

New Hampshire Yankee

Ted C. Feigenbaum
Senior Vice President and
Chief Operating Officer

NYN- 90038

February 9, 1990

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

References: (a) Facility Operating License NPF-67, Docket No. 50-443

(b) Code of Federal Regulations Title 10, Part 50, Appendix J

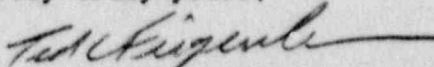
Subject: Reactor Containment Building Integrated Leak Rate Test

Gentlemen:

Enclosed is a copy of the report on the Reactor Containment Building Integrated Leak Rate Test conducted at Seabrook Station Unit 1 and successfully completed on November 22, 1989. This report is submitted in accordance with Reference (b).

If you should have any questions regarding the above, please contact Mr. Richard Belanger at (603) 474-9521, extension 4048.

Very truly yours,


Ted C. Feigenbaum

Enclosure

cc: Mr. William T. Russell
Regional Administrator
United States Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. Victor Nerses, Project Manager
Project Directorate I-3
United States Nuclear Regulatory Commission
Division of Reactor Projects
Washington, DC 20555

Mr. Noel Dudley
NRC Senior Resident Inspector
P.O. Box 1149
Seabrook, NH 03874

New Hampshire Yankee Division of Public Service Company of New Hampshire
P.O. Box 300 • Seabrook, NH 03874 • Telephone (603) 474-9521

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**REACTOR CONTAINMENT BUILDING
INTEGRATED LEAKAGE RATE TEST**

**TYPES A, B, AND C
PERIODIC TEST**

SEABROOK STATION - UNIT 1

**DOCKET NO. 50-443
OPERATING LICENSE NO. NPF-67**

NOVEMBER 1989

NEW HAMPSHIRE YANKEE

PREPARED BY: *Roger A. Hanson* 1/30/90
Preperer/Date

REVIEWED BY: *James W. Connelly* 1/30/90
Reviewer/Date

REVIEWED BY: *Thomas M. Vachon* 1/30/90
Reviewer/Date

APPROVED BY: *B. Khan* 1/30/90
Program Support Manager/Date

APPROVED BY: *J. Klein* 1/30/90
Technical Support Manager/Date

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REFERENCES

1. 10CFR Part 50, Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors, November 15, 1988.
2. ANSI N45.4, American National Standard. Leakage-Rate Testing of Containment Structures for Nuclear Reactors, March 16, 1972.
3. ANSI/ANS-56.8, Containment System Leakage Testing Requirements, January 20, 1987. (NOTE 1)
4. EX1803.001, Reactor Containment Integrated Leakage Rate Test - Type A, Seabrook Station Operating Procedure, Revision 01.
5. EX1803.003, Reactor Containment Types B and C Leakage Rate Tests, Seabrook Station Operating Procedure, Revision 02.
6. EX1803.004, Containment and Containment Enclosure Surface Inspection, Seabrook Station Operating Procedure, Revision 00.
7. NUREG-1331, Technical Specifications, Seabrook Station, Unit 1, Appendix A to License No. NPF-67, April 1989.

(NOTE 1) This document used only as a guideline and reference.

SECTION 1

PURPOSE

The purpose of this report is to present a description and analysis of the November 1989, Periodic Type A Reactor Containment Building Integrated Leakage Rate Test (ILRT), and a summary of the Preoperational and Periodic Types B and C Local Leakage Rate Tests (LLRT's) conducted at Seabrook Station - Unit 1. Seabrook Station - Unit 1 is operated by the Public Service Company of New Hampshire - New Hampshire Yankee Division (PSNH-NHY). Specific plant information and technical data is contained in Attachment 1A.

PSNH-NHY has exclusive responsibility and control over the physical construction, operation, maintenance, and all related functions with respect to Unit 1. PSNH-NHY, along with other New England utilities, own, as tenants in common, proportional interests in Unit 1.

This report is submitted as required by 10CFR50, Appendix J, Paragraph V.B. (Reference 1).

ATTACHMENT 1A
TEST DATA SUMMARY

A. Plant Information:

| | |
|-----------------------|---|
| Operator | Public Service Company of New Hampshire - New Hampshire Yankee Division (PSNH-NHY) |
| Plant | Seabrook Station - Unit 1 |
| Location | Seabrook, New Hampshire |
| Reactor Type | PWR |
| Docket Number | 50-443 |
| Operating License No. | NPF-67 |
| Date Test Completed | November 23, 1989 |

B. Technical Data:

| | |
|---|-----------------------------|
| Containment Net Free Air Volume as Tested | 2.704×10^6 cu. ft. |
| Design Pressure | 52 psig |
| Calculated Peak Accident Pressure | 49.6 psig |
| Containment Design Temperature | 296°F |
| L_a | 0.15%/day |
| 0.75 L_a | 0.1125%/day |

SECTION 2

SUMMARY

2.1 TYPE A TEST

2.1.1 Test Summary

Pressurization for the ILRT began at approximately 0130 hours on November 20, 1989, with a fairly constant pressurization rate of 3.3 psi per hour. Pressurization was temporarily secured at 0230 hours due to containment fire detectors going in alarm. After an extensive review, it was determined that these detectors were temperature and moisture sensitive. Also, during the period when the air compressors were secured, average containment temperature decreased. Pressurization of the containment was resumed at approximately 0257 hours. The air flow was adjusted for optimum compressor cycling and a pressurization rate of approximately 3.0 psi per hour was achieved throughout the remainder of the pressurization sequence. Leakage surveys of all penetration areas were conducted throughout the pressurization sequence and the Type A test. Several minor leaks were detected and monitored, but no significant leakage was found.

Containment pressurization was secured at approximately 1833 hours on November 20, 1989, with a peak instantaneous pressure of 65.754 psia and an average containment temperature of 95.487°F. The pressurization piping system was isolated and vented. Pressure, temperature and relative humidity data were continuously recorded throughout the pressurization and test period at 20 minute intervals.

At 1843 hours, the containment thermal stabilization period commenced. At 2343 hours on November 20, 1989, the thermal stabilization criteria of Reference 4 was satisfied and the ILRT test period commenced. The relative humidity detectors provided extremely unstable readings for 7 more hours when they rather abruptly settled out. During the initial stages of this period, the leakage rate appeared excessive and extensive investigations for leaks were conducted. At approximately 0625 hours on November 21, 1989, reactor makeup water containment isolation valve RMW-V30 (Penetration X-36C) was isolated and the ILRT test period was terminated. The leakage past RMW-V30 appeared minor in nature, but was the largest of all leaks observed during the investigation. At about the same time RMW-V30 was isolated, the relative humidity detectors settled out. The mass trend flattened out and the leakage rate trend improved. After achieving overall containment system stabilization, the 24 hour ILRT test period was restarted at 0643 hours on November 21, 1989.

The type A test was successfully completed at 0643 hours on November 22, 1989, with a Mass Point Upper Confidence Limit (UCL-MP) of 0.056 percent/day. The mass point leakage rate was well below the 0.75 L_a acceptance criteria.

The Superimposed Leakage Verification Test was started at 0823 hours on November 22, 1989, and was successfully completed at 1223 hours on November 22, 1989. The results of the Verification Test satisfied the requirements of Reference 4.

Depressurization of the containment began at approximately 1829 hours on November 22, 1989, and was completed at 1514 hours on November 23, 1989. Attachment 2A contains the ILRT Testing Sequence.

Penetration X-36C was local leakage rate tested on November 27, 1989, in the as-left Type A condition. The inside containment isolation valve RMW-V29 and outside containment isolation valve RMW-V30 had measured leakage rates of 0.0 SCFH and 15.7 SCFH, respectively. When added to the as-left Type A leakage rate, the Type A test results were still below the 0.75 L_a acceptance criteria, (see Section 3.3.2.1). A review of the historical leakage rate trend on valve RMW-V30 exhibited degrading as-found test data. For this reason, valve RMW-V30 was replaced (see Section 2.1.3).

2.1.2 Conclusion

The November 1989 Seabrook Station - Unit 1 Type A test is considered a successful test in that it demonstrated the leak-tight integrity of the containment boundary. The as-left Type A leakage rate is well below the Station procedure and Technical Specification acceptance criteria.

2.1.3 Corrective Action

Due to the trending concerns and the leakage history of Reactor Make-up Water containment isolation valve, RMW-V30, this valve was replaced with an enhanced leakage design type valve, (see Attachment 4A).

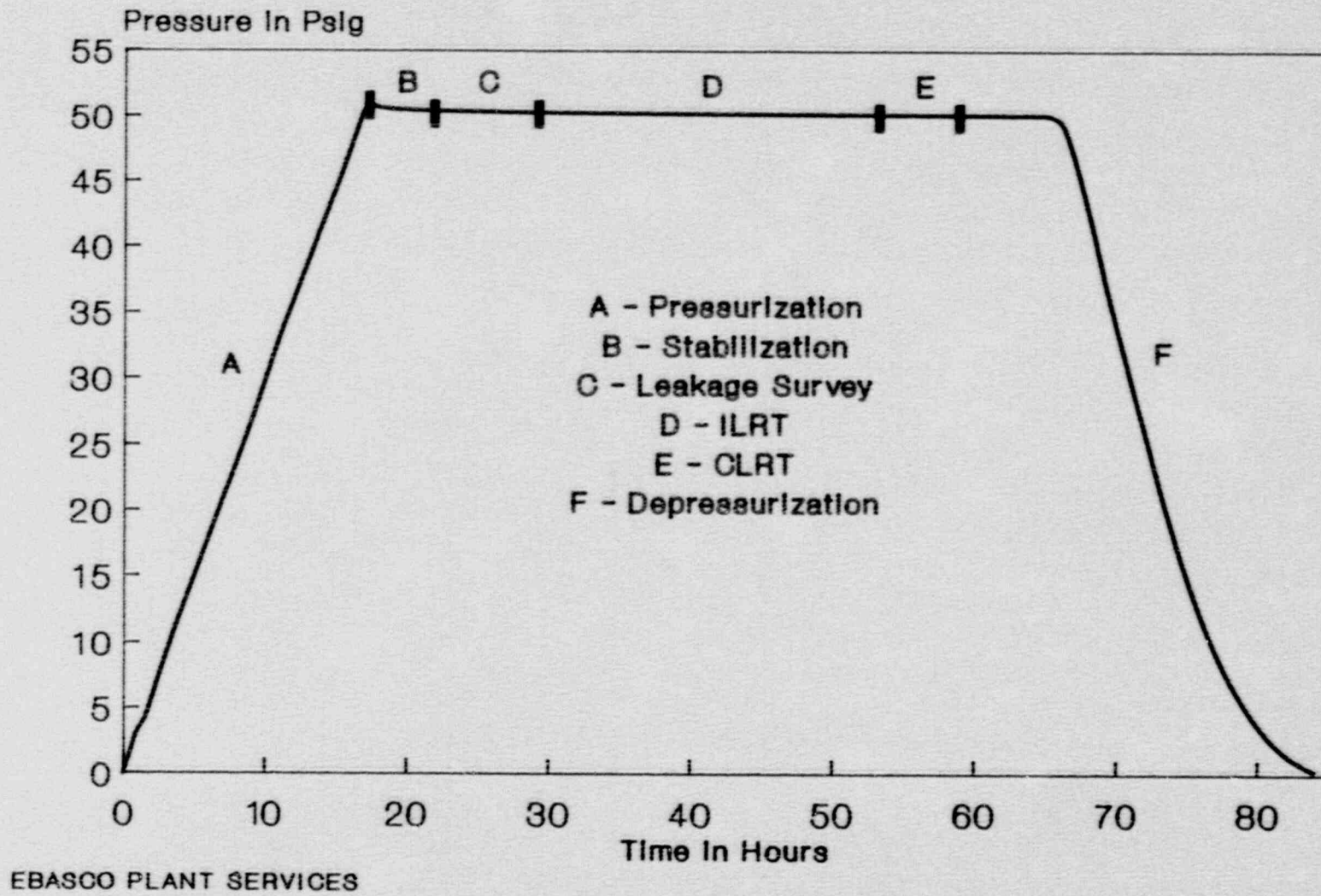
2.2 LOCAL LEAKAGE RATE TESTS (TYPES B & C)

The Local Leakage Rate Tests (LLRT's) of containment isolation valves and other containment penetrations were conducted as required by the methods described in the Seabrook Station Operating Procedure, Reference 5, for the Types B and C tests.

In accordance with Appendix J to 10CFR50, Paragraph V.B., data for the Local Leakage Rate Tests are summarized in Section 4 of this report.

ILRT TESTING SEQUENCE

1989 Seabrook Inservice ILRT



SECTION 3

TYPE A TEST

3.1 EDITED LOG OF EVENTS

This log was edited from information contained in the Official ILRT Log of Events.

November 19, 1989

- 2345 Completed final inspection of containment and secured the containment personnel airlock. De-energized containment lighting.

November 20, 1989

- 0130 Commenced containment pressurization. Pressurization rate is approximately 3.3 psi/hour.
- 0230 Secured containment pressurization per direction of the Shift Supervisor. Containment fire detectors alarmed in the control room.
- 0257 Determined that fire detectors are temperature and moisture sensitive. Restarted containment pressurization. Pressurization rate approximately 3.0 psi/hour.
- 0400 Performed gross leakage survey of penetration areas, no leakage observed.
- 0900 Initiated an extensive leakage survey of penetration areas, minor leaks observed.
- 1335 Initiated an extensive leakage survey of penetration areas, minor leaks observed.
- 1833 Secured containment pressurization with a peak instantaneous pressure of 65.754 psia and an average temperature of 95.487°F.
- 1843 Commenced containment Type A temperature stabilization period.
- 2343 Satisfied procedural temperature stabilization criteria, (Attachment 3.1A and 3.1B). Commenced Type A ILRT.

November 21, 1989

- 0625 Isolated leak past RMW-V30. Terminated Type A ILRT test period.
- 0643 Restarted Type A ILRT 24 hour test period.

November 22, 1989

- 0643 Successfully completed 24 hour Type A test period.
- 0717 Initiated flow for the Superimposed Leakage Verification Test.
- 0823 Commenced Superimposed Leakage Verification Test.
- 1223 Successfully completed Superimposed Leakage Verification Test.
- 1829 Commenced containment depressurization.

November 23, 1989

- 1514 Completed containment depressurization.

ATTACHMENT 3.1A

ILRT TEMPERATURE STABILIZATION (NOTE 1)

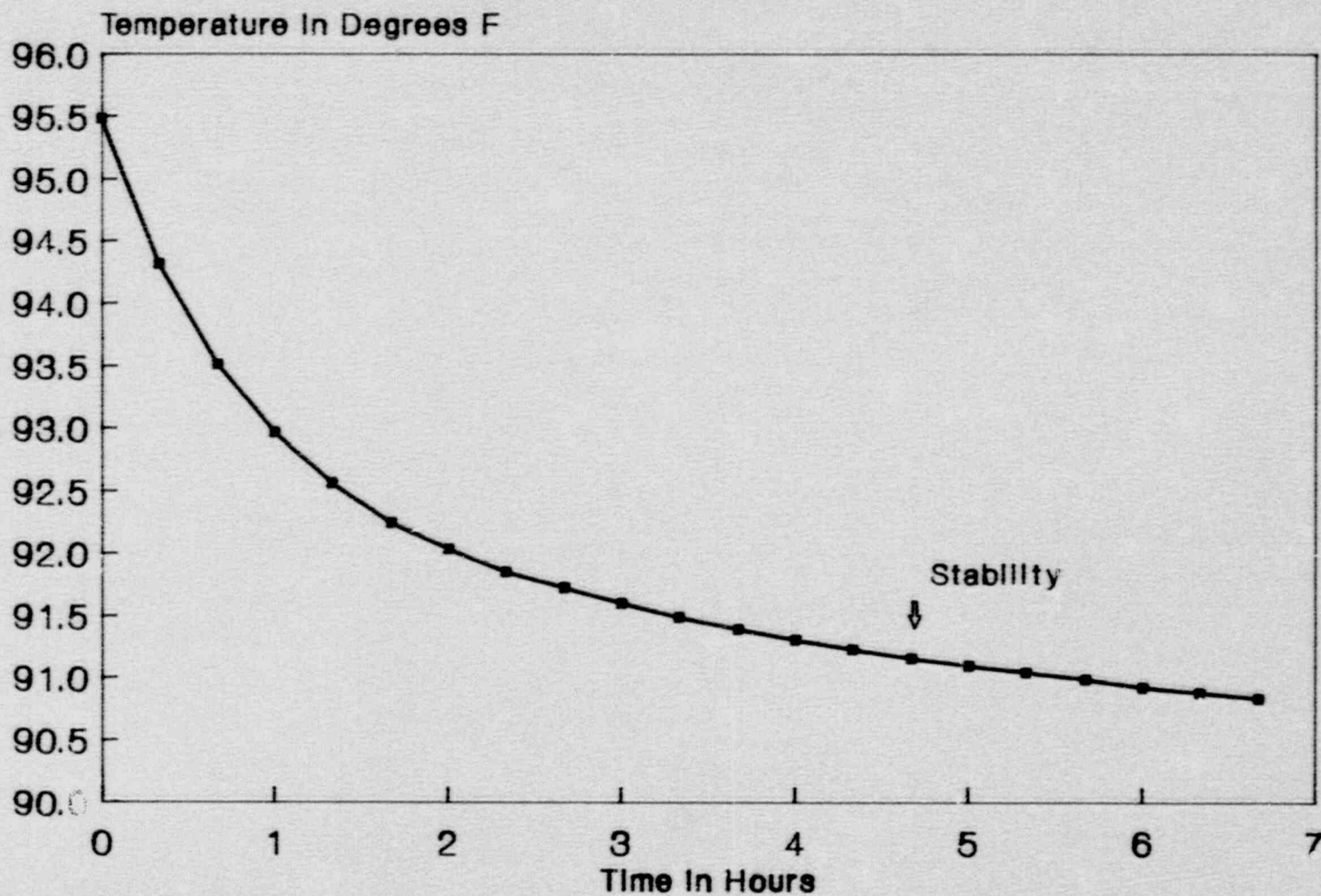
| SAMPLE NUMBER | TIME HOURS | AVE TEMP (DEG F) | DELTA T/HR LAST 1 HR | DELTA T/HR LAST 4 HR | 4 HR DELTA T - 1 HR DELTA T |
|------------------|---------------|---------------------|-------------------------|-------------------------|--------------------------------|
| 1 | 0.00 | 95.487 | 0.000 | 0.000 | 0.000 |
| 2 | 0.33 | 94.320 | 0.000 | 0.000 | 0.000 |
| 3 | 0.67 | 94.517 | 0.000 | 0.000 | 0.000 |
| 4 | 1.00 | 92.968 | -2.519 | 0.000 | 0.000 |
| 5 | 1.33 | 92.562 | -1.758 | 0.000 | 0.000 |
| 6 | 1.67 | 92.248 | -1.269 | 0.000 | 0.000 |
| 7 | 2.00 | 92.037 | -0.932 | 0.000 | 0.000 |
| 8 | 2.33 | 91.851 | -0.711 | 0.000 | 0.000 |
| 9 | 2.67 | 91.724 | -0.524 | 0.000 | 0.000 |
| 10 | 3.00 | 91.601 | -0.436 | 0.000 | 0.000 |
| 11 | 3.33 | 91.490 | -0.361 | 0.000 | 0.000 |
| 12 | 3.67 | 91.395 | -0.330 | 0.000 | 0.000 |
| 13 | 4.00 | 91.311 | -0.290 | -1.044 | 0.754 |
| 14 | 4.33 | 91.233 | -0.257 | -0.772 | 0.514 |
| 15 | 4.67 | 91.159 | -0.236 | -0.590 | 0.354 (NOTE 2) |
| 16 | 5.00 | 91.100 | -0.211 | -0.467 | 0.256 (NOTE 2) |
| 17 | 5.33 | 91.046 | -0.187 | -0.379 | 0.192 (NOTE 2) |
| 18 | 5.67 | 90.989 | -0.169 | -0.315 | 0.146 (NOTE 2) |
| 19 | 6.00 | 90.924 | -0.176 | -0.278 | 0.102 (NOTE 2) |
| 20 | 6.33 | 90.882 | -0.164 | -0.242 | 0.079 (NOTE 2) |
| 21 | 6.67 | 90.835 | -0.155 | -0.222 | 0.068 (NOTE 2) |

NOTES:

- 1) 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 4 HOURS BY LESS THAN 0.5 DEGREES F.
 - THE STABILIZATION PERIOD IS A MINIMUM OF 4 HOURS.
- 2) THE STABILIZATION CRITERIA HAS BEEN MET.

TEMPERATURE STABILIZATION

1989 Seabrook Inservice ILRT



Ebasco Plant Services

3.2 GENERAL TEST DESCRIPTION

3.2.1 Prerequisites

In accordance with Reference 4, the following is a listing of the pertinent prerequisites and other procedural requirements completed and documented prior to containment pressurization:

- a. All personnel involved with the performance of the test have been briefed on the content of the procedure and their required duties.
- b. General inspection of the accessible interior and exterior surfaces of the containment structures and components completed in accordance with Reference 6. No deterioration or corrective action required.
- c. All equipment and instrumentation that could be damaged by ILRT test pressure have been removed or protected.
- d. Access control around the periphery of the containment has been established.
- e. All required system valve lineups completed.
- f. Instrument Selection Guide (ISG) calculation completed.
- g. All test instrumentation calibrated within 6 months of the test. Test data acquisition and calculating equipment installed, calibrated and operational.
- h. Containment pressurization system checked out and ready for operation.
- i. Initial water levels recorded.
- j. Communications are established.
- k. The Official IRLT Log of Events was established.
- l. All required Type "B" and "C" local leakage rate testing completed.
- m. Site meteorological data recorded prior to and during the performance of the ILRT (Attachment 3.2A).
- n. RCS temperature maintained stable prior to and during the performance of the ILRT.
- o. Temperature survey satisfactorily performed.

3.2.2 Description of Containment

The containment is a seismic Category I reinforced concrete dry structure, which is designed to function at atmospheric conditions. It consists of an upright cylinder topped with a hemispherical dome, supported on a reinforced concrete foundation mat which is keyed into the bedrock by the depression for the reactor pit and by continuous bearing around the periphery of the foundation mat. The containment structure provides biological shielding for normal and accident conditions. The approximate dimensions of the containment are:

| | |
|--------------------------|--------------------------------|
| Inside diameter | 140 ft. |
| Inside height | 219 ft. |
| Vertical wall thickness | 4 ft. 6 in. to 4 ft. 7 1/2 in. |
| Dome thickness | 3 ft. 6 1/8 in. |
| Foundation mat thickness | 10 ft. |

Containment penetrations are provided in the lower portion of the structure, and consist of a personnel lock and an equipment hatch/personnel lock, a fuel transfer tube and piping, electrical, instrumentation, and ventilation penetrations.

The containment is designed to withstand all credible conditions of loading, including normal loads, construction loads, test loads, severe environmental loads, and extreme environmental and abnormal loads. The maximum design pressure is 52 psig. The maximum liner temperature associated with the design pressure response is 296°F. The calculated peak accident pressure for the design basis accident is 49.6 psig.

The containment free volume is 2.704×10^6 cubic feet. The maximum allowable leakage rate from the containment (L_a) is 0.15% of the containment free volume, by weight, per day.

The containment is surrounded by a containment enclosure designed in a similar configuration as a vertical right cylindrical seismic Category I, reinforced concrete structure with dome and ring base. The approximate dimensions of the structure are: inside diameter, 158 ft.; vertical wall thickness, varies from 1 ft. 3 in. to 3 ft.; and dome thickness, 1 ft., 3 in.

3.2.3 Equipment and Instrumentation

Pressurization of the containment was achieved by utilizing a temporary system consisting of nine temporary oil-free air compressors manifolded through two after coolers and refrigerant air dryers in parallel (Attachment 3.2B). The system included adequate instrumentation and valving to maintain proper monitoring and control of the compressed air quality throughout the pressurization sequence. The total capacity of the pressurization system was approximately 9,000 standard cubic feet per minute (SCFM).

The various containment parameters required to calculate containment leakage during the test were monitored using instrumentation which consisted of 26 resistance temperature detectors (RTD's), six relative humidity detectors (RHD's), and one absolute pressure sensor. Pertinent data for the test instrumentation is listed in Attachment 3.2C, and the general locations of the test instrumentation are shown in Attachments 3.2D and 3.2E. Elevations and azimuths are approximate.

A variable area rotometer was used to perform the Superimposed Leakage Verification Test (Attachment 3.2F).

3.2.4 Data Acquisition System

A programmable, multichannel data logger was used to scan the data from the 26 resistance temperature detectors, six relative humidity detectors and two pressure sensors. Data readings were recorded every 20 minutes during pressurization, the leakage rate test, verification test and depressurization.

3.2.5 Data Resolution System

The digital data was transferred automatically also at 20 minute intervals from the ILRT data logger to a dedicated computer system using Ebasco Plant Services ILRT analysis program for data reduction and leakage rate calculations. The following calculations used the instantaneous values of the ILRT sensors to determine the Mass Point Analysis Method leakage rate.

Absolute Method of Mass Point Analysis

The Absolute Method of Mass Point Analysis consists of calculating the air mass within the containment structure, over the test period, using pressure, temperature, and dew point observations made during the ILRT. The air mass is computed using the ideal gas law as follows:

$$M = \frac{144V (P - P_v)}{RT} \quad (\text{Eq. 1})$$

where:

- M = air mass, lbm
- P = total pressure, psia
- P_v = average vapor pressure, psia
- R = 53.35 ft-lbf/lbm °R (for air)
- T = average containment temperature, °R
- V = containment free volume, ft³

The leakage rate is then determined by plotting the air mass as a function of time, using a least-squares fit to determine the slope, $A = dM/dT$. The leakage rate is expressed as a percentage of the air mass lost in 24 hours or symbolically:

$$\text{Leakage Rate} = -2400 (A/B) \quad (\text{Eq. 2})$$

Where A is the slope of the least-squares curve and B is the y-intercept. The sign convention is such that the leakage out of the containment is positive, and the units are in percent/day.

The air mass is calculated and the result is correlated as a function of time by means of a least-squares curve fit of the form:

$$M = A_t + B \quad (\text{Eq. 3})$$

The slope A and y-intercept B are then used in Equation 2 to determine the leakage rate.

