

REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST

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BRAIDWOOD NUCLEAR POWER STATION
UNIT 1

REACTOR CONTAINMENT BUILDING

INTEGRATED LEAK RATE TEST

BRAIDWOOD NUCLEAR POWER GENERATING STATION

Commonwealth Edison Company

UNIT 1

March 4th - April 22nd, 1994

NRC Docket Nos. 50-456 and 50-457

UNIT 1 ILRT FINAL REPORT

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INTRODUCTION

This report describes the Second Type A Containment Leakage Rate Test conducted after the initiation of commercial service for the Braidwood Nuclear Power Station Unit 1 containment building. This report is prepared pursuant to the requirements of 10CFR50 Appendix J, Section V.B.3. The test was conducted through the performance of Braidwood Procedure 1BWVS 6.1.2.a-1, "Unit 1 Primary Containment Type A Integrated Leakage Rate Test", dated March 4th through April 22nd, 1994. Local Leak Rate Testing required to determine the final values of containment leakage were performed between March 18th through April 20th, 1994. Also included in this report is a summary report of all the periodic Type B and C Local Leakage Rate Tests that were performed since the last Type A ILRT performed February 2nd through March 5th, 1991.

The Type A test was performed at the beginning of the refueling outage to test the containment in an "AS FOUND" condition without any repairs or adjustments.

The test was performed in accordance with 10CFR50 Appendix J, and the Braidwood Station Technical Specifications. The test method used was the 24 hour Mass Plot Method.

During pressurization leak checks were conducted in all penetration areas and both Equipment and Emergency hatches. Some leakage paths were identified and at the time considered not to be significant. Once containment test pressure was reached and temperature stable the computer results of the total containment leakage rate exceeded .75L_a.

The identified leakage paths were isolated one at a time and each isolation was given sufficient time for the containment to stabilize. Even with the identified leakage paths isolated the total containment leak rate still exceeded the .75L_a. It was noticed that a significant leak was coming from under the Emergency Hatch. Personnel were dispatched to investigate the leak and quantify it if possible. Looking at prints of the Emergency Hatch construction, it was observed that there are 6 vent plugs under the hatch that were used to pour cement under the hatch during construction, and after the cement was poured these vents were to be seal welded. It was determined to take data of the containment for Information Only to assess the total containment leakage and evaluate the data for reference. After data was taken the containment was depressurized and an internal inspection of the emergency hatch was performed. It was found that the vent plugs under the hatch did not have the required caps seal welded on them. It was determined to weld caps on the vent plugs and perform a local leak rate on each vent to quantify the leakage. Other liner checks were made to verify that there wasn't any other areas that could have caused the leak to migrate to the Emergency Hatch, none were found.

With all the identified leak paths returned to original line-up Containment Pressurization was re-started. During pressurization personnel were sent to all the penetration areas and the Equipment and Emergency Hatches to check for leaks. The area under the Emergency Hatch did not show signs of leakage during the second test pressurization after the vent caps had been installed. Some of the same leakage paths were isolated again once test pressure was reached and temperature was stable, time was given between each isolation for containment to stabilize. The leak rate still exceeded .75L_a. Initially it was thought that the observed leakage through the Service Air (SA) penetration was insignificant. Leakage through the SA penetration was significantly reduced by pressurizing between the SA containment isolation valves to slightly below containment test pressure. Once this task was accomplished the containment leak rate dropped to a value below .75L_a.

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The test was then successfully continued until completion. The isolated pathways were left isolated during the entire test. A Minimum Pathway As Found penalty was later assessed for each penetration isolated.

Using the Mass Plot Method the total primary containment leak rate was calculated to be less than the allowable leak rate of 0.075wt%/day (0.75L_a). The leakage rate was calculated to be 0.04499 wt%/day at a test pressure greater than 44.4 psig (P_a). The associated 95% Upper Confidence Limit (UCL) was 0.04574 wt%/day.

The verification induced leak rate test result was measured at 0.1284 wt%/day. This compares with the sum of the measured leak rate phase result (0.04499 wt%/day) and the induced leak of 7.7 scfm (0.09979 wt%/day). The composite leak rate of 0.1284 wt%/day lies within the allowable tolerance band of 0.14478 wt%/day \pm 0.025 wt%/day.

After the ILRT, during the refuel outage, LLRTs were performed. The results from some of these tests are added to the final ILRT total as the corrective leak rate. These are added for the systems that were not properly challenged during the ILRT. The AS FOUND minpath leakage for all corrections was 27.411 scfh or 0.00592 wt%/day. Adding this leakage to the ILRT 95% UCL yields a total of 0.0517 wt%/day which is less than the 0.075 wt%/day acceptance criteria.

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A. TEST PREPARATIONS

A.1 TYPE A TEST PROCEDURE

The ILRT was performed in accordance with Braidwood Procedure 1BWVS 6.1.2.a-1, Revision 2. Temporary Procedure Changes were made to the procedure to correct for typos, add or delete steps to ensure the proper execution of the test. The original intent of the surveillance was never changed.

A.2 TYPE A TEST PROGRAM AND DATA PROCESSING

The program used for this test is the Duke Power Integrated Leak Rate program Rev 1.75, software ID# GN09405. Containment parameters were acquired by the program every 5 minutes. This included data set number, time, temperature, relative humidity in degree F and absolute pressure readings. The data was sent to a personal computer via proper computer cables. The computer stored the data every time the data was collected and every 30 minutes the data was manually stored to disc. Personnel monitored the data either in graph or numerical form. Each data set was real time, this facilitated the identification of trends as they developed.

A.3 PRE-TEST CONTAINMENT STRUCTURAL EXAMINATION

Prior to the containment pressurization, a visual examination of all accessible interior and exterior surfaces was performed. The results of this inspection were compared to the findings of the structural inspection performed during A1R02. No degradation of the containment structure was noticed since the previous inspection was performed.

A.4 TYPE A TEST INSTRUMENTATION

a. Temperature

Thirty-one type Graftel smart sensor model 9202 thermistors were used through out the containment. All sensors were calibrated using standards traceable to the National Bureau of Standards (NBS).

b. Pressure

Two Paroscientific Precision model 760-100-A range 0-100 psia absolute pressure monitors. Calibrated using standards traceable to the National Bureau of Standards (NBS).

c. Relative Humidity

Nine Type Graftel smart sensor model 9203 relative humidity sensors were used through out the containment. All sensors were calibrated using standards traceable to the National Bureau of Standards (NBS).

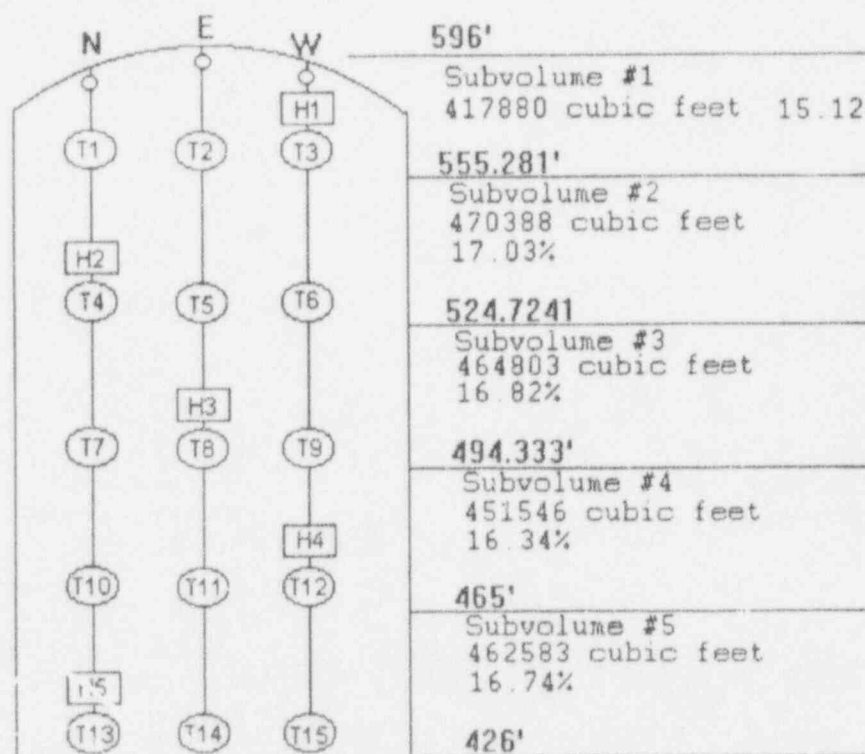
d. Flow

One flowmeter was used for the induced leakage rate tested. Type Fisher-Porter model 10A3555-S range 0-10.2 scfm. Calibrated using standards traceable to the National Bureau of Standards (NBS).

A.5 TYPE A TEST SUBVOLUME DETERMINATION

The containment is divided into 9 discrete subvolumes. Subvolume demarcation, size and weighting factors are indicated in Figures A.5.1 through A.5.3, also shown on the figures are the temperature and relative humidity sensors placed in containment. The pressure monitors and the flowmeter were installed in the auxiliary building.

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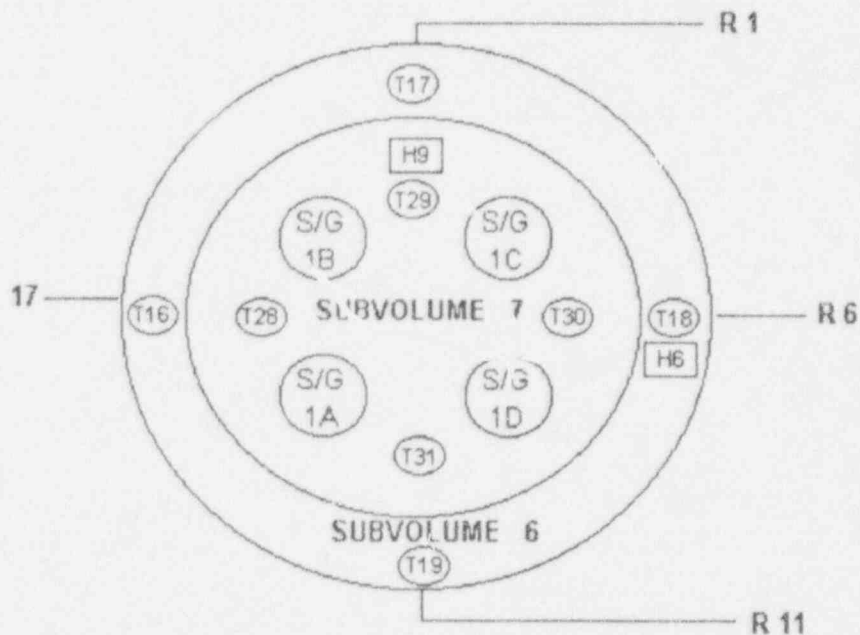
□ Relative humidity sensor (H)

○ Temperature sensor (T)

Figure A.5.1 Containment building sensor placement and subvolume identification from elevation 426' to top of containment.

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ELEVATION 398.5' TO 426'



Subvolume 6: 154567 cubic feet
5.60%

Subvolume 7: 123669 cubic feet
4.48%

- ☐ Relative humidity sensor (H)
- ☐ Temperature sensor (T)

Figure A.5.2 Containment building sensor placement and subvolume identification from elevation 398.5' to 426'.

