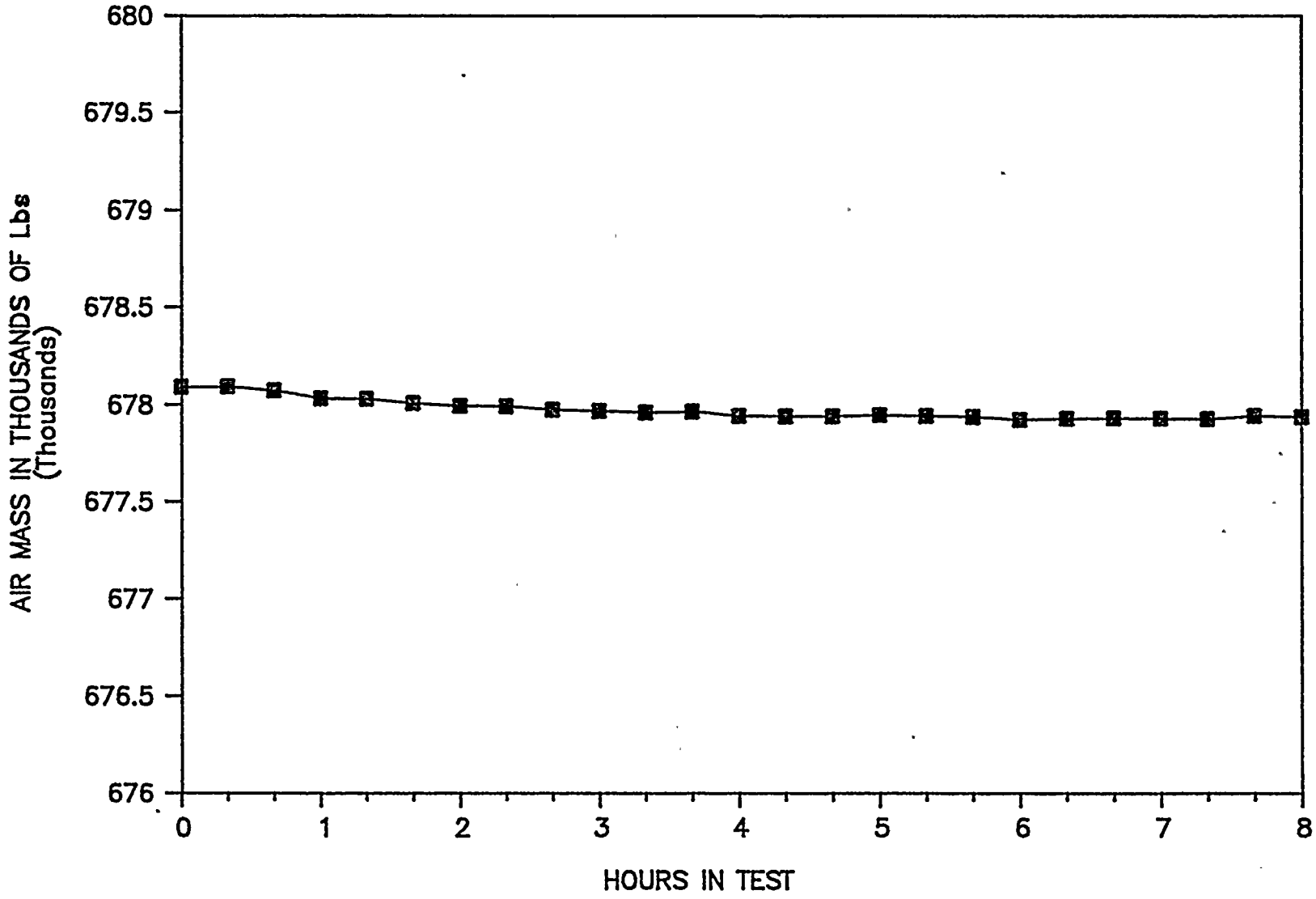
ILRT CONTAINMENT ABSOLUTE PRESSURE



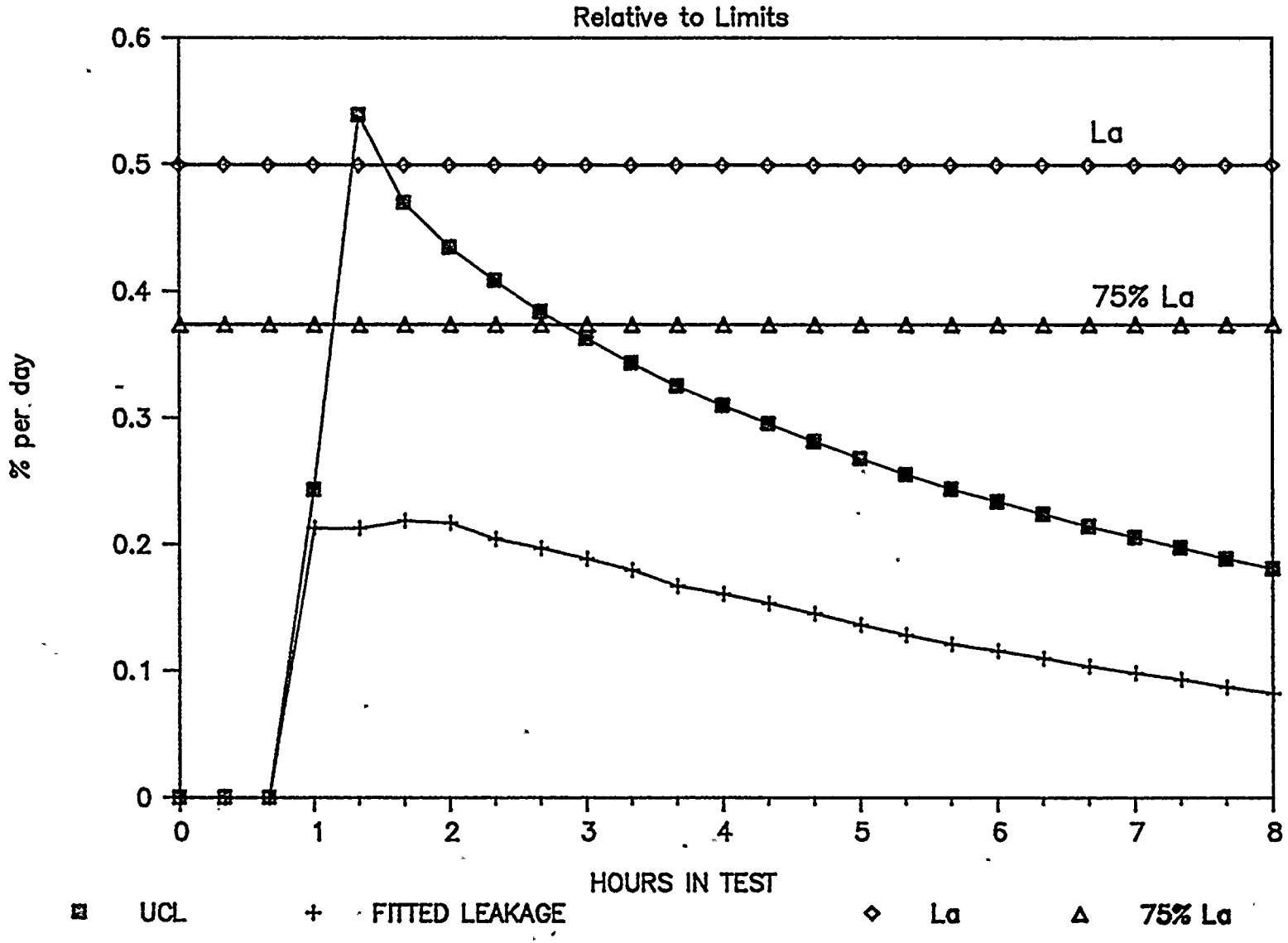
ILRT WEIGHTED AVERAGE VAPOR PRESSURE



ILRT AIR MASS



ILRT BN-TOP Leakage Rates



ILRT VARIABLE TABLE SUMMARY

SAM NO	TIME HOURS	AVE TEMP DEG F	PRESSURE PSIA	VAP PRES %/DAY	LEAK SIM %/DAY	LEAK FIT %/DAY	UCL LBS	AIRMASS
1	0.00	86.277	55.159	0.2938	0.000	0.000	0.000	678091
2	0.33	86.159	55.147	0.2934	-0.022	0.000	0.000	678093
3	0.67	86.060	55.136	0.2940	0.099	0.000	0.000	678072
4	1.00	85.976	55.124	0.2938	0.212	0.214	0.243	678031
5	1.33	85.865	55.113	0.2942	0.163	0.213	0.539	678030
6	1.67	85.774	55.102	0.2941	0.178	0.219	0.470	678007
7	2.00	85.673	55.091	0.2944	0.174	0.218	0.434	677993
8	2.33	85.577	55.081	0.2942	0.151	0.204	0.409	677992
9	2.67	85.484	55.070	0.2940	0.156	0.197	0.384	677974
10	3.00	85.391	55.060	0.2940	0.148	0.189	0.363	677966
11	3.33	85.299	55.050	0.2937	0.140	0.180	0.344	677959
12	3.67	85.208	55.041	0.2934	0.122	0.168	0.325	677964
13	4.00	85.128	55.031	0.2933	0.132	0.162	0.310	677942
14	4.33	85.042	55.022	0.2931	0.123	0.154	0.295	677940
15	4.67	84.954	55.013	0.2929	0.114	0.146	0.282	677940
16	5.00	84.864	55.004	0.2924	0.103	0.137	0.268	677946
17	5.33	84.790	54.996	0.2922	0.099	0.129	0.255	677942
18	5.67	84.717	54.988	0.2921	0.097	0.122	0.244	677936
19	6.00	84.649	54.980	0.2920	0.100	0.116	0.234	677922
20	6.33	84.567	54.972	0.2917	0.091	0.110	0.224	677928
21	6.67	84.489	54.964	0.2913	0.085	0.104	0.214	677931
22	7.00	84.415	54.956	0.2910	0.082	0.099	0.206	677928
23	7.33	84.349	54.949	0.2909	0.080	0.094	0.197	677925
24	7.67	84.270	54.942	0.2906	0.069	0.088	0.189	677941
25	8.00	84.207	54.935	0.2904	0.069	0.083	0.181	677934

SENSOR VOLUME FRACTIONS

TEMPERATURE SENSORS

1 to 5	0.026708	0.026708	0.026708	0.026708	0.026708
6 to 10	0.026708	0.026708	0.026708	0.026785	0.026785
11 to 15	0.026785	0.026785	0.026785	0.026785	0.026785
16 to 20	0.026785	0.026785	0.026785	0.024037	0.024037
21 to 25	0.024037	0.024037	0.024037	0.024037	0.024037
26 to 30	0.024037	0.024037	0.024037	0.020144	0.020144
31 to 35	0.020144	0.020144	0.020144	0.020144	0.020144
36 to 40	0.020144	0.020144	0.032274	0.032274	0.032274

HUMIDITY/DP SENSORS

1 to 5	0.073335	0.073335	0.073335	0.090064	0.090064
6 to 10	0.090064	0.090064	0.139913	0.139913	0.139913

NOTE: VALUE OF ZERO INDICATES A DELETED SENSOR.