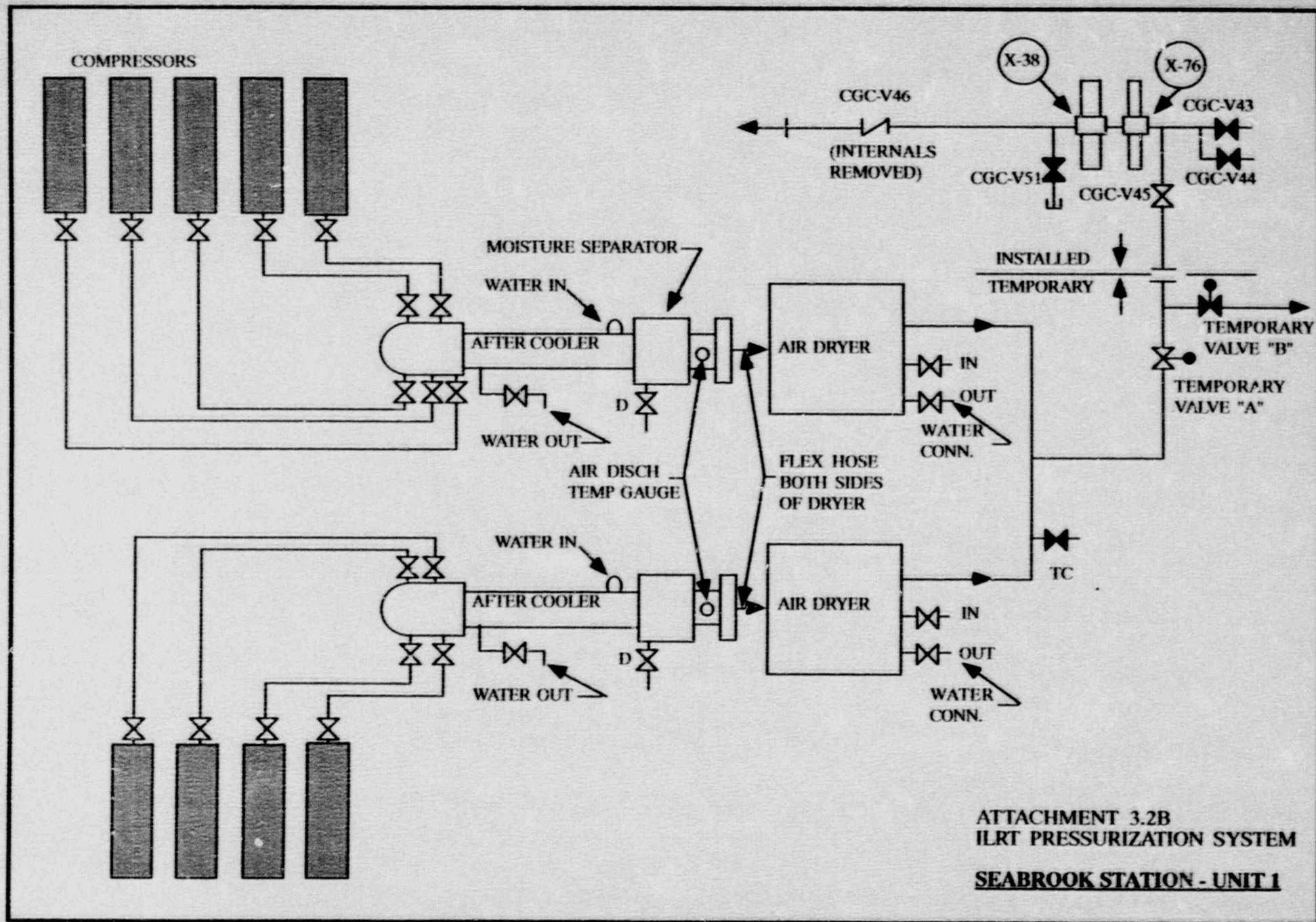
A confidence interval is calculated using a Student's T distribution. The sum of the leakage rate and confidence interval is the Upper Confidence Limit - Mass Point (UCL-MP).

ATTACHMENT 3.2A
SITE METEOROLOGY

| <u>Date</u> | <u>Time</u> | <u>Ambient Temperature (Deg F)</u> | <u>Barometric Pressure (In. Hg)</u> |
|-------------------|-------------|--|---|
| November 17, 1989 | 2000 | 40.5 | 29.94 |
| | 2400 | 38.5 | 29.94 |
| November 18, 1989 | 0400 | 32.1 | 29.94 |
| | 0800 | 34.0 | 29.92 |
| | 1200 | 45.1 | 29.85 |
| | 1546 | 41.1 | 29.82 |
| | 2000 | 35.5 | 29.94 |
| | 2400 | 34.4 | 29.99 |
| November 19, 1989 | 0400 | 31.3 | 30.04 |
| | 0800 | 38.0 | 30.12 |
| | 1200 | 39.0 | 30.03 |
| | 1600 | 36.1 | 30.02 |
| | 2000 | 33.3 | 29.90 |
| | 2400 | 34.4 | 29.77 |
| November 20, 1989 | 0130 | 33.5 | 29.70 |
| | 0230 | 31.6 | 29.66 |
| | 0330 | 32.3 | 29.60 |
| | 0430 | 34.8 | 29.56 |
| | 0530 | 35.1 | 29.51 |
| | 0630 | 33.7 | 29.48 |
| | 0730 | 33.9 | 29.44 |
| | 0830 | 35.4 | 29.40 |
| | 0930 | 36.0 | 29.38 |
| | 1035 | 38.0 | 29.32 |
| | 1131 | 40.6 | 29.36 |
| | 1230 | 40.1 | 29.22 |
| | 1325 | 44.0 | 29.21 |
| | 1425 | 43.5 | 29.18 |
| | 1528 | 44.5 | 29.16 |
| | 1626 | 46.5 | 29.12 |
| | 1727 | 45.7 | 29.10 |
| | 1830 | 45.1 | 29.06 |
| | 1930 | 43.3 | 29.01 |
| | 2030 | 43.5 | 28.92 |
| | 2130 | 41.9 | 28.86 |
| | 2230 | 41.5 | 28.80 |
| | 2330 | 41.3 | 28.74 |

ATTACHMENT 3.2A (Continued)**SITE METEOROLOGY**

| <u>Date</u> | <u>Time</u> | <u>Ambient Temperature (Deg F)</u> | <u>Barometric Pressure (In. Hg)</u> |
|-------------------|-------------|--|---|
| November 21, 1989 | 0030 | 41.5 | 28.72 |
| | 0130 | 41.2 | 28.72 |
| | 0230 | 40.2 | 28.71 |
| | 0330 | 39.8 | 28.72 |
| | 0430 | 36.2 | 28.74 |
| | 0530 | 34.4 | 28.76 |
| | 0630 | 33.7 | 28.76 |
| | 0730 | 32.8 | 28.80 |
| | 0830 | 32.3 | 28.84 |
| | 0930 | 32.8 | 28.86 |
| | 1030 | 31.2 | 28.92 |
| | 1130 | 30.9 | 29.00 |
| | 1230 | 29.8 | 29.04 |
| | 1330 | 28.8 | 29.12 |
| | 1430 | 27.8 | 29.18 |
| | 1530 | 26.4 | 29.22 |
| | 1630 | 23.2 | 29.32 |
| | 1728 | 23.2 | 29.37 |
| | 1829 | 20.6 | 29.42 |
| | 1930 | 20.7 | 29.45 |
| | 2030 | 20.4 | 29.52 |
| | 2130 | 19.9 | 29.52 |
| | 2230 | 19.8 | 29.54 |
| | 2330 | 20.6 | 29.55 |
| November 22, 1989 | 0030 | 20.3 | 29.60 |
| | 0130 | 20.4 | 29.64 |
| | 0230 | 21.0 | 29.67 |
| | 0330 | 21.3 | 29.70 |
| | 0430 | 21.3 | 29.73 |
| | 0530 | 21.3 | 29.75 |
| | 0630 | 20.6 | 29.82 |
| | 0730 | 22.3 | 29.86 |
| | 0830 | 24.6 | 29.90 |
| | 0930 | 26.3 | 29.92 |
| | 1030 | 26.2 | 29.92 |
| | 1130 | 31.3 | 29.90 |
| | 1230 | 30.0 | 29.88 |

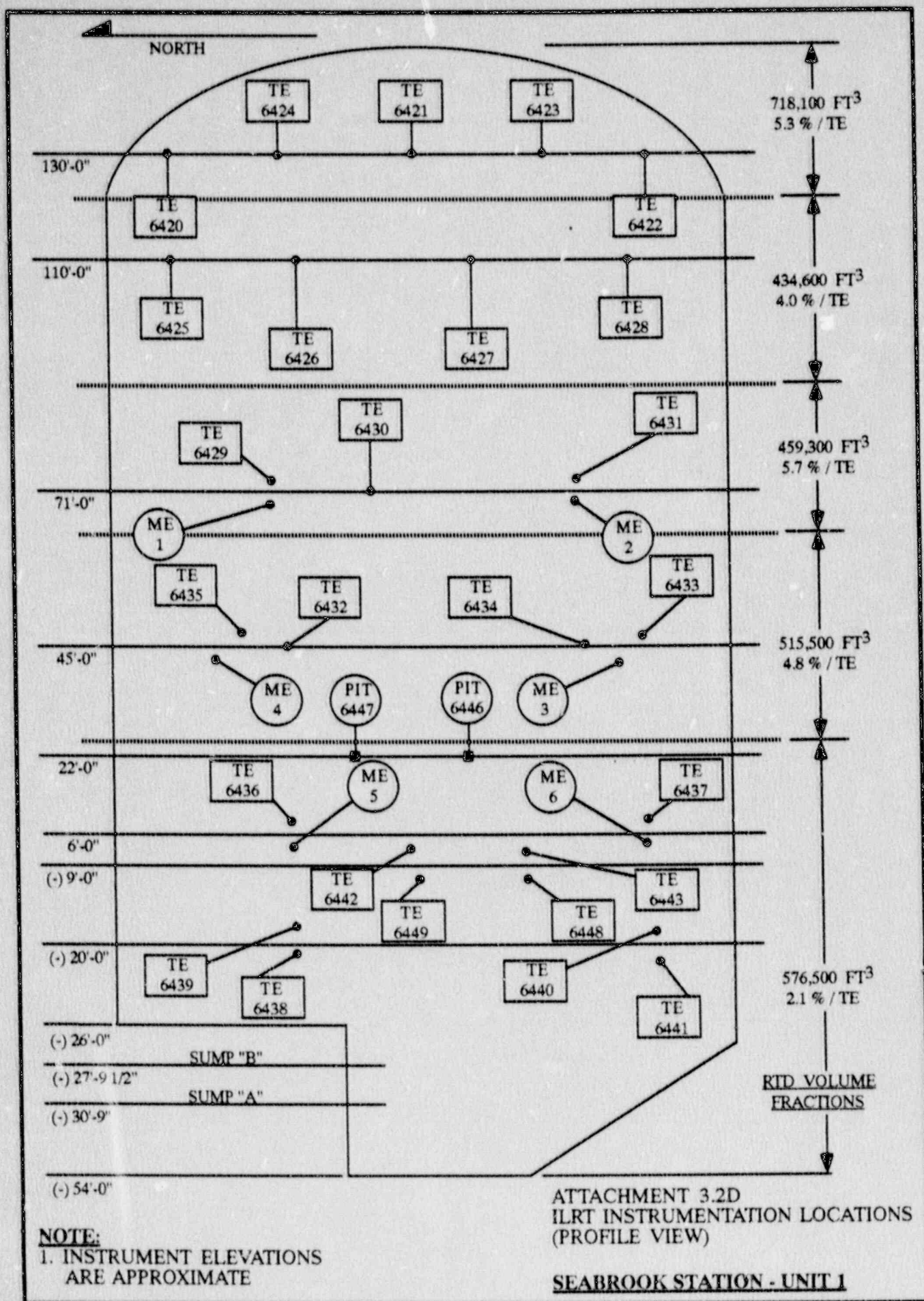


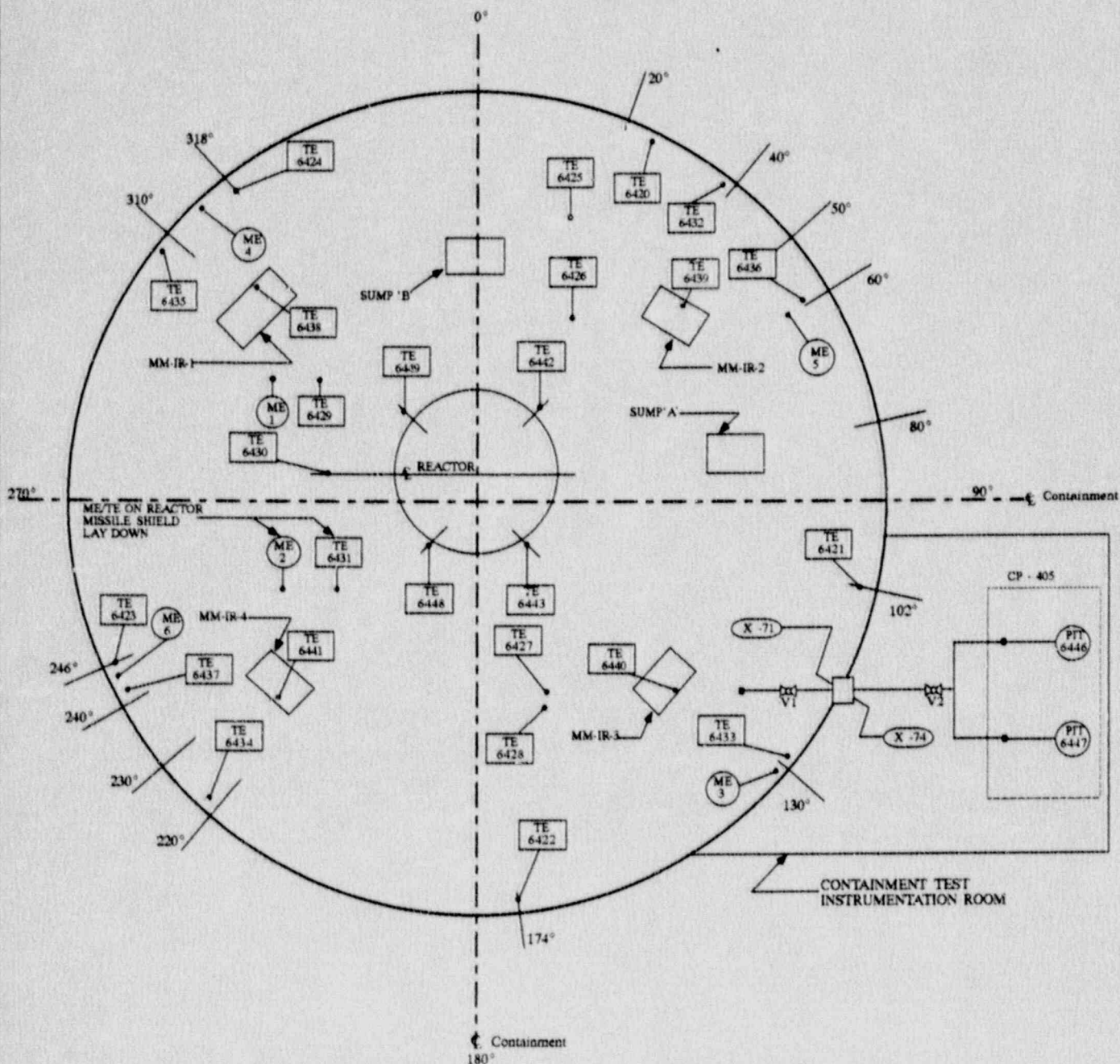
ATTACHMENT 3.2C

INSTRUMENTATION LIST

The following instrumentation was calibrated and functionally verified within 6 months prior to the performance of this test and in accordance with 10CFR50, Appendix J.

| <u>Instrument</u> | <u>No.</u> | <u>Weight Fraction</u> | <u>Elevation</u> | <u>Range</u> | <u>Accuracy</u> | <u>Sensitivity</u> |
|---|------------|------------------------|------------------|--------------|-----------------|--------------------|
| A. <u>Temperature</u> | | | | | | |
| LD-TE-6420 | TEMP 1 | 0.053114 | 130' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6421 | TEMP 2 | 0.053114 | 130' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6422 | TEMP 3 | 0.053114 | 130' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6423 | TEMP 4 | 0.053114 | 130' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6424 | TEMP 5 | 0.053114 | 130' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6425 | TEMP 6 | 0.040181 | 110' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6426 | TEMP 7 | 0.040181 | 110' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6427 | TEMP 8 | 0.040181 | 110' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6428 | TEMP 9 | 0.040181 | 110' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6429 | TEMP 10 | 0.056620 | 71' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6430 | TEMP 11 | 0.056620 | 71' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6431 | TEMP 12 | 0.056620 | 71' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6432 | TEMP 13 | 0.047661 | 45' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6433 | TEMP 14 | 0.047661 | 45' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6434 | TEMP 15 | 0.047661 | 45' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6435 | TEMP 16 | 0.047661 | 45' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6436 | TEMP 17 | 0.021320 | 6' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6437 | TEMP 18 | 0.021320 | 6' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6438 | TEMP 19 | 0.021320 | -20' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6439 | TEMP 20 | 0.021320 | -20' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6440 | TEMP 21 | 0.021320 | -20' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6441 | TEMP 22 | 0.021320 | -20' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6442 | TEMP 23 | 0.021320 | -9' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6443 | TEMP 24 | 0.021320 | -9' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6448 | TEMP 25 | 0.021320 | -9' | 0-150°F | ±0.28°F | ±0.05°F |
| LD-TE-6449 | TEMP 26 | 0.021320 | -9' | 0-150°F | ±0.28°F | ±0.05°F |
| B. <u>Relative Humidity</u> | | | | | | |
| LD-ME-1 | HUM 1 | 0.166667 | 71' | 32-212°F | ±2°F | ±0.5°F |
| LD-ME-2 | HUM 2 | 0.166667 | 71' | 32-212°F | ±2°F | ±0.5°F |
| LD-ME-3 | HUM 3 | 0.166667 | 45' | 32-212°F | ±2°F | ±0.5°F |
| LD-ME-4 | HUM 4 | 0.166667 | 45' | 32-212°F | ±2°F | ±0.5°F |
| LD-ME-5 | HUM 5 | 0.166667 | 6' | 32-212°F | ±2°F | ±0.5°F |
| LD-ME-6 | HUM 6 | 0.166667 | 6' | 32-212°F | ±2°F | ±0.5°F |
| C. <u>Pressure</u> | | | | | | |
| LD-PIT-6446 | PRESS 1 | 1.0 | 22' | 0-100 psia | ±0.02%FS | ±0.001% FS |
| LD-PIT-6447 | PRESS 2 | 0.0 | 22' | 0-100 psia | ±0.02%FS | ±0.001% FS |
| D. <u>Superimposed Leakage Verification Test Flow Instrument</u> | | | | | | |
| Rotometer | | | -26' | 0-15 SCFM | ±2% FS | ±1% FS |

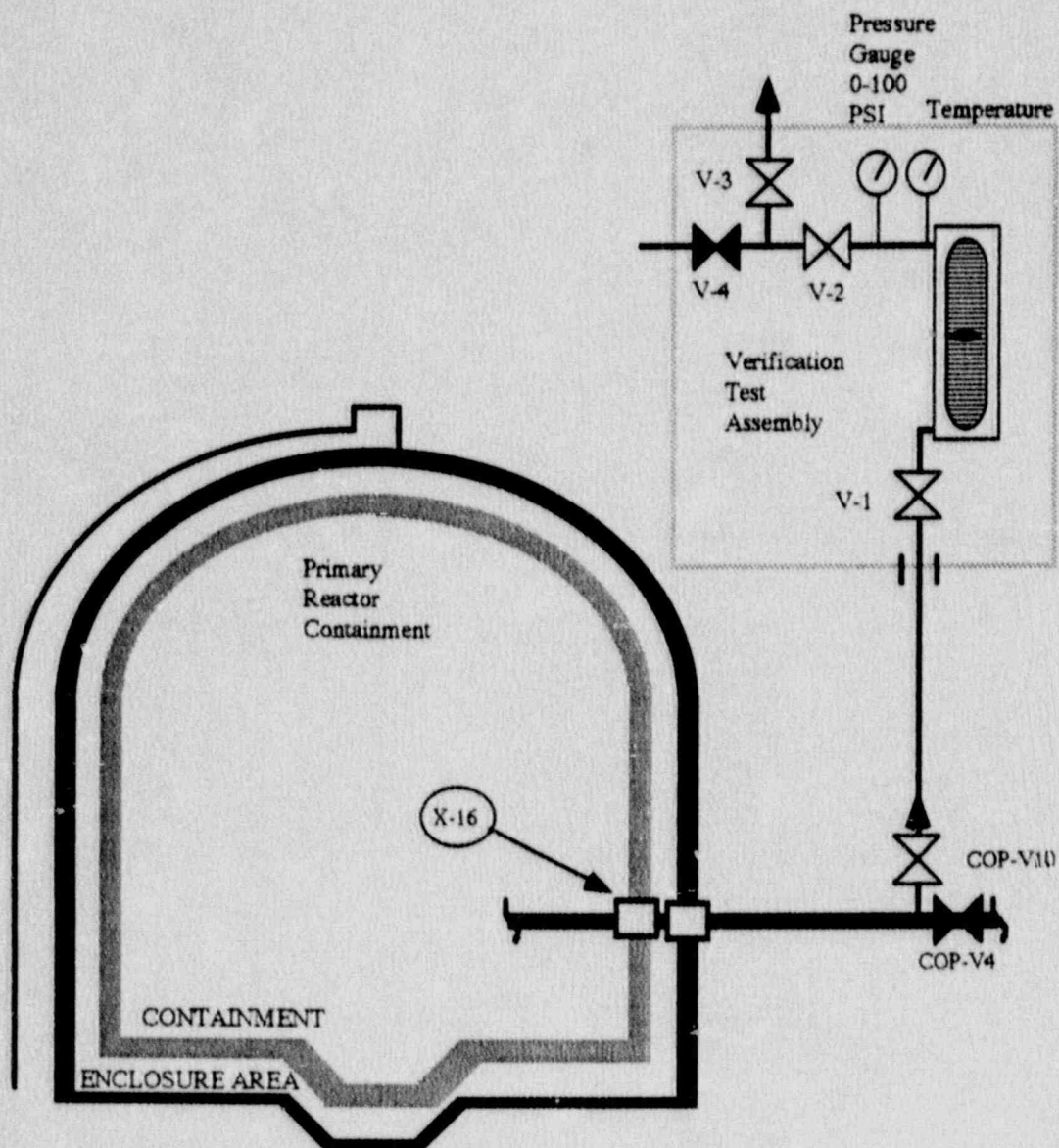




NOTE:
1. INSTRUMENT AZIMUTH
POSITIONS ARE APPROXIMATE

ATTACHMENT 3.2E
ILRT INSTRUMENTATION LOCATIONS
(PLAN VIEW)

SEABROOK STATION - UNIT 1



ATTACHMENT 3.2F
VERIFICATION TEST ASSEMBLY
SEABROOK STATION - UNIT 1

3.3 TEST RESULTS

3.3.1 Presentation of Test Results

The test data for the November 1989 ILRT is based on a 24 hour test period starting at 0643 hours on November 21, 1989. The final test results were determined using an ILRT computer analysis program. The Measured Input Data, Reduced Input Variables and Mass Point Analysis Test Results, and representative graphs are contained in Attachments 3.3A through 3.3H.

The Mass Point Analysis Test Results for the ILRT satisfied the procedural acceptance criteria.

The Type A test instrumentation was verified by the Superimposed Leakage Verification Test Method. The Measured Input Data, Reduced Input Variables and Mass Point Analysis Test Results, and representative graphs are contained in Attachments 3.3I through 3.3Q.

The Mass Point Analysis Test Results for the Superimposed Leakage Verification Test satisfied the procedural acceptance criteria.

3.3.2 ILRT Results

The ILRT was conducted in accordance with Reference 4. The results for the ILRT and for the Supplemental Test are shown below.

3.3.2.1 ILRT Results - Mass Point Analysis

| | <u>Item</u> | <u>(Percent/Day)</u> |
|-----|---|----------------------|
| 1. | L _{am} Leakage Rate Calculated | 0.055 |
| | UCL, Upper Confidence Level | <u>0.001</u> |
| | UCL-MP, L _{am} Leakage Rate plus UCL | 0.056 |
| 2. | Corrections for: (see Section 3.3.2.3) | |
| i. | Type B & C Penalties | 0.003 |
| ii. | Water Levels | <u>0.000</u> |
| | Total Corrections | 0.003 |
| 3. | Total Reported Type A Leakage Rate (Items 1. & 2.) | 0.059 |

Results were within the acceptable limits of 0.75 L_a or 0.1125 percent/day.

3.3.2 2 Supplemental Test Results

The Supplemental Verification Test was performed using the Superimposed Leakage Verification Test Method in accordance with Reference 4. The results for the Superimposed Leakage Verification Test are shown below.

1. The Superimposed Leakage Verification Test is acceptable provided L_C falls within the following range:

$$(L_{am} + L_O - 0.25 L_a) \leq L_C \leq (L_{am} + L_O + 0.25 L_a)$$

where: L_{am} = Type A calculated leakage rate (computer)
($L_{am} = 0.055\%/day$)

L_O = Superimposed leakage rate (rotometer)
($L_O = 0.147\%/day$)

L_a = Maximum allowable leakage rate
($L_a = 0.15\%/day$)

L_C = Composite leakage rate (computer)
($L_C = 0.189\%/day$)

- a. Mass Point:

$$(0.055 + 0.147 - 0.0375) \leq 0.189 \leq (0.055 + 0.147 + 0.0375)$$

$$0.1645 \leq \mathbf{0.189} \leq 0.2395$$

The Superimposed Leakage Verification Test met the requirements set forth in Reference 4.