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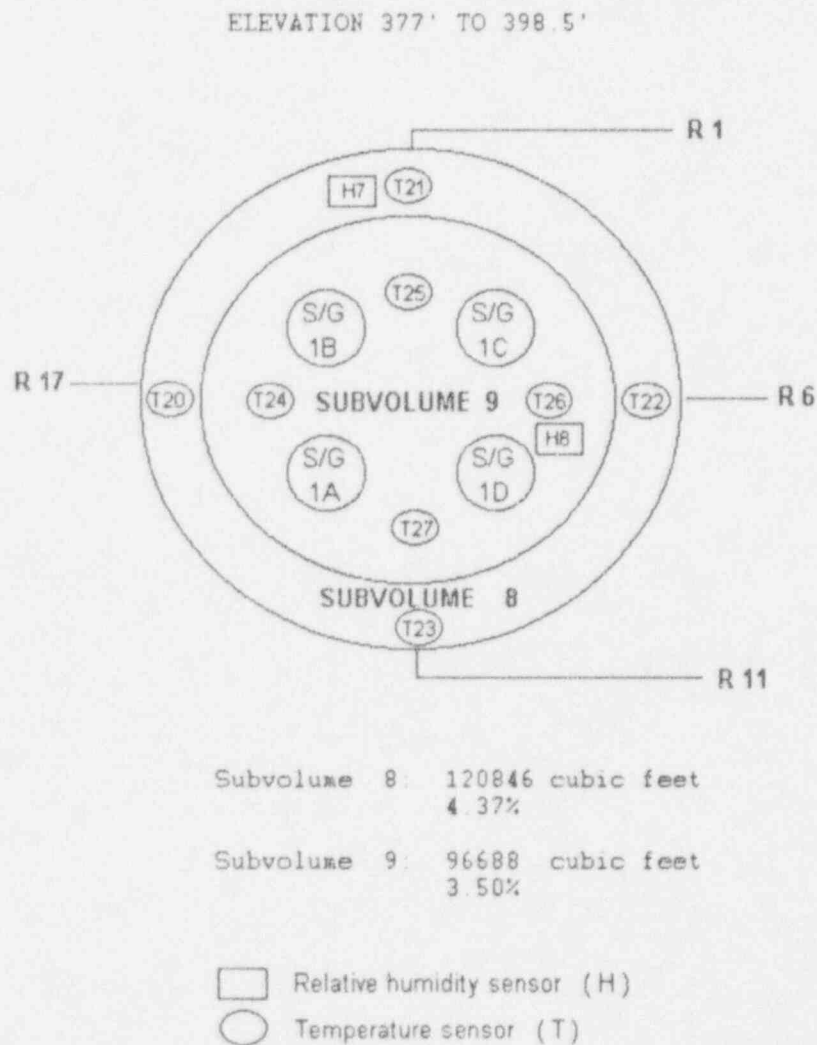


Figure A.5.3 Containment building sensor placement and subvolume identification from elevation 377' to 398.5.

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A.6 ILRT PLANT SYSTEM LINEUP

The valve and equipment lineups were detailed and specified by component with individual signoffs. The lineups ensured containment integrity conditions as close as possible to those which would exist after a design basis Loss of Coolant Accident (LOCA). Penetrations were challenged by draining and venting the piping associated with containment isolation valves.

A.7 TYPE A TEST PRESSURIZATION

To pressurize containment to full test pressure, a system of 11 diesel driven, oil free compressors were used. The compressors were located outside of the containment building on the northeast side. Pressurization was accomplished through a six inch header which penetrates containment at penetration P-4. Once the containment was pressurized, the pressurization header was isolated and vented.

B. TEST METHOD

B.1 STATISTICAL ANALYSIS TECHNIQUE

The absolute method of leak rate determination was used. As defined in ANSI N45.4-1972 the absolute method uses the ideal gas laws to calculate the measured leak rate. The inputs to the measured leak rate calculation include subvolume weighted containment temperature, subvolume weighted vapor pressure, and total absolute air pressure.

B.2 SUPPLEMENTAL VERIFICATION TEST (Induced Leak Rate)

The supplemental verification test is performed by intentionally inducing a controlled leak of a magnitude approximately equal to L_s (0.1 wt%/day). This induced leak is superimposed on the previously determined leak rate (Statistical Test) and compared with the leak rate calculated during the Statistical leak rate phase. The combined leak rate (calculated leak rate from the Statistical Test plus the induced leak rate) provides a basis for resolving any uncertainty associated with the calculated leak rate of the Statistical leak rate test. The acceptance criterion for the induced leak rate shall be within $\pm 0.25L_s$ of the sum of the statistical leak rate and the flowmeter induced leak rate.

B.3 INSTRUMENT ERROR ANALYSIS

An instrument error analysis was performed prior to the test and at the end of the measured leak rate and induced leak rate phases of the test. The analysis was performed in accordance with the definition of the Instrument Selection Guide (ISG) referenced in ANSI/ANS-56.8, 1987.

The ISG is used only to demonstrate the system's ability to measure the required parameters to calculate the containment leak rate. The ISG is not based on a statistical analysis of the leak rate calculation, and does not affect these calculations. The computed ISG is not added to the value of the calculated leak rate.

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C. SEQUENCE OF EVENTS

The following narrative describes the sequence of events associated with the ILRT. In order to give a more accurate presentation of the ILRT events, both pressurizations of containment are discussed.

C.1 PRETEST PREPARATION

DATE 3/4/94

1600 Initiated the start of 1BWVS 6.1.2.a-1. Activities include, verifying the prerequisites for start of test and insitue testing of all sensors to verify instrumentation is operating correctly. Other pretest miscellaneous activities which include compressor setup for the pressurization of containment, setting staging areas for equipment to be stored.

DATE 3/5/94

0800 Started hanging out-of-services for system lineups associated with data sheets listed in Appendix B of test procedure 1BWVS 6.1.2.a-1.

DATE 3/7/94

1015 Satisfactorily completed 1BWVS 6.1.3-1, "Visual inspection of the containment surfaces prior to the Type A Leak Test". No apparent changes have occurred in the visual appearance of the interior or exterior surfaces of the containment structure since the last performance of the test in February 1991 for A1R02.

C.2 CONTAINMENT PRESSURIZATION

DATE 3/10/94

0520 Valve lineups are complete except for RF penetration (reactor floor drains) couldn't stop the draining of system even with numerous valves other than what valves are listed in the system lineup isolated in order to drain system. The decision was made to isolate that penetration and to take a penalty for the isolated system and add it to the ILRT. All pre-pressurization checks complete. Commenced pressurization of containment.

0610 Stopped all compressors to repair drain fitting on one of the air dryers

0740 Restarted all compressors.

1055 Inspection of containment penetrations for leakage found the following at Approximately 27.8 psia:

- 1) Emergency hatch outer door seal is leaking slightly
- 2) Service Air penetration P-56 leaking slightly

1150 Operations was attempting to enhance the isolation on service air boundary valve 1SA155 to stop leakage from 1SA039 hoping that the leakage was coming from the system instead of containment.

1220 All compressors had to be shut down due to fuel consumption rate was higher than expected and compressors were starting to run out of fuel because fuel truck hasn't arrived to support test on time. Containment pressure approximately 36.4 psia.

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1255 All compressors back on line. Pressurization rate increasing same as before.

1845 Turned all compressors off, containment pressure 61.02 psia ambient pressure 14.51 psia. Vented between 1VQ011 and 0VQ002.

C.3 TEMPERATURE STABILIZATION

1925 Started temperature stabilization Data Set 141

2130 Found good size leak on VQ valves:
1VQ005B and 1VQ005C

2340 Decided to stroke the leaking VQ valves since AS FOUND data for LLRT was already taken. The sequence would be to open then close 1VQ005C then open and close 1VQ005B that way the line would be vented for the test. Leak seems to have stopped will check later.

0035 Leaks identified in curve wall area: Vent for 1PS9354B, balloon fills up immediately after being squeezed, vent for service air penetration balloon fills half way in about 5 seconds and vent for 1RY8028 has a slight leak. Decided to close vent valve for 1PS9354B.

0200 1VQ005B/C appears to be leaking again.

0310 Leakage has been observed to be coming from under the emergency hatch barrel. Crawled in to look at the emergency hatch. Found a leak between the hatch barrel and the concrete. The leak was about 6 to 10 inches long. The leak was at about the 6 o'clock position. Snoop was sprayed into the crack were the leak was coming from and large bubbles formed. Pictures were taken to evaluate the action to be taken. Also snooped the emergency hatch inner door along the bottom and small bubbles appeared.

0840 Contacted construction supervisor to remove air line from compressors to pressurization header and install blind flange.

0930 Blind flange installed on containment pressurization line.

1020 Checked for leaks in the penetration areas of curve wall, leaks found coming out of vent valves: 1SI005, 1CV063 and 1CS014A. All leaks were small.

1035 Operators were sent out to verify the following isolation valves for tight closure: 1SI8959, 1SI8963, 1CV8369, 1CV8399, 1CS004A and 1CS035A.

1155 Operators report back that valves are closed and some movement was made to the SI valves.

1450 Check VQ valves again decided to close the sparger vent valve to verify that the 1VQ003 wasn't leaking.

1540 After leaving the sparger valve closed for a few minutes, checked to see if there was any pressure buildup. Saw some pressure decided to leave sparger isolated, made note in APPENDIX N.

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1730 Decided to confine the leak under the hatch with DOW CORNING RTV and POLYCELL INSULATING FOAM to a small cross sectional area so the leakage could be measured. The emergency hatch outer door was opened and the leak rate through the penetration did not change. The leak under the emergency hatch was measured with a hot wire anemometer to determine an approximate leak rate, but due to the large cross sectional area the measurement wasn't accurate.

C.4 STATISTICAL LEAK RATE TEST

1800 A IODINE sampler was set-up to measure the amount of IODINE levels coming through the penetration boundary. Chemistry will have sample analyzed by 2000. Decided to start the statistical test for INFORMATION ONLY to get a relative leak rate to compare with the tests that will be conducted while repairs commence.

0345 Chemistry reported that there is IODINE in the area under the emergency hatch. With this information it was evident that the air was coming from containment.

C.5 INDUCED LEAK RATE TEST

DATE 3/12/94

0000 Started INDUCE leak rate for INFORMATION ONLY to verify that the instruments being used are operating correctly.

C.6 DEPRESSURIZATION AND POST ACTIVITIES

0435 Began to depressurize containment.
The following systems were released from the test line-ups to aid in any repairs: Service air, Instrument air and Containment ventilation mini-flow.

DATE 3/13/94

1800 Exited the ILRT procedure with all the system line-ups in the proper position for the ILRT test to continue after immediate repairs. In brief on the events that caused the ILRT to stop. The test was stopped due to a large leak under the emergency hatch. In the investigation of the cause of the leak, it was found that under the barrel plate of the hatch there are 6 bore hole pipes which were used to pour concrete under the hatch and after the concrete was poured the pipe ends were to be welded closed. They were found not to be welded and with the settling of the unit deterioration started to occur.