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 1 DEG F	TEMP 2 DEG F	TEMP 3 DEG F	TEMP 4 DEG F	TEMP 5 DEG F	TEMP 6 DEG F
1	0.00	80.849	81.377	80.330	80.096	79.654	81.809
2	0.33	80.860	81.334	80.319	80.108	79.654	81.798
3	0.67	80.827	81.345	80.319	80.108	79.643	81.798
4	1.00	80.845	81.363	80.348	80.137	79.661	81.81
5	1.33	80.809	81.328	80.314	80.101	79.659	81.814
6	1.67	80.838	81.334	80.330	80.130	79.666	81.809
7	2.00	80.849	81.314	80.319	80.096	79.643	81.798
8	2.33	80.816	81.303	80.330	80.108	79.654	81.798
9	2.67	80.827	81.303	80.319	80.096	79.643	81.798
10	3.00	80.773	81.281	80.310	80.096	79.643	81.809
11	3.33	80.838	81.270	80.319	80.108	79.666	81.798
12	3.67	80.849	81.249	80.319	80.096	79.654	81.809
13	4.00	80.807	81.238	80.310	80.096	79.643	81.798
14	4.33	80.807	81.238	80.310	80.108	79.654	81.798
15	4.67	80.784	81.207	80.298	80.087	79.643	81.798
16	5.00	80.795	81.227	80.310	80.076	79.623	81.798
17	5.33	80.784	81.207	80.298	80.076	79.632	81.809
18	5.67	80.816	81.185	80.298	80.087	79.632	81.787
19	6.00	80.773	81.185	80.298	80.065	79.632	81.787
20	6.33	80.784	81.165	80.298	80.076	79.632	81.787
21	6.67	80.800	81.147	80.280	80.070	79.616	81.780
22	7.00	80.784	81.131	80.287	80.065	79.623	81.775
23	7.33	80.753	81.131	80.276	80.065	79.612	81.766
24	7.67	80.746	81.124	80.269	80.047	79.605	81.760
25	8.00	80.746	81.136	80.260	80.047	79.605	81.769

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 7 DEG F	TEMP 8 DEG F	TEMP 9 DEG F	TEMP 10 DEG F	TEMP 11 DEG F	TEMP 12 DEG F
1	0.00	79.892	79.786	88.684	87.962	88.313	88.086
2	0.33	79.892	79.809	88.534	87.800	88.154	87.925
3	0.67	79.881	79.818	88.417	87.618	87.971	87.766
4	1.00	79.907	79.804	88.240	87.495	87.828	87.611
5	1.33	79.896	79.845	88.111	87.331	87.667	87.458
6	1.67	79.892	79.786	87.914	87.210	87.555	87.315
7	2.00	79.892	79.818	87.795	87.049	87.363	87.142
8	2.33	79.881	79.818	87.721	86.898	87.245	87.026
9	2.67	79.881	79.809	87.529	86.782	87.118	86.896
10	3.00	79.881	79.786	87.421	86.652	86.999	86.779
11	3.33	79.881	79.786	87.240	86.535	86.872	86.649
12	3.67	79.869	79.809	87.153	86.405	86.776	86.521
13	4.00	79.881	79.798	86.983	86.288	86.626	86.403
14	4.33	79.881	79.809	86.918	86.158	86.508	86.255
15	4.67	79.881	79.755	86.779	86.053	86.412	86.190
16	5.00	79.869	79.764	86.714	85.956	86.296	86.071
17	5.33	79.869	79.786	86.533	85.849	86.200	85.963
18	5.67	79.869	79.755	86.511	85.741	86.092	85.847
19	6.00	79.858	79.775	86.383	85.645	85.985	85.750
20	6.33	79.858	79.755	86.222	85.548	85.911	85.665
21	6.67	79.854	79.759	86.119	85.445	85.786	85.562
22	7.00	79.849	79.786	86.052	85.344	85.717	85.461
23	7.33	79.858	79.798	85.965	85.259	85.601	85.365
24	7.67	79.831	79.759	85.895	85.167	85.518	85.262
25	8.00	79.831	79.737	85.777	85.079	85.433	85.174

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 13 DEG F	TEMP 14 DEG F	TEMP 15 DEG F	TEMP 16 DEG F	TEMP 17 DEG F	TEMP 18 DEG F
1	0.00	88.130	88.139	88.243	88.108	88.184	88.226
2	0.33	87.960	87.989	88.093	87.969	88.023	88.067
3	0.67	87.833	87.838	87.934	87.796	87.884	87.906
4	1.00	87.678	87.683	87.800	87.675	87.740	87.783
5	1.33	87.504	87.522	87.639	87.512	87.567	87.600
6	1.67	87.372	87.387	87.505	87.380	87.432	87.479
7	2.00	87.222	87.248	87.334	87.230	87.273	87.318
8	2.33	87.094	87.109	87.216	87.102	87.154	87.179
9	2.67	86.953	86.970	87.099	86.972	87.003	87.060
10	3.00	86.826	86.842	86.949	86.833	86.887	86.933
11	3.33	86.707	86.723	86.831	86.706	86.768	86.803
12	3.67	86.580	86.604	86.714	86.587	86.649	86.687
13	4.00	86.461	86.476	86.596	86.448	86.532	86.568
14	4.33	86.356	86.379	86.477	86.363	86.402	86.441
15	4.67	86.248	86.251	86.372	86.244	86.296	86.333
16	5.00	86.141	86.144	86.253	86.126	86.189	86.226
17	5.33	86.022	86.047	86.157	86.029	86.092	86.118
18	5.67	85.926	85.939	86.061	85.944	85.984	86.022
19	6.00	85.821	85.843	85.942	85.828	85.888	85.915
20	6.33	85.745	85.746	85.857	85.729	85.780	85.819
21	6.67	85.631	85.632	85.754	85.628	85.688	85.716
22	7.00	85.530	85.542	85.654	85.548	85.587	85.626
23	7.33	85.456	85.466	85.568	85.440	85.490	85.541
24	7.67	85.342	85.365	85.466	85.360	85.419	85.449
25	8.00	85.257	85.278	85.389	85.263	85.311	85.353

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 19 DEG F	TEMP 20 DEG F	TEMP 21 DEG F	TEMP 22 DEG F	TEMP 23 DEG F	TEMP 24 DEG F
1	0.00	88.045	86.820	86.648	87.283	87.797	87.239
2	0.33	87.862	86.809	86.552	87.303	87.721	87.143
3	0.67	87.788	86.798	86.552	87.241	87.658	87.109
4	1.00	87.613	86.766	86.518	87.283	87.614	87.089
5	1.33	87.492	86.728	86.458	87.138	87.629	87.029
6	1.67	87.360	86.728	86.545	86.988	87.576	87.040
7	2.00	87.219	86.802	86.597	86.912	87.479	86.975
8	2.33	87.103	86.674	86.469	86.816	87.383	86.890
9	2.67	87.027	86.567	86.469	86.753	87.287	86.901
10	3.00	86.930	86.490	86.395	86.635	87.159	86.847
11	3.33	86.684	86.466	86.283	86.503	87.036	86.777
12	3.67	86.610	86.394	86.265	86.411	86.945	86.621
13	4.00	86.545	86.320	86.373	86.293	86.840	86.643
14	4.33	86.418	86.266	86.160	86.208	86.764	86.547
15	4.67	86.299	86.168	86.198	86.098	86.632	86.457
16	5.00	86.171	86.074	86.052	86.015	86.529	86.385
17	5.33	86.095	86.060	85.983	85.903	86.428	86.284
18	5.67	85.979	85.995	85.929	85.818	86.332	86.284
19	6.00	85.894	85.899	85.878	85.733	86.267	86.179
20	6.33	85.786	85.838	85.848	85.631	86.164	86.130
21	6.67	85.695	85.753	85.721	85.512	86.068	86.000
22	7.00	85.657	85.688	85.624	85.458	85.983	85.968
23	7.33	85.529	85.668	85.548	85.362	85.909	85.883
24	7.67	85.426	85.560	85.474	85.266	85.802	85.807
25	8.00	85.341	85.424	85.369	85.183	85.719	85.713

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 25 DEG F	TEMP 26 DEG F	TEMP 27 DEG F	TEMP 28 DEG F	TEMP 29 DEG F	TEMP 30 DEG F
1	0.00	87.901	88.053	87.577	87.829	87.992	87.884
2	0.33	87.678	87.754	87.460	87.679	87.842	87.702
3	0.67	87.604	87.763	87.407	87.605	87.694	87.530
4	1.00	87.443	87.615	87.373	87.648	87.553	87.424
5	1.33	87.340	87.521	87.304	87.415	87.398	87.256
6	1.67	87.190	87.436	87.132	87.245	87.268	87.137
7	2.00	87.074	87.350	87.154	87.180	87.075	86.956
8	2.33	86.944	87.265	87.015	87.041	86.959	86.839
9	2.67	86.816	87.146	86.885	86.979	86.840	86.700
10	3.00	86.698	87.007	86.812	86.925	86.681	86.539
11	3.33	86.555	86.906	86.700	86.856	86.580	86.449
12	3.67	86.463	86.771	86.619	86.721	86.455	86.313
13	4.00	86.335	86.663	86.492	86.625	86.370	86.174
14	4.33	86.217	86.578	86.447	86.464	86.242	86.089
15	4.67	86.107	86.468	86.326	86.386	86.121	85.999
16	5.00	86.013	86.354	86.223	86.241	86.005	85.831
17	5.33	85.904	86.273	86.145	86.194	85.906	85.764
18	5.67	85.808	86.176	86.038	86.097	85.777	85.636
19	6.00	85.732	86.091	85.964	86.032	85.714	85.593
20	6.33	85.620	85.988	85.870	85.952	85.577	85.457
21	6.67	85.524	85.891	85.807	85.833	85.515	85.360
22	7.00	85.416	85.784	85.669	85.737	85.418	85.221
23	7.33	85.340	85.710	85.604	85.663	85.311	85.179
24	7.67	85.255	85.613	85.508	85.567	85.226	85.060
25	8.00	85.173	85.541	85.445	85.493	85.143	85.000

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 31 DEG F	TEMP 32 DEG F	TEMP 33 DEG F	TEMP 34 DEG F	TEMP 35 DEG F	TEMP 36 DEG F
1	0.00	87.806	87.920	87.991	87.831	87.852	87.782
2	0.33	87.636	87.750	87.843	87.658	87.693	87.623
3	0.67	87.464	87.577	87.640	87.476	87.520	87.473
4	1.00	87.294	87.416	87.501	87.359	87.404	87.334
5	1.33	87.160	87.282	87.387	87.214	87.215	87.166
6	1.67	87.053	87.165	87.225	87.074	87.085	87.015
7	2.00	86.883	86.992	87.075	86.924	86.947	86.876
8	2.33	86.754	86.885	86.959	86.794	86.796	86.738
9	2.67	86.627	86.746	86.809	86.635	86.680	86.608
10	3.00	86.488	86.618	86.701	86.527	86.550	86.480
11	3.33	86.388	86.506	86.558	86.415	86.418	86.348
12	3.67	86.220	86.340	86.446	86.269	86.315	86.256
13	4.00	86.104	86.253	86.316	86.161	86.218	86.159
14	4.33	86.039	86.157	86.231	86.044	86.090	86.009
15	4.67	85.908	86.027	86.099	85.935	85.969	85.908
16	5.00	85.774	85.879	85.954	85.818	85.844	85.774
17	5.33	85.662	85.769	85.864	85.708	85.743	85.684
18	5.67	85.597	85.704	85.777	85.600	85.647	85.599
19	6.00	85.492	85.619	85.692	85.546	85.584	85.512
20	6.33	85.410	85.516	85.600	85.423	85.470	85.400
21	6.67	85.294	85.420	85.493	85.336	85.362	85.312
22	7.00	85.186	85.323	85.397	85.230	85.255	85.196
23	7.33	85.122	85.227	85.323	85.143	85.181	85.120
24	7.67	85.026	85.131	85.204	85.037	85.062	85.003
25	8.00	84.965	85.068	85.153	84.974	85.002	84.929

ILRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 37 DEG F	TEMP 38 DEG F	TEMP 39 DEG F	TEMP 40 DEG F
1	0.00	88.019	87.677	87.959	87.779
2	0.33	87.849	87.516	87.788	87.595
3	0.67	87.710	87.335	87.607	87.456
4	1.00	87.572	87.228	87.488	87.313
5	1.33	87.392	87.062	87.311	87.172
6	1.67	87.276	86.921	87.204	87.029
7	2.00	87.137	86.751	87.023	86.867
8	2.33	86.998	86.623	86.884	86.728
9	2.67	86.860	86.494	86.754	86.590
10	3.00	86.719	86.366	86.637	86.505
11	3.33	86.609	86.265	86.525	86.343
12	3.67	86.484	86.109	86.380	86.236
13	4.00	86.398	86.035	86.284	86.151
14	4.33	86.260	85.939	86.156	86.001
15	4.67	86.150	85.784	86.055	85.893
16	5.00	86.002	85.670	85.941	85.786
17	5.33	85.924	85.592	85.840	85.701
18	5.67	85.828	85.476	85.744	85.582
19	6.00	85.754	85.422	85.681	85.519
20	6.33	85.629	85.265	85.525	85.381
21	6.67	85.544	85.189	85.471	85.287
22	7.00	85.425	85.073	85.332	85.208
23	7.33	85.371	84.997	85.245	85.112
24	7.67	85.244	84.892	85.160	85.009
25	8.00	85.172	84.840	85.120	84.935

ILRT PRESSURE AND HUMIDITY VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	PRES 1 PSIA	PRES 2 PSIA	HUM 1 % RH	HUM 2 % RH	HUM 3 % RH	HUM 4 % RH
1	0.00	55.161	55.159	39.490	42.690	42.660	48.370
2	0.33	55.150	55.147	39.670	42.840	42.800	48.380
3	0.67	55.137	55.136	39.810	42.960	42.930	48.440
4	1.00	55.126	55.124	39.970	43.110	43.140	48.540
5	1.33	55.114	55.113	40.160	43.240	43.330	48.820
6	1.67	55.104	55.102	40.290	43.360	43.550	48.770
7	2.00	55.094	55.091	40.400	43.490	43.730	48.950
8	2.33	55.083	55.081	40.540	43.590	43.910	49.120
9	2.67	55.072	55.070	40.680	43.790	44.090	49.040
10	3.00	55.063	55.060	40.820	44.010	44.310	49.220
11	3.33	55.053	55.050	40.970	44.180	44.520	49.250
12	3.67	55.043	55.041	41.110	44.380	44.670	49.340
13	4.00	55.034	55.031	41.250	44.560	44.880	49.310
14	4.33	55.025	55.022	41.380	44.750	45.040	49.410
15	4.67	55.016	55.013	41.560	44.950	45.270	49.560
16	5.00	55.007	55.004	41.640	45.150	45.450	49.510
17	5.33	54.999	54.996	41.770	45.370	45.630	49.550
18	5.67	54.990	54.988	41.930	45.560	45.810	49.660
19	6.00	54.982	54.980	42.030	45.760	46.030	49.700
20	6.33	54.974	54.972	42.210	45.970	46.260	49.750
21	6.67	54.966	54.964	42.340	46.200	46.440	49.760
22	7.00	54.959	54.956	42.490	46.420	46.660	49.820
23	7.33	54.952	54.949	42.590	46.660	46.850	49.790
24	7.67	54.944	54.942	42.820	46.900	47.100	49.920
25	8.00	54.936	54.935	43.030	47.150	47.340	49.840

ILRT HUMIDITY VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	HUM 5 % RH	HUM 6 % RH	HUM 7 % RH	HUM 8 % RH	HUM 9 % RH	HUM 10 % RH
1	0.00	47.650	48.360	47.800	48.570	49.480	49.670
2	0.33	47.660	48.140	48.360	48.690	49.690	49.790
3	0.67	48.170	49.210	48.500	48.850	49.800	49.880
4	1.00	48.280	49.030	48.320	48.980	49.960	50.070
5	1.33	48.210	49.630	48.710	49.160	50.080	50.250
6	1.67	48.690	49.540	48.910	49.260	50.220	50.390
7	2.00	48.920	50.030	49.040	49.390	50.360	50.530
8	2.33	49.060	50.170	49.140	49.500	50.450	50.650
9	2.67	49.010	50.290	49.280	49.610	50.600	50.780
10	3.00	49.400	50.430	49.350	49.740	50.710	50.850
11	3.33	49.500	50.540	49.380	49.800	50.810	50.980
12	3.67	49.580	50.590	49.470	49.910	50.860	51.040
13	4.00	49.650	50.720	49.520	50.000	50.990	51.160
14	4.33	49.780	50.760	49.600	50.070	51.040	51.290
15	4.67	49.780	50.870	49.640	50.160	51.190	51.370
16	5.00	49.870	50.950	49.710	50.240	51.290	51.430
17	5.33	49.960	50.980	49.800	50.300	51.340	51.480
18	5.67	50.030	51.030	49.820	50.360	51.400	51.570
19	6.00	50.060	51.090	49.880	50.480	51.450	51.650
20	6.33	50.110	51.130	49.880	50.550	51.520	51.720
21	6.67	50.210	51.180	49.890	50.580	51.610	51.730
22	7.00	50.220	51.200	49.990	50.630	51.610	51.810
23	7.33	50.270	51.280	49.980	50.700	51.700	51.850
24	7.67	50.300	51.300	50.020	50.740	51.750	51.880
25	8.00	50.360	51.340	50.080	50.780	51.770	51.990

Appendix B.3

CLRT TEST MODE

PSL 1 SPRING 90

Sequence Started 08:10 4/06/90
Sequence Ended 12:10 4/06/90

PSL 1 SPRING 90

CONTAINMENT INTEGRATED LEAKAGE RATE TEST
SUPPLEMENTAL VERIFICATION TEST

LEAKAGE RATE IS MEASURED USING THE ABSOLUTE METHOD AND IS COMPUTED USING THE TOTAL TIME METHOD IN STRICT ACCORDANCE WITH TOPICAL REPORT BN-TOP-1 (REV 1)

TEST PERIOD STARTED AT 08:10 HOURS ON 4/06/90
TEST CONDUCTED FOR 4.00 HOURS

FREESPACE VOLUME OF CONTAINMENT IS 2500000 CU FT
CONTAINMENT WAS PRESSURIZED TO 54.91 PSIA

FITTED TOTAL TIME ILRT LEAKAGE RATE	Lam	= 0.083 % /DAY
CONTAINMENT DESIGN LEAKAGE RATE	La	= 0.500 % /DAY
SUPERIMPOSED CLRT LEAKAGE RATE	Lo	= 0.299 % /DAY
FITTED CLRT TOTAL TIME LEAKAGE RATE	Lc	= 0.334 % /DAY

$$Lo + Lam - La/4 <= Lc <= Lo + Lam + La/4$$

$$0.299 + 0.083 - 0.125 <= 0.334 <= 0.299 + 0.083 + 0.125$$

$$0.257 <= 0.334 <= 0.507$$

DESCRIPTION OF VARIABLES

AVE TEMP - CONTAINMENT MEAN TEMPERATURE CALCULATED FROM VOLUMETRICALLY WEIGHTED RTD SENSOR INDICATIONS.

PRESSURE - PRIMARY CONTAINMENT PRESSURE INDICATION.

VAPOR PRES - CONTAINMENT VAPOR PRESSURE CALCULATED FROM VOLUMETRICALLY WEIGHTED HUMIDITY/DEWPOINT SENSOR INDICATIONS.

LEAK SIM - SIMPLE TOTAL TIME MEASURED LEAKAGE RATE.

LEAK FIT - LEAKAGE RATE CALCULATED FROM FIRST ORDER REGRESSION OF SIMPLE TOTAL TIME LEAKAGE RATE DATA.

95% UCL - UPPER LIMIT OF THE 95% CONFIDENCE LEVEL OF FITTED LEAKAGE RATE DATA.

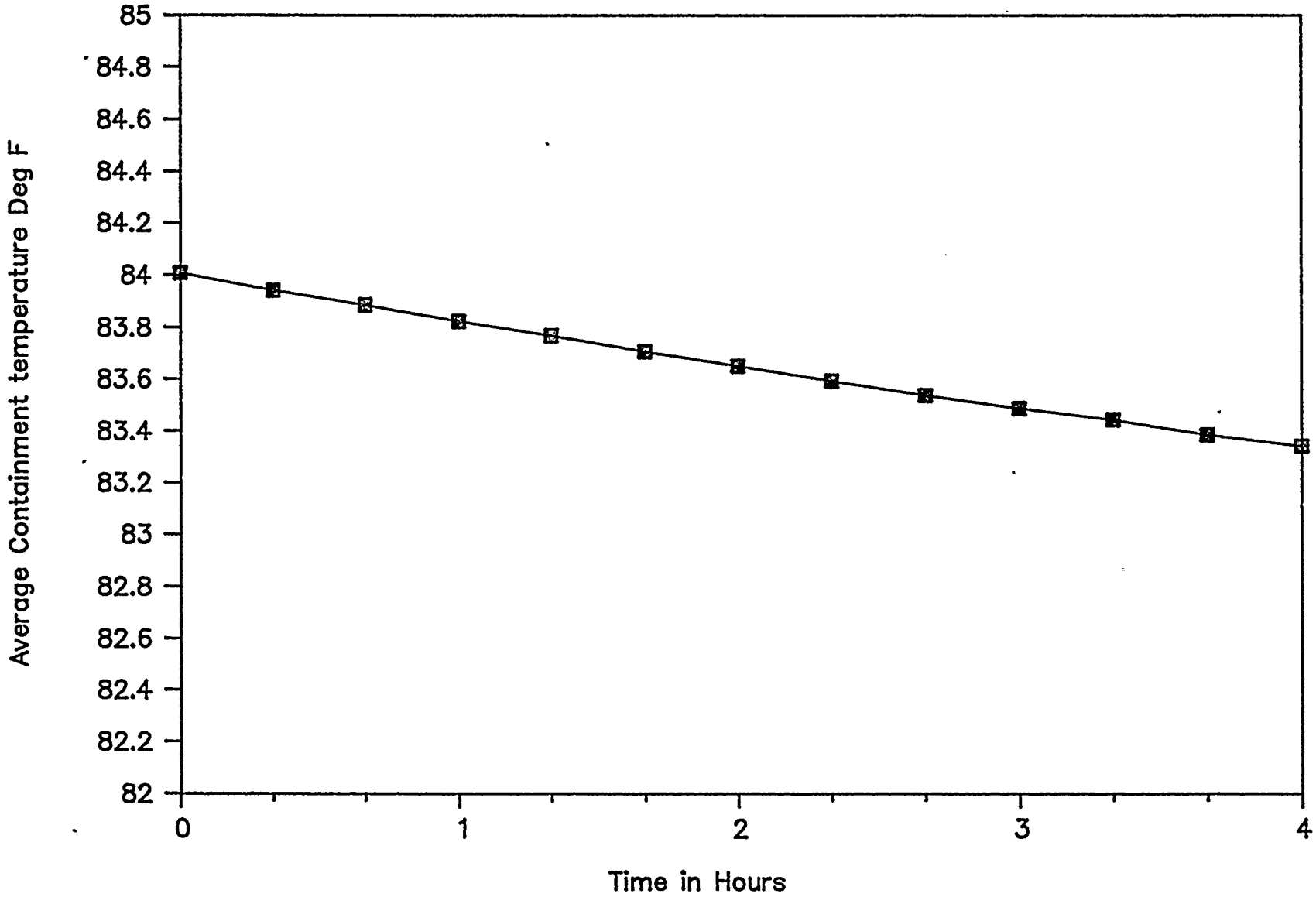
AIR MASS - CONTAINMENT AIR MASS.