3.3.2.3 Leakage Penalties Added to Type A Leakage

Penetration leakage to be added since these penetrations were isolated or could not be vented and drained during the Type A test. The leakage assigned is the recorded value for minimum pathway analysis.

i. Type B & C Penalties

| <u>Penetration</u> | <u>Description</u> | <u>Leakage (SCFH)</u> |
|--------------------|--------------------|---------------------------|
| X-9 | RHR Suction Loop 1 | 0.000 |
| X-10 | RHR Suction Loop 4 | 3.020 |
| X-20 | PCCW Supply Loop A | 0.000 |
| X-21 | PCCW Return Loop A | 1.412 |
| X-22 | PCCW Return Loop B | 3.522 |
| X-23 | PCCW Supply Loop B | 4.025 |
| X-35A | SI Accumulator | 0.000 |
| X-36C | RMW Supply | 0.000 |
| X-71D | Cont. Press. Inst | 0.000 |

Total Type B & C Leakage

11.979 SCFH

Total Type B & C Leakage

0.003 Percent/Day

ii. Water Level Corrections

| <u>Description</u> | <u>Gallons</u> |
|--------------------|----------------|
| Rx Vessel | 0.000 |
| Pressurizer | 0.000 |
| Containment Sump | 0.000 |

Total Water Level Corrections

0.000 Gallons

Total Water Corrections

0.000 Percent/Day

iii. Total Corrections

| <u>Description</u> | <u>Leakage (Percent/Day)</u> |
|--|----------------------------------|
| Total Type A Corrections (i. & ii.) | 0.003 |
| Penalties and Corrections | |

ATTACHMENT 3.3A

ILRT MEASURED INPUT DATA

| 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 | 90.035 | 90.023 | 89.952 | 90.173 | 90.134 | 90.297 |
| 2 | 0.33 | 90.090 | 89.946 | 89.930 | 90.141 | 90.114 | 90.263 |
| 3 | 0.67 | 89.992 | 89.980 | 89.930 | 90.152 | 90.071 | 90.254 |
| 4 | 1.00 | 90.044 | 89.883 | 89.887 | 90.109 | 90.071 | 90.242 |
| 5 | 1.33 | 89.958 | 89.958 | 89.843 | 90.075 | 90.048 | 90.208 |
| 6 | 1.67 | 89.981 | 89.926 | 89.778 | 90.075 | 90.059 | 90.176 |
| 7 | 2.00 | 89.949 | 89.849 | 89.800 | 90.055 | 90.016 | 90.145 |
| 8 | 2.33 | 89.938 | 89.860 | 89.778 | 90.021 | 90.016 | 90.156 |
| 9 | 2.67 | 89.904 | 89.828 | 89.812 | 90.000 | 89.962 | 90.111 |
| 10 | 3.00 | 89.915 | 89.849 | 89.769 | 89.989 | 89.962 | 90.122 |
| 11 | 3.33 | 89.883 | 89.817 | 89.734 | 89.977 | 89.939 | 90.111 |
| 12 | 3.67 | 89.872 | 89.785 | 89.703 | 89.957 | 89.939 | 90.047 |
| 13 | 4.00 | 89.872 | 89.774 | 89.734 | 89.966 | 89.930 | 90.025 |
| 14 | 4.33 | 89.851 | 89.763 | 89.703 | 89.923 | 89.896 | 90.013 |
| 15 | 4.67 | 89.860 | 89.797 | 89.660 | 89.914 | 89.885 | 90.025 |
| 16 | 5.00 | 89.774 | 89.774 | 89.691 | 89.903 | 89.832 | 90.004 |
| 17 | 5.33 | 89.829 | 89.774 | 89.648 | 89.891 | 89.853 | 90.004 |
| 18 | 5.67 | 89.754 | 89.699 | 89.616 | 89.880 | 89.787 | 89.993 |
| 19 | 6.00 | 89.786 | 89.719 | 89.637 | 89.860 | 89.821 | 89.950 |
| 20 | 6.33 | 89.742 | 89.719 | 89.605 | 89.825 | 89.832 | 89.950 |
| 21 | 6.67 | 89.688 | 89.688 | 89.573 | 89.837 | 89.787 | 89.927 |
| 22 | 7.00 | 89.786 | 89.676 | 89.616 | 89.805 | 89.755 | 89.916 |
| 23 | 7.33 | 89.731 | 89.699 | 89.605 | 89.805 | 89.778 | 89.884 |
| 24 | 7.67 | 89.627 | 89.615 | 89.657 | 89.787 | 89.760 | 89.866 |
| 25 | 8.00 | 89.677 | 89.633 | 89.573 | 89.782 | 89.735 | 89.884 |
| 26 | 8.33 | 89.611 | 89.611 | 89.562 | 89.751 | 89.735 | 89.852 |
| 27 | 8.67 | 89.634 | 89.611 | 89.519 | 89.751 | 89.735 | 89.829 |
| 28 | 9.00 | 89.656 | 89.567 | 89.539 | 89.751 | 89.712 | 89.818 |
| 29 | 9.33 | 89.590 | 89.556 | 89.528 | 89.762 | 89.680 | 89.798 |
| 30 | 9.67 | 89.634 | 89.579 | 89.485 | 89.751 | 89.680 | 89.798 |
| 31 | 10.00 | 89.602 | 89.556 | 89.528 | 89.708 | 89.646 | 89.786 |
| 32 | 10.33 | 89.611 | 89.556 | 89.485 | 89.685 | 89.669 | 89.775 |
| 33 | 10.67 | 89.547 | 89.547 | 89.464 | 89.696 | 89.669 | 89.766 |
| 34 | 11.00 | 89.525 | 89.524 | 89.486 | 89.685 | 89.592 | 89.775 |
| 35 | 11.33 | 89.579 | 89.470 | 89.410 | 89.664 | 89.615 | 89.743 |
| 36 | 11.67 | 89.504 | 89.493 | 89.421 | 89.653 | 89.592 | 89.743 |
| 37 | 12.00 | 89.525 | 89.481 | 89.421 | 89.642 | 89.571 | 89.723 |
| 38 | 12.33 | 89.525 | 89.493 | 89.485 | 89.621 | 89.592 | 89.723 |
| 39 | 12.67 | 89.547 | 89.470 | 89.387 | 89.578 | 89.592 | 89.711 |
| 40 | 13.00 | 89.504 | 89.438 | 89.333 | 89.610 | 89.517 | 89.677 |
| 41 | 13.33 | 89.482 | 89.438 | 89.356 | 89.578 | 89.560 | 89.677 |
| 42 | 13.67 | 89.482 | 89.406 | 89.333 | 89.578 | 89.549 | 89.677 |
| 43 | 14.00 | 89.513 | 89.406 | 89.344 | 89.578 | 89.506 | 89.646 |
| 44 | 14.33 | 89.536 | 89.415 | 89.344 | 89.556 | 89.506 | 89.668 |
| 45 | 14.67 | 89.416 | 89.427 | 89.344 | 89.501 | 89.528 | 89.646 |
| 46 | 15.00 | 89.407 | 89.384 | 89.235 | 89.513 | 89.528 | 89.677 |
| 47 | 15.33 | 89.416 | 89.341 | 89.333 | 89.533 | 89.485 | 89.625 |
| 48 | 15.67 | 89.450 | 89.384 | 89.281 | 89.524 | 89.474 | 89.625 |
| 49 | 16.00 | 89.384 | 89.372 | 89.324 | 89.501 | 89.451 | 89.603 |
| 50 | 16.33 | 89.373 | 89.361 | 89.301 | 89.501 | 89.463 | 89.580 |
| 51 | 16.67 | 89.364 | 89.318 | 89.312 | 89.469 | 89.474 | 89.548 |
| 52 | 17.00 | 89.407 | 89.318 | 89.290 | 89.501 | 89.419 | 89.537 |
| 53 | 17.33 | 89.364 | 89.286 | 89.203 | 89.447 | 89.442 | 89.537 |
| 54 | 17.67 | 89.416 | 89.275 | 89.235 | 89.426 | 89.419 | 89.528 |
| 55 | 18.00 | 89.298 | 89.264 | 89.235 | 89.426 | 89.388 | 89.505 |
| 56 | 18.33 | 89.341 | 89.329 | 89.192 | 89.435 | 89.419 | 89.505 |
| 57 | 18.67 | 89.352 | 89.264 | 89.226 | 89.415 | 89.388 | 89.505 |
| 58 | 19.00 | 89.341 | 89.286 | 89.215 | 89.415 | 89.397 | 89.505 |
| 59 | 19.33 | 89.341 | 89.232 | 89.226 | 89.415 | 89.376 | 89.482 |
| 60 | 19.67 | 89.309 | 89.211 | 89.183 | 89.404 | 89.365 | 89.494 |
| 61 | 20.00 | 89.298 | 89.275 | 89.215 | 89.415 | 89.376 | 89.482 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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) |
|------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 62 | 20.33 | 89.275 | 89.211 | 89.172 | 89.392 | 89.322 | 89.439 |
| 63 | 20.67 | 89.309 | 89.220 | 89.215 | 89.383 | 89.322 | 89.462 |
| 64 | 21.00 | 89.309 | 89.200 | 89.203 | 89.372 | 89.333 | 89.473 |
| 65 | 21.33 | 89.232 | 89.220 | 89.106 | 89.329 | 89.322 | 89.419 |
| 66 | 21.67 | 89.275 | 89.166 | 89.160 | 89.383 | 89.279 | 89.430 |
| 67 | 22.00 | 89.266 | 89.200 | 89.129 | 89.361 | 89.311 | 89.462 |
| 68 | 22.33 | 89.255 | 89.211 | 89.106 | 89.349 | 89.267 | 89.430 |
| 69 | 22.67 | 89.248 | 89.139 | 89.079 | 89.333 | 89.240 | 89.401 |
| 70 | 23.00 | 89.243 | 89.189 | 89.074 | 89.329 | 89.299 | 89.407 |
| 71 | 23.33 | 89.248 | 89.096 | 89.122 | 89.311 | 89.304 | 89.412 |
| 72 | 23.67 | 89.212 | 89.157 | 89.063 | 89.317 | 89.279 | 89.376 |
| 73 | 24.00 | 89.178 | 89.146 | 89.074 | 89.317 | 89.202 | 89.364 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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 | 90.705 | 90.343 | 90.413 | 90.771 | 90.285 | 90.479 |
| 2 | 0.33 | 90.683 | 90.309 | 90.381 | 90.749 | 90.254 | 90.499 |
| 3 | 0.67 | 90.662 | 90.288 | 90.358 | 90.717 | 90.222 | 90.490 |
| 4 | 1.00 | 90.628 | 90.288 | 90.327 | 90.651 | 90.233 | 90.456 |
| 5 | 1.33 | 90.619 | 90.257 | 90.327 | 90.683 | 90.188 | 90.445 |
| 6 | 1.67 | 90.574 | 90.211 | 90.283 | 90.576 | 90.167 | 90.424 |
| 7 | 2.00 | 90.564 | 90.191 | 90.272 | 90.683 | 90.156 | 90.347 |
| 8 | 2.33 | 90.553 | 90.191 | 90.249 | 90.608 | 90.145 | 90.358 |
| 9 | 2.67 | 90.530 | 90.148 | 90.218 | 90.565 | 90.113 | 90.315 |
| 10 | 3.00 | 90.499 | 90.148 | 90.206 | 90.565 | 90.124 | 90.424 |
| 11 | 3.33 | 90.478 | 90.148 | 90.218 | 90.499 | 90.081 | 90.358 |
| 12 | 3.67 | 90.455 | 90.125 | 90.174 | 90.565 | 90.070 | 90.249 |
| 13 | 4.00 | 90.455 | 90.061 | 90.152 | 90.478 | 90.058 | 90.218 |
| 14 | 4.33 | 90.455 | 90.070 | 90.120 | 90.401 | 90.047 | 90.304 |
| 15 | 4.67 | 90.401 | 90.038 | 90.120 | 90.499 | 90.027 | 90.249 |
| 16 | 5.00 | 90.401 | 90.027 | 90.100 | 90.381 | 90.004 | 90.272 |
| 17 | 5.33 | 90.380 | 90.027 | 90.109 | 90.521 | 90.004 | 90.175 |
| 18 | 5.67 | 90.369 | 90.016 | 90.065 | 90.456 | 89.983 | 90.295 |
| 19 | 6.00 | 90.346 | 89.995 | 90.088 | 90.390 | 89.972 | 90.283 |
| 20 | 6.33 | 90.303 | 90.016 | 90.045 | 90.478 | 89.949 | 90.218 |
| 21 | 6.67 | 90.326 | 89.984 | 90.022 | 90.326 | 89.940 | 90.261 |
| 22 | 7.00 | 90.292 | 89.952 | 90.022 | 90.358 | 89.918 | 90.186 |
| 23 | 7.33 | 90.315 | 89.963 | 90.002 | 90.292 | 89.906 | 90.175 |
| 24 | 7.67 | 90.253 | 89.934 | 89.995 | 90.285 | 89.879 | 90.211 |
| 25 | 8.00 | 90.271 | 89.898 | 89.979 | 90.326 | 89.874 | 90.175 |
| 26 | 8.33 | 90.217 | 89.898 | 89.968 | 90.381 | 89.852 | 90.186 |
| 27 | 8.67 | 90.237 | 89.886 | 89.957 | 90.433 | 89.874 | 90.120 |
| 28 | 9.00 | 90.237 | 89.866 | 89.968 | 90.315 | 89.874 | 90.066 |
| 29 | 9.33 | 90.217 | 89.855 | 89.925 | 90.292 | 89.918 | 90.034 |
| 30 | 9.67 | 90.174 | 89.855 | 89.904 | 90.260 | 89.843 | 89.979 |
| 31 | 10.00 | 90.194 | 89.832 | 89.904 | 90.238 | 89.843 | 89.936 |
| 32 | 10.33 | 90.174 | 89.820 | 89.904 | 90.272 | 89.820 | 89.968 |
| 33 | 10.67 | 90.174 | 89.789 | 89.882 | 90.186 | 89.788 | 89.968 |
| 34 | 11.00 | 90.140 | 89.800 | 89.882 | 90.077 | 89.754 | 90.088 |
| 35 | 11.33 | 90.131 | 89.800 | 89.838 | 90.151 | 89.765 | 90.045 |
| 36 | 11.67 | 90.131 | 89.777 | 89.838 | 90.217 | 89.745 | 89.991 |
| 37 | 12.00 | 90.140 | 89.745 | 89.816 | 90.217 | 89.722 | 90.022 |
| 38 | 12.33 | 90.108 | 89.745 | 89.827 | 90.195 | 89.711 | 90.054 |
| 39 | 12.67 | 90.087 | 89.702 | 89.807 | 90.163 | 89.702 | 90.054 |
| 40 | 13.00 | 90.076 | 89.714 | 89.784 | 90.195 | 89.702 | 90.002 |
| 41 | 13.33 | 90.042 | 89.680 | 89.795 | 90.131 | 89.691 | 89.957 |
| 42 | 13.67 | 90.053 | 89.702 | 89.752 | 90.186 | 89.668 | 89.957 |
| 43 | 14.00 | 90.065 | 89.691 | 89.784 | 90.065 | 89.668 | 90.077 |
| 44 | 14.33 | 90.053 | 89.671 | 89.752 | 90.120 | 89.657 | 89.968 |
| 45 | 14.67 | 89.990 | 89.659 | 89.752 | 90.249 | 89.679 | 89.957 |
| 46 | 15.00 | 90.022 | 89.625 | 89.729 | 90.186 | 89.657 | 89.882 |
| 47 | 15.33 | 89.999 | 89.648 | 89.745 | 90.097 | 89.613 | 89.948 |
| 48 | 15.67 | 89.978 | 89.648 | 89.711 | 90.097 | 89.593 | 89.882 |
| 49 | 16.00 | 89.990 | 89.616 | 89.675 | 89.999 | 89.636 | 89.839 |
| 50 | 16.33 | 89.967 | 89.616 | 89.635 | 89.947 | 89.604 | 89.796 |
| 51 | 16.67 | 89.967 | 89.573 | 89.675 | 89.956 | 89.593 | 89.796 |
| 52 | 17.00 | 89.967 | 89.593 | 89.655 | 89.990 | 89.593 | 89.850 |
| 53 | 17.33 | 89.956 | 89.561 | 89.643 | 90.033 | 89.593 | 89.796 |
| 54 | 17.67 | 89.944 | 89.550 | 89.664 | 89.979 | 89.550 | 89.741 |
| 55 | 18.00 | 89.935 | 89.561 | 89.632 | 90.033 | 89.559 | 89.839 |
| 56 | 18.33 | 89.924 | 89.518 | 89.632 | 90.011 | 89.604 | 89.621 |
| 57 | 18.67 | 89.924 | 89.561 | 89.632 | 89.936 | 89.550 | 89.752 |
| 58 | 19.00 | 89.892 | 89.530 | 89.611 | 89.902 | 89.538 | 89.741 |
| 59 | 19.33 | 89.892 | 89.539 | 89.643 | 89.936 | 89.550 | 89.741 |
| 60 | 19.67 | 89.881 | 89.539 | 89.589 | 89.913 | 89.538 | 89.687 |
| 61 | 20.00 | 89.869 | 89.496 | 89.577 | 89.924 | 89.527 | 89.687 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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) |
|------------------|----------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| 62 | 20.33 | 89.892 | 89.464 | 89.600 | 89.968 | 89.582 | 89.652 |
| 63 | 20.67 | 89.858 | 89.484 | 89.577 | 89.936 | 89.507 | 89.675 |
| 64 | 21.00 | 89.847 | 89.475 | 89.577 | 89.838 | 89.484 | 89.666 |
| 65 | 21.33 | 89.838 | 89.475 | 89.546 | 89.859 | 89.507 | 89.589 |
| 66 | 21.67 | 89.815 | 89.475 | 89.546 | 89.902 | 89.473 | 89.730 |
| 67 | 22.00 | 89.803 | 89.464 | 89.557 | 89.893 | 89.452 | 89.752 |
| 68 | 22.33 | 89.826 | 89.464 | 89.534 | 89.947 | 89.418 | 89.709 |
| 69 | 22.67 | 89.819 | 89.434 | 89.527 | 89.831 | 89.423 | 89.714 |
| 70 | 23.00 | 89.803 | 89.432 | 89.523 | 89.893 | 89.452 | 89.687 |
| 71 | 23.33 | 89.797 | 89.414 | 89.496 | 89.863 | 89.423 | 89.539 |
| 72 | 23.67 | 89.772 | 89.484 | 89.523 | 89.859 | 89.398 | 89.764 |
| 73 | 24.00 | 89.783 | 89.441 | 89.502 | 89.795 | 89.409 | 89.657 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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 | 90.154 | 90.185 | 90.154 | 90.304 | 90.345 | 90.421 |
| 2 | 0.33 | 90.079 | 90.130 | 90.197 | 90.282 | 90.323 | 90.433 |
| 3 | 0.67 | 89.786 | 90.067 | 90.111 | 90.207 | 90.323 | 90.358 |
| 4 | 1.00 | 89.970 | 90.076 | 90.154 | 90.261 | 90.291 | 90.324 |
| 5 | 1.33 | 89.982 | 90.087 | 89.936 | 90.195 | 90.280 | 90.324 |
| 6 | 1.67 | 89.927 | 90.087 | 90.077 | 90.164 | 90.237 | 90.237 |
| 7 | 2.00 | 89.948 | 90.130 | 90.045 | 90.098 | 90.280 | 90.237 |
| 8 | 2.33 | 89.852 | 90.087 | 90.045 | 90.141 | 90.237 | 90.217 |
| 9 | 2.67 | 89.884 | 90.067 | 90.066 | 90.109 | 90.193 | 90.174 |
| 10 | 3.00 | 89.743 | 90.032 | 90.034 | 90.087 | 90.182 | 90.151 |
| 11 | 3.33 | 89.743 | 89.989 | 89.882 | 90.109 | 90.182 | 90.162 |
| 12 | 3.67 | 89.927 | 89.958 | 89.936 | 90.118 | 90.162 | 90.174 |
| 13 | 4.00 | 89.786 | 89.958 | 89.968 | 90.044 | 90.171 | 90.076 |
| 14 | 4.33 | 89.732 | 89.969 | 89.968 | 90.066 | 90.162 | 90.065 |
| 15 | 4.67 | 89.732 | 89.969 | 89.916 | 90.012 | 90.085 | 90.076 |
| 16 | 5.00 | 89.830 | 89.871 | 89.870 | 89.989 | 90.085 | 90.065 |
| 17 | 5.33 | 89.764 | 89.935 | 89.882 | 89.969 | 90.073 | 90.097 |
| 18 | 5.67 | 89.732 | 89.915 | 89.870 | 89.978 | 90.064 | 89.979 |
| 19 | 6.00 | 89.677 | 89.871 | 89.752 | 89.957 | 90.030 | 90.010 |
| 20 | 6.33 | 89.755 | 89.849 | 89.850 | 89.957 | 90.041 | 90.010 |
| 21 | 6.67 | 89.591 | 89.794 | 89.807 | 89.911 | 90.010 | 90.010 |
| 22 | 7.00 | 89.666 | 89.785 | 89.839 | 89.903 | 89.967 | 89.988 |
| 23 | 7.33 | 89.623 | 89.785 | 89.818 | 89.891 | 90.010 | 89.956 |
| 24 | 7.67 | 89.616 | 89.778 | 89.702 | 89.864 | 89.960 | 89.938 |
| 25 | 8.00 | 89.548 | 89.828 | 89.752 | 89.891 | 89.976 | 89.979 |
| 26 | 8.33 | 89.732 | 89.785 | 89.698 | 89.871 | 89.944 | 89.890 |
| 27 | 8.67 | 89.623 | 89.860 | 89.686 | 89.805 | 89.878 | 89.935 |
| 28 | 9.00 | 89.623 | 89.806 | 89.752 | 89.826 | 89.912 | 89.913 |
| 29 | 9.33 | 89.623 | 89.708 | 89.698 | 89.773 | 89.955 | 89.869 |
| 30 | 9.67 | 89.559 | 89.785 | 89.666 | 89.826 | 89.923 | 89.890 |
| 31 | 10.00 | 89.494 | 89.633 | 89.686 | 89.794 | 89.923 | 89.847 |
| 32 | 10.33 | 89.537 | 89.599 | 89.730 | 89.794 | 89.889 | 89.881 |
| 33 | 10.67 | 89.548 | 89.719 | 89.720 | 89.794 | 89.912 | 89.815 |
| 34 | 11.00 | 89.373 | 89.688 | 89.666 | 89.739 | 89.869 | 89.815 |
| 35 | 11.33 | 89.537 | 89.642 | 89.600 | 89.773 | 89.835 | 89.792 |
| 36 | 11.67 | 89.482 | 89.665 | 89.643 | 89.739 | 89.826 | 89.749 |
| 37 | 12.00 | 78.439 | 89.633 | 89.600 | 89.708 | 89.835 | 89.815 |
| 38 | 12.33 | 89.416 | 89.633 | 89.546 | 89.676 | 89.780 | 89.783 |
| 39 | 12.67 | 89.462 | 89.633 | 89.655 | 89.676 | 89.826 | 89.783 |
| 40 | 13.00 | 89.569 | 89.642 | 89.534 | 89.676 | 89.771 | 89.749 |
| 41 | 13.33 | 89.373 | 89.665 | 89.600 | 89.696 | 89.803 | 89.760 |
| 42 | 13.67 | 89.482 | 89.567 | 89.534 | 89.633 | 89.737 | 89.729 |
| 43 | 14.00 | 89.407 | 89.567 | 89.534 | 89.621 | 89.706 | 89.706 |
| 44 | 14.33 | 89.482 | 89.590 | 89.503 | 89.621 | 89.694 | 89.695 |
| 45 | 14.67 | 89.537 | 89.599 | 89.525 | 89.696 | 89.694 | 89.706 |
| 46 | 15.00 | 89.407 | 89.513 | 89.514 | 89.587 | 89.728 | 89.792 |
| 47 | 15.33 | 89.319 | 89.513 | 89.534 | 89.587 | 89.728 | 89.686 |
| 48 | 15.67 | 89.416 | 89.536 | 89.480 | 89.610 | 89.694 | 89.663 |
| 49 | 16.00 | 89.255 | 89.556 | 89.546 | 89.587 | 89.685 | 89.631 |
| 50 | 16.33 | 89.319 | 89.438 | 89.534 | 89.621 | 89.694 | 89.651 |
| 51 | 16.67 | 89.428 | 89.524 | 89.503 | 89.578 | 89.674 | 89.620 |
| 52 | 17.00 | 89.276 | 89.481 | 89.491 | 89.621 | 89.674 | 89.620 |
| 53 | 17.33 | 89.221 | 89.481 | 89.514 | 89.556 | 89.663 | 89.620 |
| 54 | 17.67 | 89.287 | 89.524 | 89.480 | 89.544 | 89.663 | 89.608 |
| 55 | 18.00 | 89.276 | 89.395 | 89.480 | 89.599 | 89.640 | 89.588 |
| 56 | 18.33 | 89.221 | 89.502 | 89.437 | 89.535 | 89.663 | 89.588 |
| 57 | 18.67 | 89.287 | 89.493 | 89.859 | 89.535 | 89.608 | 89.577 |
| 58 | 19.00 | 89.158 | 89.395 | 89.405 | 89.544 | 89.597 | 89.577 |
| 59 | 19.33 | 89.255 | 89.438 | 89.394 | 89.469 | 89.619 | 89.597 |
| 60 | 19.67 | 89.169 | 89.350 | 89.394 | 89.481 | 89.631 | 89.511 |
| 61 | 20.00 | 89.221 | 89.493 | 89.382 | 89.490 | 89.597 | 89.565 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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) |
|------------------|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 62 | 20.33 | 89.221 | 89.395 | 89.394 | 89.490 | 89.588 | 89.565 |
| 63 | 20.67 | 89.212 | 89.404 | 89.332 | 89.458 | 89.554 | 89.533 |
| 64 | 21.00 | 89.169 | 89.318 | 89.382 | 89.490 | 89.565 | 89.533 |
| 65 | 21.33 | 89.178 | 89.340 | 89.394 | 89.513 | 89.565 | 89.533 |
| 66 | 21.67 | 89.244 | 89.395 | 89.362 | 89.458 | 89.554 | 89.522 |
| 67 | 22.00 | 89.267 | 89.372 | 89.253 | 89.447 | 89.554 | 89.490 |
| 68 | 22.33 | 89.298 | 89.404 | 89.350 | 89.404 | 89.522 | 89.577 |
| 69 | 22.67 | 89.260 | 89.345 | 89.269 | 89.451 | 89.492 | 89.495 |
| 70 | 23.00 | 89.267 | 89.340 | 89.307 | 89.404 | 89.533 | 89.447 |
| 71 | 23.33 | 89.183 | 89.311 | 89.246 | 89.397 | 89.504 | 89.504 |
| 72 | 23.67 | 89.124 | 89.384 | 89.276 | 89.426 | 89.499 | 89.511 |
| 73 | 24.00 | 89.189 | 89.361 | 89.276 | 89.404 | 89.467 | 89.447 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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 | 90.241 | 89.793 | 90.030 | 90.088 | 91.129 | 91.015 |
| 2 | 0.33 | 90.166 | 89.784 | 90.084 | 90.088 | 91.140 | 91.015 |
| 3 | 0.67 | 90.154 | 89.750 | 90.064 | 90.068 | 91.117 | 90.951 |
| 4 | 1.00 | 90.089 | 89.750 | 90.073 | 90.056 | 91.106 | 90.929 |
| 5 | 1.33 | 90.123 | 89.730 | 90.030 | 90.024 | 91.095 | 90.897 |
| 6 | 1.67 | 90.084 | 89.725 | 90.014 | 90.020 | 91.047 | 90.924 |
| 7 | 2.00 | 90.127 | 89.691 | 89.959 | 90.009 | 91.047 | 90.881 |
| 8 | 2.33 | 90.073 | 89.702 | 89.971 | 89.997 | 91.036 | 90.892 |
| 9 | 2.67 | 90.107 | 89.680 | 89.959 | 89.997 | 91.015 | 90.904 |
| 10 | 3.00 | 90.084 | 89.659 | 89.905 | 89.965 | 90.992 | 90.892 |
| 11 | 3.33 | 90.073 | 89.648 | 89.884 | 89.965 | 90.992 | 90.881 |
| 12 | 3.67 | 89.943 | 89.637 | 89.982 | 89.965 | 91.015 | 90.815 |
| 13 | 4.00 | 90.077 | 89.621 | 89.943 | 89.933 | 90.997 | 90.842 |
| 14 | 4.33 | 90.057 | 89.609 | 89.943 | 89.936 | 90.911 | 90.799 |
| 15 | 4.67 | 90.064 | 89.605 | 89.873 | 89.922 | 90.949 | 90.826 |
| 16 | 5.00 | 90.002 | 89.566 | 89.955 | 89.904 | 90.931 | 90.788 |
| 17 | 5.33 | 89.968 | 89.575 | 89.855 | 89.904 | 90.899 | 90.754 |
| 18 | 5.67 | 89.991 | 89.566 | 89.866 | 89.893 | 90.911 | 90.788 |
| 19 | 6.00 | 89.937 | 89.555 | 89.878 | 89.861 | 90.868 | 90.777 |
| 20 | 6.33 | 89.975 | 89.528 | 89.850 | 89.877 | 90.906 | 90.717 |
| 21 | 6.67 | 89.968 | 89.532 | 89.889 | 89.861 | 90.888 | 90.754 |
| 22 | 7.00 | 89.925 | 89.521 | 89.846 | 89.827 | 90.868 | 90.754 |
| 23 | 7.33 | 89.925 | 89.521 | 89.846 | 89.861 | 90.856 | 90.699 |
| 24 | 7.67 | 89.860 | 89.500 | 89.846 | 89.850 | 90.790 | 90.711 |
| 25 | 8.00 | 89.912 | 89.507 | 89.873 | 89.822 | 90.829 | 90.717 |
| 26 | 8.33 | 89.905 | 89.489 | 89.878 | 89.818 | 90.790 | 90.690 |
| 27 | 8.67 | 89.889 | 89.453 | 89.798 | 89.813 | 90.809 | 90.686 |
| 28 | 9.00 | 89.871 | 89.457 | 89.780 | 89.773 | 90.813 | 90.656 |
| 29 | 9.33 | 89.905 | 89.466 | 89.757 | 89.784 | 90.802 | 90.636 |
| 30 | 9.67 | 89.882 | 89.457 | 89.791 | 89.784 | 90.802 | 90.636 |
| 31 | 10.00 | 89.828 | 89.446 | 89.757 | 89.741 | 90.779 | 90.613 |
| 32 | 10.33 | 89.857 | 89.441 | 89.798 | 89.768 | 90.754 | 90.640 |
| 33 | 10.67 | 89.796 | 89.423 | 89.769 | 89.763 | 90.736 | 90.656 |
| 34 | 11.00 | 89.796 | 89.403 | 89.725 | 89.718 | 90.747 | 90.570 |
| 35 | 11.33 | 89.816 | 89.412 | 89.725 | 89.698 | 90.693 | 90.570 |
| 36 | 11.67 | 89.805 | 89.357 | 89.757 | 89.718 | 90.681 | 90.602 |
| 37 | 12.00 | 89.757 | 89.387 | 89.644 | 89.703 | 90.711 | 90.531 |
| 38 | 12.33 | 89.762 | 89.357 | 89.691 | 89.675 | 90.661 | 90.558 |
| 39 | 12.67 | 89.726 | 89.355 | 89.666 | 89.682 | 90.666 | 90.586 |
| 40 | 13.00 | 89.753 | 89.348 | 89.725 | 89.664 | 90.670 | 90.558 |
| 41 | 13.33 | 89.708 | 89.337 | 89.703 | 89.686 | 90.650 | 90.547 |
| 42 | 13.67 | 89.757 | 89.332 | 89.666 | 89.670 | 90.611 | 90.522 |
| 43 | 14.00 | 89.676 | 89.326 | 89.637 | 89.632 | 90.627 | 90.527 |
| 44 | 14.33 | 89.694 | 89.321 | 89.635 | 89.659 | 90.579 | 90.511 |
| 45 | 14.67 | 89.762 | 89.294 | 89.671 | 89.664 | 90.616 | 90.527 |
| 46 | 15.00 | 89.687 | 89.282 | 89.714 | 89.655 | 90.595 | 90.558 |
| 47 | 15.33 | 89.687 | 89.294 | 89.551 | 89.632 | 90.584 | 90.515 |
| 48 | 15.67 | 89.665 | 89.294 | 89.617 | 89.589 | 90.584 | 90.493 |
| 49 | 16.00 | 89.653 | 89.294 | 89.562 | 89.600 | 90.595 | 90.481 |
| 50 | 16.33 | 89.671 | 89.301 | 89.644 | 89.616 | 90.611 | 90.488 |
| 51 | 16.67 | 89.649 | 89.301 | 89.589 | 89.584 | 90.591 | 90.434 |
| 52 | 17.00 | 89.653 | 89.271 | 89.530 | 89.589 | 90.584 | 90.461 |
| 53 | 17.33 | 89.621 | 89.260 | 89.628 | 89.566 | 90.572 | 90.418 |
| 54 | 17.67 | 89.633 | 89.248 | 89.573 | 89.566 | 90.595 | 90.438 |
| 55 | 18.00 | 89.633 | 89.239 | 89.573 | 89.555 | 90.552 | 90.438 |
| 56 | 18.33 | 89.594 | 89.255 | 89.569 | 89.562 | 90.557 | 90.499 |
| 57 | 18.67 | 89.610 | 89.248 | 89.539 | 89.555 | 90.541 | 90.449 |
| 58 | 19.00 | 89.560 | 89.221 | 89.578 | 89.528 | 90.522 | 90.465 |
| 59 | 19.33 | 89.590 | 89.228 | 89.530 | 89.534 | 90.507 | 90.418 |
| 60 | 19.67 | 89.567 | 89.205 | 89.496 | 89.500 | 90.552 | 90.395 |
| 61 | 20.00 | 89.556 | 89.217 | 89.594 | 89.534 | 90.529 | 90.418 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| 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) |
|------------------|----------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 62 | 20.33 | 89.540 | 89.223 | 89.546 | 89.530 | 90.536 | 90.402 |
| 63 | 20.67 | 89.574 | 89.201 | 89.569 | 89.507 | 90.513 | 90.402 |
| 64 | 21.00 | 89.544 | 89.185 | 89.617 | 89.512 | 90.507 | 90.340 |
| 65 | 21.33 | 89.535 | 89.196 | 89.508 | 89.512 | 90.507 | 90.372 |
| 66 | 21.67 | 89.567 | 89.196 | 89.476 | 89.480 | 90.486 | 90.329 |
| 67 | 22.00 | 89.551 | 89.180 | 89.480 | 89.498 | 90.459 | 90.379 |
| 68 | 22.33 | 89.524 | 89.162 | 89.508 | 89.480 | 90.475 | 90.406 |
| 69 | 22.67 | 89.524 | 89.151 | 89.442 | 89.469 | 90.409 | 90.384 |
| 70 | 23.00 | 89.501 | 89.151 | 89.508 | 89.480 | 90.432 | 90.318 |
| 71 | 23.33 | 89.481 | 89.162 | 89.496 | 89.469 | 90.443 | 90.363 |
| 72 | 23.67 | 89.469 | 89.142 | 89.442 | 89.469 | 90.432 | 90.372 |
| 73 | 24.00 | 89.513 | 89.119 | 89.410 | 89.457 | 90.409 | 90.318 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| SAMPLE NUMBER | DELTA HOURS | TEMP 25 (DEG F) | TEMP 26 (DEG F) | PRESS 1 (PSIA) | PRESS 2 (PSIA) |
|------------------|----------------|--------------------|--------------------|-------------------|-------------------|
| 1 | 0.00 | 90.886 | 90.570 | 64.979 | 64.981 |
| 2 | 0.33 | 90.908 | 90.559 | 64.976 | 64.978 |
| 3 | 0.67 | 90.822 | 90.550 | 64.973 | 64.975 |
| 4 | 1.00 | 90.777 | 90.527 | 64.970 | 64.972 |
| 5 | 1.33 | 90.777 | 90.527 | 64.967 | 64.970 |
| 6 | 1.67 | 90.795 | 90.511 | 64.964 | 64.967 |
| 7 | 2.00 | 90.795 | 90.491 | 64.962 | 64.964 |
| 8 | 2.33 | 90.763 | 90.479 | 64.959 | 64.961 |
| 9 | 2.67 | 90.752 | 90.468 | 64.957 | 64.959 |
| 10 | 3.00 | 90.083 | 90.479 | 64.954 | 64.956 |
| 11 | 3.33 | 90.729 | 90.457 | 64.952 | 64.954 |
| 12 | 3.67 | 90.729 | 90.445 | 64.949 | 64.952 |
| 13 | 4.00 | 90.713 | 90.407 | 64.947 | 64.949 |
| 14 | 4.33 | 90.702 | 90.395 | 64.945 | 64.947 |
| 15 | 4.67 | 90.686 | 90.413 | 64.943 | 64.945 |
| 16 | 5.00 | 90.713 | 90.395 | 64.940 | 64.943 |
| 17 | 5.33 | 90.690 | 90.375 | 64.938 | 64.941 |
| 18 | 5.67 | 90.647 | 90.386 | 64.937 | 64.938 |
| 19 | 6.00 | 90.625 | 90.364 | 64.935 | 64.936 |
| 20 | 6.33 | 90.643 | 90.348 | 64.933 | 64.934 |
| 21 | 6.67 | 90.636 | 90.332 | 64.931 | 64.932 |
| 22 | 7.00 | 90.615 | 90.332 | 64.929 | 64.930 |
| 23 | 7.33 | 90.604 | 90.309 | 64.927 | 64.928 |
| 24 | 7.67 | 90.604 | 90.320 | 64.925 | 64.926 |
| 25 | 8.00 | 90.611 | 90.316 | 64.923 | 64.924 |
| 26 | 8.33 | 90.561 | 90.309 | 64.921 | 64.922 |
| 27 | 8.67 | 90.545 | 90.304 | 64.919 | 64.920 |
| 28 | 9.00 | 90.570 | 90.298 | 64.918 | 64.918 |
| 29 | 9.33 | 90.550 | 90.277 | 64.915 | 64.916 |
| 30 | 9.67 | 90.506 | 90.255 | 64.913 | 64.914 |
| 31 | 10.00 | 90.506 | 90.243 | 64.911 | 64.912 |
| 32 | 10.33 | 90.522 | 90.230 | 64.910 | 64.911 |
| 33 | 10.67 | 90.484 | 90.223 | 64.908 | 64.909 |
| 34 | 11.00 | 90.472 | 90.223 | 64.906 | 64.907 |
| 35 | 11.33 | 90.461 | 90.189 | 64.904 | 64.905 |
| 36 | 11.67 | 90.461 | 90.223 | 64.902 | 64.904 |
| 37 | 12.00 | 90.457 | 90.207 | 64.900 | 64.901 |
| 38 | 12.33 | 90.441 | 90.189 | 64.899 | 64.900 |
| 39 | 12.67 | 90.425 | 90.175 | 64.897 | 64.898 |
| 40 | 13.00 | 90.472 | 90.177 | 64.896 | 64.896 |
| 41 | 13.33 | 90.441 | 90.157 | 64.894 | 64.895 |
| 42 | 13.67 | 90.402 | 90.141 | 64.893 | 64.893 |
| 43 | 14.00 | 90.398 | 90.146 | 64.891 | 64.892 |
| 44 | 14.33 | 90.402 | 90.184 | 64.890 | 64.891 |
| 45 | 14.67 | 90.398 | 90.134 | 64.889 | 64.890 |
| 46 | 15.00 | 90.452 | 90.123 | 64.887 | 64.888 |
| 47 | 15.33 | 90.418 | 90.114 | 64.885 | 64.886 |
| 48 | 15.67 | 90.386 | 90.102 | 64.884 | 64.885 |
| 49 | 16.00 | 90.375 | 90.091 | 64.882 | 64.883 |
| 50 | 16.33 | 90.402 | 90.109 | 64.880 | 64.881 |
| 51 | 16.67 | 90.338 | 90.075 | 64.878 | 64.880 |
| 52 | 17.00 | 90.289 | 90.080 | 64.877 | 64.879 |
| 53 | 17.33 | 90.352 | 90.059 | 64.875 | 64.877 |
| 54 | 17.67 | 90.320 | 90.059 | 64.874 | 64.875 |
| 55 | 18.00 | 90.289 | 90.037 | 64.872 | 64.874 |
| 56 | 18.33 | 90.338 | 90.055 | 64.871 | 64.873 |
| 57 | 18.67 | 90.309 | 90.025 | 64.870 | 64.872 |
| 58 | 19.00 | 90.357 | 90.030 | 64.868 | 64.870 |
| 59 | 19.33 | 90.289 | 90.005 | 64.867 | 64.869 |
| 60 | 19.67 | 90.298 | 89.993 | 64.866 | 64.868 |