Tests are being conducted on all weld chase channels on the liner of the containment to check for other causes of leaks. Vacuum boxes were brought in to check marked areas of the liner for leaks and the pipes under the hatch are in the process of being welded closed.

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C.1 PRETEST PREPARATIONS (for second test)

DATE 3/14/94

- 1200 Began RE-entry into the ILRT following the exit of procedure 1BwVS 6.1.2.a-1 started 3/4/94. Repairs are in progress on the leaking concrete vent pipes found under the hatch. Following the welding of the vent pipes, an LLRT will be performed on the vents in an attempt to quantify the leakage.
- 1300 Notified operations to prepare to restore the penetrations released to aid in the repairs of the unit back to the ILRT final lineup status. The following penetrations were to be restored: Service air, Instrument air and Containment ventilation mini-flow. RF penetration was isolated and drained this time, now all penetrations are lined up.
- 1445 Notified operations to VERIFY/OPEN 1VQ011 and 1VQ012, which were closed by step F.3.10.c of 1BwVS 6.1.2.a-1 started 3/4/94. Checked computer to verify all instruments are operable, verified compressors are all connected and full of fuel.
- 1500 Service air, Instrument air and VQ mini-flow was restored to the ILRT line up positions.

C.2 CONTAINMENT PRESSURIZATION (second press-up)

- 2030 Unit 1 containment pressurization began with 10 of the 11 compressors loaded, the 11th had a broken fan clutch and was not able to run. Computer points T0630 and T0631 are unavailable. Residual Heat (RH) temperature is being monitored with 1TR-612 temperature recorder on the Main Control Board.
- 2350 Observed a leak at the emergency hatch outer door seal around the bottom, will continue to trend to see if it gets worse.

DATE 3/15/94

- 0040 The following penetrations were observed to have leaks:
Vent valve for 1FC010 shows a significant leak (P-57), Vent valve for 1CC9414 slightly (P-21), All PS vent valves on 377' 1PS9354A/B, 1PS9355A/B, 1PS9356A/B and 1PS9357A/B (P-70) fairly good leaks, Vent valve for 1CV8100 slight leak and vent valve for 1RY8033 slight leak. No action was taken to isolate these valves at this point.
- 0100 Snooped equipment hatch door seals found very small leak, nothing to worry about. Checked under the emergency hatch where the leak was before, found nothing, checked door seals, outer door was leaking around the whole perimeter.
- 0350 Penetration P-56 vent valve upstream of 1SA032 found to be leaking.
- 0430 Emergency hatch still shows no sign of leaks under the hatch.
- 0920 Reached containment test pressure of 60.8 psia. Shutdown all compressors and vented containment pressurization line.

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C.3 TEMPERATURE STABILIZATION

0956 Started temperature stabilization at DATA SET 90.

1405 Closed inner emergency hatch door and opened outer door due to outer door was leaking excessively. Checked shaft seals, no leaks.

1500 Requested that Service air penetration P-56 be isolated by closing vent valve 1SA039, due to high leakage.

1520 Suggest that a gauge be installed on vent valve 1SA039 to determine the pressure in the penetration. This allowed us to determine if the leak was from containment or the Main Service air header. Pressure was found to be 46 psig. This verified the penetration was leaking from containment. Suggested that the Main Service air header to Unit 1 Auxiliary Building be Isolated.

1720 Service air to Unit 1 Aux. Building was isolated and vented.

2015 Service air penetration P-56 was pressurized to 44 psig. Monitored regularly with Heise gauge QA# 033912br calibrated 3/7/94.

2100 Closed and capped the following valves: 1PS131 isolating 1PS9354A/B, 1PS133 isolating 1PS9355A/B, 1PS135 isolating 1PS9356A/B, 1PS137 isolating 1PS9357A/B and 1FC032 isolating 1FC009 and 1FC010. All known leaking penetrations are isolated.

DATE 3/16/94

0000 Reopened the following valves to determine the impact on the isolating service air: 1PS131, 1PS133, 1PS135, 1PS137 and 1FC032. 1PS133 and 1PS137 were identified as leakers. The reason for reopening these valves was that there wasn't ample time to determine if service air was indeed the source of the major leak.

0205 Determined that leak rate was still excessive and isolated 1PS133

0240 Leak rate still excessive isolated 1PS137

0300 Checked emergency and equipment hatch seals for leaks found none.

0400 Checked VQ valves for leaks found none. The cap was installed on the mini flow exhaust valves.

0550 Found leak by the containment pressurization line at the spacer flange, and secured leak.

C.4 STATISTICAL LEAK RATE TEST

0640 Started statistical leak rate test with data set 338 timed at 0637

0800 Decided to log the pressure in the pressurized service air penetration to verify that pressure was below test pressure in containment. Refer to page 14 for log readings. To help find leaks that could possibly be in the liner a tracer gas will be injected into containment and samples will be taken with large garbage bags to determine the concentration in the area.

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1350 Injected SF6 into containment via vent/test valve 1VQ009 to look for leaks that can't be found. Samples will be taken at 5, 15, and 30 minutes after the injection. The injection of SF6 will last approximately 5 seconds. Samples will be taken from the following areas: Electrical penetration general areas, Curve wall general area 401 and 364 elevations, A,B,C and D MSIV rooms, Emergency hatch and Equipment hatch general 426 elevation area, containment chiller rooms, and the tendon tunnels. A sampler was set up at the 401 elevation of the Auxiliary Building. A special test procedure, SPP# 94-011, was initiated for this evolution.

1430 Found traces of SF6 in B and C MSIV rooms, Zone 4 electrical penetration, equipment hatch had a high concentration of SF6 leakage. Snooped the equipment hatch for leaks didn't find anything at any of the seals, but when snooped the liner where the barrel meets the concrete at the 3 o'clock position found large leak. Will snoop area at NOP/NOT to see if the leak is only at high pressure.

1515 Snooping the Zone 4 electrical penetration to locate the leak found with the tracer gas. Couldn't find leak. Determined that the tracer gas at the penetration area was caused by a draft in the door leading to the equipment hatch where a large leak was detected.

1530 In the special procedure for the injection of a tracer gas it has you run the RCFC's in low speed for proper mixture before or during depressurization. After some investigation, decided not to start the RCFC's for mixture at a pressure greater than 20 psig. The fans would trip on overcurrent at this pressure. The reason has to do with density. Currently containment is at 46 psig of air. The design for the RCFC's is for 46 psig of steam. The density of air is almost twice as much of steam. Therefore the mass flow through the fan will double causing the fan motor to draw more current than design, causing the fan motor to trip.

1700 Continued to monitor the MASS PLOT LEAK 24 hr TEST. NO other incidents occurring, scheduled to finish test at 0630 on 3/17/94.

DATE 3/17/94

0709 Ended statistical leak rate test at data step 632.

C.5 INDUCE LEAK RATE TEST (second press-up)

0724 Started the Induced Test for the 1 hour stabilization. Data step 635

0824 Started Induced Test, data step 647

1230 Induced Test is over, data step 696

C.6 DE-PRESSURIZATION AND POST ACTIVITIES

1300 Rad protection took containment air sample to start depressurization.

1500 Started de-pressurization of containment.

Last entry into log.

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Service Air penetration pressure log

Time	Penetration P-56 Pressure	Time	Penetration P-56 Pressure
0800	43.8	000	43.8
0900	43.8	0100	43.8
1000	43.8	0200	43.8
1100	43.8	0300	43.8
1200	43.8	0400	43.8
1300	43.8	0500	43.8
1400	43.8	0600	43.8
1500	43.8		
1600	43.8		
1700	43.8		
1800	Reading missed		
1900	43.8		
2000	43.8		
2100	43.8		
2200	43.8		
2300	43.8		

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D. ILRT DATA

A temperature survey of the containment was performed prior to the pressurization of containment. Each subvolume was surveyed in at least one location with a maximum of three taken per subvolume.

<u>SUBVOLUME NUMBER</u>	<u>OBSERVED TEMPERATURE</u>	
1	74.7	75.1
2	75.1	75.0
3	74.6	74.6
4	75.1	75.1
5	75.0	75.0
6	75.5	76.0
7	76.8	77.0
8	71.5	71.8
9	71.6	72.0

The following sections present computer data for the three main sections of the ILRT.

D.1 TEMPERATURE STABILIZATION DATA

The temperature stabilization phase demonstrated proper temperature stability prior to the beginning of the test. The thermal parameters are graphically shown in Figures D.1.1 and D.1.2. A summary of the computer data can be found in Appendix C.

D.2 STATISTICAL LEAK RATE TEST DATA

Graphic results of the measured leak rate test are found in Figures D.2.1 through D.2.6. A summary of the computed data using the MASS PLOT METHOD can be found in Appendix D.

D.3 INDUCED LEAK RATE TEST DATA

The calculated leak rate and target value leak rates associated with the induced leakage test are shown in Figure D.3.1. Containment conditions during this phase of the test are shown in Figures D.3.2 through D.3.6. A summary of the Induced Leak Rate data of the ILRT can be found in Appendix E.