NOTES FOR TABULAR DATA -

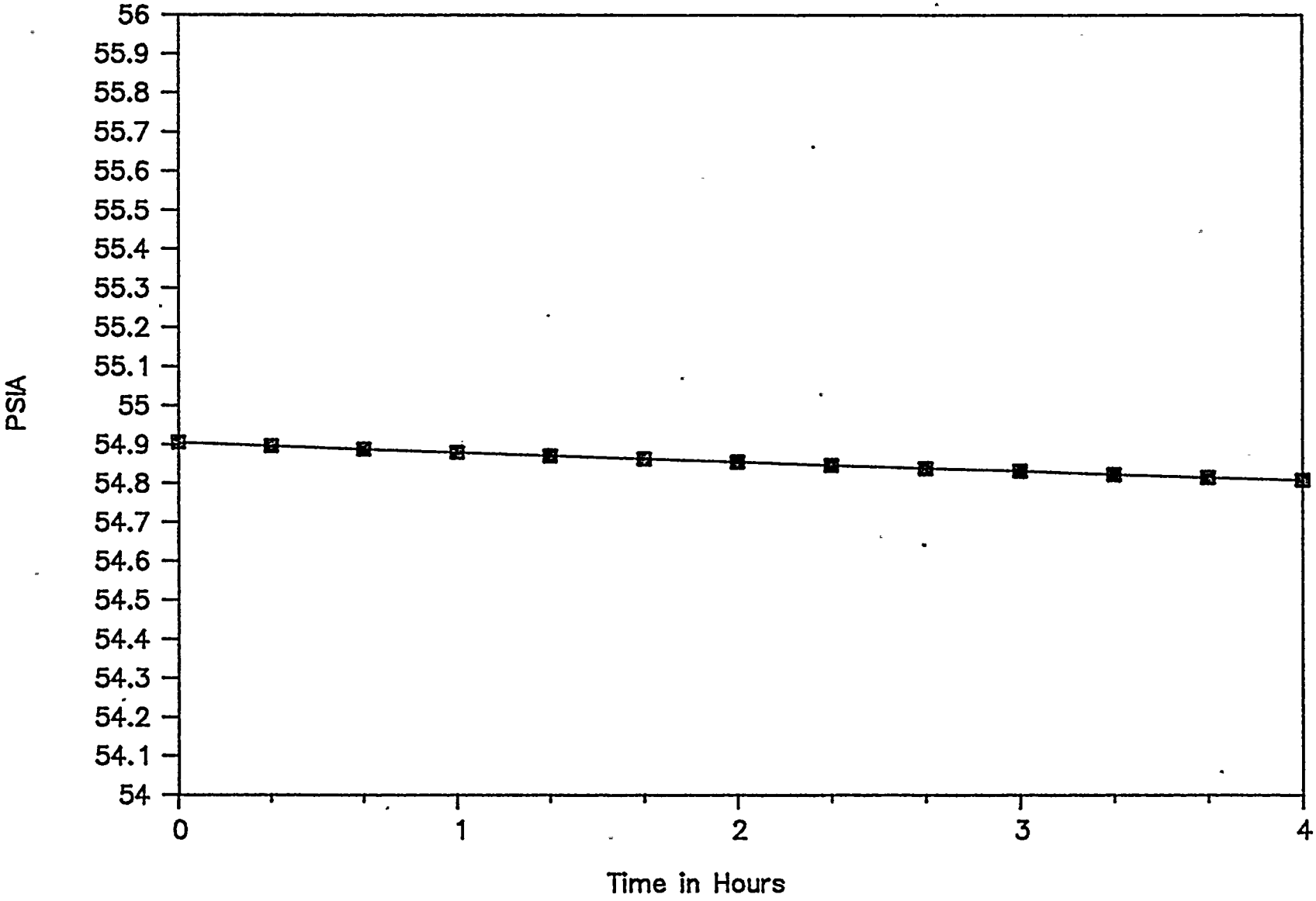
1. TABLE VALUES OF ZERO SIGNIFY THE DATA IS NOT APPLICABLE TO THE CALCULATION.

2. "DELETED" SIGNIFIES THE SENSOR WAS DELETED.