ATTACHMENT 3.3A (Continued)**ILRT MEASURED INPUT DATA**

| <u>SAMPLE NUMBER</u> | <u>DELTA HOURS</u> | <u>TEMP 25 (DEG F)</u> | <u>TEMP 26 (DEG F)</u> | <u>PRESS 1 (PSIA)</u> | <u>PRESS 2 (PSIA)</u> |
|--------------------------|------------------------|----------------------------|----------------------------|---------------------------|---------------------------|
| 61 | 20.00 | 90.255 | 90.005 | 64.865 | 64.867 |
| 62 | 20.33 | 90.261 | 90.012 | 64.863 | 64.866 |
| 63 | 20.67 | 90.304 | 90.000 | 64.862 | 64.864 |
| 64 | 21.00 | 90.243 | 90.037 | 64.860 | 64.863 |
| 65 | 21.33 | 90.277 | 89.962 | 64.859 | 64.861 |
| 66 | 21.67 | 90.266 | 89.971 | 64.858 | 64.860 |
| 67 | 22.00 | 90.241 | 89.989 | 64.858 | 64.860 |
| 68 | 22.33 | 90.234 | 89.962 | 64.856 | 64.859 |
| 69 | 22.67 | 90.255 | 89.962 | 64.854 | 64.857 |
| 70 | 23.00 | 90.243 | 89.971 | 64.853 | 64.856 |
| 71 | 23.33 | 90.266 | 89.950 | 64.851 | 64.855 |
| 72 | 23.67 | 90.200 | 89.939 | 64.850 | 64.854 |
| 73 | 24.00 | 90.234 | 89.939 | 64.849 | 64.853 |

ATTACHMENT 3.3A (Continued)

ILRT MEASURED INPUT DATA

| SAMPLE NUMBER | DELTA HOURS | HUM 1 (% RH) | HUM 2 (% RH) | HUM 3 (% RH) | HUM 4 (% RH) | HUM 5 (% RH) | HUM 6 (% RH) |
|------------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | 0.00 | 58.223 | 58.275 | 60.045 | 59.048 | 58.223 | 57.249 |
| 2 | 0.33 | 58.402 | 58.315 | 60.149 | 59.156 | 58.345 | 57.380 |
| 3 | 0.67 | 58.541 | 58.438 | 60.254 | 59.279 | 58.379 | 57.468 |
| 4 | 1.00 | 58.513 | 58.456 | 60.302 | 59.280 | 58.285 | 57.491 |
| 5 | 1.33 | 58.564 | 58.564 | 60.300 | 59.407 | 58.501 | 57.555 |
| 6 | 1.67 | 58.589 | 58.606 | 60.365 | 59.482 | 58.555 | 57.585 |
| 7 | 2.00 | 58.741 | 58.643 | 60.471 | 59.519 | 58.613 | 57.656 |
| 8 | 2.33 | 58.657 | 58.699 | 60.463 | 59.569 | 58.669 | 57.717 |
| 9 | 2.67 | 58.763 | 58.787 | 60.540 | 59.604 | 58.711 | 57.794 |
| 10 | 3.00 | 58.920 | 58.839 | 60.597 | 59.634 | 58.723 | 57.852 |
| 11 | 3.33 | 58.892 | 58.864 | 60.651 | 59.722 | 58.776 | 57.871 |
| 12 | 3.67 | 58.995 | 58.914 | 60.719 | 59.716 | 58.793 | 57.904 |
| 13 | 4.00 | 58.926 | 58.909 | 60.742 | 59.819 | 58.827 | 57.991 |
| 14 | 4.33 | 58.903 | 58.995 | 60.760 | 59.808 | 58.890 | 58.032 |
| 15 | 4.67 | 59.042 | 59.025 | 60.807 | 59.884 | 58.926 | 58.062 |
| 16 | 5.00 | 59.094 | 59.082 | 60.934 | 60.005 | 59.019 | 58.096 |
| 17 | 5.33 | 59.152 | 59.146 | 60.852 | 59.987 | 59.023 | 58.124 |
| 18 | 5.67 | 59.246 | 59.210 | 60.940 | 60.005 | 59.059 | 58.182 |
| 19 | 6.00 | 59.354 | 59.226 | 61.014 | 60.045 | 59.127 | 58.252 |
| 20 | 6.33 | 59.355 | 59.309 | 61.073 | 60.127 | 59.111 | 58.258 |
| 21 | 6.67 | 59.354 | 59.325 | 61.147 | 60.184 | 59.167 | 58.385 |
| 22 | 7.00 | 59.501 | 59.303 | 61.166 | 60.197 | 59.175 | 58.363 |
| 23 | 7.33 | 59.500 | 59.349 | 61.166 | 60.272 | 59.233 | 58.414 |
| 24 | 7.67 | 59.565 | 59.437 | 61.190 | 60.303 | 59.241 | 58.434 |
| 25 | 8.00 | 59.501 | 59.431 | 61.219 | 60.291 | 59.321 | 58.456 |
| 26 | 8.33 | 59.628 | 59.541 | 61.288 | 60.319 | 59.297 | 58.484 |
| 27 | 8.67 | 59.744 | 59.594 | 61.178 | 60.382 | 59.349 | 58.507 |
| 28 | 9.00 | 59.617 | 59.576 | 61.306 | 60.406 | 59.402 | 58.555 |
| 29 | 9.33 | 59.589 | 59.572 | 61.371 | 60.477 | 59.363 | 58.607 |
| 30 | 9.67 | 59.592 | 59.580 | 61.362 | 60.469 | 59.436 | 58.669 |
| 31 | 10.00 | 59.512 | 59.663 | 61.497 | 60.522 | 59.454 | 58.654 |
| 32 | 10.33 | 59.617 | 59.657 | 61.543 | 60.557 | 59.478 | 58.658 |
| 33 | 10.67 | 59.633 | 59.615 | 61.455 | 60.549 | 59.510 | 58.773 |
| 34 | 11.00 | 59.640 | 59.779 | 61.549 | 60.592 | 59.535 | 58.804 |
| 35 | 11.33 | 59.762 | 59.790 | 61.538 | 60.679 | 59.558 | 58.833 |
| 36 | 11.67 | 59.871 | 59.795 | 61.600 | 60.741 | 59.609 | 58.843 |
| 37 | 12.00 | 59.889 | 59.895 | 61.648 | 60.765 | 59.663 | 58.926 |
| 38 | 12.33 | 59.941 | 59.954 | 61.665 | 60.789 | 59.692 | 58.932 |
| 39 | 12.67 | 60.024 | 59.972 | 61.713 | 60.819 | 59.698 | 58.984 |
| 40 | 13.00 | 60.128 | 59.983 | 61.742 | 60.819 | 59.728 | 59.026 |
| 41 | 13.33 | 60.040 | 60.000 | 61.711 | 60.830 | 59.762 | 58.995 |
| 42 | 13.67 | 60.087 | 60.028 | 61.827 | 60.900 | 59.767 | 59.071 |
| 43 | 14.00 | 60.168 | 60.128 | 61.829 | 60.946 | 59.825 | 59.083 |
| 44 | 14.33 | 60.264 | 60.137 | 61.873 | 60.967 | 59.835 | 59.103 |
| 45 | 14.67 | 60.261 | 60.151 | 61.863 | 60.889 | 59.872 | 59.141 |
| 46 | 15.00 | 60.242 | 60.143 | 61.874 | 61.002 | 59.871 | 59.156 |
| 47 | 15.33 | 60.215 | 60.232 | 61.921 | 61.045 | 59.889 | 59.175 |
| 48 | 15.67 | 60.359 | 60.237 | 61.938 | 61.050 | 59.929 | 59.221 |
| 49 | 16.00 | 60.260 | 60.167 | 61.967 | 61.085 | 59.918 | 59.227 |
| 50 | 16.33 | 60.190 | 60.203 | 62.032 | 61.073 | 59.988 | 59.291 |
| 51 | 16.67 | 60.232 | 60.255 | 62.025 | 61.132 | 59.988 | 59.285 |
| 52 | 17.00 | 60.179 | 60.255 | 62.031 | 61.115 | 60.017 | 59.315 |
| 53 | 17.33 | 60.272 | 60.314 | 62.037 | 61.219 | 60.052 | 59.321 |
| 54 | 17.67 | 60.232 | 60.313 | 62.054 | 61.195 | 60.074 | 59.379 |
| 55 | 18.00 | 60.266 | 60.336 | 62.158 | 61.125 | 60.063 | 59.366 |
| 56 | 18.33 | 60.295 | 60.447 | 62.101 | 61.271 | 60.116 | 59.366 |
| 57 | 18.67 | 60.323 | 60.311 | 62.163 | 61.310 | 60.149 | 59.436 |
| 58 | 19.00 | 60.348 | 60.371 | 62.200 | 61.248 | 60.162 | 59.467 |
| 59 | 19.33 | 60.441 | 60.435 | 62.275 | 61.357 | 60.179 | 59.442 |
| 60 | 19.67 | 60.342 | 60.522 | 62.280 | 61.381 | 60.192 | 59.541 |
| 61 | 20.00 | 60.422 | 60.428 | 62.211 | 61.381 | 60.226 | 59.546 |

ATTACHMENT 3.3A (Continued)**ILRT MEASURED INPUT DATA**

| <u>SAMPLE NUMBER</u> | <u>DELTA HOURS</u> | <u>HUM 1 (% RH)</u> | <u>HUM 2 (% RH)</u> | <u>HUM 3 (% RH)</u> | <u>HUM 4 (% RH)</u> | <u>HUM 5 (% RH)</u> | <u>HUM 6 (% RH)</u> |
|--------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 62 | 20.33 | 60.424 | 60.552 | 62.299 | 61.359 | 60.238 | 59.576 |
| 63 | 20.67 | 60.482 | 60.476 | 62.299 | 61.451 | 60.272 | 59.606 |
| 64 | 21.00 | 60.527 | 60.563 | 62.362 | 61.456 | 60.319 | 59.657 |
| 65 | 21.33 | 60.522 | 60.499 | 62.408 | 61.450 | 60.308 | 59.716 |
| 66 | 21.67 | 60.626 | 60.551 | 62.432 | 61.486 | 60.336 | 59.651 |
| 67 | 22.00 | 60.656 | 60.649 | 62.426 | 61.486 | 60.336 | 59.651 |
| 68 | 22.33 | 60.707 | 60.671 | 62.424 | 61.543 | 60.370 | 59.645 |
| 69 | 22.67 | 60.696 | 60.679 | 62.495 | 61.503 | 60.382 | 59.727 |
| 70 | 23.00 | 60.662 | 60.604 | 62.438 | 61.614 | 60.400 | 59.762 |
| 71 | 23.33 | 60.725 | 60.684 | 62.524 | 61.625 | 60.446 | 59.790 |
| 72 | 23.67 | 60.818 | 60.725 | 62.478 | 61.619 | 60.435 | 59.779 |
| 73 | 24.00 | 60.747 | 60.730 | 62.529 | 61.647 | 60.427 | 59.818 |

ATTACHMENT 3.3B

ILRT REDUCED INPUT VARIABLES AND ABSOLUTE TEST METHOD - MASS POINT ANALYSIS TEST RESULTS

| SAM NO. | TIME HOURS | AVG TEMP (DEG F) | PRESSURE (PSIA) | VAP PRES (PSIA) | LEAK SIM (%/DAY) | LEAK FIT (%/DAY) | UCL (%/DAY) | AIR MASS (LBS) |
|---------|------------|------------------|-----------------|-----------------|------------------|------------------|-------------|----------------|
| 1 | 0.00 | 90.309 | 64.979 | 0.4131 | 0.000 | 0.000 | 0.000 | 856767 |
| 2 | 0.33 | 90.291 | 64.967 | 0.4137 | 0.174 | 0.000 | 0.000 | 856746 |
| 3 | 0.67 | 90.247 | 64.973 | 0.4136 | -0.040 | -0.040 | 1.020 | 856777 |
| 4 | 1.00 | 90.241 | 64.970 | 0.4138 | 0.062 | 0.030 | 0.232 | 856745 |
| 5 | 1.33 | 90.216 | 64.967 | 0.4140 | 0.053 | 0.044 | 0.139 | 856742 |
| 6 | 1.67 | 90.195 | 64.964 | 0.4139 | 0.054 | 0.049 | 0.106 | 856735 |
| 7 | 2.00 | 90.182 | 64.962 | 0.4145 | 0.065 | 0.059 | 0.099 | 856721 |
| 8 | 2.33 | 90.166 | 64.959 | 0.4143 | 0.071 | 0.067 | 0.097 | 856708 |
| 9 | 2.67 | 90.146 | 64.957 | 0.4144 | 0.058 | 0.064 | 0.087 | 856712 |
| 10 | 3.00 | 90.134 | 64.954 | 0.4147 | 0.075 | 0.071 | 0.090 | 856687 |
| 11 | 3.33 | 90.107 | 64.952 | 0.4146 | 0.053 | 0.064 | 0.081 | 856704 |
| 12 | 3.67 | 90.101 | 64.949 | 0.4150 | 0.076 | 0.070 | 0.085 | 856668 |
| 13 | 4.00 | 90.080 | 64.947 | 0.4146 | 0.061 | 0.068 | 0.081 | 856679 |
| 14 | 4.33 | 90.066 | 64.945 | 0.4148 | 0.061 | 0.066 | 0.077 | 856673 |
| 15 | 4.67 | 90.056 | 64.943 | 0.4150 | 0.065 | 0.066 | 0.076 | 856659 |
| 16 | 5.00 | 90.034 | 64.940 | 0.4153 | 0.066 | 0.067 | 0.075 | 856649 |
| 17 | 5.33 | 90.032 | 64.938 | 0.4154 | 0.075 | 0.070 | 0.078 | 856624 |
| 18 | 5.67 | 90.013 | 64.937 | 0.4155 | 0.063 | 0.069 | 0.076 | 856639 |
| 19 | 6.00 | 89.994 | 64.935 | 0.4156 | 0.059 | 0.067 | 0.073 | 856640 |
| 20 | 6.33 | 89.994 | 64.933 | 0.4160 | 0.070 | 0.068 | 0.074 | 856609 |
| 21 | 6.67 | 89.962 | 64.931 | 0.4158 | 0.056 | 0.065 | 0.071 | 856635 |
| 22 | 7.00 | 89.958 | 64.929 | 0.4159 | 0.061 | 0.064 | 0.070 | 856614 |
| 23 | 7.33 | 89.946 | 64.927 | 0.4160 | 0.062 | 0.064 | 0.069 | 856605 |
| 24 | 7.67 | 89.916 | 64.925 | 0.4159 | 0.051 | 0.061 | 0.066 | 856626 |
| 25 | 8.00 | 89.924 | 64.923 | 0.4161 | 0.064 | 0.062 | 0.067 | 856584 |
| 26 | 8.33 | 89.913 | 64.921 | 0.4164 | 0.066 | 0.062 | 0.067 | 856571 |
| 27 | 8.67 | 89.902 | 64.919 | 0.4165 | 0.067 | 0.063 | 0.068 | 856560 |
| 28 | 9.00 | 89.891 | 64.918 | 0.4164 | 0.063 | 0.063 | 0.067 | 856566 |
| 29 | 9.33 | 89.870 | 64.915 | 0.4163 | 0.062 | 0.063 | 0.067 | 856560 |
| 30 | 9.67 | 89.859 | 64.913 | 0.4162 | 0.063 | 0.063 | 0.067 | 856551 |
| 31 | 10.00 | 89.834 | 64.911 | 0.4160 | 0.056 | 0.062 | 0.065 | 856567 |
| 32 | 10.33 | 89.837 | 64.910 | 0.4164 | 0.061 | 0.062 | 0.065 | 856543 |
| 33 | 10.67 | 89.825 | 64.908 | 0.4163 | 0.060 | 0.061 | 0.064 | 856537 |
| 34 | 11.00 | 89.797 | 64.906 | 0.4162 | 0.054 | 0.060 | 0.063 | 856555 |
| 35 | 11.33 | 89.793 | 64.904 | 0.4166 | 0.059 | 0.060 | 0.063 | 856530 |
| 36 | 11.67 | 89.786 | 64.902 | 0.4168 | 0.062 | 0.060 | 0.063 | 856511 |
| 37 | 12.00 | 89.773 | 64.900 | 0.4172 | 0.062 | 0.060 | 0.063 | 856500 |
| 38 | 12.33 | 89.768 | 64.899 | 0.4171 | 0.062 | 0.060 | 0.063 | 856496 |
| 39 | 12.67 | 89.761 | 64.897 | 0.4175 | 0.065 | 0.061 | 0.063 | 856473 |
| 40 | 13.00 | 89.749 | 64.896 | 0.4176 | 0.062 | 0.061 | 0.063 | 856480 |
| 41 | 13.33 | 89.734 | 64.894 | 0.4173 | 0.060 | 0.061 | 0.063 | 856480 |
| 42 | 13.67 | 89.721 | 64.893 | 0.4174 | 0.058 | 0.060 | 0.062 | 856485 |
| 43 | 14.00 | 89.713 | 64.891 | 0.4175 | 0.060 | 0.060 | 0.062 | 856469 |
| 44 | 14.33 | 89.712 | 64.890 | 0.4177 | 0.061 | 0.060 | 0.062 | 856456 |
| 45 | 14.67 | 89.718 | 64.889 | 0.4181 | 0.065 | 0.061 | 0.063 | 856428 |
| 46 | 15.00 | 89.687 | 64.887 | 0.4179 | 0.059 | 0.060 | 0.062 | 856452 |
| 47 | 15.33 | 89.673 | 64.885 | 0.4177 | 0.058 | 0.060 | 0.062 | 856451 |
| 48 | 15.67 | 89.668 | 64.884 | 0.4178 | 0.058 | 0.060 | 0.061 | 856442 |
| 49 | 16.00 | 89.648 | 64.882 | 0.4174 | 0.055 | 0.059 | 0.061 | 856454 |
| 50 | 16.33 | 89.641 | 64.880 | 0.4174 | 0.057 | 0.059 | 0.060 | 856437 |
| 51 | 16.67 | 89.632 | 64.878 | 0.4176 | 0.058 | 0.058 | 0.060 | 856422 |
| 52 | 17.00 | 89.627 | 64.877 | 0.4175 | 0.058 | 0.058 | 0.060 | 856418 |
| 53 | 17.33 | 89.609 | 64.875 | 0.4177 | 0.057 | 0.058 | 0.060 | 856416 |
| 54 | 17.67 | 89.604 | 64.874 | 0.4176 | 0.056 | 0.058 | 0.059 | 856414 |
| 55 | 18.00 | 89.595 | 64.872 | 0.4177 | 0.057 | 0.057 | 0.059 | 856400 |
| 56 | 18.33 | 89.587 | 64.871 | 0.4177 | 0.057 | 0.057 | 0.059 | 856397 |
| 57 | 18.67 | 89.584 | 64.870 | 0.4178 | 0.057 | 0.057 | 0.059 | 856387 |
| 58 | 19.00 | 89.565 | 64.868 | 0.4175 | 0.055 | 0.057 | 0.058 | 856395 |
| 59 | 19.33 | 89.565 | 64.867 | 0.4181 | 0.057 | 0.057 | 0.058 | 856374 |