UNIT 1 ILRT FINAL REPORT

Average Temperature & Average Pressure
Braidwood Unit 1
A1R04

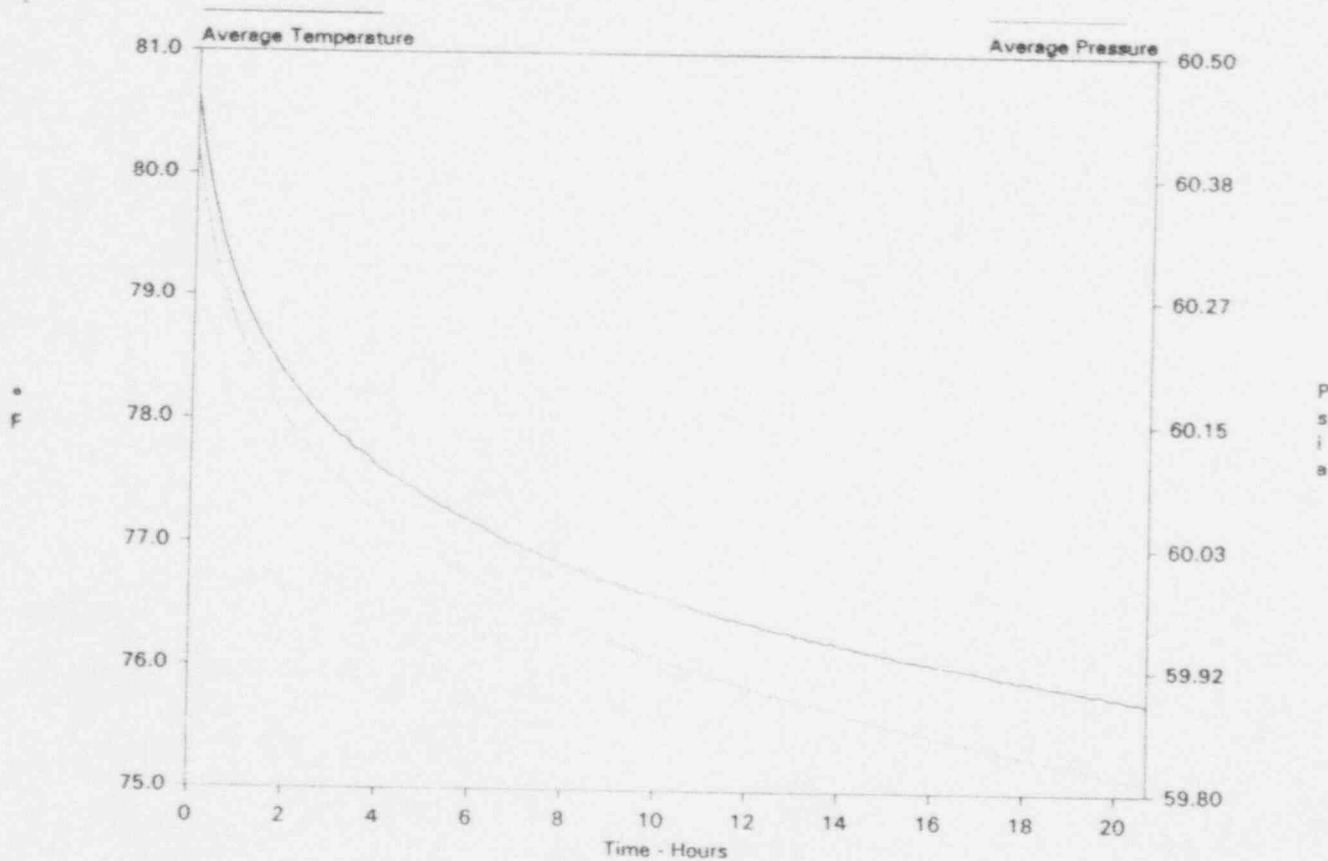


Figure D.1.1 Temperature stabilization parameters for Temperature sensors with respect to containment pressure

UNIT 1 ILRT FINAL REPORT

Average Dew Point & Average Pressure
Braidwood Unit 1
A1R04

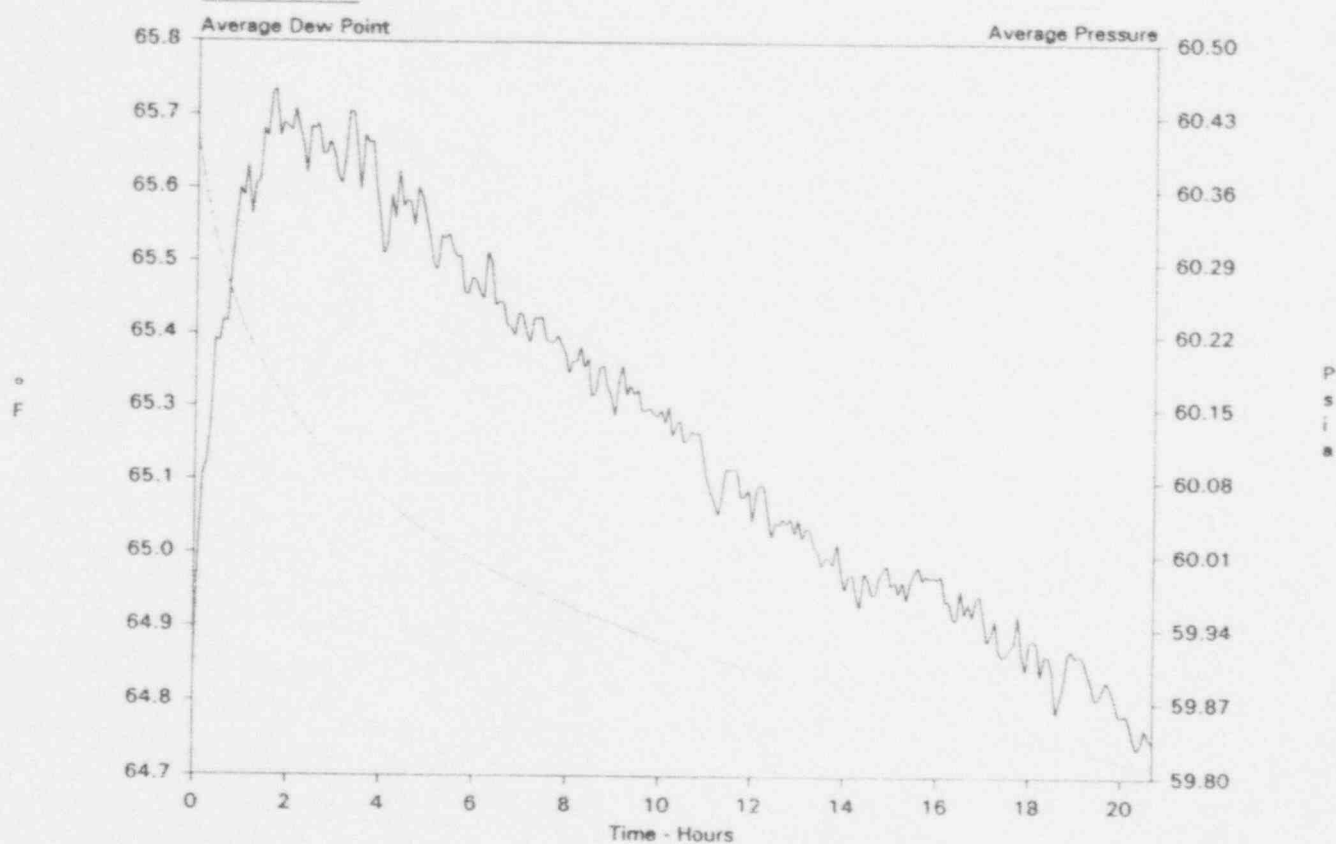


Figure D.1.2 Temperature stabilization parameters for RH sensors with respect to containment pressure

UNIT 1 ILRT FINAL REPORT

Containment Mass
Braidwood Unit 1
A1R04

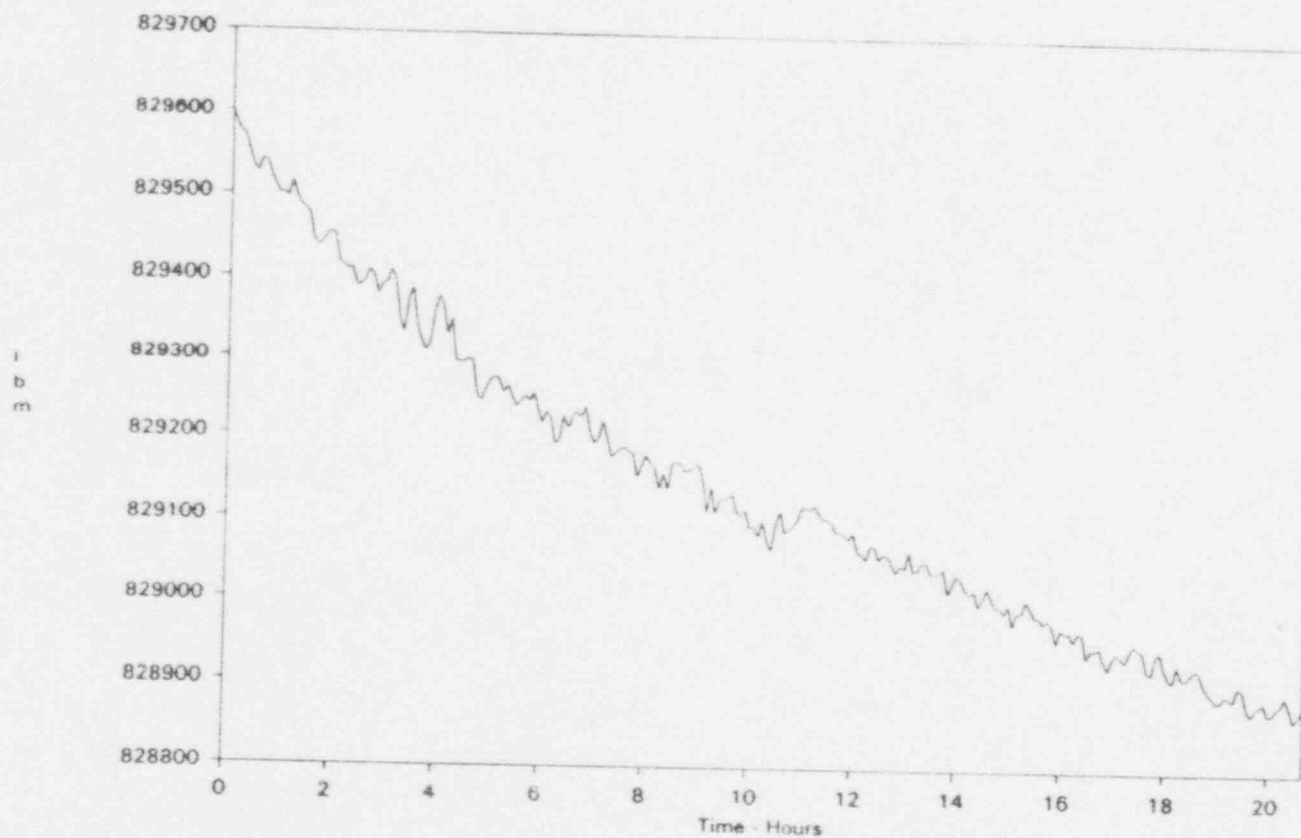


Figure D.1.3 Temperature stabilization parameter for Containment Mass with respect to containment pressure