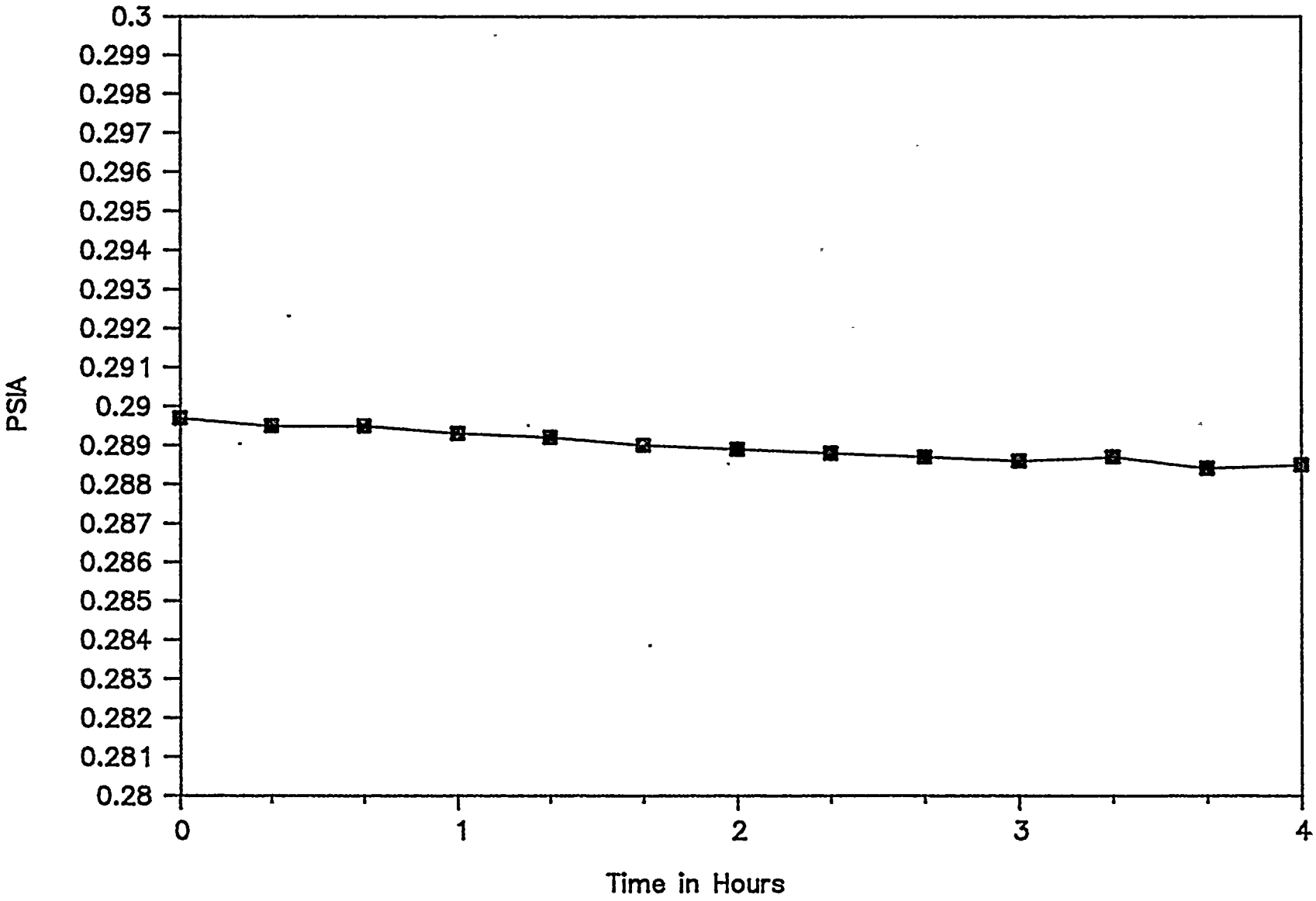
CLRT Weighted Average Temperature



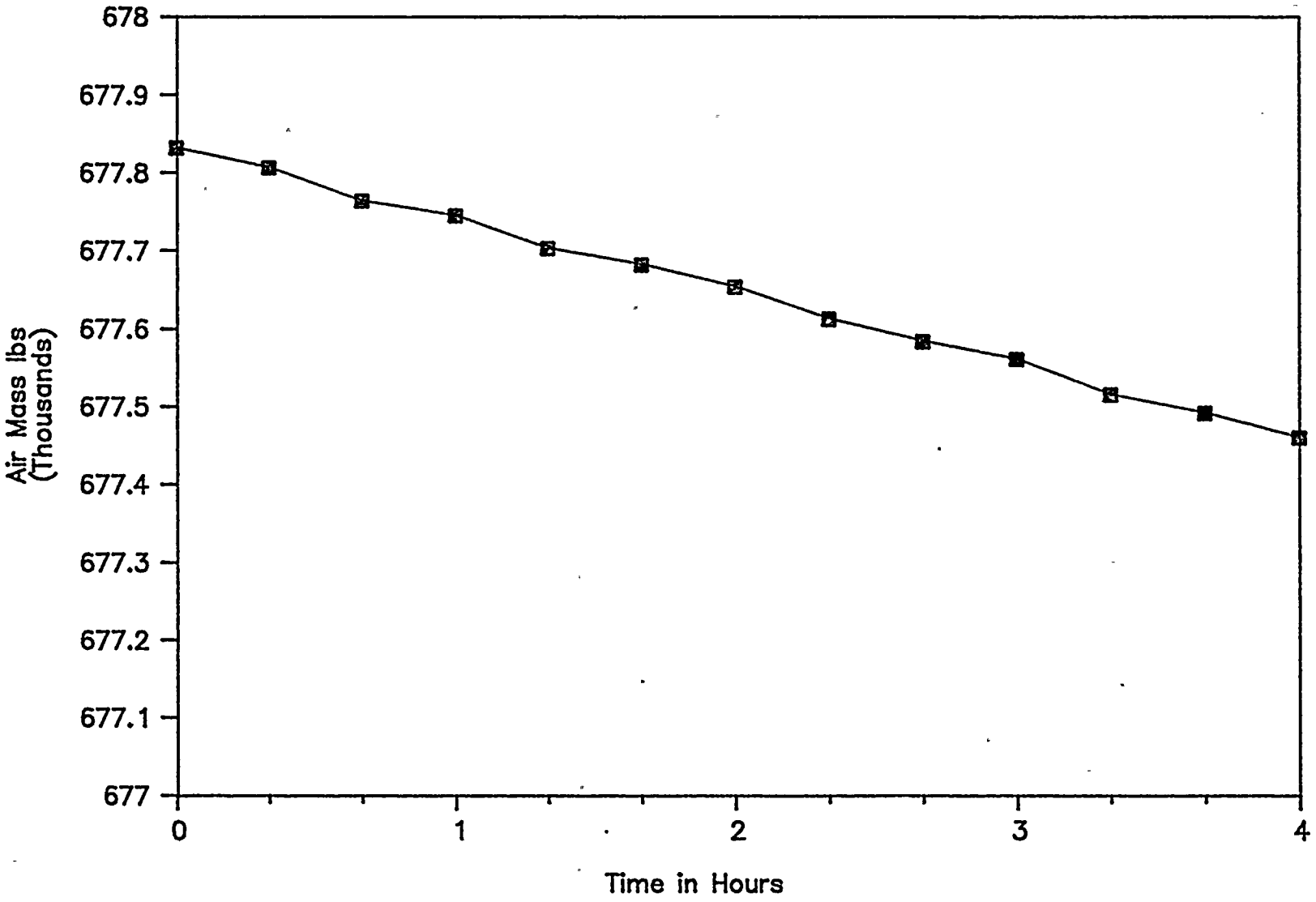
CLRT Containment Absolute Pressure



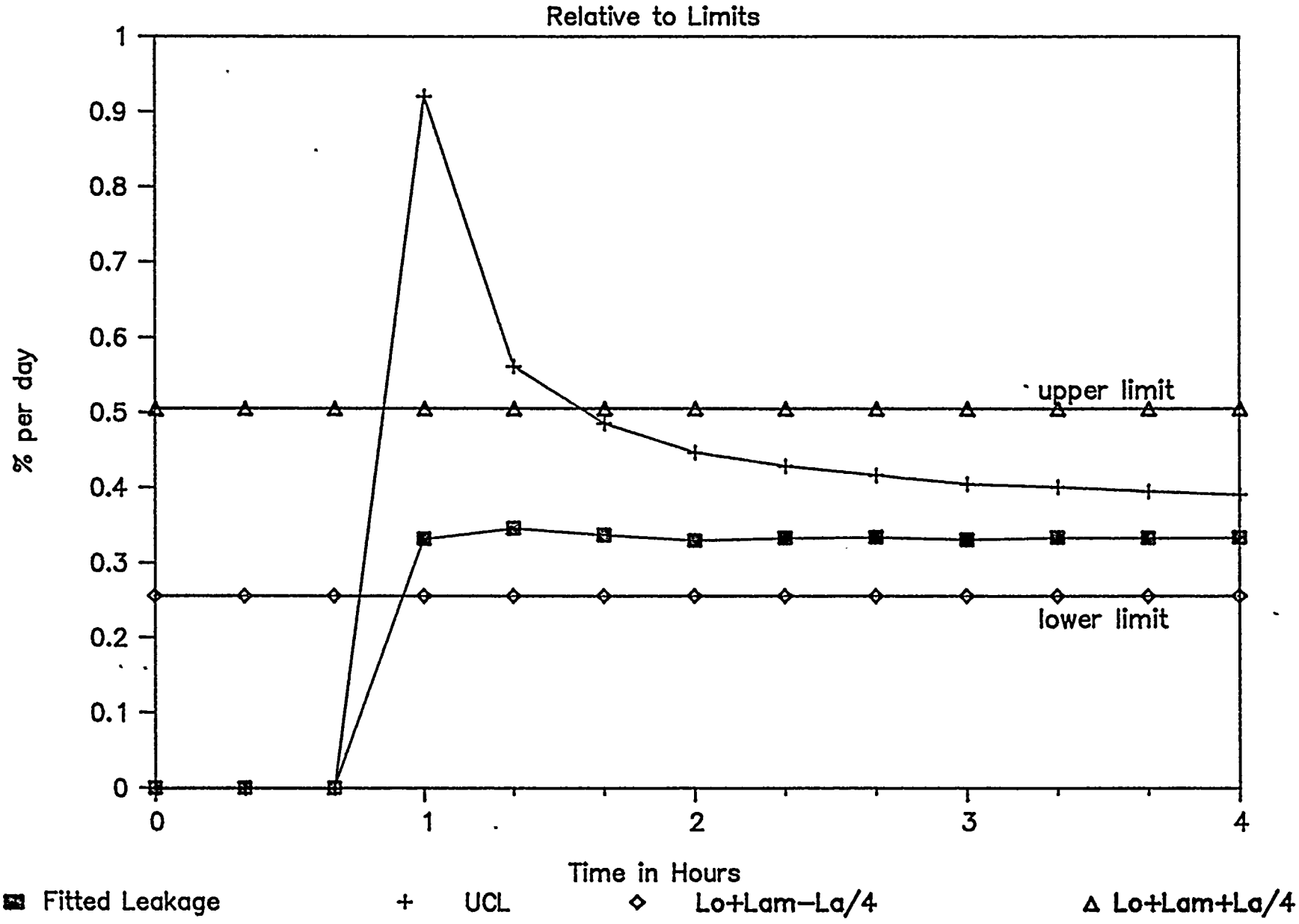
CLRT Weighted Vapor Pressure



CLRT Air Mass



CLRT BN-TOP Leakage Rates



CLRT VARIABLE TABLE SUMMARY

SAM NO	TIME HOURS	AVE TEMP DEG F	PRESSURE PSIA	VAP PRES PSIA	LEAK SIM %/DAY	LEAK FIT %/DAY	UCL %/DAY	AIRMASS LBS
1	0.00	84.007	54.906	0.2897	0.000	0.000	0.000	677832
2	0.33	83.940	54.897	0.2895	0.269	0.000	0.000	677807
3	0.67	83.885	54.888	0.2895	0.363	0.000	0.000	677764
4	1.00	83.822	54.880	0.2893	0.307	0.332	0.921	677745
5	1.33	83.768	54.871	0.2892	0.343	0.346	0.562	677703
6	1.67	83.707	54.863	0.2890	0.320	0.337	0.486	677682
7	2.00	83.651	54.855	0.2889	0.316	0.330	0.447	677654
8	2.33	83.595	54.846	0.2888	0.332	0.333	0.429	677613
9	2.67	83.539	54.838	0.2887	0.330	0.334	0.417	677584
10	3.00	83.489	54.831	0.2886	0.320	0.331	0.405	677561
11	3.33	83.444	54.823	0.2887	0.335	0.334	0.401	677516
12	3.67	83.386	54.815	0.2884	0.328	0.333	0.395	677492
13	4.00	83.342	54.808	0.2885	0.329	0.334	0.391	677460

SENSOR VOLUME FRACTIONS

TEMPERATURE SENSORS

1 to 5	0.026708	0.026708	0.026708	0.026708	0.026708
6 to 10	0.026708	0.026708	0.026708	0.026785	0.026785
11 to 15	0.026785	0.026785	0.026785	0.026785	0.026785
16 to 20	0.026785	0.026785	0.026785	0.024037	0.024037
21 to 25	0.024037	0.024037	0.024037	0.024037	0.024037
26 to 30	0.024037	0.024037	0.024037	0.020144	0.020144
31 to 35	0.020144	0.020144	0.020144	0.020144	0.020144
36 to 40	0.020144	0.020144	0.032274	0.032274	0.032274

HUMIDITY/DP SENSORS

1 to 5	0.073335	0.073335	0.073335	0.090064	0.090064
6 to 10	0.090064	0.090064	0.139913	0.139913	0.139913

NOTE: VALUE OF ZERO INDICATES A DELETED SENSOR.

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 1 DEG F	TEMP 2 DEG F	TEMP 3 DEG F	TEMP 4 DEG F	TEMP 5 DEG F	TEMP 6 DEG F
1	0.00	80.773	81.100	80.267	80.045	79.601	81.755
2	0.33	80.742	81.069	80.267	80.045	79.589	81.744
3	0.67	80.730	81.077	80.245	80.045	79.589	81.744
4	1.00	80.719	81.069	80.256	80.034	79.589	81.744
5	1.33	80.719	81.077	80.245	80.054	79.589	81.744
6	1.67	80.730	81.069	80.245	80.034	79.578	81.733
7	2.00	80.753	81.046	80.233	80.034	79.578	81.733
8	2.33	80.719	81.057	80.233	80.023	79.578	81.722
9	2.67	80.742	81.035	80.245	80.034	79.578	81.722
10	3.00	80.762	81.046	80.233	80.045	79.578	81.722
11	3.33	80.719	81.024	80.233	80.045	79.578	81.713
12	3.67	80.762	81.024	80.233	80.045	79.578	81.713
13	4.00	80.719	81.024	80.233	80.045	79.601	81.713

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 7 DEG F	TEMP 8 DEG F	TEMP 9 DEG F	TEMP 10 DEG F	TEMP 11 DEG F	TEMP 12 DEG F
1	0.00	79.816	79.764	85.517	84.819	85.163	84.935
2	0.33	79.827	79.764	85.441	84.743	85.098	84.849
3	0.67	79.804	79.764	85.325	84.669	85.014	84.775
4	1.00	79.796	79.755	85.249	84.582	84.949	84.699
5	1.33	79.804	79.764	85.249	84.485	84.853	84.614
6	1.67	79.816	79.755	85.110	84.434	84.788	84.549
7	2.00	79.804	79.732	85.045	84.358	84.714	84.464
8	2.33	79.796	79.721	84.983	84.292	84.650	84.399
9	2.67	79.784	79.721	84.918	84.218	84.587	84.345
10	3.00	79.804	79.721	84.788	84.153	84.511	84.260
11	3.33	79.796	79.744	84.788	84.091	84.438	84.195
12	3.67	79.796	79.712	84.672	84.026	84.373	84.121
13	4.00	79.804	79.721	84.650	83.961	84.319	84.079

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 13 DEG F	TEMP 14 DEG F	TEMP 15 DEG F	TEMP 16 DEG F	TEMP 17 DEG F	TEMP 18 DEG F
1	0.00	85.018	85.026	85.141	85.001	85.062	85.114
2	0.33	84.942	84.941	85.054	84.928	84.985	85.029
3	0.67	84.857	84.867	84.980	84.863	84.911	84.953
4	1.00	84.783	84.791	84.895	84.778	84.824	84.868
5	1.33	84.696	84.705	84.819	84.713	84.761	84.792
6	1.67	84.633	84.640	84.745	84.648	84.674	84.718
7	2.00	84.568	84.566	84.669	84.552	84.611	84.642
8	2.33	84.483	84.490	84.604	84.478	84.534	84.579
9	2.67	84.407	84.416	84.530	84.424	84.472	84.503
10	3.00	84.354	84.362	84.465	84.359	84.406	84.450
11	3.33	84.291	84.286	84.403	84.305	84.341	84.376
12	3.67	84.226	84.223	84.338	84.209	84.267	84.311
13	4.00	84.161	84.158	84.273	84.146	84.202	84.257

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 19 DEG F	TEMP 20 DEG F	TEMP 21 DEG F	TEMP 22 DEG F	TEMP 23 DEG F	TEMP 24 DEG F
1	0.00	85.122	85.237	85.143	84.935	85.482	85.486
2	0.33	85.025	85.195	85.089	84.850	85.406	85.390
3	0.67	84.951	85.105	85.008	84.803	85.350	85.354
4	1.00	84.875	85.074	84.946	84.707	85.254	85.246
5	1.33	84.833	84.993	84.896	84.638	85.202	85.197
6	1.67	84.737	84.917	84.811	84.573	85.106	85.121
7	2.00	84.672	84.852	84.746	84.497	85.044	85.078
8	2.33	84.609	84.789	84.670	84.446	84.990	84.993
9	2.67	84.544	84.724	84.585	84.370	84.925	84.939
10	3.00	84.490	84.688	84.538	84.312	84.847	84.881
11	3.33	84.394	84.646	84.495	84.249	84.793	84.818
12	3.67	84.329	84.563	84.403	84.166	84.722	84.769
13	4.00	84.267	84.523	84.352	84.115	84.672	84.706

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 25 DEG F	TEMP 26 DEG F	TEMP 27 DEG F	TEMP 28 DEG F	TEMP 29 DEG F	TEMP 30 DEG F
1	0.00	84.904	85.270	85.197	85.267	84.872	84.728
2	0.33	84.839	85.205	85.112	85.171	84.807	84.643
3	0.67	84.750	85.126	85.054	85.093	84.729	84.596
4	1.00	84.674	85.052	84.957	85.028	84.632	84.511
5	1.33	84.605	84.969	84.899	84.948	84.572	84.397
6	1.67	84.540	84.906	84.823	84.872	84.498	84.323
7	2.00	84.466	84.830	84.761	84.809	84.444	84.280
8	2.33	84.379	84.756	84.685	84.733	84.348	84.193
9	2.67	84.327	84.702	84.620	84.668	84.294	84.130
10	3.00	84.258	84.633	84.553	84.621	84.216	84.061
11	3.33	84.204	84.570	84.488	84.536	84.182	84.018
12	3.67	84.135	84.498	84.439	84.476	84.102	83.938
13	4.00	84.072	84.426	84.378	84.415	84.019	83.875