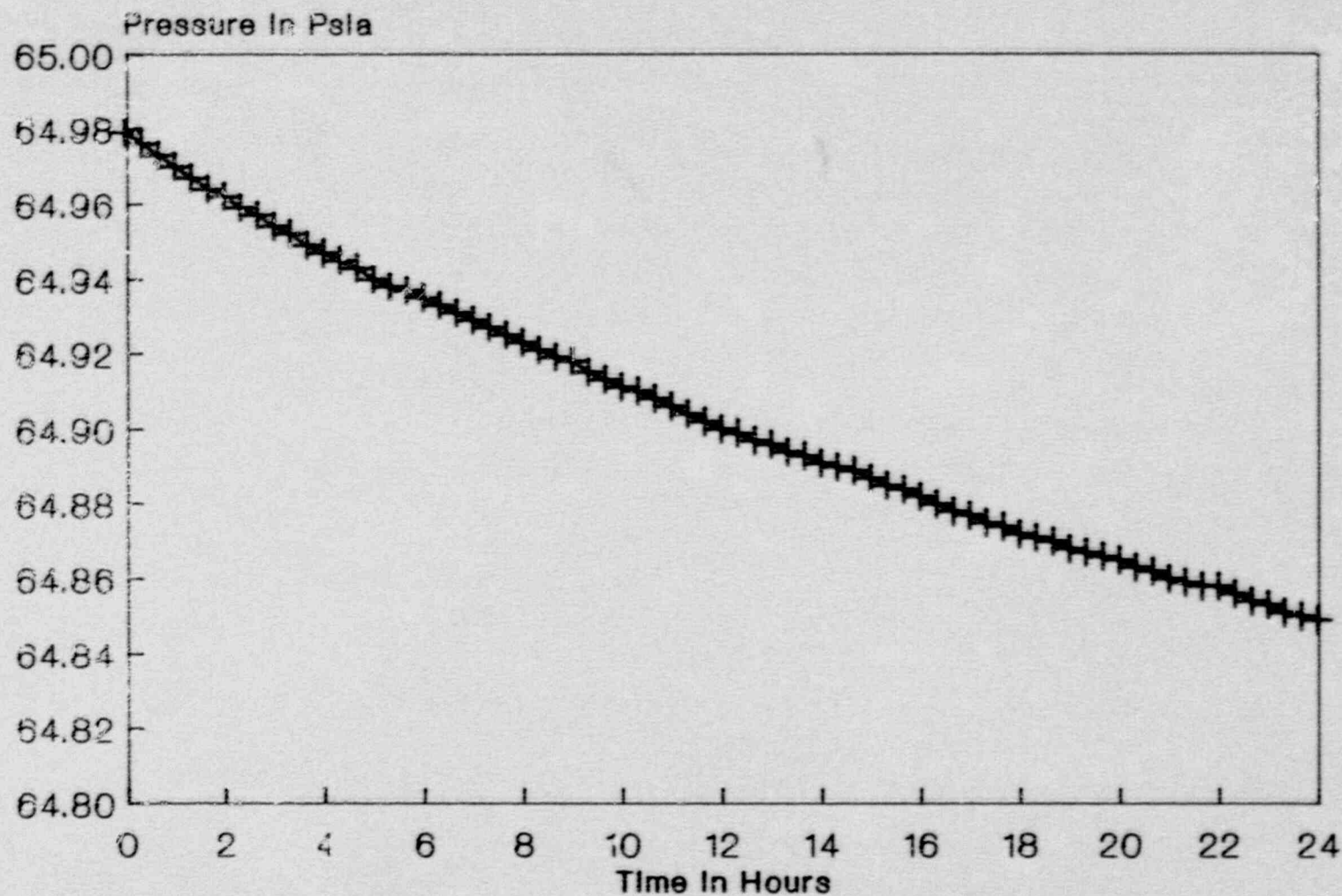
ATTACHMENT 3.3B (Continued)

ILRT REDUCED INPUT VARIABLES AND ABSOLUTE TEST METHOD - MASS POINT ANALYSIS TEST RESULTS

| SAM NO. | TIME HOURS | AVG TEMP (DEG F) | PRESSURE (PSIA) | VAP PRES (PSIA) | LEAK SIM (%/DAY) | LEAK FIT (%/DAY) | UCL (%/DAY) | AIR MASS (LBS) |
|---------|------------|------------------|-----------------|-----------------|------------------|------------------|-------------|----------------|
| 60 | 19.67 | 89.540 | 64.866 | 0.4178 | 0.052 | 0.056 | 0.057 | 856404 |
| 61 | 20.00 | 89.554 | 64.865 | 0.4180 | 0.056 | 0.056 | 0.057 | 856365 |
| 62 | 20.33 | 89.539 | 64.863 | 0.4182 | 0.056 | 0.056 | 0.057 | 856360 |
| 63 | 20.67 | 89.536 | 64.862 | 0.4181 | 0.056 | 0.056 | 0.057 | 856353 |
| 64 | 21.00 | 89.520 | 64.860 | 0.4182 | 0.056 | 0.055 | 0.057 | 856350 |
| 65 | 21.33 | 89.504 | 64.859 | 0.4182 | 0.053 | 0.055 | 0.056 | 856361 |
| 66 | 21.67 | 89.514 | 64.858 | 0.4186 | 0.057 | 0.055 | 0.056 | 856327 |
| 67 | 22.00 | 89.508 | 64.858 | 0.4185 | 0.055 | 0.055 | 0.056 | 856337 |
| 68 | 22.33 | 89.508 | 64.856 | 0.4189 | 0.058 | 0.055 | 0.056 | 856306 |
| 69 | 22.67 | 89.479 | 64.854 | 0.4185 | 0.054 | 0.055 | 0.056 | 856329 |
| 70 | 23.00 | 89.487 | 64.853 | 0.4186 | 0.056 | 0.055 | 0.056 | 856303 |
| 71 | 23.33 | 89.463 | 64.851 | 0.4185 | 0.054 | 0.055 | 0.056 | 856315 |
| 72 | 23.67 | 89.473 | 64.850 | 0.4189 | 0.058 | 0.055 | 0.056 | 856281 |
| 73 | 24.00 | 89.454 | 64.849 | 0.4186 | 0.054 | 0.055 | 0.056 | 856300 |

ILRT CONTAINMENT ABSOLUTE PRESSURE

1989 Seabrook Inservice ILRT

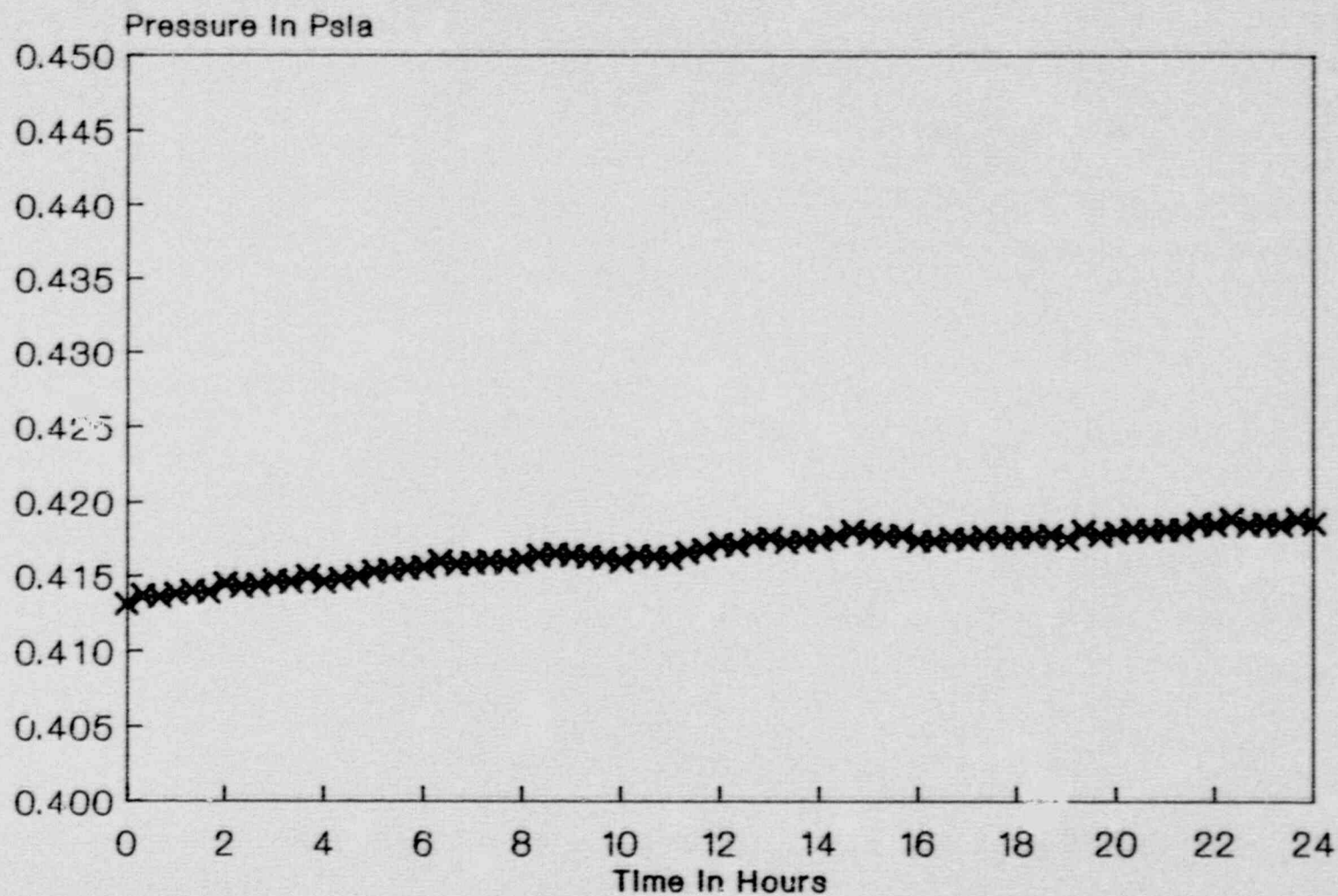


Ebasco Plant Services

ATTACHMENT 3.3C
GRAPH 3

ILRT WEIGHTED AVERAGE VAPOR PRESSURE

1989 Seabrook Inservice ILRT

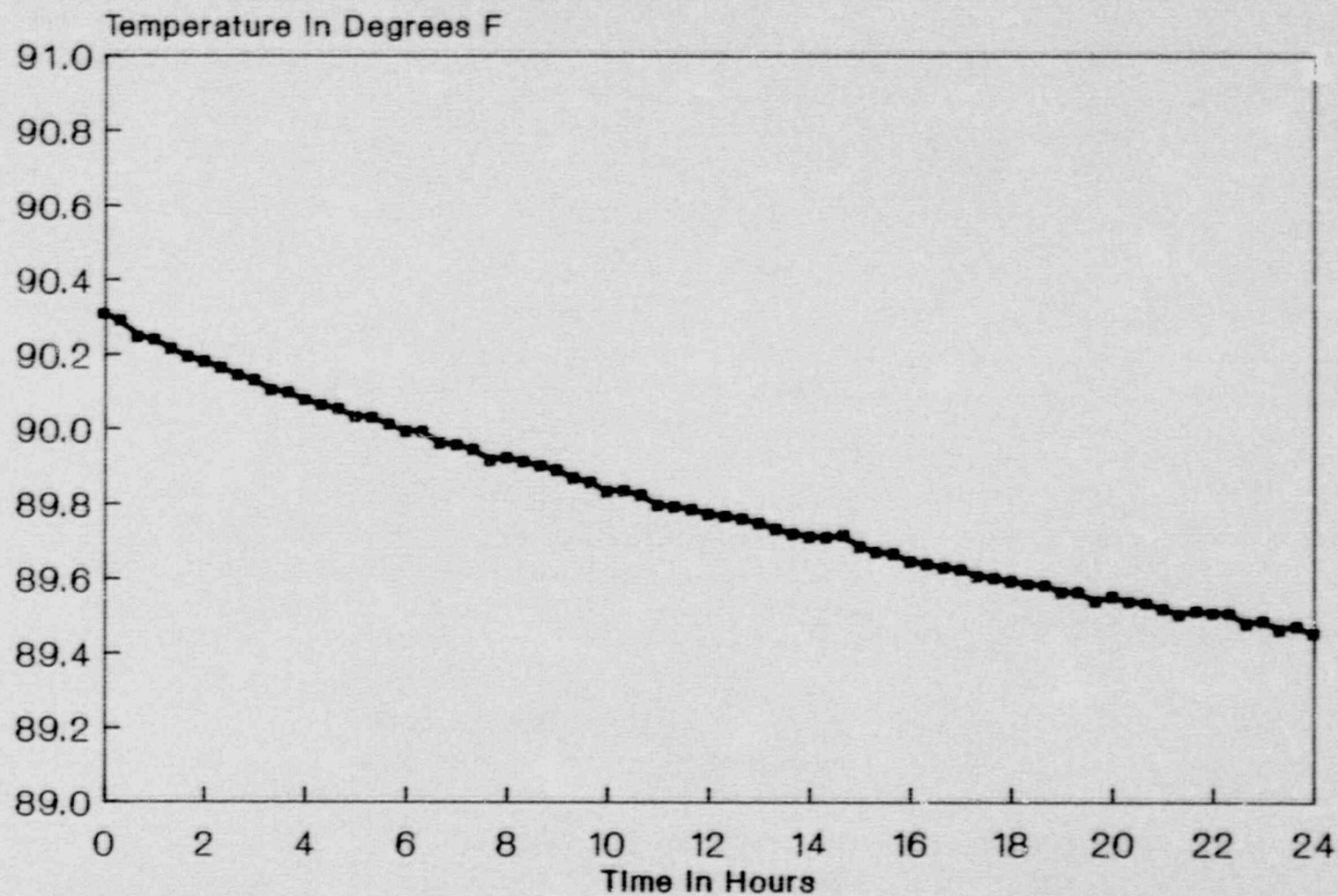


Ebasco Plant Services

ATTACHMENT 3.3D
GRAPH 4

ILRT WEIGHTED AVERAGE TEMPERATURE

1989 Seabrook Inservice ILRT

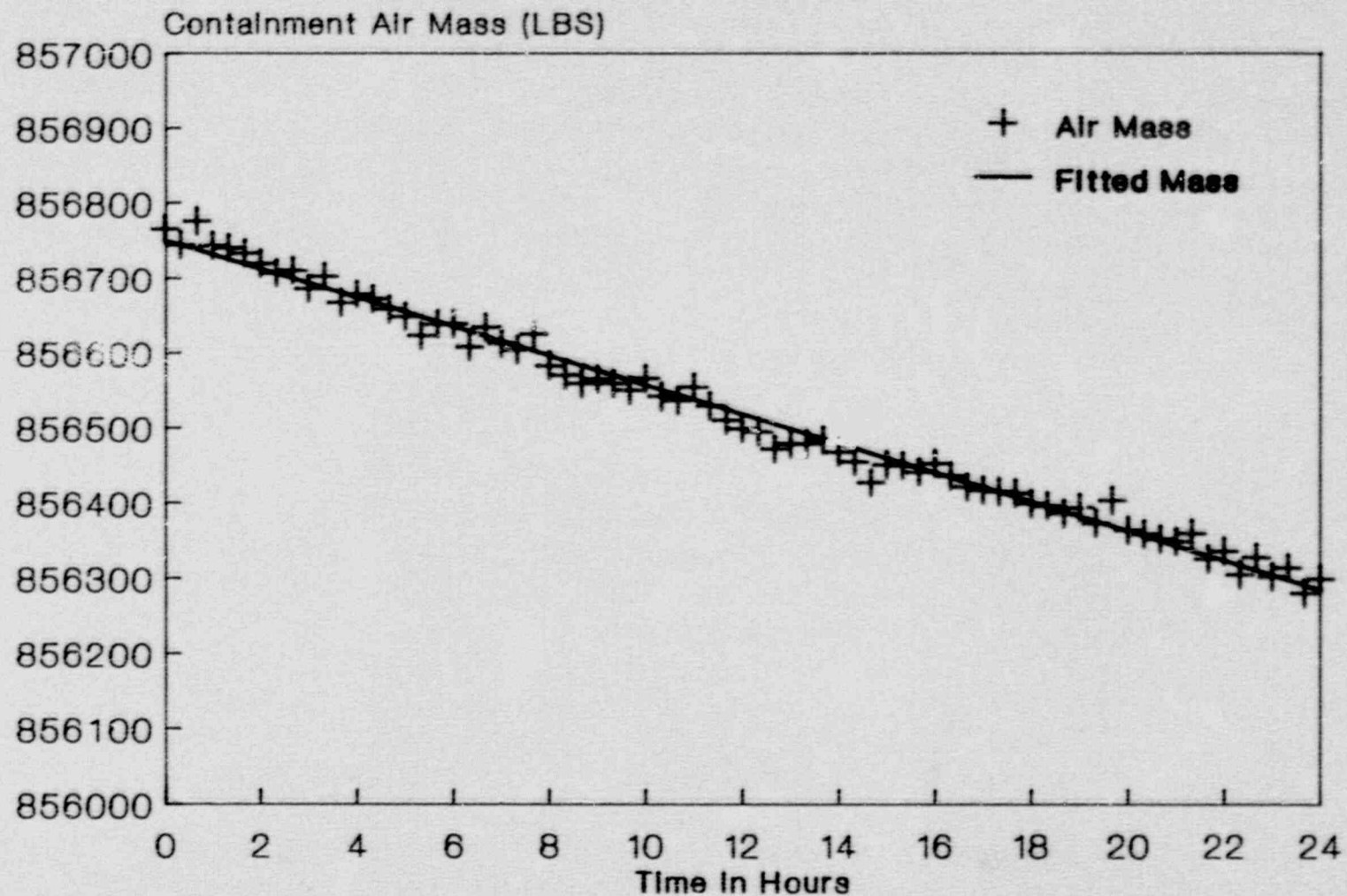


Ebasco Plant Services

ATTACHMENT 3.3E
GRAPH 5

ILRT AIR MASS

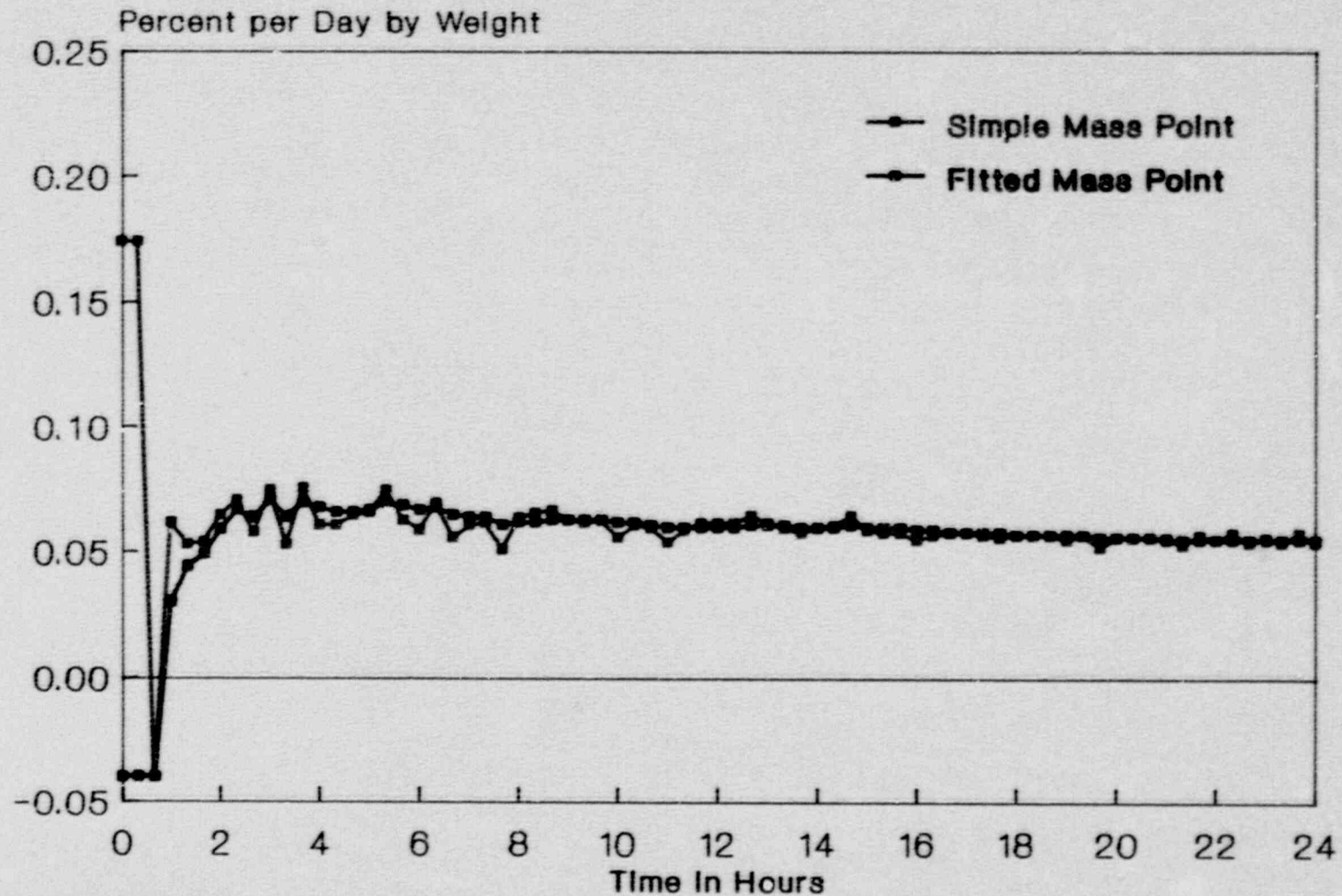
1989 Seabrook Inservice ILRT



Ebasco Plant Services

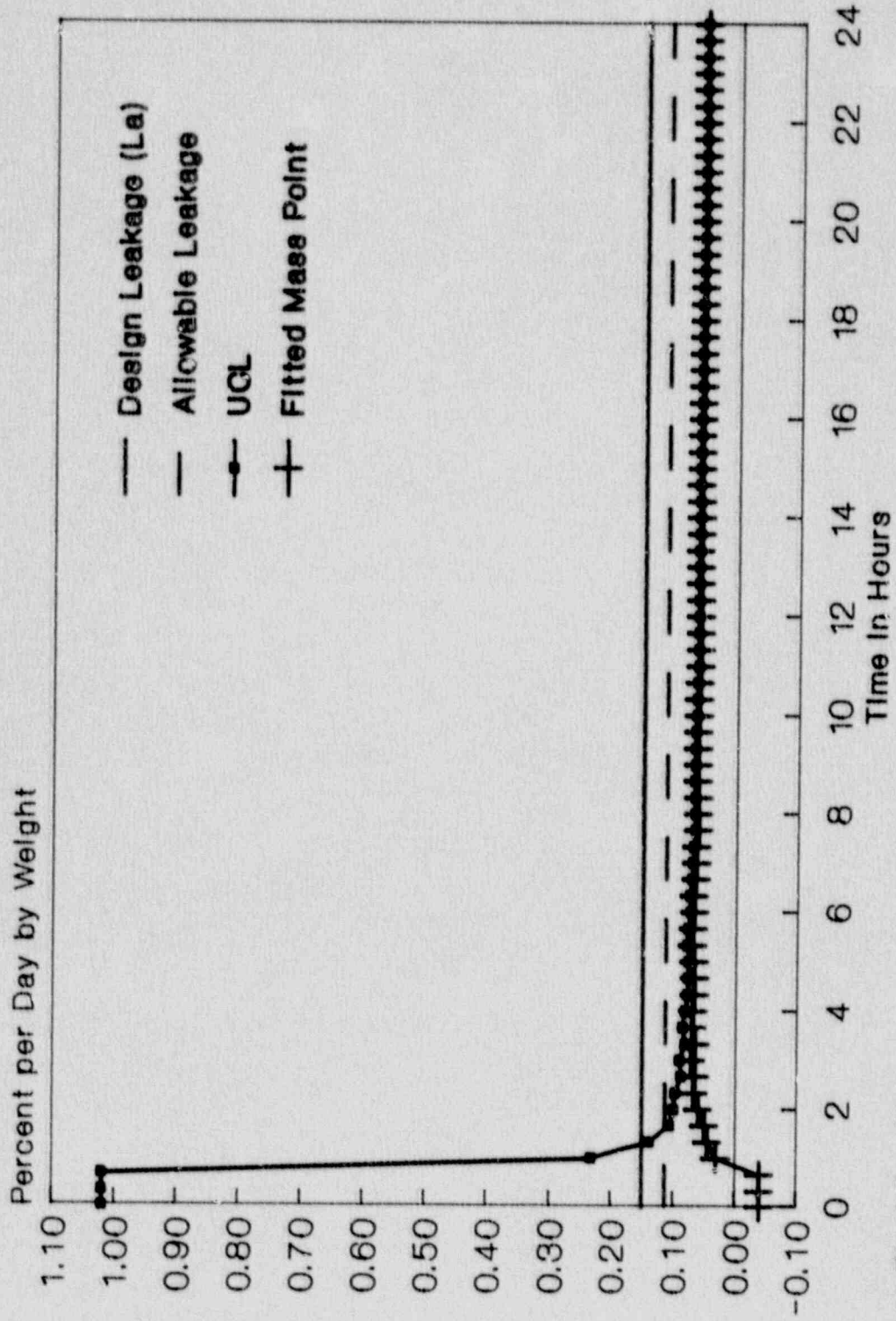
ILRT COMPUTED LEAKAGE RATES

1989 Seabrook Inservice ILRT



Ebasco Plant Services

ILRT LEAKAGE RATES RELATIVE TO LIMITS 1989 Seabrook Inservice ILRT



ATTACHMENT 3.31

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT) MEASURED INPUT DATA

| 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 | 89.182 | 89.096 | 89.013 | 89.268 | 89.206 | 89.326 |
| 2 | 0.33 | 89.123 | 89.114 | 89.008 | 89.263 | 89.224 | 89.353 |
| 3 | 0.67 | 89.139 | 89.105 | 89.022 | 89.234 | 89.195 | 89.323 |
| 4 | 1.00 | 89.159 | 89.062 | 89.033 | 89.234 | 89.206 | 89.346 |
| 5 | 1.33 | 89.148 | 89.062 | 89.067 | 89.245 | 89.174 | 89.323 |
| 6 | 1.67 | 89.105 | 89.062 | 89.013 | 89.256 | 89.195 | 89.292 |
| 7 | 2.00 | 89.178 | 89.068 | 89.020 | 89.231 | 89.202 | 89.310 |
| 8 | 2.33 | 89.139 | 89.073 | 88.990 | 89.222 | 89.195 | 89.312 |
| 9 | 2.67 | 89.062 | 89.062 | 88.990 | 89.202 | 89.163 | 89.303 |
| 10 | 3.00 | 89.105 | 89.084 | 88.936 | 89.213 | 89.206 | 89.303 |
| 11 | 3.33 | 89.114 | 89.048 | 88.922 | 89.188 | 89.181 | 89.321 |
| 12 | 3.67 | 89.041 | 89.050 | 88.947 | 89.213 | 89.140 | 89.312 |
| 13 | 4.00 | 89.123 | 89.048 | 88.945 | 89.220 | 89.138 | 89.287 |