UNIT 1 ILRT FINAL REPORT

Mass Point Leak & Mass Point Leak at UCL
Braidwood Unit 1
A1R04

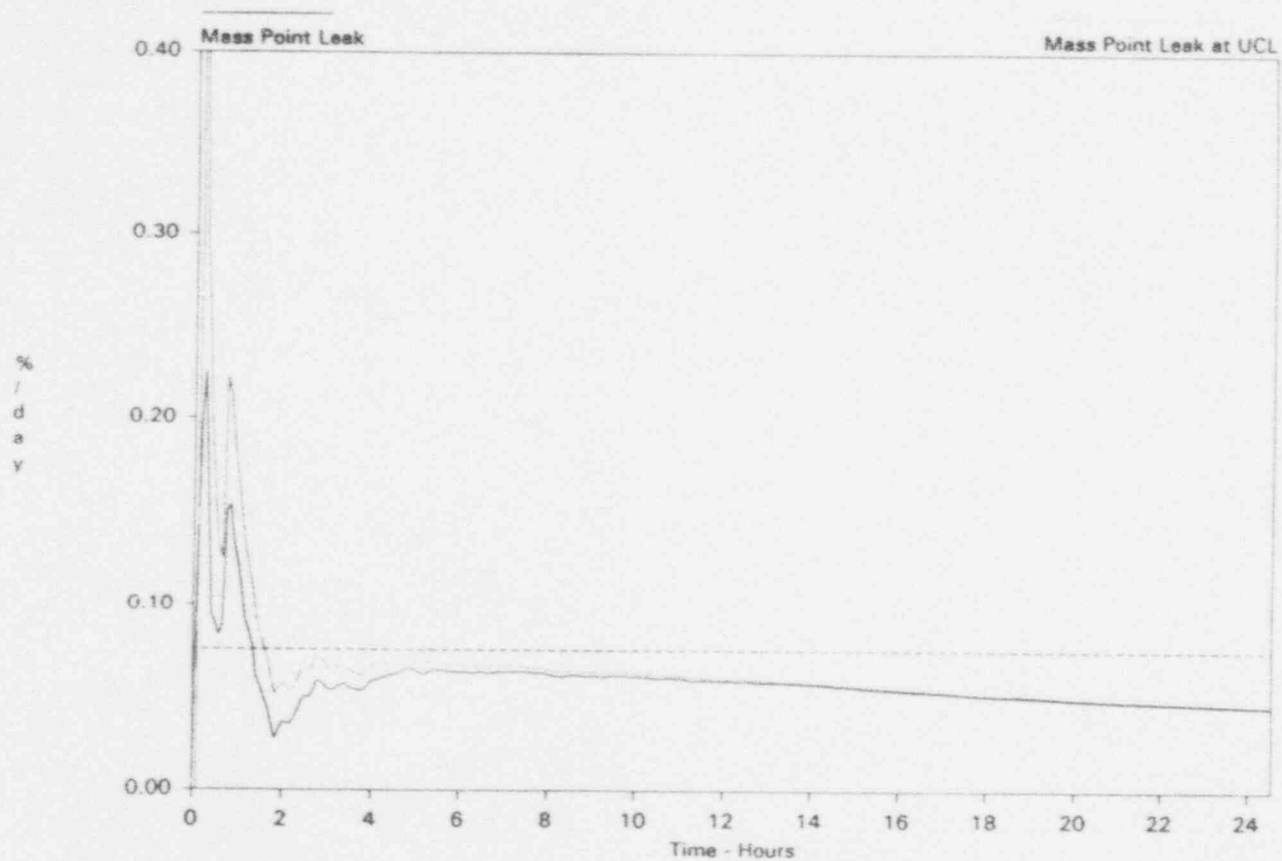


Figure D.2.1 Statistical leak rate Mass point leak and Mass Point leak at UCL

UNIT 1 ILRT FINAL REPORT

Containment Mass
Braidwood Unit 1
A1R04

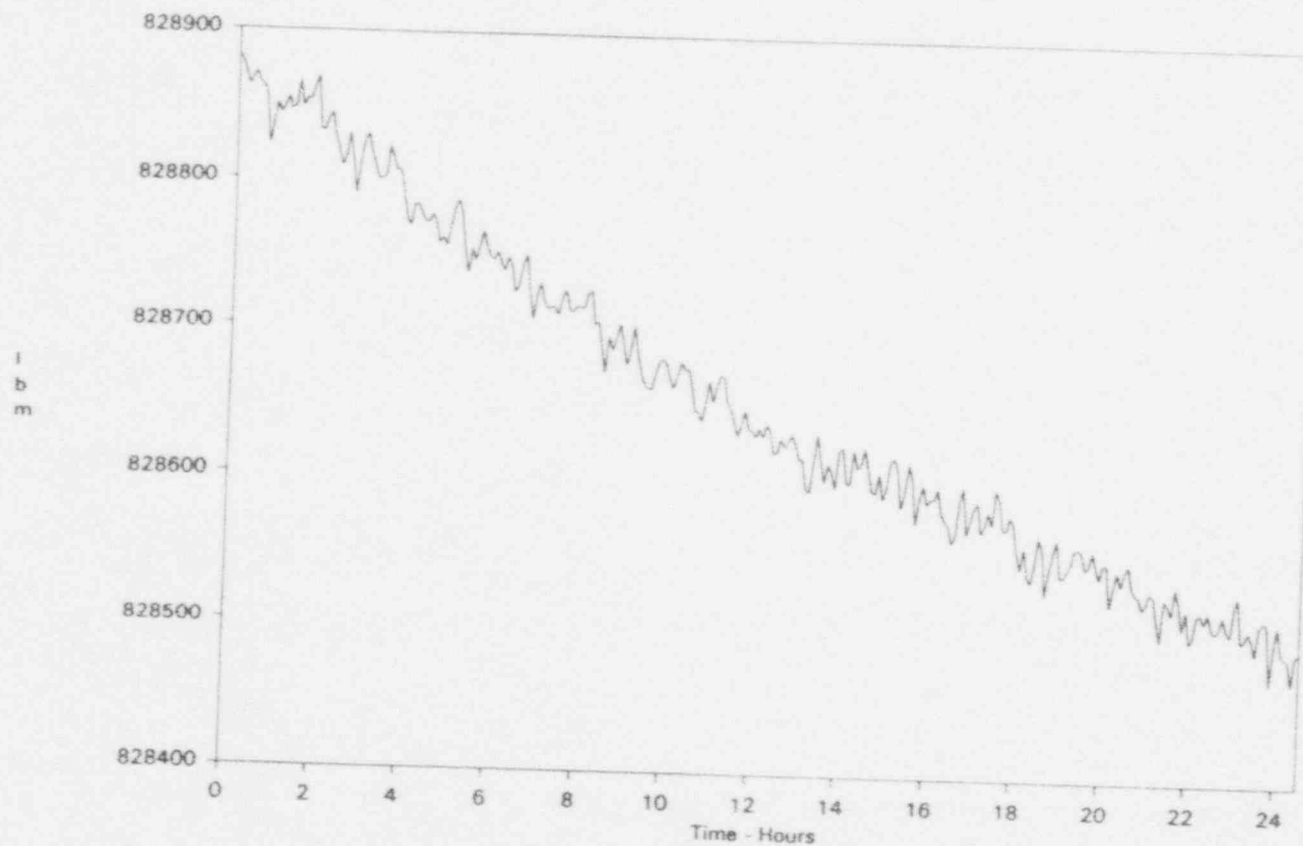


Figure D.2.2 Containment Mass during the statistical leak rate

UNIT 1 ILRT FINAL REPORT

Average Pressure
Braidwood Unit 1
A1R04

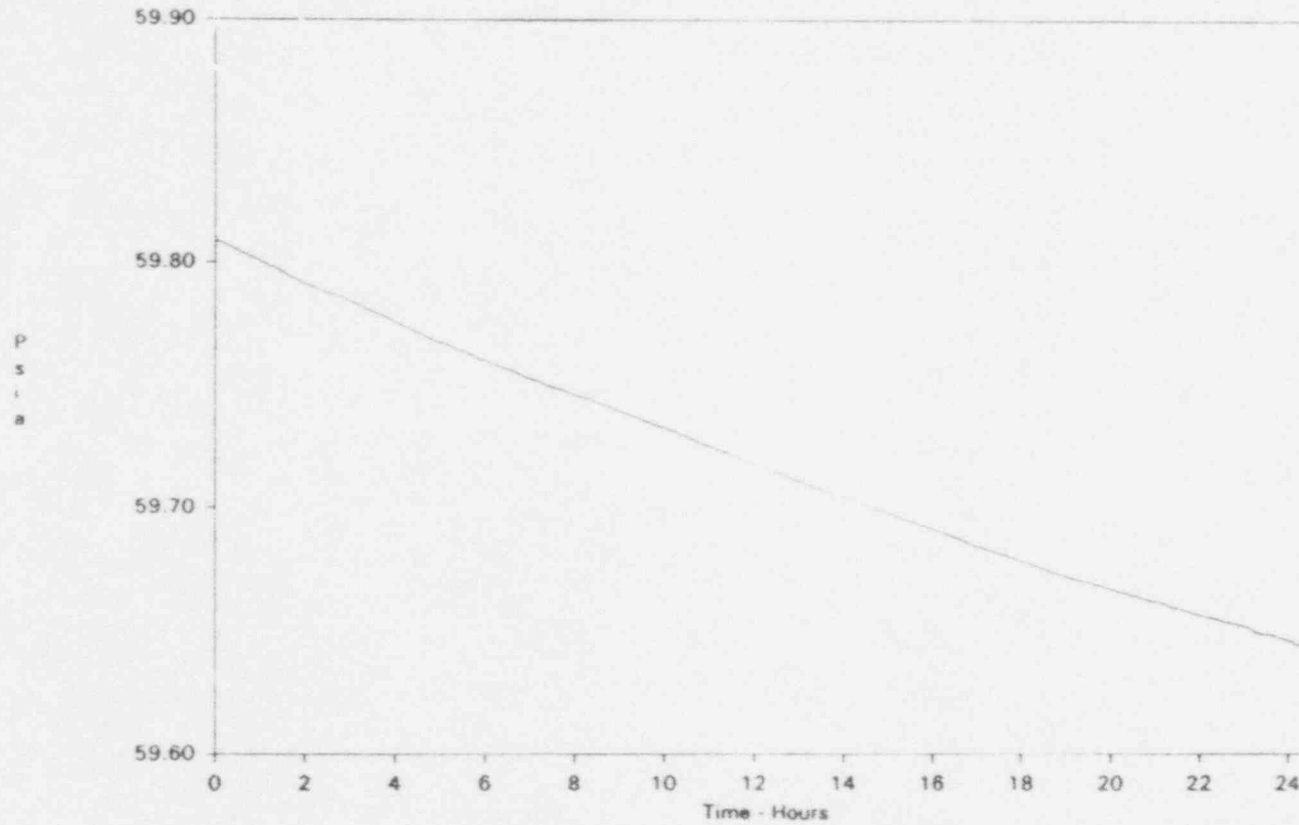


Figure D.2.3 Containment average pressure during the statistical leak rate

UNIT 1 ILRT FINAL REPORT

Average Temperature
Braidwood Unit 1
A1R04