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 31 DEG F	TEMP 32 DEG F	TEMP 33 DEG F	TEMP 34 DEG F	TEMP 35 DEG F	TEMP 36 DEG F
1	0.00	84.695	84.799	84.862	84.694	84.710	84.661
2	0.33	84.577	84.680	84.777	84.609	84.623	84.564
3	0.67	84.521	84.622	84.710	84.562	84.587	84.517
4	1.00	84.445	84.559	84.633	84.485	84.513	84.441
5	1.33	84.334	84.477	84.584	84.405	84.441	84.383
6	1.67	84.280	84.403	84.477	84.319	84.345	84.296
7	2.00	84.215	84.327	84.403	84.243	84.280	84.222
8	2.33	84.151	84.253	84.349	84.169	84.217	84.157
9	2.67	84.077	84.179	84.264	84.104	84.132	84.060
10	3.00	84.019	84.121	84.206	84.026	84.052	83.993
11	3.33	83.954	84.078	84.152	83.983	84.020	83.959
12	3.67	83.885	83.995	84.092	83.900	83.928	83.859
13	4.00	83.845	83.944	84.020	83.860	83.877	83.816

CLRT TEMPERATURE VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	TEMP 37 DEG F	TEMP 38 DEG F	TEMP 39 DEG F	TEMP 40 DEG F
1	0.00	84.901	84.570	84.851	84.673
2	0.33	84.805	84.462	84.721	84.608
3	0.67	84.747	84.427	84.674	84.523
4	1.00	84.673	84.342	84.578	84.449
5	1.33	84.613	84.261	84.520	84.384
6	1.67	84.528	84.185	84.455	84.308
7	2.00	84.463	84.123	84.379	84.234
8	2.33	84.400	84.046	84.305	84.181
9	2.67	84.304	83.961	84.231	84.084
10	3.00	84.234	83.892	84.173	84.020
11	3.33	84.203	83.850	84.131	83.957
12	3.67	84.111	83.769	84.059	83.892
13	4.00	84.060	83.729	83.976	83.838

CLRT PRESSURE AND HUMIDITY VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	PRES 1 PSIA	PRES 2 PSIA	HUM 1 % RH	HUM 2 % RH	HUM 3 % RH	HUM 4 % RH
1	0.00	54.908	54.906	43.710	47.860	48.020	49.850
2	0.33	54.900	54.897	43.980	48.100	48.270	50.080
3	0.67	54.890	54.888	44.230	48.360	48.520	50.000
4	1.00	54.882	54.880	44.460	48.570	48.760	49.990
5	1.33	54.873	54.871	44.680	48.830	48.970	50.170
6	1.67	54.865	54.863	44.940	49.070	49.260	50.160
7	2.00	54.857	54.855	45.210	49.310	49.470	50.180
8	2.33	54.849	54.846	45.420	49.540	49.730	50.160
9	2.67	54.840	54.838	45.670	49.800	49.970	50.190
10	3.00	54.833	54.831	45.890	50.030	50.210	50.260
11	3.33	54.825	54.823	46.130	50.270	50.430	50.440
12	3.67	54.817	54.815	46.320	50.510	50.690	50.320
13	4.00	54.810	54.808	46.520	50.770	50.920	50.400

CLRT HUMIDITY VARIABLE SUMMARY

SAMPLE NUMBER	DELTA HOURS	HUM 5 % RH	HUM 6 % RH	HUM 7 % RH	HUM 8 % RH	HUM 9 % RH	HUM 10 % RH
1	0.00	50.450	51.430	50.150	50.920	51.830	52.150
2	0.33	50.480	51.440	50.130	50.930	51.930	52.140
3	0.67	50.530	51.500	50.160	50.950	51.990	52.150
4	1.00	50.560	51.470	50.210	51.050	52.010	52.220
5	1.33	50.580	51.510	50.220	51.040	51.990	52.230
6	1.67	50.570	51.530	50.240	51.100	52.080	52.270
7	2.00	50.620	51.540	50.290	51.080	52.120	52.250
8	2.33	50.630	51.630	50.330	51.160	52.140	52.360
9	2.67	50.690	51.610	50.370	51.180	52.190	52.390
10	3.00	50.710	51.600	50.370	51.200	52.220	52.380
11	3.33	50.720	51.650	50.390	51.240	52.230	52.460
12	3.67	50.780	51.730	50.360	51.240	52.280	52.510
13	4.00	50.830	51.730	50.440	51.290	52.330	52.550

Appendix B.4

LEAK CHASE

PSL 1 SPRING 90

Sequence Started 17:10 4/05/90
Sequence Ended 22:50 4/05/90

LEAK CHASE PERIOD

Sample number	Time In Mode	Average Temperature	Pressure	Vapor Pressure	Air Mass
1	0.00	88.842	55.463	0.2904	678701
2	0.33	88.627	55.439	0.29	678677
3	0.67	88.427	55.418	0.2908	678656
4	1.00	88.238	55.397	0.2901	678640
5	1.33	88.063	55.377	0.2901	678611
6	1.67	87.897	55.357	0.2896	678577
7	2.00	87.729	55.339	0.2885	678575
8	2.33	87.59	55.321	0.2883	678528
9	2.67	87.449	55.303	0.2876	678490
10	3.00	87.301	55.287	0.2868	678486
11	3.33	87.175	55.271	0.2858	678458
12	3.67	87.059	55.255	0.2857	678406
13	4.00	86.931	55.24	0.2868	678366
14	4.33	86.814	55.226	0.2861	678346
15	4.67	86.702	55.211	0.2884	678272
16	5.00	86.591	55.198	0.2902	678227
17	5.33	86.49	55.185	0.2917	678173
18	5.67	86.367	55.172	0.2922	678159