ATTACHMENT 3.3I (Continued)

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT) MEASURED INPUT DATA

| 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 | 89.733 | 89.402 | 89.441 | 89.745 | 89.368 | 89.691 |
| 2 | 0.33 | 89.740 | 89.398 | 89.459 | 89.686 | 89.409 | 89.666 |
| 3 | 0.67 | 89.722 | 89.348 | 89.450 | 89.777 | 89.368 | 89.668 |
| 4 | 1.00 | 89.710 | 89.402 | 89.441 | 89.863 | 89.346 | 89.700 |
| 5 | 1.33 | 89.731 | 89.348 | 89.430 | 89.743 | 89.336 | 89.548 |
| 6 | 1.67 | 89.731 | 89.359 | 89.450 | 89.809 | 89.325 | 89.603 |
| 7 | 2.00 | 89.706 | 89.343 | 89.425 | 89.827 | 89.321 | 89.612 |
| 8 | 2.33 | 89.731 | 89.325 | 89.418 | 89.797 | 89.325 | 89.603 |
| 9 | 2.67 | 89.688 | 89.337 | 89.396 | 89.722 | 89.336 | 89.657 |
| 10 | 3.00 | 89.699 | 89.337 | 89.407 | 89.777 | 89.302 | 89.637 |
| 11 | 3.33 | 89.663 | 89.343 | 89.405 | 89.815 | 89.277 | 89.500 |
| 12 | 3.67 | 89.676 | 89.325 | 89.375 | 89.679 | 89.302 | 89.680 |
| 13 | 4.00 | 89.642 | 89.323 | 89.405 | 89.632 | 89.312 | 89.600 |

ATTACHMENT 3.3I (Continued)

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT)
MEASURED INPUT DATA

| 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 | 89.108 | 89.279 | 89.214 | 89.342 | 89.440 | 89.449 |
| 2 | 0.33 | 89.092 | 89.306 | 89.167 | 89.361 | 89.381 | 89.413 |
| 3 | 0.67 | 89.096 | 89.300 | 89.223 | 89.320 | 89.372 | 89.449 |
| 4 | 1.00 | 89.183 | 89.277 | 89.180 | 89.320 | 89.438 | 89.395 |
| 5 | 1.33 | 88.956 | 89.256 | 89.257 | 89.299 | 89.426 | 89.449 |
| 6 | 1.67 | 89.062 | 89.213 | 89.235 | 89.320 | 89.395 | 89.384 |
| 7 | 2.00 | 88.994 | 89.231 | 89.232 | 89.295 | 89.402 | 89.370 |
| 8 | 2.33 | 89.051 | 89.300 | 89.160 | 89.320 | 89.449 | 89.363 |
| 9 | 2.67 | 89.062 | 89.213 | 89.137 | 89.385 | 89.372 | 89.352 |
| 10 | 3.00 | 89.171 | 89.225 | 89.235 | 89.320 | 89.383 | 89.395 |
| 11 | 3.33 | 89.006 | 89.200 | 89.135 | 89.274 | 89.358 | 89.381 |
| 12 | 3.67 | 89.019 | 89.202 | 89.137 | 89.277 | 89.363 | 89.352 |
| 13 | 4.00 | 89.049 | 89.231 | 89.198 | 89.263 | 89.358 | 89.370 |

ATTACHMENT 3.3I (Continued)**SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT)
MEASURED INPUT DATA**

| <u>SAMPLE NUMBER</u> | <u>DELTA HOURS</u> | <u>TEMP 19 (DEG F)</u> | <u>TEMP 20 (DEG F)</u> | <u>TEMP 21 (DEG F)</u> | <u>TEMP 22 (DEG F)</u> | <u>TEMP 23 (DEG F)</u> | <u>TEMP 24 (DEG F)</u> |
|--------------------------|------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1 | 0.00 | 89.481 | 89.119 | 89.442 | 89.414 | 90.389 | 90.372 |
| 2 | 0.33 | 89.458 | 89.108 | 89.421 | 89.403 | 90.389 | 90.340 |
| 3 | 0.67 | 89.426 | 89.087 | 89.421 | 89.391 | 90.343 | 90.297 |
| 4 | 1.00 | 89.436 | 89.076 | 89.367 | 89.403 | 90.366 | 90.275 |
| 5 | 1.33 | 89.415 | 89.108 | 89.367 | 89.382 | 90.377 | 90.275 |
| 6 | 1.67 | 89.436 | 89.108 | 89.464 | 89.403 | 90.311 | 90.243 |
| 7 | 2.00 | 89.426 | 89.087 | 89.399 | 89.391 | 90.366 | 90.266 |
| 8 | 2.33 | 89.404 | 89.076 | 89.376 | 89.403 | 90.377 | 90.243 |
| 9 | 2.67 | 89.458 | 89.087 | 89.367 | 89.403 | 90.334 | 90.286 |
| 10 | 3.00 | 89.458 | 89.053 | 89.344 | 89.391 | 90.366 | 90.231 |
| 11 | 3.33 | 89.372 | 89.064 | 89.376 | 89.382 | 90.323 | 90.286 |
| 12 | 3.67 | 89.404 | 89.053 | 89.344 | 89.382 | 90.334 | 90.211 |
| 13 | 4.00 | 89.415 | 89.053 | 89.290 | 89.360 | 90.323 | 90.254 |

ATTACHMENT 3.3I (Continued)

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT) MEASURED INPUT DATA

| SAMPLE NUMBER | DELTA HOURS | TEMP 25 (DEG F) | TEMP 26 (DEG F) | PRESS 1 (PSIA) | PRESS 2 (PSIA) |
|------------------|----------------|--------------------|--------------------|-------------------|-------------------|
| 1 | 0.00 | 90.180 | 89.907 | 64.837 | 64.841 |
| 2 | 0.33 | 90.180 | 89.928 | 64.834 | 64.839 |
| 3 | 0.67 | 90.168 | 89.896 | 64.832 | 64.837 |
| 4 | 1.00 | 90.223 | 89.916 | 64.830 | 64.834 |
| 5 | 1.33 | 90.211 | 89.896 | 64.827 | 64.832 |
| 6 | 1.67 | 90.200 | 89.873 | 64.825 | 64.829 |
| 7 | 2.00 | 90.125 | 89.884 | 64.823 | 64.827 |
| 8 | 2.33 | 90.180 | 89.862 | 64.821 | 64.825 |
| 9 | 2.67 | 90.168 | 89.862 | 64.819 | 64.823 |
| 10 | 3.00 | 90.146 | 89.862 | 64.816 | 64.821 |
| 11 | 3.33 | 90.168 | 89.853 | 64.814 | 64.818 |
| 12 | 3.67 | 90.146 | 89.841 | 64.811 | 64.816 |
| 13 | 4.00 | 90.154 | 89.853 | 64.809 | 64.813 |

ATTACHMENT 3.3I (Continued)

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT) MEASURED INPUT DATA

| SAMPLE NUMBER | DELTA HOURS | HUM 1 (% RH) | HUM 2 (% RH) | HUM 3 (% RH) | HUM 4 (% RH) | HUM 5 (% RH) | HUM 6 (% RH) |
|------------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | 0.00 | 60.997 | 60.869 | 62.651 | 61.746 | 60.573 | 59.952 |
| 2 | 0.33 | 61.056 | 60.968 | 62.693 | 61.793 | 60.609 | 59.935 |
| 3 | 0.67 | 61.079 | 60.957 | 62.629 | 61.787 | 60.580 | 59.965 |
| 4 | 1.00 | 61.038 | 60.997 | 62.692 | 61.815 | 60.660 | 60.004 |
| 5 | 1.33 | 61.010 | 60.957 | 62.728 | 61.846 | 60.662 | 59.982 |
| 6 | 1.67 | 60.895 | 60.964 | 62.723 | 61.887 | 60.640 | 60.012 |
| 7 | 2.00 | 60.999 | 60.992 | 62.775 | 61.898 | 60.714 | 60.046 |
| 8 | 2.33 | 61.096 | 61.014 | 62.780 | 61.897 | 60.679 | 60.034 |
| 9 | 2.67 | 61.063 | 61.086 | 62.856 | 61.881 | 60.703 | 60.052 |
| 10 | 3.00 | 61.138 | 61.045 | 62.872 | 61.898 | 60.725 | 60.074 |
| 11 | 3.33 | 61.223 | 61.072 | 62.837 | 61.978 | 60.770 | 60.079 |
| 12 | 3.67 | 61.167 | 61.178 | 62.902 | 61.968 | 60.754 | 60.133 |
| 13 | 4.00 | 61.195 | 61.207 | 62.872 | 61.956 | 60.737 | 60.192 |

ATTACHMENT 3.3J

SUPERIMPOSED LEAKAGE VERIFICATION TEST (CLRT) REDUCED INPUT VARIABLES

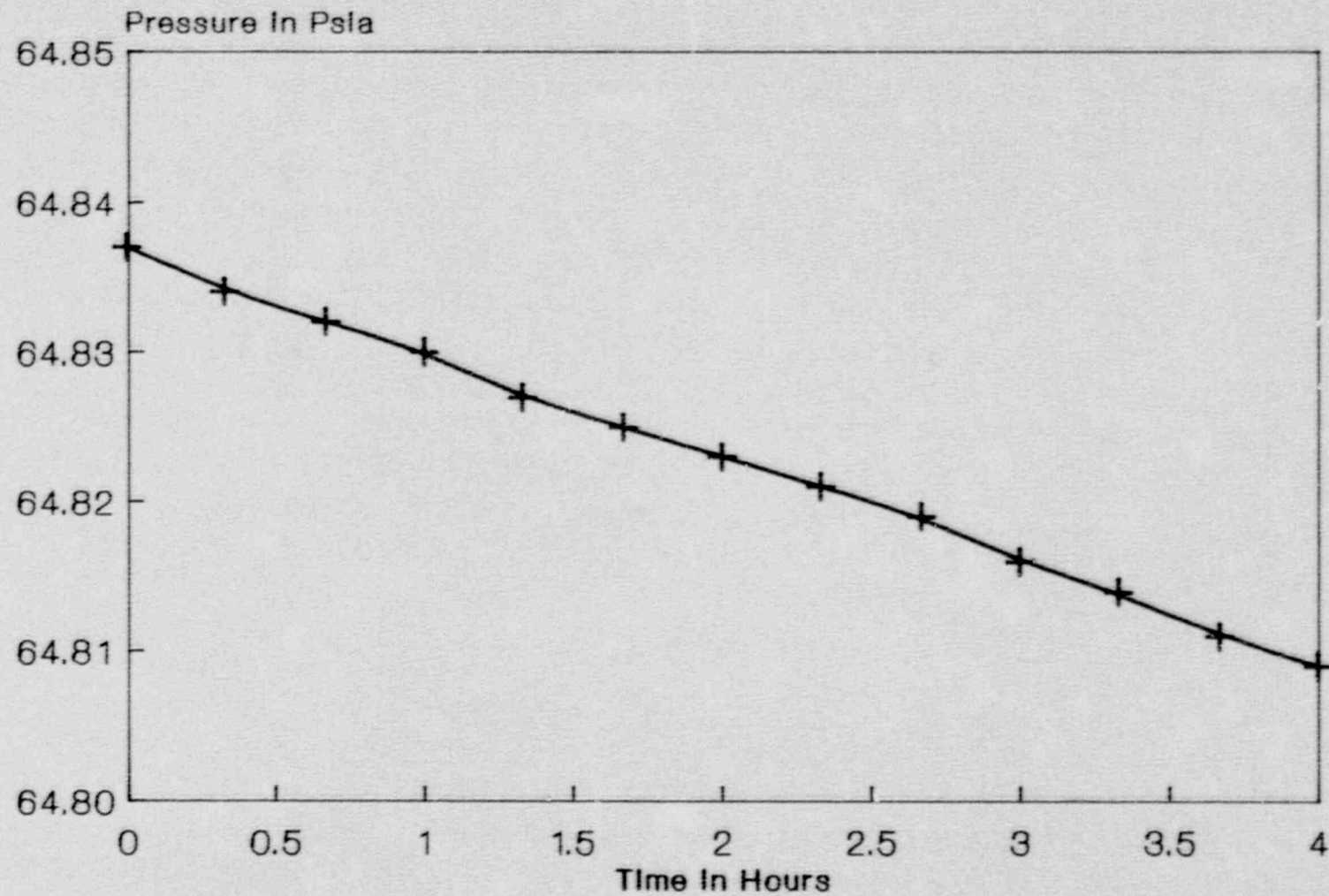
AND

ABSOLUTE TEST METHOD - MASS POINT ANALYSIS TEST RESULTS

| SAM NO. | TIME HOURS | AVG TEMP (DEG F) | PRESSURE (PSIA) | VAP PRES (PSIA) | LEAK SIM (%/DAY) | LEAK FIT (%/DAY) | UCL (%/DAY) | AIR MASS (LBS) |
|------------|---------------|---------------------|--------------------|--------------------|---------------------|---------------------|----------------|-------------------|
| 1 | 0.00 | 89.418 | 64.837 | 0.4191 | 0.000 | 0.000 | 0.000 | 856191 |
| 2 | 0.33 | 89.411 | 64.834 | 0.4192 | 0.250 | 0.000 | 0.000 | 856162 |
| 3 | 0.67 | 89.404 | 64.832 | 0.4192 | 0.199 | 0.199 | 0.451 | 856144 |
| 4 | 1.00 | 89.414 | 64.830 | 0.4197 | 0.265 | 0.253 | 0.353 | 856097 |
| 5 | 1.33 | 89.387 | 64.827 | 0.4191 | 0.177 | 0.196 | 0.286 | 856107 |
| 6 | 1.67 | 89.390 | 64.825 | 0.4191 | 0.195 | 0.190 | 0.244 | 856075 |
| 7 | 2.00 | 89.388 | 64.823 | 0.4193 | 0.199 | 0.191 | 0.227 | 856049 |
| 8 | 2.33 | 89.385 | 64.821 | 0.4195 | 0.202 | 0.194 | 0.220 | 856023 |
| 9 | 2.67 | 89.372 | 64.819 | 0.4195 | 0.182 | 0.185 | 0.207 | 856018 |
| 10 | 3.00 | 89.383 | 64.816 | 0.4199 | 0.219 | 0.198 | 0.221 | 855957 |
| 11 | 3.33 | 89.359 | 64.814 | 0.4196 | 0.185 | 0.191 | 0.211 | 855971 |
| 12 | 3.67 | 89.350 | 64.811 | 0.4197 | 0.189 | 0.189 | 0.205 | 855944 |
| 13 | 4.00 | 89.351 | 64.809 | 0.4198 | 0.194 | 0.189 | 0.203 | 855915 |