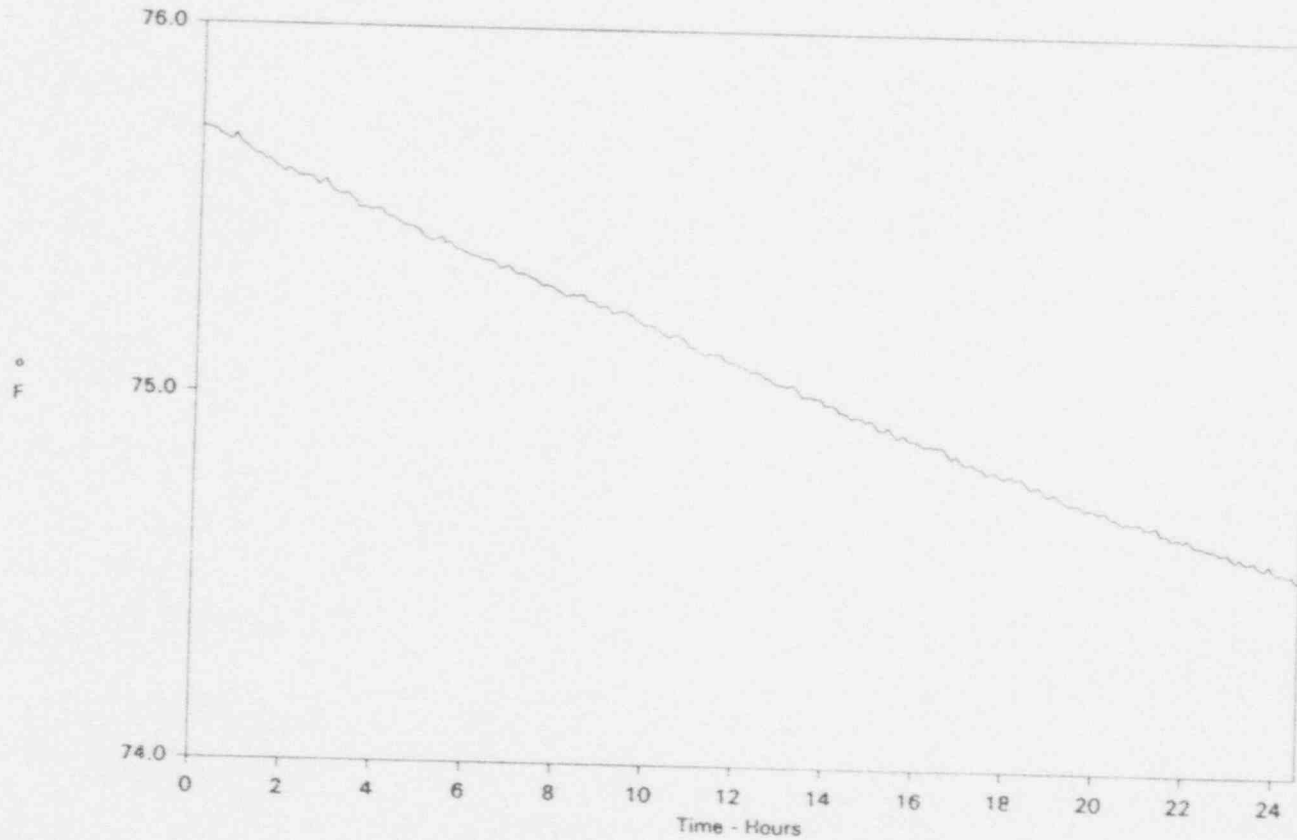


Figure D.2.4 Containment average temperature during the statistical leak rate

UNIT 1 ILRT FINAL REPORT

Average Dew Point
Braidwood Unit 1
A1R04

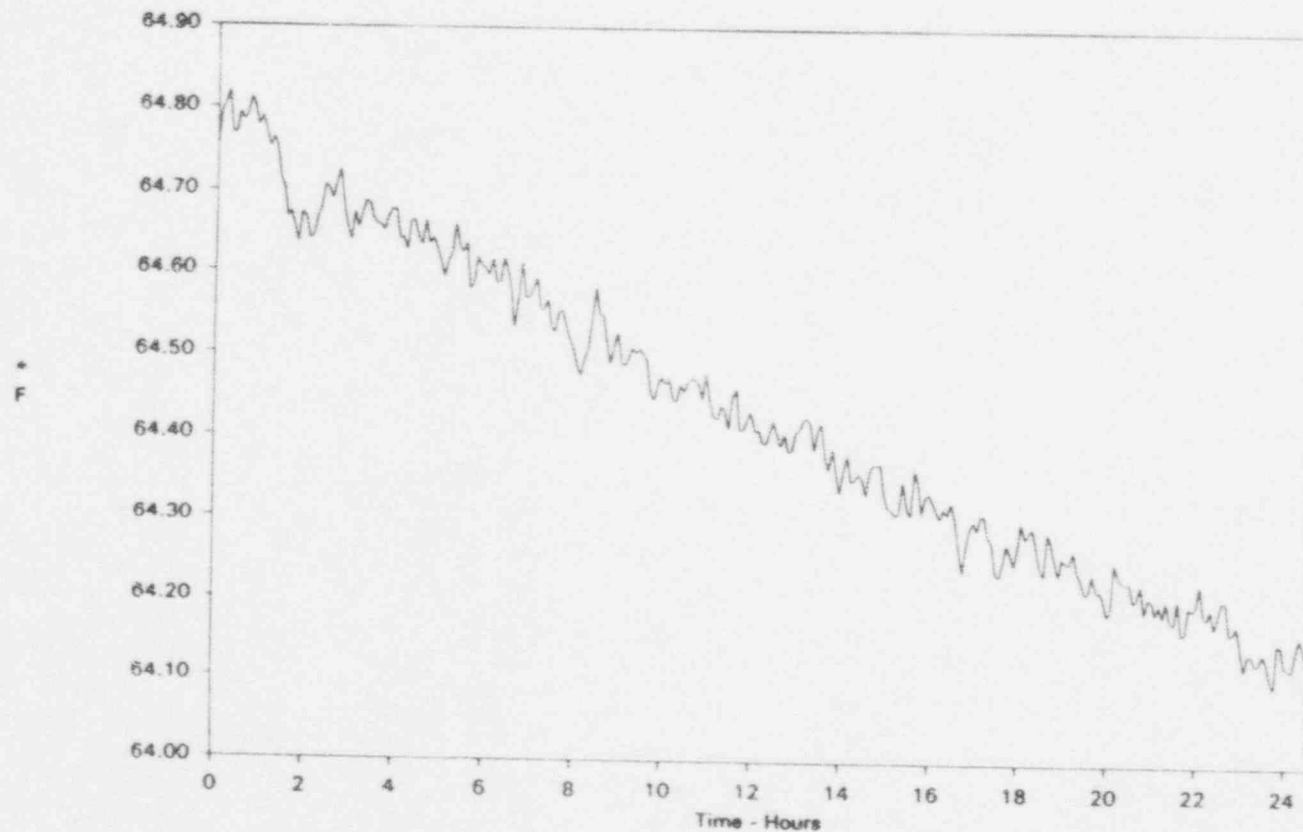


Figure D.2 5 Containment average dew point during the statistical leak rate

UNIT 1 ILRT FINAL REPORT

Average Vapor Pressure
Braidwood Unit 1
AlR04

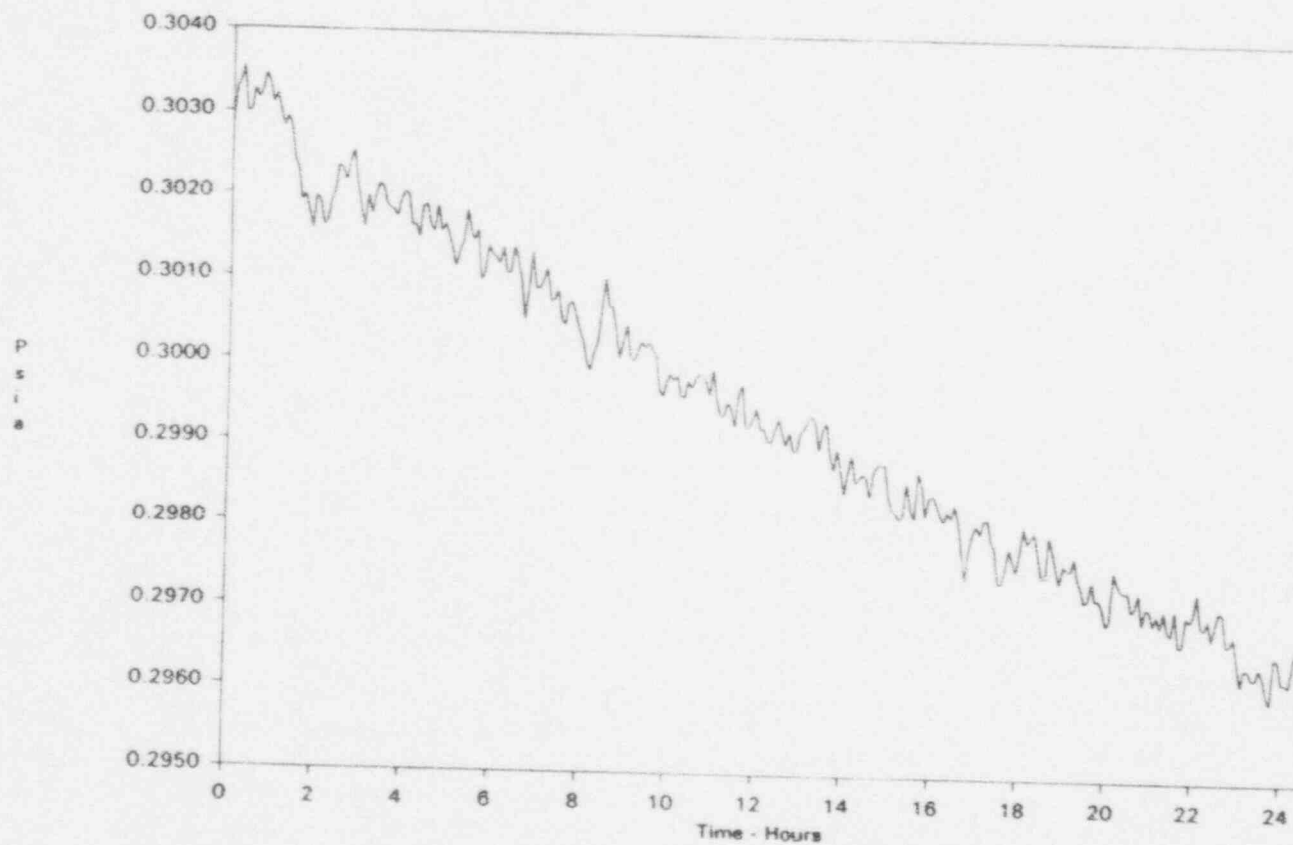


Figure D.2.6 Containment average vapor pressure during the statistical leak rate

UNIT 1 ILRT FINAL REPORT

Mass Point Leak
Braidwood Unit 1
A1R04

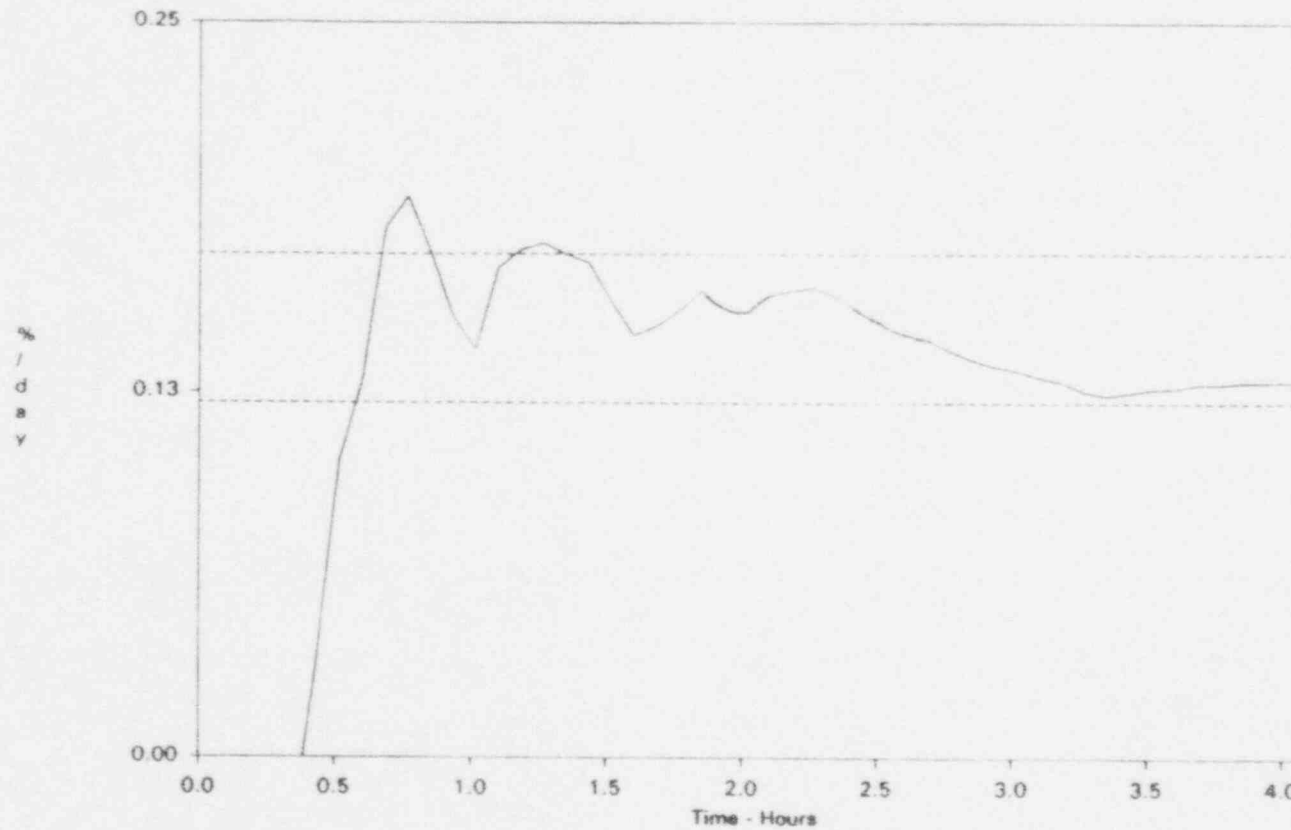


Figure D.3.1 Verification test Mass Point leak
(Induced test)