Appendix C

LOCAL LEAKAGE RATE TESTING
CONDUCTED SINCE LAST ILRT

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
1	MN STM 1A	1	07/20/88	0.0	0.0
1	MN STM 1A	2	07/20/88	0.0	0.0
1	MN STM 1A	1	01/03/90	0.0	0.0
1	MN STM 1A	2	01/03/90	0.0	0.0
2	MN STM 1B	1	07/20/88	0.0	0.0
2	MN STM 1B	2	07/20/88	0.0	0.0
2	MN STM 1B	1	01/03/90	0.0	0.0
2	MN STM 1B	2	01/03/90	0.0	0.0
3	FEEDWATER 1A	1	07/20/88	0.0	0.0
3	FEEDWATER 1A	2	07/20/88	0.0	0.0
3	FEEDWATER 1A	1	01/03/90	0.0	0.0
3	FEEDWATER 1A	2	01/03/90	0.0	0.0
4	FEEDWATER 1B	2	07/20/88	0.0	0.0
4	FEEDWATER 1B	1	07/20/88	0.0	0.0
4	FEEDWATER 1B	1	01/03/90	0.0	0.0
4	FEEDWATER 1B	2	01/03/90	0.0	0.0
7	PRIMARY MAKE UP	V15328	07/15/88	7500.0	0.0
7	PRIMARY MAKE UP	MV15-1	07/18/88	160.0	160.0
7	PRIMARY MAKE UP	V15328	08/18/88	0.0	1120.0
7	PRIMARY MAKE UP	V15328	01/24/90	300.0	300.0
7	PRIMARY MAKE UP	MV15-1	01/24/90	0.0	0.0
7	PRIMARY MAKE UP	MV15-1	03/07/90	0.0	320.0
8	SERVICE AIR	V18794,18796	08/20/88	175.0	175.0
8	SERVICE AIR	V18797	08/20/88	0.0	0.0
8	SERVICE AIR	V18798	08/20/88	0.0	0.0
8	SERVICE AIR	V18795	08/20/88	0.0	0.0
8	SERVICE AIR	V18794,18796	01/25/90	1280.0	1280.0
8	SERVICE AIR	V18797	01/25/90	300.0	300.0
8	SERVICE AIR	V18798	01/25/90	0.0	0.0
8	SERVICE AIR	V18795	01/25/90	35.0	35.0
9	INSTRUMENT AIR	MV18-1,V18193	08/16/88	5000.0	0.0
9	INSTRUMENT AIR	V18195	08/16/88	0.0	0.0
9	INSTRUMENT AIR	MV18-1,V18193	08/21/88	0.0	1500.0
9	INSTRUMENT AIR	MV18-1, V18193	03/21/90	540.0	540.0
9	INSTRUMENT AIR	V18195	03/21/90	146000.0	0.0
9	INSTRUMENT AIR	V18195	03/24/90	0.0	3000.0
10	CNTNMNT PRG EXH	FCV25-4,5	08/09/88	4400.0	0.0
10	CNTNMNT PRG EXH	FCV25-4,5	08/17/88	0.0	380.0
10	CNTNMNT PRG EXH	FCV25-4,5	02/18/90	460.0	0.0
10	CNTNMNT PRG EXH	FCV25-4,5	03/04/90	0.0	2000.0
10	CNTNMNT PRG EXH	FCV25-4,5	04/04/90	0.0	2250.0
10	CNTNMNT PRG EXH	FCV25-4,5	04/10/90	0.0	220.0
11	CNTNMNT PRG MU	FCV25-2,3	08/02/88	450.0	0.0
11	CNTNMNT PRG MU	FCV25-2,3	08/12/88	0.0	240.0
11	CNTNMNT PRG MU	FCV25-2,3	01/24/90	908970.0	0.0
11	CNTNMNT PRG MU	FCV25-2,3	02/19/90	10000.0	0.0
11	CNTNMNT PRG MU	FCV25-2,3	03/11/90	0.0	20000.0
11	CNTNMNT PRG MU	FCV25-2,3	04/04/90	0.0	1800.0
11	CNTNMNT PRG MU	FVC25-2,3	04/07/90	0.0	200.0
14	NITROGEN	V6779	07/19/88	0.0	0.0
14	NITROGEN	V6741	07/19/88	0.0	0.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
14	NITROGEN	V6340	07/19/88	0.0	0.0
14	NITROGEN	V6779	01/30/90	100.0	100.0
14	NITROGEN	V6741	01/30/90	0.0	0.0
14	NITROGEN	V6340	01/30/90	0.0	0.0
23	CCW TO RCP	HCV14-1,7	07/15/88	90.0	0.0
23	CCW TO RCP	V14368	07/15/88	0.0	0.0
23	CCW TO RCP	V14367	07/15/88	0.0	0.0
23	CCW TO RCP	HCV14-1,7	08/18/88	0.0	2500.0
23	CCW TO RCP	V14368	08/18/88	0.0	0.0
23	CCW TO RCP	V14367	08/18/88	0.0	0.0
23	CCW TO RCP	HCV14-1,7	07/03/89	0.0	0.0
23	CCW TO RCP	HCV14-1,7	07/12/89	0.0	0.0
23	CCW TO RCP	V14367	07/12/89	0.0	0.0
23	CCW TO RCP	HCV14-1,7	01/30/90	0.0	0.0
23	CCW TO RCP	V14368	01/30/90	0.0	0.0
23	CCW TO RCP	V14367	01/30/90	0.0	0.0
23	CCW TO RCP	HCV14-1,7	03/07/90	0.0	50.0
24	CCW FROM RCP	HCV14-2,6	07/15/88	0.0	0.0
24	CCW FROM RCP	V14415	07/15/88	0.0	0.0
24	CCW FROM RCP	V14417	07/15/88	1800.0	0.0
24	CCW FROM RCP	HCV14-2,6	08/18/88	0.0	0.0
24	CCW FROM RCP	V14415	08/18/88	0.0	810.0
24	CCW FROM RCP	V14417	08/18/88	0.0	300.0
24	CCW FROM RCP	HCV14-2,6	07/13/89	17.9	0.0
24	CCW FROM RCP	HCV14-2,6	07/14/89	0.0	0.0
24	CCW FROM RCP	HCV14-2,6	01/30/90	0.0	0.0
24	CCW FROM RCP	V14415	01/30/90	0.0	0.0
24	CCW FROM RCP	V14417	01/30/90	140.0	140.0
24	CCW FROM RCP	HCV14-2,6	03/07/90	0.0	0.0
25	FUEL XFR	1	07/20/88	0.0	0.0
25	FUEL XFR	1	02/02/90	0.0	0.0
26	LETDOWN	V2515	08/12/88	0.0	0.0
26	LETDOWN	V2516	08/12/88	17.9	0.0
26	LETDOWN	V2516	08/27/88	0.0	30.0
26	LETDOWN	V2515	02/26/90	0.0	0.0
26	LETDOWN	V2516	02/26/90	17.9	0.0
26	LETDOWN	V2516	03/10/90	0.0	45.0
28A	SIT SAMPLE	FCV03-1E	07/20/88	80.0	80.0
28A	SIT SAMPLE	FCV03-1F	07/20/88	70.0	70.0
28A	SIT SAMPLE	FCV03-1E	01/30/90	0.0	0.0
28A	SIT SAMPLE	FCV03-1F	01/30/90	0.0	0.0
28B	RCS HOT LEG	V5200	07/20/88	80.0	0.0
28B	RCS HOT LEG	V5203	07/20/88	40.0	0.0
28B	RCS HOT LEG	V5200	08/12/88	0.0	100.0
28B	RCS HOT LEG	V5203	08/12/88	0.0	55.0
28B	RCS HOT LEG	V5200	12/08/88	105.0	105.0
28B	RCS HOT LEG SAM	V5200	02/01/90	135.0	135.0
28B	RCS HOT LEG SAM	V5203	02/01/90	0.0	0.0
29A	PZR SRG SAMPLE	V5201	04/11/88	1285.0	0.0
29A	PZR SRG SAMPLE	V5204	04/11/88	0.0	0.0
29A	PZR SRG SAMPLE	V5201	04/13/88	0.0	650.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
29A	PZR SRG SAMPLE	V5204	04/13/88	0.0	0.0
29A	PZR SRG SAMPLE	V5201	07/20/88	8500.0	0.0
29A	PZR SRG SAMPLE	V5204	07/20/88	6700.0	0.0
29A	PZR SRG SAMPLE	V5201	08/15/88	0.0	600.0
29A	PZR SRG SAMPLE	V5204	08/15/88	0.0	0.0
29A	PZR SRG SAMPLE	V5201	02/01/90	0.0	0.0
29A	PZR SRG SAMPLE	V5204	02/01/90	0.0	0.0
29B	PZR STM SAMPLE	V5205	07/23/87	0.0	0.0
29B	PZR STM SAMPLE	V5202	07/20/88	8300.0	0.0
29B	PZR STM SAMPLE	V5205	07/20/88	0.0	0.0
29B	PZR STM SAMPLE	V5202	08/20/88	0.0	0.0
29B	PZR STM SAMPLE	V5202	02/01/90	0.0	0.0
29B	PZR STM SAMPLE	V5205	02/01/90	600.0	600.0
31	CNTNMNT VNT HDR	V6554	07/20/88	0.0	0.0
31	CNTNMNT VNT HDR	V6555	07/20/88	0.0	0.0
31	CNTNMNT VNT HDR	V6554	01/30/90	0.0	0.0
31	CNTNMNT VNT HDR	V6555	01/30/90	0.0	0.0
41	SIT TEST	V07009,V3463	07/21/88	0.0	0.0
41	SIT TEST	V07010	07/21/88	0.0	0.0
41	SIT TEST	V07009,V3463	02/02/90	0.0	0.0
41	SIT TEST	V07010	02/02/90	0.0	0.0
42	RX CAVITY SUMP	LCV07-11A,11B	08/15/88	6600.0	0.0
42	RX CAVITY SUMP	V07171	08/15/88	200.0	0.0
42	RX CAVITY SUMP	LCV07-11A,11B	08/19/88	0.0	3200.0
42	RX CAVITY SUMP	LCV07-11A,11B	02/08/90	2200.0	2200.0
42	RX CAVITY SUMP	V07171	02/08/90	620.0	620.0
43	RX DRAIN TNK	V6301	08/19/88	500.0	500.0
43	RX DRAIN TNK	V6302	08/19/88	450.0	450.0
43	RX DRAIN TNK	V6301	02/01/90	650.0	0.0
43	RX DRAIN TNK	V6302	02/01/90	500.0	0.0
43	RX DRAIN TNK	V6301	02/02/90	0.0	400.0
43	RX DRAIN TNK	V6302	02/02/90	0.0	350.0
44	RCP BLEEDOFF	SE01-1	07/20/88	0.0	0.0
44	RCP BLEEDOFF	V2505	07/20/88	0.0	0.0
44	RCP BLEEDOFF	SE01-1	08/19/88	0.0	0.0
44	RCP BLEEDOFF	V2505	08/19/88	0.0	0.0
44	RCP BLEEDOFF	SE01-1	02/02/90	0.0	0.0
44	RCP BLEEDOFF	V2505	02/02/90	0.0	0.0
46	RFL CVTY PRF RT	V07189,072	08/15/88	80.0	0.0
46	RFL CVTY PRF RT	V07167	08/15/88	0.0	0.0
46	RFL CVTY PRF RT	V07189,072	08/21/88	0.0	100.0
46	RFLNG CVTY PURF	V07189,206	02/27/90	800.0	800.0
46	RFLNG CVTY PURF	V07167	02/27/90	25.0	25.0
47	RFL CVTY PRF SP	V07188,071	08/15/88	0.0	0.0
47	RFL CVTY PRF SP	V07169	08/15/88	0.0	0.0
47	RFLNG CVTY PURF	V07188,170	02/27/90	0.0	0.0
47	RFLNG CVTY PURF	V07169	02/27/90	250.0	250.0
48A	H2 SMP TO 'A'	FSE27-1	07/19/88	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-2	07/19/88	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-3	07/19/88	18.0	18.0
48A	H2 SMP TO 'A'	FSE27-4	07/19/88	0.0	0.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
48A	H2 SMP TO 'A'	FSE27-8	07/19/88	76.0	76.0
48A	H2 SMP TO 'A'	FSE27-1	01/30/90	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-2	01/30/90	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-3	01/30/90	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-4	01/30/90	0.0	0.0
48A	H2 SMP TO 'A'	FSE27-8	01/30/90	0.0	0.0
48C	H2 SMP FROM 'A'	V27101	07/18/88	420.0	420.0
48C	H2 SMP FROM 'A'	FSE27-11	07/18/88	0.0	0.0
48C	H2 SMP FROM 'A'	FSE27-11	08/24/89	0.0	0.0
48C	H2 SMP FROM 'A'	V27101	01/30/90	0.0	0.0
48C	H2 SMP FROM 'A'	FSE27-11	01/30/90	0.0	0.0
51A	H2 SMP FROM 'B'	V27102	08/19/88	50.0	50.0
51A	H2 SMP FROM 'B'	FSE27-10	08/19/88	0.0	0.0
51A	H2 SMP FROM 'B'	V27102	01/30/90	40.0	40.0
51A	H2 SMP FROM 'B'	FSE27-10	01/30/90	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-5	07/19/88	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-6	07/19/88	200.0	200.0
51C	H2 SMP TO 'B'	FSE27-7	07/19/88	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-9	07/19/88	200.0	200.0
51C	H2 SMP TO 'B'	FSE27-5	01/30/90	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-6	01/30/90	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-7	01/30/90	0.0	0.0
51C	H2 SMP TO 'B'	FSE27-9	01/30/90	0.0	0.0
52A	RAD MON SUP	FCV26-1	02/10/88	2831998.8	0.0
52A	RAD MON SUP	FCV26-2	02/10/88	1100.0	0.0
52A	RAD MON SUP	FCV26-1	02/12/88	0.0	450.0
52A	RAD MON SUP	FCV26-1	07/19/88	300.0	0.0
52A	RAD MON SUP	FCV26-2	07/19/88	300.0	0.0
52A	RAD MON SUP	FCV26-1	08/18/88	0.0	55.0
52A	RAD MON SUP	FCV26-1	01/31/90	40.0	0.0
52A	RAD MON SUP	FCV26-2	01/31/90	100.0	0.0
52A	RAD MON SUP	FCV26-1	03/27/90	0.0	200.0
52A	RAD MON SUP	FCV26-2	03/27/90	0.0	60.0
52B	IODINE RAD MON	FCV26-3	07/18/88	36000.0	0.0
52B	IODINE RAD MON	FCV26-4	07/18/88	300.0	300.0
52B	IODINE RAD MON	FCV26-3	08/09/88	0.0	420.0
52B	IODINE RAD MON	FCV26-3	01/31/90	40.0	0.0
52B	IODINE RAD MON	FCV26-4	01/31/90	5616286.0	0.0
52B	IODINE RAD MON	FCV26-3	03/27/90	0.0	95.0
52B	IODINE RAD MON	FCV26-4	03/27/90	0.0	200.0
52B	IODINE RAD MON	FCV26-3	04/12/90	0.0	800.0
52C	RAD MON RET	FCV26-5	05/16/88	200.0	0.0
52C	RAD MON RET	FCV26-6	05/16/88	40.0	0.0
52C	RAD MON RET	FCV26-6	05/18/88	0.0	0.0
52C	RAD MON RET	FCV26-5	07/19/88	140.0	0.0
52C	RAD MON RET	FCV26-6	07/19/88	17.9	0.0
52C	RAD MON RET	FCV26-5	01/31/90	40.0	0.0
52C	RAD MON RET	FCV26-6	01/31/90	30.0	30.0
52C	RAD MON RET	FCV26-5	03/27/90	0.0	35.0
52D	ILRT CLRT	V00140,143	03/22/87	0.0	0.0
52D	ILRT CLRT	V00140,143	07/18/88	300.0	0.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
52D	ILRT CLRT	V00142	07/18/88	0.0	0.0
52D	ILRT CLRT	V00140,143	01/31/90	300.0	0.0
52D	ILRT CLRT	V00142	01/31/90	0.0	0.0
52D	ILRT CLRT	V00140,143	04/09/90	0.0	780.0
52D	ILRT CLRT	V00142	04/09/90	0.0	0.0
52E	ILRT PRESS	V00139,144	03/23/87	0.0	250.0
52E	ILRT PRESS	V00139,144	07/18/88	0.0	0.0
52E	ILRT PRESS	V00141	07/18/88	0.0	0.0
52E	ILRT PRESS	V00139,144	01/31/90	0.0	0.0
52E	ILRT PRESS	V00141	01/31/90	0.0	0.0
52E	ILRT PRESS	V00139,144	04/09/90	0.0	18.0
52E	ILRT PRESS	V00141	04/09/90	0.0	18.0
54	ILRT PZR	V00101	03/23/87	0.0	1500.0
54	ILRT PZR	V00101	07/12/88	1050.0	0.0
54	ILRT PZR	V00101	08/17/88	0.0	2500.0
54	ILRT PZR	V00101	01/29/90	0.0	0.0
54	ILRT PZR	V00101	04/09/90	0.0	960.0
56	H2 PURGE MAKEUP	V25-11,12	03/27/87	0.0	70.0
56	H2 PURGE MAKEUP	V25-11,12	07/22/88	80.0	80.0
56	H2 PURGE MAKEUP	V25-11,12	01/24/90	70.0	70.0
57	H2 PURGE FILTER	V25-13,14	03/27/87	0.0	125.0
57	H2 PURGE FILTER	V25-13,14	07/22/88	90.0	90.0
57	H2 PURGE FILTER	V25-13,14	01/24/90	200.0	200.0
58	H2 PRG FLTR BYP	V25-15,16	03/27/87	0.0	260.0
58	H2 PRG FLTR BYP	V25-15,16	07/21/88	270.0	270.0
58	H2 PRG FLTR BYP	V25-15,16	01/24/90	300.0	300.0
67	CNTNMNT VAC RLF	V25-20	07/21/88	500.0	500.0
67	CNTNMNT VAC RLF	FCV25-7	07/21/88	600.0	600.0
67	CNTNMNT VAC RLF	FCV25-7	02/23/90	400.0	0.0
67	CNTNMNT VAC RLF	V25-20	02/26/90	600.0	600.0
67	CNTNMNT VAC RLF	FCV25-7	03/12/90	0.0	50.0
68	CNTNMNT VAC RLF	V25-21	07/21/88	186000.0	0.0
68	CNTNMNT VAC RLF	FCV25-8	07/21/88	0.0	0.0
68	CNTNMNT VAC RLF	FCV25-21	08/09/88	0.0	7000.0
68	CNTNMNT VAC RLF	FCV25-21	08/19/88	0.0	6800.0
68	CNTNMNT VAC RLF	FCV25-8	02/23/90	140.0	0.0
68	CNTNMNT VAC RLF	FCV25-21	02/28/90	9700.0	0.0
68	CNTNMNT VAC RLF	FCV25-21	03/12/90	0.0	90.0
68	CNTNMNT VAC RLF	FCV25-8	03/14/90	0.0	0.0
A1	ELECT PEN	NA	07/21/88	0.0	0.0
A1	ELECT PEN	NA	02/07/90	0.0	0.0
A2	ELECT PEN	NA	07/21/88	0.0	0.0
A2	ELECT PEN	NA	02/07/90	0.0	0.0
A3	ELECT PEN	NA	07/21/88	0.0	0.0
A3	ELECT PEN	NA	02/07/90	0.0	0.0
A4	ELECT PEN	NA	07/21/88	0.0	0.0
A4	ELECT PEN	NA	02/07/90	0.0	0.0
A5	ELECT PEN	NA	07/21/88	0.0	0.0
A5	ELECT PEN	NA	02/07/90	0.0	0.0
A6	ELECT PEN	NA	07/21/88	0.0	0.0
A6	ELECT PEN	NA	02/07/90	0.0	0.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
A7	ELECT PEN	NA	07/21/88	0.0	0.0
A7	ELECT PEN	NA	02/07/90	0.0	0.0
A8	ELECT PEN	NA	07/21/88	0.0	0.0
A8	ELECT PEN	NA	02/07/90	0.0	0.0
A9	ELECT PEN	NA	07/21/88	0.0	0.0
A9	ELECT PEN	NA	02/07/90	0.0	0.0
A10	ELECT PEN	NA	07/21/88	0.0	0.0
A10	ELECT PEN	NA	02/07/90	0.0	0.0
B1	ELECT PEN	NA	07/21/88	0.0	0.0
B1	ELECT PEN	NA	02/07/90	0.0	0.0
B3	ELECT PEN	NA	07/21/88	0.0	0.0
B3	ELECT PEN	NA	02/07/90	0.0	0.0
B4	ELECT PEN	NA	02/07/90	0.0	0.0
B5	ELECT PEN	NA	07/21/88	0.0	0.0
B5	ELECT PEN	NA	02/07/90	0.0	0.0
B6	ELECT PEN	NA	07/21/88	0.0	0.0
B6	ELECT PEN	NA	02/07/90	0.0	0.0
B7	ELECT PEN	NA	07/21/88	0.0	0.0
B7	ELECT PEN	NA	02/07/90	0.0	0.0
B8	ELECT PEN	NA	07/21/88	0.0	0.0
B8	ELECT PEN	NA	02/07/90	0.0	0.0
B9	ELECT PEN	NA	07/21/88	0.0	0.0
B9	ELECT PEN	NA	02/07/90	0.0	0.0
B4	ELECT PEN	NA	07/21/88	0.0	0.0
C1	ELECT PEN	NA	07/21/88	0.0	0.0
C1	ELECT PEN	NA	02/07/90	0.0	0.0
C2	ELECT PEN	NA	07/21/88	0.0	0.0
C2	ELECT PEN	NA	02/07/90	0.0	0.0
C3	ELECT PEN	NA	07/21/88	0.0	0.0
C3	ELECT PEN	NA	02/07/90	0.0	0.0
C4	ELECT PEN	NA	07/21/88	0.0	0.0
C4	ELECT PEN	NA	02/07/90	0.0	0.0
C5	ELECT PEN	NA	07/21/88	0.0	0.0
C5	ELECT PEN	NA	02/07/90	0.0	0.0
C6	ELECT PEN	NA	07/21/88	0.0	0.0
C6	ELECT PEN	NA	02/07/90	0.0	0.0
C7	ELECT PEN	NA	07/21/88	0.0	0.0
C7	ELECT PEN	NA	02/07/90	0.0	0.0
C8	ELECT PEN	NA	07/21/88	0.0	0.0
C8	ELECT PEN	NA	02/07/90	0.0	0.0
C9	ELECT PEN	NA	02/07/90	0.0	0.0
C10	ELECT PEN	NA	07/21/88	0.0	0.0
C10	ELECT PEN	NA	02/07/90	0.0	0.0
D1	ELECT PEN	NA	07/21/88	0.0	0.0
D1	ELECT PEN	NA	02/07/90	0.0	0.0
D2	ELECT PEN	NA	07/21/88	0.0	0.0
D2	ELECT PEN	NA	02/07/90	0.0	0.0
D3	ELECT PEN	NA	07/21/88	0.0	0.0
D3	ELECT PEN	NA	02/07/90	0.0	0.0
D4	ELECT PEN	NA	07/21/88	0.0	0.0
D4	ELECT PEN	NA	02/07/90	0.0	0.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
D6	ELECT PEN	NA	07/21/88	0.0	0.0
D6	ELECT PEN	NA	02/07/90	0.0	0.0
D7	ELECT PEN	NA	07/21/88	0.0	0.0
D7	ELECT PEN	NA	02/07/90	0.0	0.0
D8	ELECT PEN	NA	07/21/88	0.0	0.0
D8	ELECT PEN	NA	02/07/90	0.0	0.0
D9	ELECT PEN	NA	07/21/88	0.0	0.0
D9	ELECT PEN	NA	02/07/90	0.0	0.0
D10	ELECT PEN	NA	07/21/88	0.0	0.0
D10	ELECT PEN	NA	02/07/90	0.0	0.0
E1	ELECT PEN	NA	07/21/88	0.0	0.0
E1	ELECT PEN	NA	02/07/90	0.0	0.0
E3	ELECT PEN	NA	07/21/88	0.0	0.0
E3	ELECT PEN	NA	02/07/90	0.0	0.0
E4	ELECT PEN	O RING	07/12/88	0.0	0.0
E4	ELECT PEN	O RING	08/16/88	0.0	0.0
E4	ELECT PEN	O RING	01/24/90	0.0	0.0
E4	ELECT PEN	O RING	02/07/90	0.0	0.0
E4	ELECT PEN	O RING	04/02/90	0.0	0.0
E5	ELECT PEN	NA	07/21/88	0.0	0.0
E5	ELECT PEN	NA	02/07/90	0.0	0.0
E7	ELECT PEN	NA	07/21/88	0.0	0.0
E7	ELECT PEN	NA	02/07/90	0.0	0.0
E9	ELECT PEN	NA	07/21/88	0.0	0.0
E9	ELECT PEN	NA	02/07/90	0.0	0.0
EMEX	EMRG EXP HATCH	STRONG BACK	08/13/87	0.0	0.0
EMEX	EMRG EXP HATCH	STRONG BACK	02/11/88	0.0	0.0
EMEX	EMRG EXP HATCH	STRONG BACK	08/18/88	2230.0	2230.0
EMEX	EMRG EXP HATCH	STRONG BACK	02/01/89	210000.0	0.0
EMEX	EMRG EXP HATCH	STRONG BACK	02/01/89	0.0	1230.0
EMEX	EMRG EXP HATCH	STRONG BACK	07/25/89	4042.0	4042.0
EMEX	EMRG EXP HATCH	STRONG BACK	03/06/90	7438.0	7438.0
EMEX	EMRG EXP HATCH	STRONG BACK	04/10/90	0.0	0.0
FXFR	FUEL XFR FLNG	O RING	07/12/88	0.0	0.0
FXFR	FUEL XFR FLNG	O RING	08/17/88	0.0	0.0
FXFR	FUEL XFR FLNG	O RING	01/28/90	0.0	0.0
FXFR	FUEL XFR FLNG	O RING	03/25/90	0.0	0.0
MHG	MAINT HATCH	GASKET	10/09/87	0.0	0.0
MHG	MAINT HATCH	GASKET	10/14/87	0.0	0.0
MHG	MAINT HATCH	GASKET	07/12/88	0.0	0.0
MHG	MAINT HATCH	GASKET	08/22/88	0.0	0.0
MHG	MAINT HATCH	GASKET	06/29/89	0.0	0.0
MHG	MAINT HATCH	GASKET	07/13/89	0.0	0.0
MHG	MAINT HATCH	GASKET	01/23/90	0.0	0.0
MHG	MAINT HATCH	GASKET	04/10/90	0.0	0.0
PRSN	PERSONNEL HATCH	STRONG BACK	08/13/87	2020.0	2020.0
PRSN	PERSONNEL HATCH	STRONG BACK	02/11/88	5040.0	5040.0