CLRT CONTAINMENT ABSOLUTE PRESSURE

1989 Seabrook Inservice ILRT

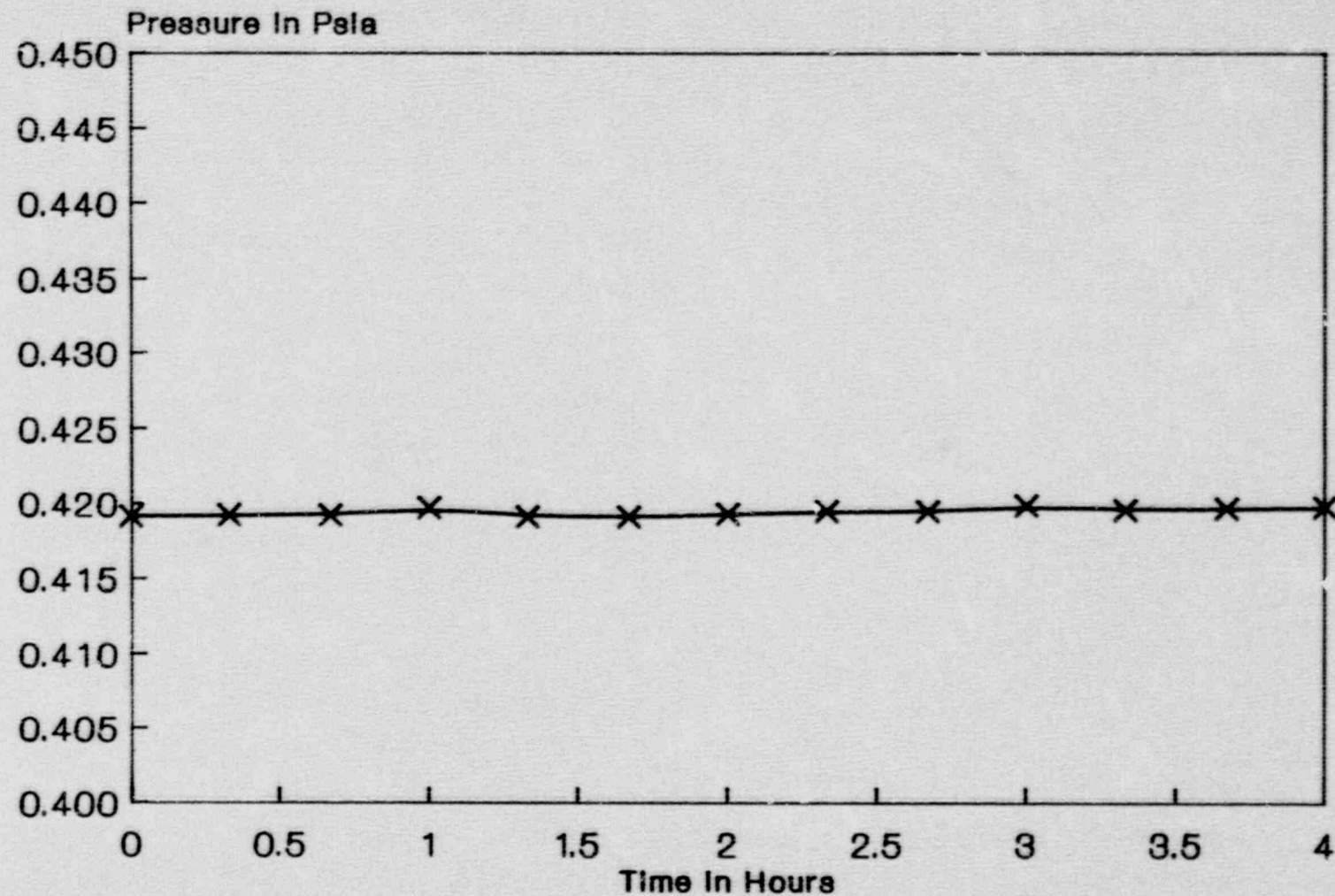


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ATTACHMENT 3.3K
GRAPH 9

CLRT WEIGHTED AVERAGE VAPOR PRESSURE

1989 Seabrook Inservice ILRT

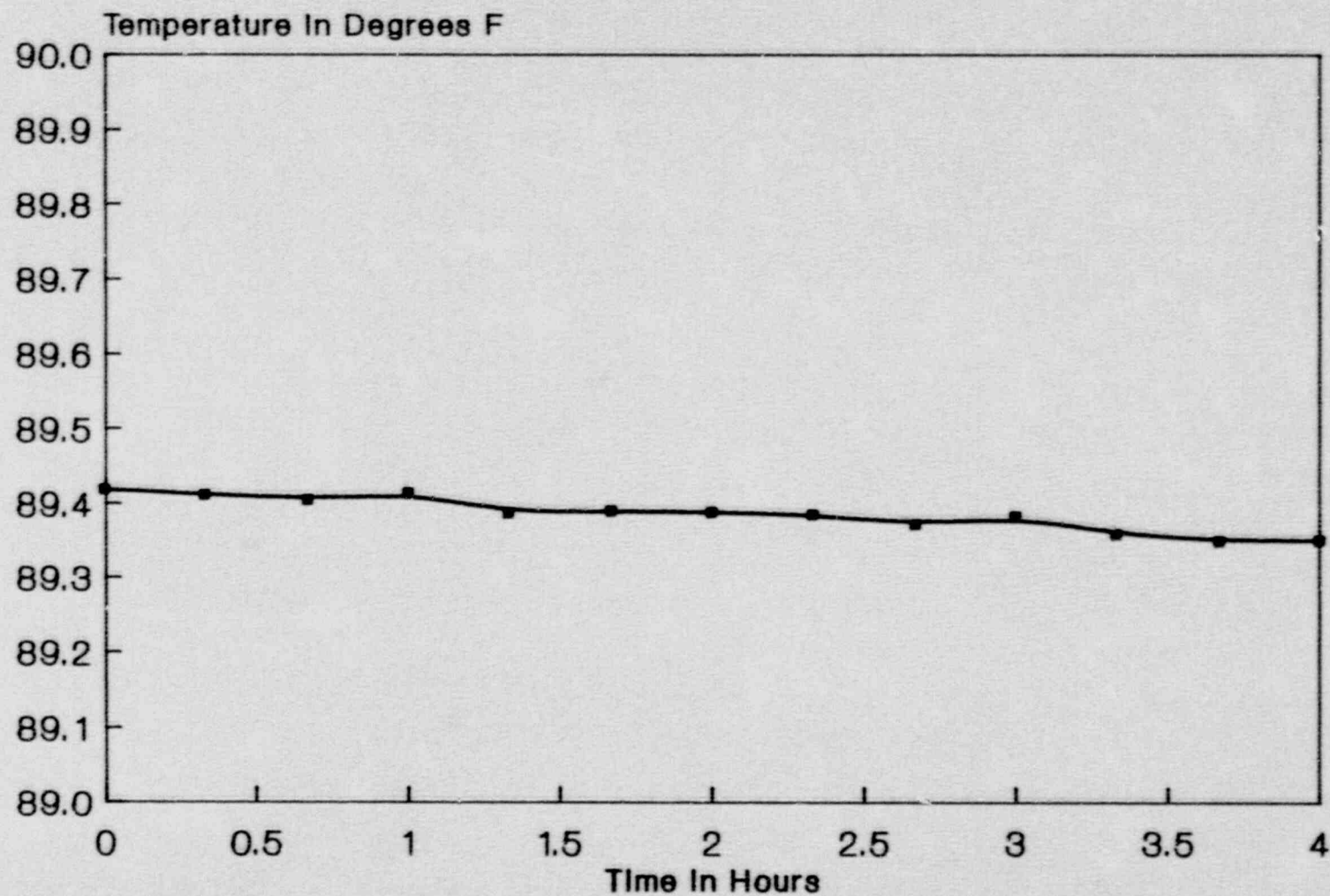


Ebasco Plant Services

ATTACHMENT 3.3L
GRAPH 10

CLRT WEIGHTED AVERAGE TEMPERATURE

1989 Seabrook Inservice ILRT

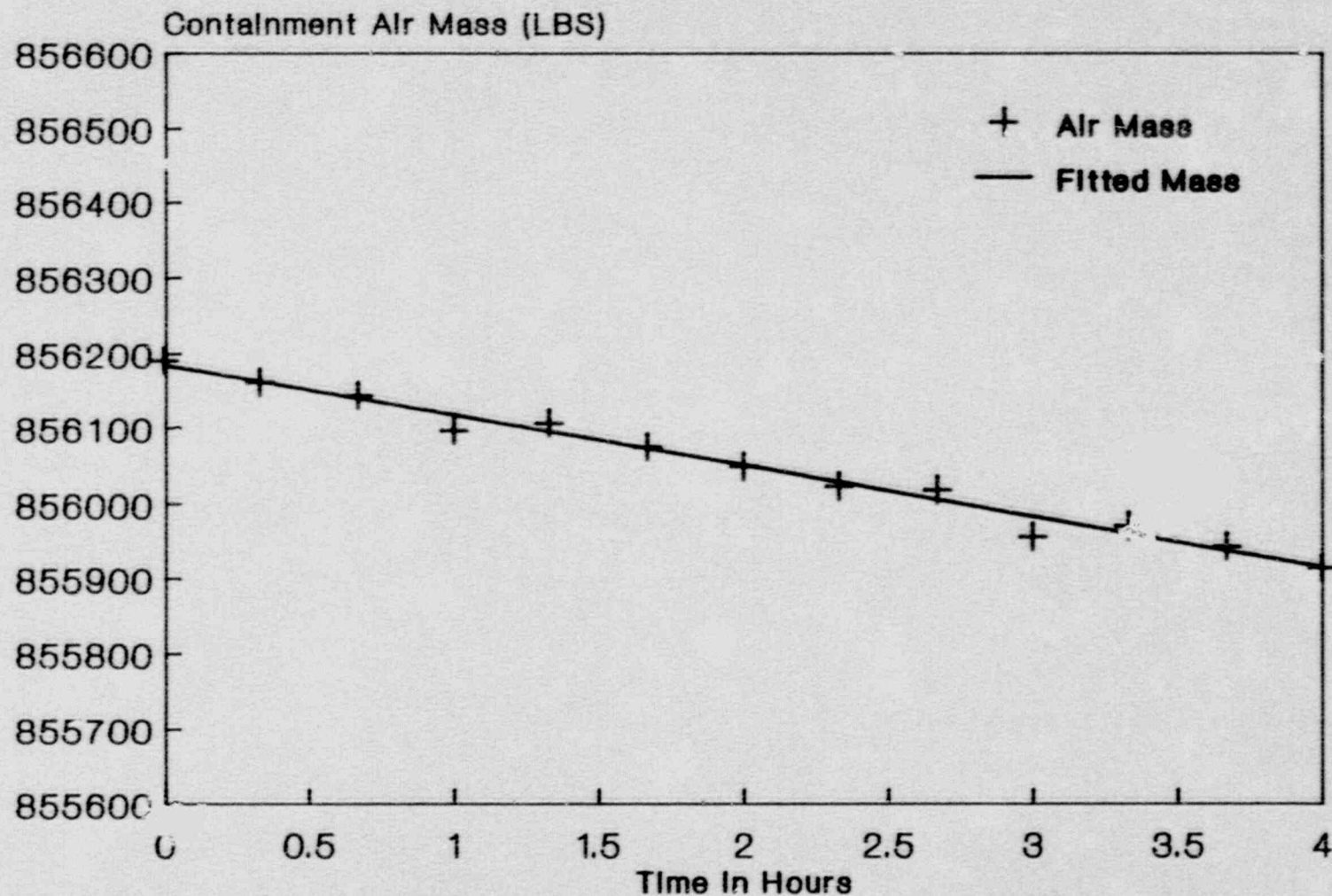


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ATTACHMENT 3.3M
GRAPH 11

CLRT AIR MASS

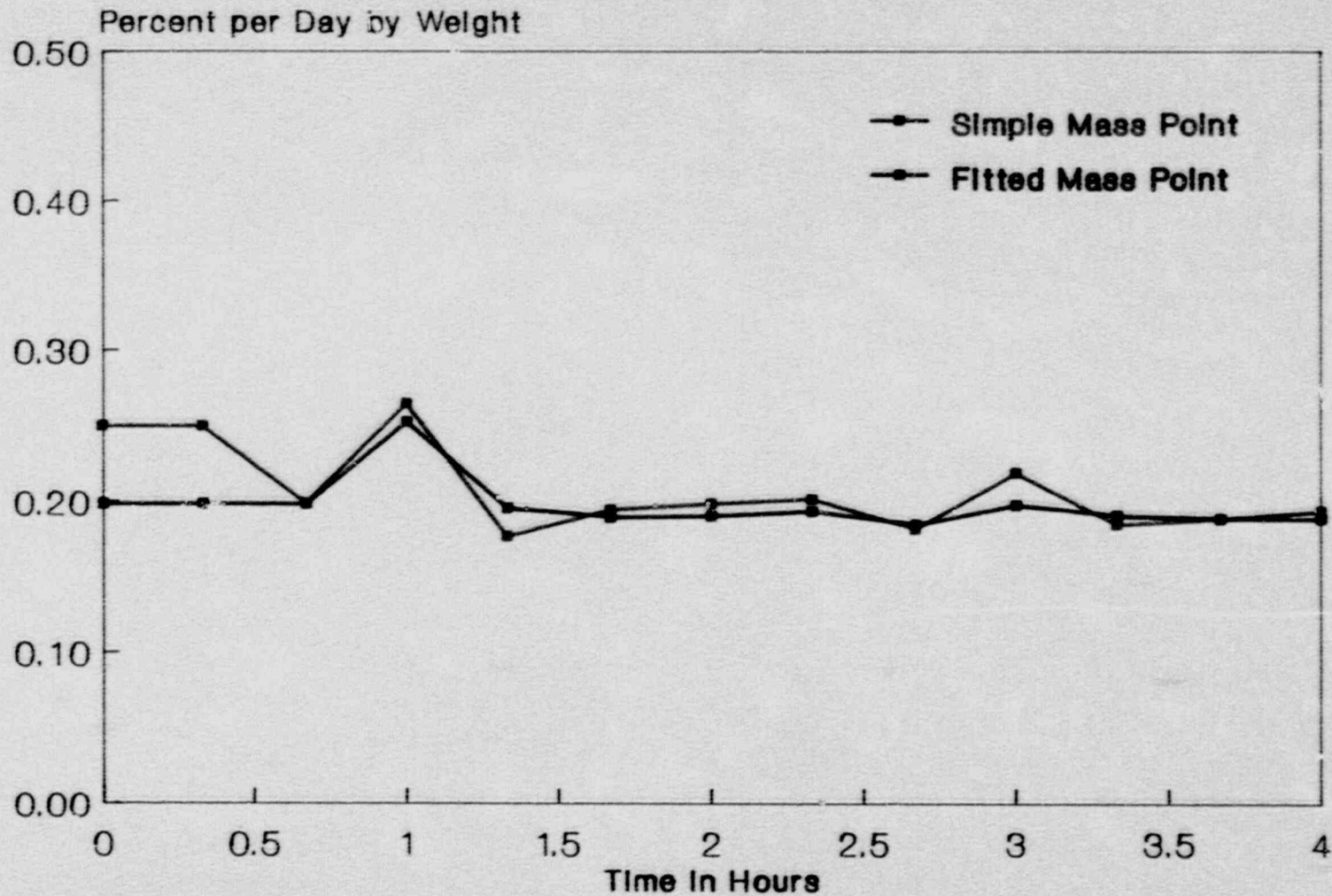
1989 Seabrook Inservice ILRT



Ebasco Plant Services

ATTACHMENT 3.3N
GRAPH 12

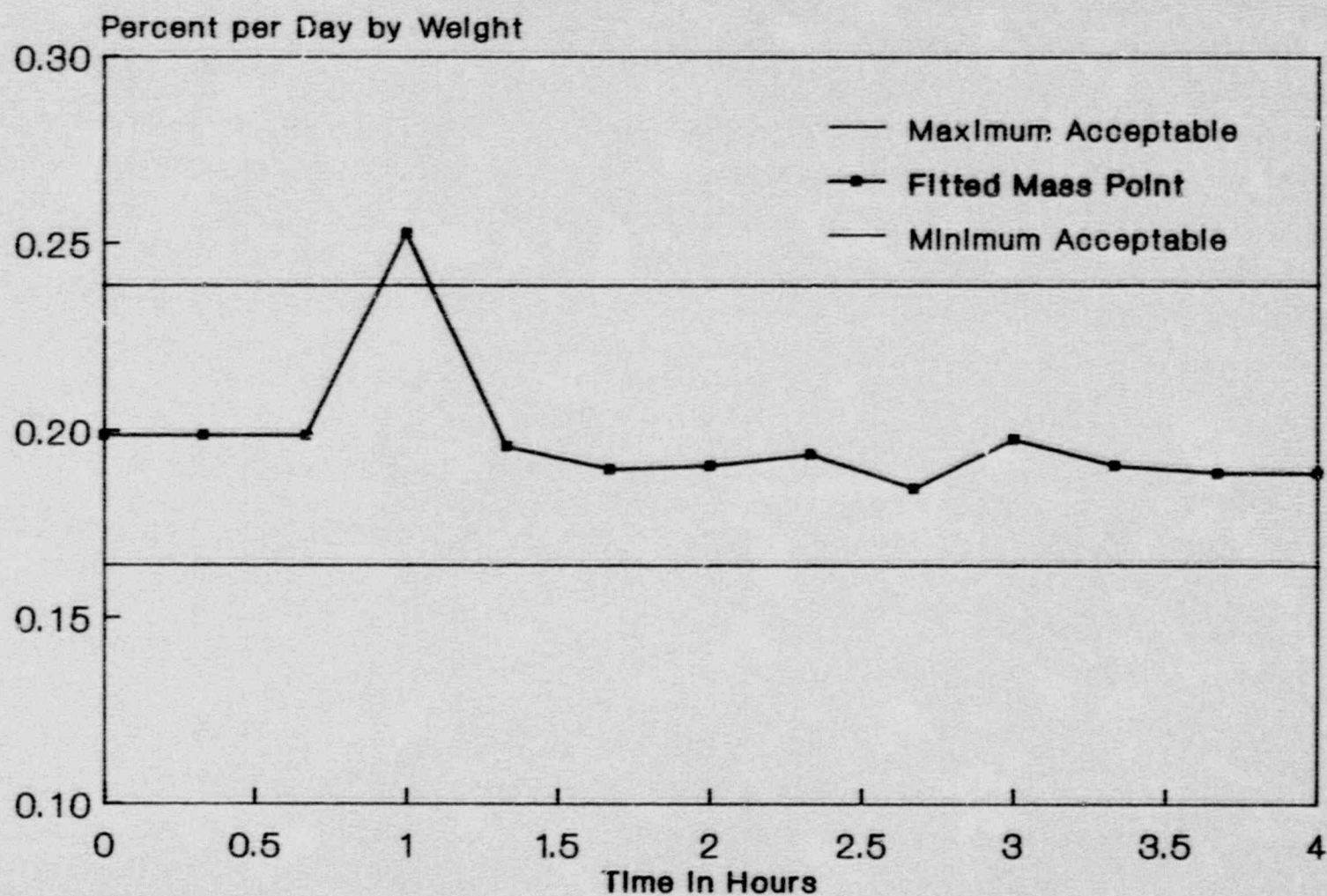
CLRT COMPUTED LEAKAGE RATES 1989 Seabrook Inservice ILRT



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CLRT LEAKAGE RATES RELATIVE TO LIMITS

1989 Seabrook Inservice ILRT



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SECTION 4

LOCAL LEAKAGE RATE TESTS (TYPES B & C)

Section 4 summarizes the results of the Local Leakage Rate Test's (LLRT's) data that was established to support the overall containment leakage testing program. Maintenance data is provided for surveillance testing performed in 1987/1988 and 1989. These LLRT's were performed by pressurizing the listed penetrations with air or nitrogen and either measuring leakage across the containment isolation valves boundary (Type C) or across the resilient seals (Type B). The leakage rates that are listed in Attachments 4A, 4B and 4C are valve leakage rates, not penetration leakage rates. Each penetration leakage rate can be obtained from site reference material.

Attachment 4D contains an analysis of the containment penetrations that were repaired during the 1989 outage to assess the as-found containment condition.

The acceptance criteria for Types B and C testing are in accordance with 10CFR50, Appendix J. The combined as-left leakage rate for all penetrations and valves, subject to Types B and C tests, is well below the acceptance criteria of less than 0.60 La.

The data contained in this section are summarized below:

| <u>Attachment No.</u> | <u>Title</u> |
|-----------------------|---|
| 4A | 1989 Local Leakage Rate Test Data |
| 4B | 1987/1988 Local Leakage Rate Test Data |
| 4C | 1986 Local Leakage Rate Test Data |
| 4D | 1989 Local Leakage Rate Test Summary Analysis |

**ATTACHMENT 4A
1989 LOCAL LEAKAGE RATE TEST DATA**

| PENETRATION NO./SYSTEM | | TYPE TEST | EQUIPMENT/VALVES TESTED (NOTE 1) | | AS-FOUND LEAKAGE (SCFH)/DATE | AS-LEFT LEAKAGE (SCFH)/DATE | REMARKS |
|------------------------|-------------------------------------|-----------|----------------------------------|----------------|------------------------------|------------------------------|--|
| X-9 | RHR Pump Suction (Loop I/Hot Leg) | C | RC-V23 | (IRC) | 0.000/08-27-89 | 0.000/08-27-89 | |
| | | | RC-V24 | (IRC) | 0.000/08-02-89 | 0.000/08-02-89 | |
| X-10 | RHR Pump Suction (Loop IV/Hot Leg) | C | RC-V88 | (IRC) | 3.020/10-28-89 | 3.020/10-28-89 | |
| | | | RC-V89 | (IRC) | 0.000/10-05-89 | 0.000/10-5-89 | |
| X-14 | Containment Spray | C | CBS-V12 | (IRC) | 4.536/08-27-89 | 4.536/08-27-89 | WR#89W001730- Replaced motor pinion key. (CBS-V11). |
| | | | CBS-V11 | (ORC) | 3.521/08-27-89 | 0.360/10-05-89 | |
| X-15 | Containment Spray | C | CBS-V18 | (IRC) | 1.100/10-25-89 | 1.100/10-25-89 | WR#89W001731- Replaced motor pinion key. (CBS-V17). |
| | | | CBS-V17 | (ORC) | - | 0.000/10-28-89 | |
| X-16 | Containment On-Line Purge (Exhaust) | C | COP-V3 COP-V4 | (IRC) (ORC) | 2.430/04-04-89 (Combined) | 2.430/04-04-89 (Combined) | |
| | | | | | 2.430/08-24-89 (Combined) | 2.430/08-24-89 (Combined) | |
| | | | | | 2.440/11-16-89 (Combined) | 2.440/11-16-89 (Combined) | |
| | | | | | 2.275/11-30-89 (Combined) | 2.275/11-30-89 (Combined) | |
| X-17 | Equipment Vent (RCDT) | C | VG-FV1712 | (IRC) | 0.000/08-03-89 | 0.000/08-03-89 | |
| | | | VG-FV1661 | (ORC) | 0.000/08-03-89 | 0.000/08-03-89 | |
| X-18 | Containment On-Line Purge (Supply) | C | COP-V2 COP-V1 | (IRC) (ORC) | 0.810/04-04-89 (Combined) | 0.810/04-04-89 (Combined) | |
| | | | | | 0.860/08-24-89 (Combined) | 0.860/08-24-89 (Combined) | |
| | | | | | 0.715/11-16-89 (Combined) | 0.715/11-16-89 (Combined) | |

ATTACHMENT 4A (Continued)
1989 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|---|------------------|--|---|--|---|
| X-19 Post Accident Monitoring Sample | C | SS-V273 (IRC) SS-FV2857 (ORC) | 0.000/08-31-89 12.070/08-31-89 >22.000/09-05-89 | 0.000/08-31-89 8.060/11-15-89 | NOTE 2, WR# 89W004269- Replaced valve internals, (SS-FV2857). |
| X-20 PCCW Loop A (Supply) | C | CC-V57 (IRC) CC-V845 (IRC) CC-V168 (ORC) | 11.552/07-24-89 9.000/07-24-89 (Combined) | 0.403/07-31-89 0.000/07-31-89 (Combined) | WR#89W003626-Disassembled, cleaned seating surfaces, replaced seal, packing, gaskets, and re-assembled, (CC-V843). |
| X-21 PCCW Loop A (Return) | C | CC-V121 (IRC) CC-V410 (IRC) CC-V122 (ORC) | >22.000/07-24-89 >22.000/07-24-89 (Combined) | 1.614/07-31-89 1.400/07-31-89 (Combined) | NOTE 2, WR#89W003656- Disassembled, cleaned seating surfaces, replaced seal, packing, gaskets, and re-assembled, (CC-V844). |
| X-22 PCCW Loop B (Return) | C | CC-V256 (IRC) CC-V474 (IRC) CC-V257 (ORC) | 3.522/10-29-89 3.522/10-29-89 (Combined) | 3.522/10-29-89 3.522/10-29-89 (Combined) | WR#89W005268- Disassembled, cleaned seating surfaces, replaced seal packing, gaskets, and re-assembled, (CC-V838). |
| X-23 PCCW Loop B (Supply) | C | CC-176 (IRC) CC-840 (IRC) CC-175 (ORC) | 4.025/10-29-89 0.000/10-26-89 6.037/10-29-89 | 4.025/10-29-89 6.037/10-29-89 (Combined) | WR#89W005267- Disassembled cleaned seating surfaces replaced seal, packing, gaskets, and re-assembled, (CC-V837). WR#89W002433- Replaced valve, (CC-V840). |
| X-32 Equipment and Floor Drainage (RCDT) | C | WLD-V81 (IRC) WLD-V213 (IRC) WLD-V82 (ORC) | 0.000/08-04-89 0.000/08-04-89 (Combined) | 0.000/8-4-89 0.000/8-4-89 (Combined) | |
| X-34 Equipment and Floor Drainage (RC Sump) | C | WLD-FV8331 (IRC) WLD-V209 (IRC) WLD-FV8330 (ORC) | >22.000/08-04-89 1.111/08-04-89 (Combined) | 0.000/11-15-89 1.111/08-04-89 (Combined) | NOTE 2, WR#89W003803- Disassembled, inspected & cleaned valve internals, and re-assembled, (WLD-FV8331). |

ATTACHMENT 4A (Continued)
1989 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|---|------------------|--|---|--|---|
| X-35A Safety Injection (Test Line) | C | SI-V70 (IRC) SI-V247 (IRC) SI-V62 (ORC) SI-V157 (ORC) | 0.000/08-08-89 0.000/08-08-89 (Combined) | 0.000/08-08-89 0.000/08-08-89 (Combined) | |
| X-35B Reactor Coolant (PZR Stm/Liq Sample) | C | RC-FV2830 (IRC) RC-FV2831 (IRC) RC-V312 (IRC) RC-FV2840 (ORC) | 0.000/08-21-89 0.000/08-21-89 0.000/08-21-89 (Combined) | 0.000/08-21-89 0.000/08-21-89 0.000/08-21-89 (Combined) | |
| X-35C Reactor Coolant (RC Sample Loop I) | C | RC-FV2832 (IRC) RC-V314 (IRC) RC-FV2874 (ORC) RC-FV2894 (ORC) | 0.101/10-23-89 0.000/11-11-89 0.000/10-23-89 (Combined) 0.000/11-11-89 (Combined) | 0.101/10-23-89 0.000/11-11-89 0.000/10-23-89 (Combined) 0.000/11-11-89 (Combined) | |
| X-35D Reactor Coolant (RC Sample Loop III) | C | RC-FV2833 (IRC) RC-V337 (IRC) RC-FV2876 (ORC) RC-FV2896 (ORC) | 0.202/08-21-89 0.000/08-21-89 (Combined) | 0.202/08-21-89 0.000/08-21-89 (Combined) | |
| X-36A Demineralized Water | C | DM-V5 (IRC) DM-V18 (IRC) DM-V4 (ORC) | 16.160/08-23-89 0.000/08-23-89 (Combined) | 4.030/10-17-89 0.000/08-23-89 (Combined) | WR#89W004161- Replaced wedge & gasket, and blue checked wedge & seat, (DM-V5). |
| X-36B Nitrogen Gas (HP) | C | NG-V14 (IRC) NG-V13 (ORC) | 0.202/08-25-89 0.000/08-25-89 | 0.202/08-25-89 0.000/08-25-89 | |
| X-36C Reactor Makeup Water | C | RMW-V29 (IRC) RMW-V30 (ORC) | 0.000/08-15-89 0.000/11-27-89 >22.000/08-15-89 >22.000/10-17-89 >22.000/10-18-89 15.700/11-27-89 | 0.000/08-15-89 0.000/11-27-89 5.540/10-23-89 0.000/01-08-90 | NOTE 2. WR#89W004017- Replaced wedge & gasket, and blue checked wedge & seat, (RMW-V30). WR#89W005999- Replaced valve, (RMW-V30). |

ATTACHMENT 4A (Continued)
1989 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--|------------------|--|--|--|---|---|
| X-37A CVC (Letdown) | C | CS-V149 (IRC) CS-V150 (ORC) | | 0.000/07-17-89 0.000/07-17-89 | 0.000/07-17-89 0.000/07-17-89 | |
| X-37B CVC (Excess Letdown) | C | CS-V168 (IRC) CS-V794 (IRC) CS-V167 (ORC) | | 0.039/01-23-89 0.000/07-17-89 0.900/01-23-89 (Combined) | 0.039/01-23-89 0.000/07-17-89 0.900/01-23-89 (Combined) | WR#89W000142- MOVATS test, (CS-V168). WR#89W000280- Replaced packing and gland bolts, (CS-V167). |
| | | | | 0.000/07-17-89 (Combined) | 0.000/07-17-89 (Combined) | |
| X-38A Fire Protection | C | FP-V588 (IRC) FP-V592 (ORC) | | 0.000/08-22-89 0.000/08-22-89 | 0.000/08-22-89 0.000/08-22-89 | |
| X-38B Combustible Gas Control | C | CGC-V46 (IRC) CGC-V43 (ORC) CGC-V44 (ORC) CGC-V45 (ORC) | | 16.160/08-15-89 16.160/08-15-89 1.510/08-15-89 (Combined) | 16.160/08-15-89 2.420/12-18-89 1.510/08-15-89 (Combined) | WR#89W004436- Removed & restored valve internals for the ILRT, (CGC-V46). |
| X-39 Spent Fuel Pool Cooling and Cleanup | C | SF-V86 (IRC) SF-V101 (IRC) SF-V87 (ORC) | | 1.520/08-09-89 0.809/08-09-89 (Combined) | 1.520/08-09-89 0.809/8-09-89 (Combined) | |
| X-40A Nitrogen Gas (LP) | C | NG-FV4610 (IRC) NG-FV4609 (ORC) | | >22.000/08-25-89 0.000/08-25-89 | 0.000/11-11-89 0.000/08-25-89 | NOTE 2 , WR#89W004181- Disassembled, inspected & cleaned valve internals, replaced "O"-rings, and re-assembled, (NG-FV4610). |
| X-40B PRT Sample | C | RC-FV2836 (IRC) RC-FV2837 (ORC) | | 0.000/08-24-89 0.000/08-24-89 | 0.000/08-24-89 0.000/08-24-89 | |
| X-52A Air Sample Supply | C | CAH-FV6573 (IRC) CAH-FV6572 (ORC) | | 0.000/08-08-89 0.000/08-08-89 | 0.000/08-08-89 0.000/08-80-89 | |
| X-52B Air Sample Return | C | CAH-V12 (IRC) CAH-FV6574 (ORC) | | 0.405/08-08-89 0.284/08-08-89 | 0.405/08-08-89 0.284/08-08-89 | |

ATTACHMENT 4A (Continued)
1989 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--------------------------------|------------------|---|--|--|----------------------------------|
| X-67 Service Air | C | SA-V1042 (IRC) SA-V229 (ORC) | 0.303/08-03-89 0.505/08-03-89 | 0.303/08-03-89 0.505/08-03-89 | |
| X-68 Instrument Air | C | IA-V531 (IRC) IA-V530 (ORC) | - - | 5.735/11-19-89 0.000/11-19-89 | WR#89W003348- New Penetration. |
| X-68 Spare | C | Spare | - | 0.000/01-08-90 | WR#89W006056- Spare Penetration. |
| X-71C Combustible Gas Control | C | CGC-V28 (IRC) CGC-V36 (ORC) | 0.000/08-16-89 0.404/08-16-89 | 0.000/08-16-89 0.404/08-16-89 | |
| X-71D Leak Detection | C | LD-V1 (IRC) LD-V2 (ORC) | 0.000/08-09-89 0.000/08-09-89 | 0.000/08-09-89 0.000/08-09-89 | |
| X-72C Combustible Gas Control | C | CGC-V14 (IRC) CGC-V15 (ORC) | 0.000/08-16-89 0.000/08-16-89 | 0.000/08-16-89 0.000/08-16-89 | |
| X-HVAC-1 Containment Air Purge | C | CAP-V2 (IRC) CAP-V1 (ORC) | 15.375/03-30-89 (Combined) 6.160/05-12-89 (Combined) 3.035/08-17-89 (Combined) 0.720/11-16-89 (Combined) 0.610/11-17-89 (Combined) | 15.375/03-30-89 (Combined) 6.150/05-12-89 (Combined) 3.035/08-17-89 (Combined) 0.720/11-16-89 (Combined) 0.610/11-17-89 (Combined) | |

ATTACHMENT 4A (Continued)
1989 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--|------------------|---|-------------------------------------|------------------------------------|--|
| X-HVAC-2 Containment Air Purge | C | CAP-V3 (IRC) | 8.200/03-30-89 | 8.200/03-30-89 | |
| | | CAP-V4 (ORC) | (Combined) | (Combined) | |
| | | | 12.840/05-12-89 | 12.840/05-12-89 | |
| | | | (Combined) | (Combined) | |
| | | | 5.058/08-17-89 | 5.058/08-17-89 | |
| | | | (Combined) | (Combined) | |
| | | | 12.790/11-16-89 | 12.790/11-16-89 | |
| | | | (Combined) | (Combined) | |
| | | | 6.600/11-17-89 | 6.600/11-17-89 | |
| | | | (Combined) | (Combined) | |
| X-62 Fuel Transfer Tube Flange | B | "O"-Rings | 0.000/08-07-89 | 0.000/10-20-89 | WR#89W001126- Installed quick-closure device, (X-62). |
| | | | 0.000/10-20-89 | 0.000/11-03-89 | WR#89W001142- Installed test connection, (X-62). |
| Fuel Transfer Tube/ Containment Liner Bellows | B | Bellows | 0.000/09-11-89 | 0.000/09-11-89 | |
| Equipment Hatch | B | "O"-Rings | 0.000/08-07-89 | 0.000/08-07-89 | |
| Equipment Hatch Airlock | B | "O"-Rings | 1.770/04-03-89 0.172/09-14-89 | 1.770/04-03-89 0.172/09-14-89 | |
| Personnel Airlock | B | "O"-Rings | 3.220/04-04-89 0.504/09-26-89 | 3.220/04-04-89 0.504/09-26-89 | |
| Electrical Penetrations | B | "O"-Rings | 0.000/09-11-89 | 0.000/09-11-89 | NOTE 3 |

NOTES:

- (IRC) Inside Reactor Containment
(ORC) Outside Reactor Containment
- The largest scale rotometer utilized for local leakage rate testing was 22.000 SCFH.
- Each electrical penetration was tested with a combined total leakage of 0.000 SCFH.