UNIT 1 ILRT FINAL REPORT

Containment Mass
Braidwood Unit 1
A1R04

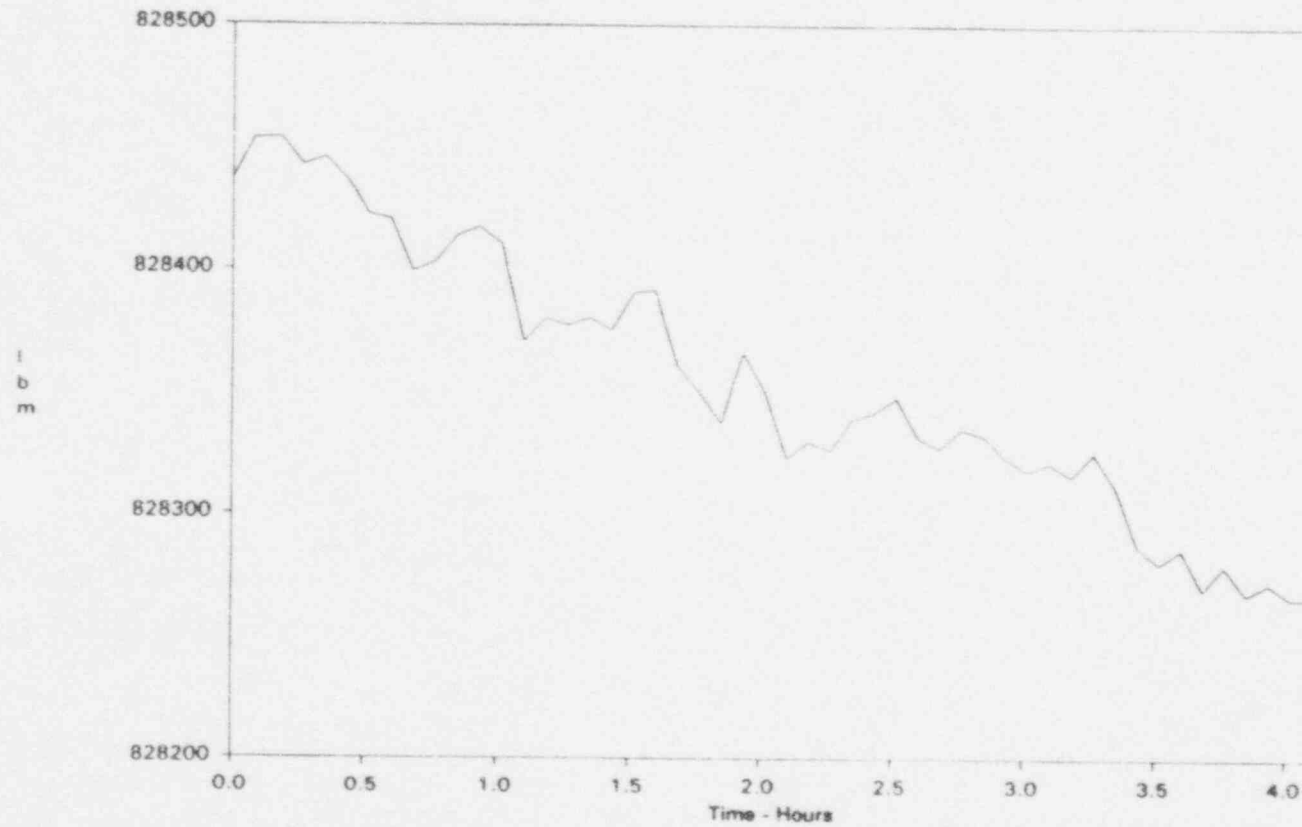


Figure D.3.2 Containment Mass during the induced leak rate

UNIT 1 ILRT FINAL REPORT

Average Pressure
Braidwood Unit 1
A1R04

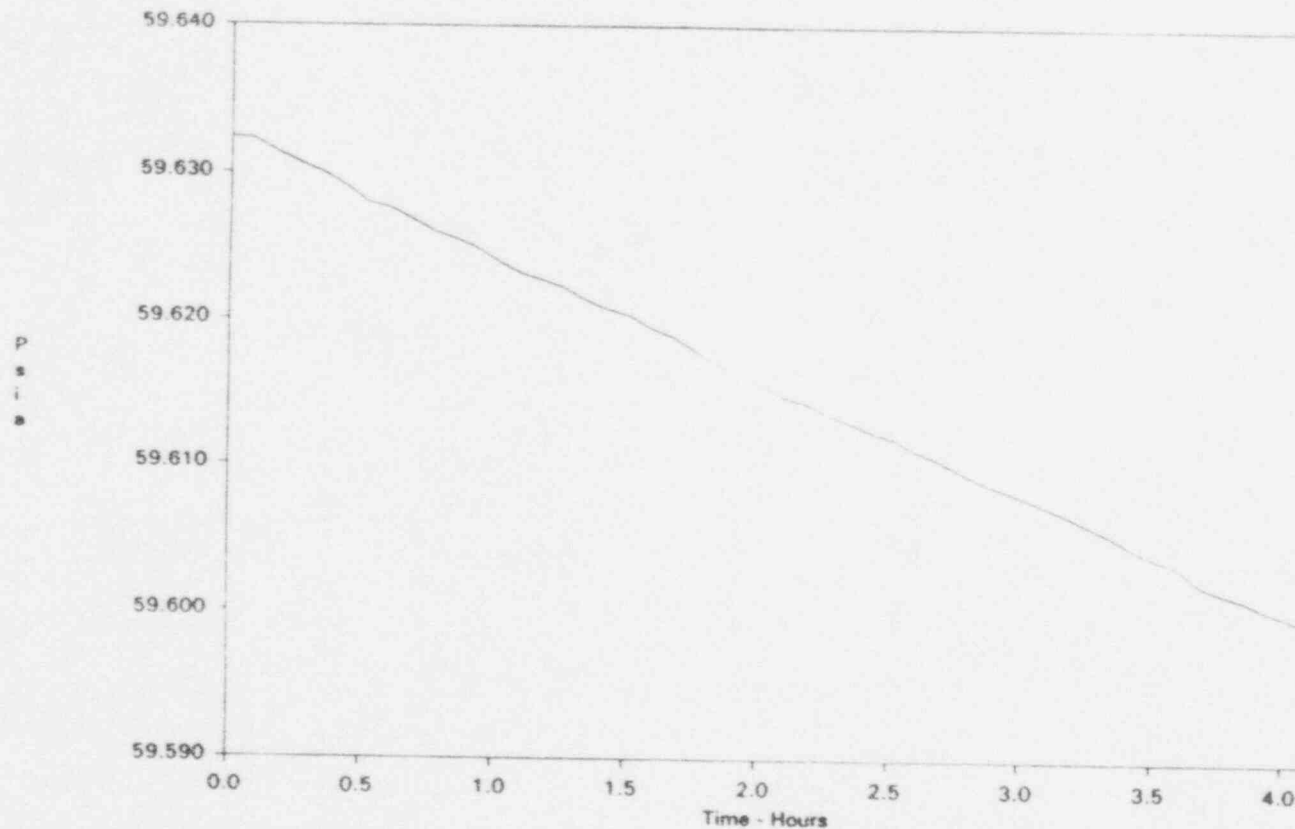


Figure D.3.3 Containment average Pressure during the induced leak rate

UNIT 1 ILRT FINAL REPORT

Average Temperature
Braidwood Unit 1
A1R04

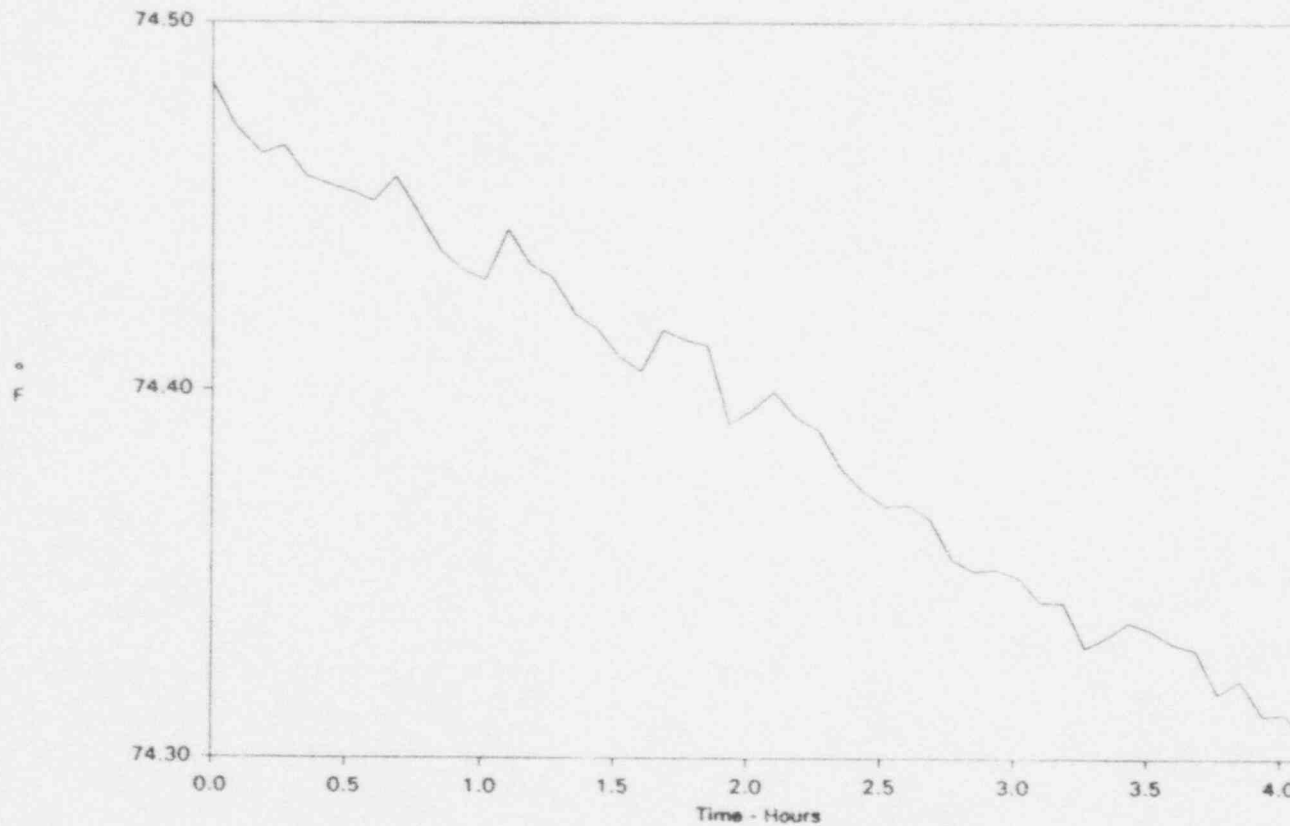


Figure D.3.4 Containment average Temperature during the induced leak rate

UNIT 1 ILRT FINAL REPORT

Average Dew Point
Braidwood Unit 1
A1R04

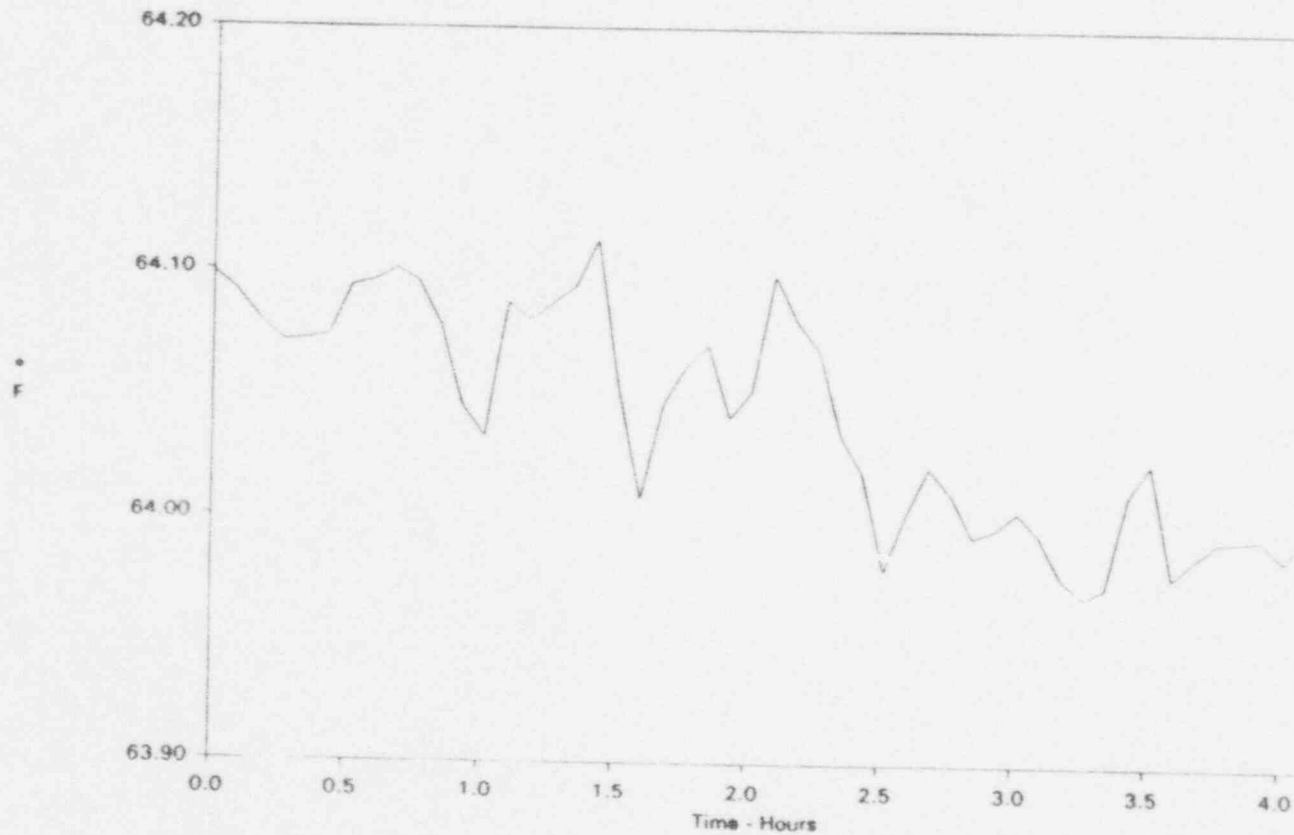


Figure D.3.5 Containment average Dew Point during the induced leak rate

UNIT 1 ILRT FINAL REPORT

Average Vapor Pressure
Braidwood Unit 1
A1R04

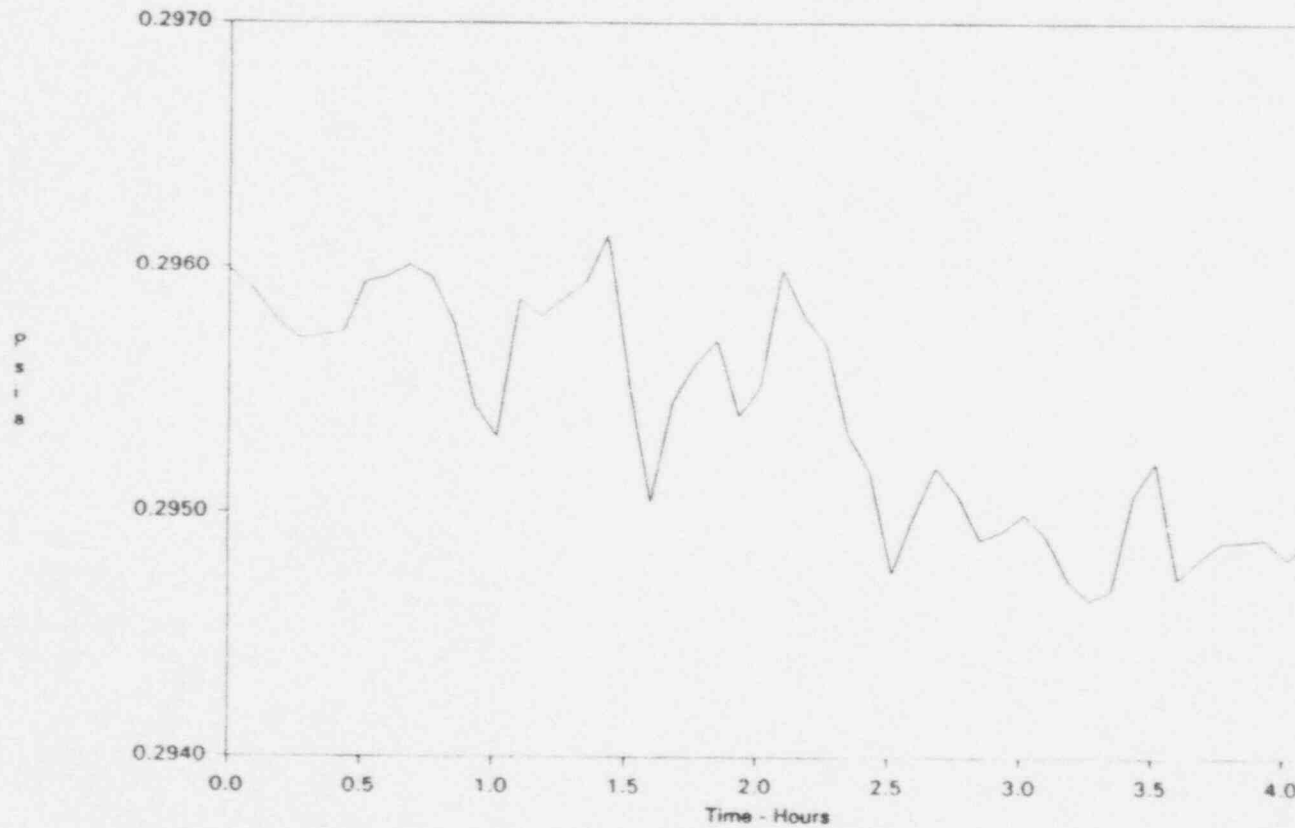


Figure D.3.6 Pressure average Vapor Pressure during the induced leak rate

E. TEST CALCULATIONS

Calculations for the test were based on Braidwood Station procedure 1BwVS 6.1.2.a-1. A reproduction of the compilations is found in Appendix B. Braidwood performed the Mass Plot Method test using mass point calculations.

F. TEST RESULTS AND INTERPRETATIONS

The results given in this section are for the actual test performed and not the aborted test. The values in the aborted test were for INFORMATION ONLY and used as an aid for trouble shooting and a reference value.

F.1 STATISTICAL LEAK RATE TEST RESULTS

The "AS FOUND" statistical average leak rate (95% UCL) before any corrections was 0.04574 wt%/day. The "AS LEFT" statistical average leak rate (95% UCL) after corrections was 0.0517 wt%/day.