PEN	NAME	COMPONENT I.D.	DATE	AS FOUND	AS LEFT
PRSN	PERSONNEL HATCH	STRONG BACK	08/18/88	3800.0	3800.0
PRSN	PERSONNEL HATCH	STRONG BACK	01/31/89	4530.0	4530.0
PRSN	PERSONNEL HATCH	STRONG BACK	07/26/89	6517.0	6517.0
PRSN	PERSONNEL HATCH	STRONG BACK	03/20/90	20000.0	0.0
PRSN	PERSONNEL HATCH	STRONG BACK	03/29/90	0.0	3800.0

A summary for the Type B and C Local Leakage Rate Tests since the last ILRT are as follows (all values in sccm).

YEAR	BYPASS	TYPE B	TYPE C	TOTAL
1987	11505	41.6	4638	14689
1988	15320	6030	8766	30116
1989	11710	10560	8766	31036
1990	11313	11238	2430	24981

Note: Per the plant Technical Specifications the limit for total Bypass leakage is less than .27 La (245,000 sccm) and the limit for total Type B and C leakage is less than .6 La (544,000 sccm).

LOCAL LEAKAGE RATE PROBLEMS SINCE LAST ILRT

On February 10, 1988 Containment Radiation Monitor isolation valve FCV-26-1 was found to have a leakage rate of approximately 100 scfm. This value was in excess of the plant's Technical Specification limit of 0.27 La (245,153 sccm). This was reported on Licensee Event Report #335-88-002. The valve was repaired and the as-left leakage was 450 sccm. The outside valve on this penetration was 1100 sccm, thus the as-found as well as the minimum pathway leakage for this penetration was 1100 sccm.