ATTACHMENT 4B
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| PENETRATION NO./SYSTEM | | TYPE TEST | EQUIPMENT/VALVES TESTED (NOTE 1) | | AS-FOUND LEAKAGE (SCFH)/DATE | AS-LEFT LEAKAGE (SCFH)/DATE | REMARKS |
|------------------------|-------------------------------------|-----------|----------------------------------|-------|------------------------------|-----------------------------|--|
| X-9 | RHR Pump Suction (Loop I/Hot Leg) | C | RC-V23 | (IRC) | 1.500/05-11-87 | 1.500/05-11-87 | WR#87W003689- Replaced packing, (RC-V23). WR#88W000535- Pre & Post MOVATS test, (RC-V23). |
| | | | | | 0.605/05-23-88 | 1.816/05-27-88 | |
| | | | RC-V24 | (IRC) | 0.039/07-15-87 | 0.039/07-15-87 | WR#87W005817- Replaced valve, (RC-V24). |
| X-10 | RHR Pump Suction (Loop IV/Hot Leg) | C | RC-V88 | (IRC) | 1.100/03-08-88 | 1.100/03-08-88 | WR#88W000748- Disassembled, inspected & cleaned valve internals, and re-assembled, (RC-V88). WR#87W005122- Disassembled, inspected & cleaned valve internals, replaced gaskets, and re-assembled, (RC-V89). |
| | | | | | 0.000/10-23-87 | 0.000/10-23-87 | |
| X-14 | Containment Spray | C | CBS-V12 | (IRC) | >22.000/05-16-88 | 1.620/06-02-88 | NOTE 2 , WR#88W002333- Ground & lapped disc and seat, (CBS-V12). |
| | | | | | 9.576/05-16-88 | 9.576/05-16-88 | |
| X-15 | Containment Spray | C | CBS-V18 | (IRC) | >22.000/05-10-88 | 7.580/06-02-88 | NOTE 2 , WR#88W002188- Ground & lapped disc and seat, (CBS-V18). |
| | | | | | 0.204/5-10-88 | 0.204/5-10-88 | |
| X-16 | Containment On-Line Purge (Exhaust) | C | COP-V3 COP-V4 | (IRC) | 2.600/04-03-87 | 2.600/04-03-87 | |
| | | | | (ORC) | (Combined) | (Combined) | |
| | | | | | 2.300/10-16-87 | 2.300/10-16-87 | |
| | | | | | (Combined) | (Combined) | |
| | | | | | 1.869/05-20-88 | 1.869/05-20-88 | |
| | | | | | (Combined) | (Combined) | |
| | | | | | 2.230/11-02-88 | 2.230/11-02-88 | |
| | | | | | (Combined) | (Combined) | |
| X-17 | Equipment Vent (RCDT) | C | VG-FV1712 VG-FV1661 | (IRC) | 0.000/05-04-88 | 0.000/05-04-88 | |
| | | | | (ORC) | 0.000/05-04-88 | 0.000/05-04-88 | |

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|-------------------------------|-------------------------------------|---|--|---|---|
| X-18 | Containment On-Line Purge (Supply) | C | COP-V2 (IRC) COP-V1 (ORC) | 1.200/04-03-87 (Combined) 0.800/10-16-87 (Combined) 0.304/05-20-88 (Combined) 1.100/11-2-88 (Combined) | 1.200/04-03-87 (Combined) 0.800/10-16-87 (Combined) 0.304/05-20-88 (Combined) 1.100/11-2-88 (Combined) |
| X-19 | Post Accident Monitoring Sample | C | SS-V273 (IRC) SS-FV2857 (ORC) | 0.000/05-19-88 5.544/05-19-88 | 0.000/05-19-88 5.544/05-19-88 |
| X-20 | PCCW Loop A (Supply) | C | CC-V57 (IRC) CC-V845 (IRC) CC-V168 (ORC) | 10.642/06-02-88 10.126/06-02-88 (Combined) | 10.642/06-02-88 10.126/06-02-88 (Combined) |
| X-21 | PCCW Loop A (Return) | C | CC-V121 (IRC) CC-V410 (IRC) CC-V122 (ORC) | 2.400/06-01-88 >22.000/06-01-88 (Combined) | 2.400/06-01-88 8.057/06-22-88 (Combined) |
| X-22 | PCCW Loop B (Return) | C | CC-V256 (IRC) CC-V474 (IRC) CC-V257 (ORC) | 4.000/05-03-88 0.000/05-03-88 (Combined) | 4.000/05-03-88 0.000/05-03-88 (Combined) |
| X-23 | PCCW Loop B (Supply) | C | CC-V176 (IRC) CC-V840 (IRC) CC-V175 (ORC) | 4.000/05-03-88 6.000/05-03-88 (Combined) | 4.000/05-03-88 6.000/05-03-88 (Combined) |
| X-32 | Equipment and Floor Drainage (RCDT) | C | WLD-V81 (IRC) WLD-V213 (IRC) WLD-V82 (ORC) | 0.000/05-05-88 0.000/05-05-88 (Combined) | 0.000/05-05-88 0.000/05-05-88 (Combined) |
| X-34 | Equipment and Floor Drainage (RCDT) | C | WLD-FV8331 (IRC) WLD-V209 (IRC) WLD-FV8330 (ORC) | 1.800/05-06-88 1.950/05-06-88 (Combined) | 1.800/05-06-88 1.950/05-06-88 (Combined) |

NOTE 2, WR #88W002610-
Disassembled, inspected &
cleaned valve internals,
replaced packing, seals, gaskets,
and re-assembled, (CC-V122).

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|---|------------------|--|---|--|---|
| X-35A Safety Injection (Test Line) | C | SI-V79 (IRC) SI-V247 (IRC) SI-V62 (ORC) SI-V157 (ORC) | 0.000/05-09-88 0.000/05-09-88 (Combined) | 0.000/05-09-88 0.000/05-09-88 (Combined) | |
| X-35B Reactor Coolant (PZR Stm/Liq Sample) | C | RC-FV2830 (IRC) RC-FV2831 (IRC) RC-V312 (IRC) RC-FV2840 (ORC) | 0.050/05-16-88 0.323/05-16-88 0.000/05-16-88 (Combined) | 0.050/05-16-88 0.323/05-16-88 0.000/05-16-88 (Combined) | |
| X-35C Reactor Coolant (RC Sample Loop I) | C | RC-FV2832 (IRC) RC-V314 (IRC) RC-FV2874 (ORC) RC-FV2894 (ORC) | 1.114/05-17-88 0.908/05-17-88 (Combined) | 1.114/05-17-88 0.908/05-17-88 (Combined) | |
| X-35D Reactor Coolant (RC Sample Loop III) | C | RC-FV2833 (IRC) RC-V337 (IRC) RC-FV2876 (ORC) RC-FV2896 (ORC) | 0.504/05-18-88 0.000/05-18-88 (Combined) | 0.504/05-18-88 0.000/05-18-88 (Combined) | |
| X-36A Demineralized Water | C | DM-V5 (IRC) DM-V18 (IRC) DM-V4 (ORC) | 11.088/05-19-88 6.043/07-26-88 0.202/05-19-88 (Combined) | 11.088/05-19-88 6.043/07-26-88 0.202/05-19-88 (Combined) | |
| X-36B Nitrogen Gas (HP) | C | NG-V14 (IRC) NG-V13 (ORC) | 0.202/05-23-88 0.202/05-23-88 0.000/05-23-88 0.000/05-23-88 | 0.202/05-23-88 0.202/12-15-88 0.000/05-23-88 0.202/12-15-88 | WR#88W005983- Replaced packing, (NG-V14). WR#88W005994- Replaced packing, (NG-V13). |
| X-36C Reactor Makeup Water | C | RMW-V29 (IRC) RMW-V30 (ORC) | 2.419/05-23-88 >22.000/05-23-88 11.000/06-14-88 >22.000/07-26-88 | 2.419/05-23-88 16.120/08-20-88 | NOTE 2 , WR#88W002455- Overhauled valve internals and replaced solenoid valve & air supply piping, (RMW-V30). |

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--|------------------|---|--|--|---|
| X-37A CVC (Letdown) | C | CS-V149 (IRC) | 0.100/02-09-87 | 0.100/02-09-87 | WR#87W001016- Disassembled and overhauled operator, (CS-V149). NOTE 2 , Flushed line. |
| | | CS-V150 (ORC) | >22.000/05-17-88 0.141/05-17-88 | 0.000/05-24-88 0.141/05-17-88 | |
| X-37B CVC (Excess Letdown) | C | CS-V168 (IRC) | 0.600/02-03-87 0.100/04-05-87 0.500/05-12-87 0.050/10-06-87 0.000/05-11-88 | 0.600/02-03-87 0.100/04-05-87 0.500/05-12-87 0.050/10-06-87 0.000/05-11-88 | WR#87W005421- Replaced packing, (CS-V168). WR#87W004277- Lapped disc and seat, (CS-V794). |
| | | CS-V794 (IRC) | 3.000/02-03-87 | 3.000/02-03-87 | |
| | | CS-V167 (ORC) | (Combined) | (Combined) | |
| | | | 0.100/04-05-87 (Combined) | 0.100/04-05-87 (Combined) | |
| | | | 0.500/05-12-87 (Combined) | 0.500/05-12-87 (Combined) | |
| | | | 0.050/10-06-87 (Combined) | 0.050/10-06-87 (Combined) | |
| | | | 0.000/05-11-88 (Combined) | 0.000/05-11-88 (Combined) | |
| X-38A Fire Protection | C | FP-V588 (IRC) | 1.010/05-18-88 | 1.010/05-18-88 | |
| | | FP-V592 (ORC) | 1.110/05-18-88 | 1.110/05-18-88 | |
| X-38B Combustible Gas Control | C | CGC-V46 (IRC) | >22.000/05-12-88 | 7.093/07-19-88 | NOTE 2 , WR#88W002248- Disassembled, inspected & cleaned valve internals, blue checked disc & seat, and re-assembled, (CGC-V46). |
| | | CGC-V43 (ORC) | 3.027/05-13-88 | 3.027/05-13-88 | |
| | | CGC-V44 (ORC) | (Combined) | (Combined) | |
| | | CGC-V45 (ORC) | | | |
| X-39 Spent Fuel Pool Cooling and Cleanup | C | SF-V86 (IRC) | 0.313/05-05-88 | 0.313/05-05-88 | |
| | | SF-V101 (IRC) | 0.906/05-05-88 | 0.906/05-05-88 | |
| | | SF-V87 (ORC) | (Combined) | (Combined) | |

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|-------------------------------|------------------|---|--|--|---|
| X-40A Nitrogen Gas (LP) | C | NG-FV4610 (IRC) NG-FV4609 (ORC) | >22.000/05-19-88 0.0.00/05-19-88 | 9.000/05-26-88 0.000/05-19-88 | NOTE 2, WR#88W002402- Disassembled, inspected & cleaned valve internals, replaced "O"-Rings, and re-assembled, (NG-FV4610). |
| X-40B PRT Sample | C | RC-FV2836 (IRC) RC-FV2837 (ORC) | 0.202/05-18-88 0.202/05-18-88 | 0.202/05-18-88 0.202/05-18-88 | |
| X-52A Air Sample Supply | C | CAH-FV6573 (IRC) CAH-FV6572 (ORC) | 0.000/05-10-88 0.000/05-10-88 | 0.000/05-10-88 0.000/05-10-88 | |
| X-52B Air Sample Return | C | CAH-V12 (IRC) CAH-FV6574 (ORC) | >22.000/05-11-88 0.383/05-11-88 | 0.000/07-05-88 0.383/05-11-88 | NOTE 2, WR#88W002220- Replaced valve, (CAH-V12). |
| X-67 Service Air | C | SA-V1042 (IRC) SA-V229 (ORC) | 0.000/05-04-88 2.020/05-04-88 | 0.000/05-04-88 2.020/05-04-88 | |
| X-71C Combustible Gas Control | C | CGC-V28 (IRC) CGC-V36 (ORC) | 0.203/06-13-88 0.506/06-13-88 | 0.203/6-13-88 0.506/6-13-88 | |
| X-71D Leak Detection | C | LD-V1 (IRC) LD-V2 (ORC) | 0.202/05-06-88 0.000/05-06-88 | 0.202/05-06-88 0.000/05-06-88 | |
| X-72C Combustible Gas Control | C | CGC-V14 (IRC) CGC-V15 (ORC) | 0.040/12-07-87 0.000/05-24-88 0.040/12-07-87 0.000/05-24-88 | 0.040/12-07-87 0.000/05-24-88 0.040/12-07-87 0.000/05-24-88 | WR#87W006654- Disassembled and overhauled operator, (CGC-V14). |

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--------------------------------|------------------|---|----------------|-------------------------------------|------------------------------------|----------------|
| X-HVAC-1 Containment Air Purge | C | CAP-V2 CAP-V1 | (IRC) (ORC) | 6.500/03-23-87 (Combined) | 6.500/03-23-87 (Combined) | |
| | | | | 6.500/04-03-87 (Combined) | 6.500/04-03-87 (Combined) | |
| | | | | 2.100/10-16-87 (Combined) | 2.100/10-16-87 (Combined) | |
| | | | | 1.944/05-13-88 (Combined) | 1.944/05-13-88 (Combined) | |
| | | | | 1.132/11-30-88 (Combined) | 1.132/11-30-88 (Combined) | |
| | | | | 2.266/12-06-88 (Combined) | 2.266/12-06-88 (Combined) | |
| X-HVAC-2 Containment Air Purge | C | CAP-V3 CAP-V4 | (IRC) (ORC) | 4.500/03-23-87 (Combined) | 4.500/03-23-87 (Combined) | |
| | | | | 1.700/04-03-87 (Combined) | 1.700/04-03-87 (Combined) | |
| | | | | 4.000/10-16-87 (Combined) | 4.000/10-16-87 (Combined) | |
| | | | | 2.847/05-13-88 (Combined) | 2.847/05-13-88 (Combined) | |
| | | | | 6.688/11-01-88 (Combined) | 6.688/11-01-88 (Combined) | |
| | | | | 5.140/11-28-88 (Combined) | 5.140/11-28-88 (Combined) | |
| | | | | 6.694/12-06-88 (Combined) | 6.694/12-06-88 (Combined) | |

ATTACHMENT 4B (Continued)
1987/1988 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>AS-LEFT LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--|------------------|---|--|------------------------------------|----------------|
| A 32 Fuel Transfer Tube Flange | B | "O"-Rings | 0.000/05-26-88 | 0.000/05-26-88 | |
| Fuel Transfer Tube/Containment Liner Bellows | B | Bellows | 0.000/07-26-88 | 0.000/07-26-88 | |
| Equipment Hatch | B | "O"-Rings | 0.000/06-13-88 | 0.000/06-13-88 | |
| Equipment Hatch Airlock | B | "O"-Rings 3.688/09-29-87 1.700/06-03-88 1.371/11-21-88 | 0.000/02-17-87 3.688/09-29-87 1.700/06-03-88 1.371/11-21-88 | 0.000/02-17-87 | |
| Personnel Airlock | B | "O"-Rings 0.417/05-27-88 1.690/11-22-88 | 3.110/05-08-87 0.417/05-27-88 1.690/11-22-88 | 3.110/05-08-87 | |
| Electrical Penetrations | B | "O"-Rings | 0.000/06-16-88 | 0.000/06-16-88 | NOTE 3 |

NOTES:

1. (IRC) Inside Reactor Containment
(ORC) Outside Reactor Containment
2. The largest scale rotometer utilized for local leakage rate testing was 22.000 SCFH.
3. Each electrical penetration was tested with a combined total leakage of 0.000 SCFH.

ATTACHMENT 4C
1986 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|-------------------------------|--|------------------|---|-------|-------------------------------------|--|
| X-9 | RHR Pump Suction (Loop I/Hot Leg) | C | RC-V23 | (IRC) | 2.400/07-19-86 | |
| | | | RC-V24 | (IRC) | 0.200/07-21-86 | |
| X-10 | RHR Pump Suction (Loop IV/Hot Leg) | C | RC-V88 | (IRC) | 2.650/07-19-86 | |
| | | | RC-V89 | (IRC) | 0.200/07-21-86 | |
| X-14 | Containment Spray | C | CBS-V12 | (IRC) | 4.000/05-12-86 | |
| | | | CBS-V11 | (ORC) | 0.750/05-12-86 | |
| X-15 | Containment Spray | C | CBS-V18 | (IRC) | 8.000/06-05-86 | |
| | | | CBS-V17 | (ORC) | 2.000/06-05-86 | |
| X-16 | Containment On-Line Purge (Exhaust) | C | COP-V3 | (IRC) | 2.050/05-22-86 | |
| | | | COP-V4 | (ORC) | (Combined) | |
| | | | | | 2.250/12-22-86 (Combined) | |
| X-17 | Equipment Vent (RCDT) | C | VG-FV1712 | (IRC) | 0.000/05-21-86 | |
| | | | VG-FV1661 | (ORC) | 0.000/05-21-86 | |
| X-18 | Containment On-Line Purge (Supply) | C | COP-V2 | (IRC) | 0.350/05-22-86 | |
| | | | COP-V1 | (ORC) | (Combined) | |
| | | | | | 0.400/12-22-86 (Combined) | |
| X-19 | Post Accident Monitoring Sample | C | SS-V273 | (IRC) | 0.020/07-25-86 | |
| | | | SS-FV2857 | (ORC) | 4.250/05-20-86 | |
| X-20 | PCCW Loop A (Supply) | C | CC-V57 | (IRC) | 0.400/06-19-86 | WR#86W008862- POSI-Seal replacement, (CC-V57). |
| | | | | | 0.700/10-30-86 | |
| | | | CC-V845 | (IRC) | 0.300/06-19-86 | |
| | | | CC-V168 | (ORC) | (Combined) | |
| | | | | | 2.200/10-24-86 (Combined) | |

ATTACHMENT 4C (Continued)
1986 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|---|------------------|---|--|---|
| X-21 PCCW Loop A (Return) | C | CC-V121 (IRC) CC-V410 (IRC) CC-V122 (ORC) 0.28/10-24-86 (Combined) | 1.500/05-20-86 1.000/10-24-86 10.750/05-20-86 (Combined) | WR#86W008862- POSI-Seal replacement, (CC-V121). |
| X-22 PCCW Loop B (Return) | C | CC-V256 (IRC) CC-V474 (IRC) CC-V257 (ORC) | 1.300/06-20-86 6.500/11-05-86 1.800/06-20-86 (Combined) 5.000/11-05-86 (Combined) | WR#86W008862- POSI-Seal replacement, (CC-V256). |
| X-23 PCCW Loop B (Supply) | C | CC-V176 (IRC) CC-V840 (IRC) CC-V175 (ORC) | 4.250/06-20-86 3.000/11-05-86 10.500/06-20-86 (Combined) 12.000/11-06-86 (Combined) | WR#86W008862- POSI-Seal replacement, (CC-V176). |
| X-32 Equipment and Floor Drainage (RCDT) | C | WLD-V81 (IRC) WLD-V213 (IRC) WLD-V82 (ORC) | 0.200/05-29-86 0.000/05-29-86 (Combined) | |
| X-34 Equipment and Floor Drainage (RC Sump) | C | WLD-FV8331 (IRC) WLD-V209 (IRC) WLD-FV8330 (ORC) | 0.000/05-29-86 0.000/05-29-86 (Combined) | |
| X-35A Safety Injection (Test Line) | C | SI-V70 (IRC) SI-V247 (IRC) SI-V62 (ORC) SI-V157 (ORC) | 0.000/05-28-86 0.050/05-28-86 (Combined) | |
| X-35B Reactor Coolant (PZR Stm/Liq Sample) | C | RC-FV2830 (IRC) RC-FV2831 (IRC) RC-V312 (IRC) RC-FV2840 (ORC) | 0.039/05-15-86 0.000/05-15-86 0.039/05-15-86 (Combined) | |

ATTACHMENT 4C (Continued)
1986 LOCAL LEAKAGE RATE TEST DATA

| PENETRATION NO./SYSTEM | TYPE TEST | EQUIPMENT/VALVES TESTED (NOTE 1) | | AS-FOUND LEAKAGE (SCFH)/DATE | REMARKS |
|---|------------------|---|-------|-------------------------------------|----------------|
| X-35C Reactor Coolant (RC Sample Loop I) | C | RC-FV2832 | (IRC) | 0.080/05-15-86 | |
| | | RC-V314 | (IRC) | 0.070/05-15-86 | |
| | | RC-FV2874 | (ORC) | (Combined) | |
| | | RC-FV2894 | (ORC) | | |
| X-35D Reactor Coolant (RC Sample Loop III) | C | RC-FV2833 | (IRC) | 0.050/05-15-86 | |
| | | RC-V337 | (IRC) | 0.050/05-15-86 | |
| | | RC-FV2876 | (ORC) | (Combined) | |
| | | RC-FV2896 | (ORC) | | |
| X-36A Demineralized Water | C | DM-V5 | (IRC) | 1.650/05-23-86 | |
| | | DM-V18 | (IRC) | 0.300/05-23-86 | |
| | | DM-V4 | (ORC) | (Combined) | |
| X-36B Nitrogen Gas (HP) | C | NG-V14 | (IRC) | 0.700/05-16-86 | |
| | | NG-V13 | (ORC) | 0.130/05-16-86 | |
| X-36C Reactor Makeup Water | C | RMW-V29 | (IRC) | 0.039/05-23-86 | |
| | | RMW-V30 | (ORC) | 0.190/05-23-86 | |
| X-37A CVC (Letdown) | C | CS-V149 | (IRC) | 0.060/05-14-86 | |
| | | CS-V150 | (ORC) | 0.090/05-14-86 | |
| X-37B CVC (Excess Letdown) | C | CS-V168 | (IRC) | 0.080/05-14-86 | |
| | | | | 2.000/12-04-86 | |
| | | CS-V794 | (IRC) | 0.040/05-14-86 | |
| | | CS-V167 | (ORC) | (Combined) | |
| | | | | 1.600/12-04-86 (Combined) | |
| X-38A Fire Protection | C | FP-V588 | (IRC) | 0.000/05-29-86 | |
| | | FP-V592 | (ORC) | 0.700/05-29-86 | |
| X-38B Combustible Gas Control | C | CGC-V46 | (IRC) | 8.000/05-13-86 | |
| | | CGC-V43 | (ORC) | 1.000/05-13-86 | |
| | | CGC-V44 | (ORC) | (Combined) | |
| | | CGC-V45 | (ORC) | | |

ATTACHMENT 4C (Continued)
1986 LOCAL LEAKAGE RATE TEST DATA

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|--|------------------|---|--|----------------|
| X-39 Spent Fuel Pool Cooling and Cleanup | C | SF-V86 (IRC) SF-V101 (IRC) SF-V87 (ORC) | 0.050/05-23-86 3.000/05-23-86 (Combined) | |
| X-40A Nitrogen Gas (LP) | C | NG-FV4610 (IRC) NG-FV4609 (ORC) | 3.000/05-21-86 0.039/05-21-86 | |
| X-40B PRT Sample | C | RC-FV2836 (IRC) RC-FV2837 (ORC) | 0.060/05-21-86 0.080/05-21-86 | |
| X-52A Air Sample Supply | C | CAH-FV6573 (IRC) CAH-FV6572 (ORC) | 0.070/05-16-86 0.050/05-16-86 | |
| X-52B Air Sample Return | C | CAH-V12 (IRC) CAH-FV6574 (ORC) | 0.070/05-16-86 0.170/05-16-86 | |
| X-67 Service Air | C | SA-V1042 (IRC) SA-V229 (ORC) | 0.110/05-16-86 0.450/05-16-86 | |
| X-71C Combustible Gas Control | C | CGC-V28 (IRC) CGC-V36 (ORC) | 1.500/05-13-86 1.850/05-13-86 | |
| X-71D Leak Detection | C | LD-V1 (IRC) LD-V2 (ORC) | 0.000/05-13-86 0.000/05-13-86 | |
| X-72C Combustible Gas Control | C | CGC-V14 (IRC) CGC-V15 (ORC) | 0.220/05-13-86 0.200/05-13-86 | |
| X-HVAC-1 Containment Air Purge | C | CAP-V2 (IRC) CAP-V1 (ORC) | 5.250/07-15-86 (Combined) 9.000/12-31-86 (Combined) | |
| X-HVAC-2 Containment Air Purge | C | CAP-V3 (IRC) CAP-V4 (ORC) | 9.500/05-19-86 (Combined) 5.000/12-07-86 (Combined) | |

**ATTACHMENT 4C (Continued)
1986 LOCAL LEAKAGE RATE TEST DATA**

| <u>PENETRATION NO./SYSTEM</u> | <u>TYPE TEST</u> | <u>EQUIPMENT/VALVES TESTED (NOTE 1)</u> | <u>AS-FOUND LEAKAGE (SCFH)/DATE</u> | <u>REMARKS</u> |
|---|------------------|---|-------------------------------------|----------------|
| X-62 Fuel Transfer Tube Flange | B | "O"-Rings | 0.000/10-15-86 0.000/11-12-86 | |
| Fuel Transfer Tube/Containment Line Bellows | B | Bellows | 0.000/06-18-86 | |
| Equipment Hatch | B | "O"-Rings | 0.000/06-23-86 | |
| Equipment Hatch Airlock | B | "O"-Rings | 2.250/11-19-86 | |
| Personnel Airlock | B | "O"-Rings | 0.944/12-05-86 | |
| Electrical Penetrations | B | "O"-Rings | 0.000/05-17-86 | NOTE 2 |

NOTES:

- (IRC) Inside Reactor Containment
(ORC) Outside Reactor Containment
- Each electrical penetration was tested with a combined total leakage of 0.000 SCFH.

ATTACHMENT 4D 1989 LOCAL LEAKAGE RATE SUMMARY ANALYSIS

The as-found LLRT, the repair, and the as-left LLRT for each boundary, or penetration, was reviewed. The net leakage contribution for each penetration was determined using the following criteria:

1. A leakage equivalent to the repair improvement achieved on each valve in the penetration is calculated.
2. The leakage equivalent is the difference between the as-found and the as-left leakage rates.
3. If a repair was not performed, a zero leakage equivalent is assessed to the valve.
4. The leakage equivalent assessed to a penetration may be reduced due to the safety-related service of the system associated with the penetration(s). Justification for this reduction will be provided with the analysis.
5. The net equivalent leakage for the penetration is the lowest of the inside or outside valve grouping (e.g., simulates minimum pathway leakage). The inside barrier may be inside the containment or the innermost barrier of the two barriers outside the containment. See Attachment 4A.
6. No repair improvement credit is taken if the as-left leakage rate is higher than the as-found leakage rate. Only those penetrations where repairs were performed are included in this attachment.
7. If the as-left leakage rate of a repaired valve is lower than the as-left leakage rate of a valve that didn't require a repair, then the penetration net equivalent leakage is the difference between the as-left leakage rates, or the repair improvement of the reworked valve.
8. For series valves tested together (i.e., combination test), the penetration net equivalent leakage is half the difference between the as-found and the as-left leakage rates when both valves are repaired at the same time (prior to performing another test).
9. When the summation of the leakage equivalent and the leakage measured during a successful Type A test is greater than L_a , the penetration(s) with excessive leakage(s) shall be analyzed under a failure analysis program.
10. All leakage rate values are in SCFH.

Conclusion:

Based on the above criteria and the values tabulated on Page 2 of 2 of this attachment, the resulting net equivalent leakage of 0.0011 percent/day, when added to the results of the ILRT (0.059 Mass Point UCL plus corrections), indicates that the as-found ILRT test result, determined by analysis, (0.0601) is below the plant's maximum allowable leakage rate of 0.15 percent/day.

ATTACHMENT 4D (Continued)
1989 LOCAL LEAKAGE RATE SUMMARY ANALYSIS

| <u>PEN. NO.</u> | <u>SYSTEM</u> | <u>INSIDE</u> | <u>OUTSIDE</u> | <u>NET</u> | <u>REMARKS</u> |
|---------------------|---|---------------|----------------|---------------------------|---|
| X-14 | Containment Spray | 0.000 | 3.161 | 3.161 | |
| X-15 | Containment Spray | 0.000 | - | 1.100 | As-Found data not obtained for outside barrier. |
| X-19 | Post Accident Monitoring Sample | 0.000 | 4.010 | 0.000 | |
| X-23 | PCCW Loop B (Supply) | 0.000 | 0.000 | 0.000 | |
| X-34 | Equipment and Floor Drainage (RC Sump) | >22.000 | 0.000 | 1.111 | |
| X-36A | Demineralized Water | 12.130 | 0.000 | 0.000 | |
| X-36C | Reactor Makeup Water | 0.000 | >22.000 | 0.000 | |
| X-37B | CVC (Excess Letdown) | 0.000 | 0.000 | 0.000 | |
| X-40A | Nitrogen Gas (LP) | >22.000 | 0.000 | 0.000 | |
| X-62 | Fuel Transfer Tube Flange | N/A | 0.000 | <u>0.000</u> | |
| TOTAL | | | | 5.372 SCFH 0.0011%/day | |