Containment dry air temperature and relative humidity trended downward throughout the test. This is indicative of a stable containment with no major heat sources as the reactor coolant was kept reasonably constant throughout the test. Measured tank and containment sump levels did not significantly changed from the beginning to end of the test.

There were no instrument failures or any erratic indications.

During pressurization a number of leakage paths were identified. The magnitude of leakage from these paths could not be quantified by visual observation, although they appeared to be small. It was decided to continue with the pressurization and measure the total containment leakage rate once pressure was stable. After the containment reached test pressure the total containment leak rate exceeded .075L_a. Looking for penetrations that were potential leakers we came across some slight leaks and one major leak, the following were found: P-56, P-70 and the emergency hatch outer/inner door were swapped. Penetration P-70 has 4 lines that go through that penetration two of the four were isolated, due to the leakage being excessive. Penetration P-56 was determined to be the major leak. A number of activities were performed to verify the leak was actually coming from containment and not the service air system.

The penetrations were isolated one at a time and the effects on the total containment leakage rate was observed. With the isolation of penetration P-70 and the swapping of the emergency hatch doors the leakage rate was still above the .075L_a. It was only after the isolation of penetration P-56 did the leakage rate fall below the .075L_a. Penetration P-56 was isolated by pressurizing between the containment isolation valves to a pressure slightly below test pressure (43.8 psig).

The test was then successfully continued until completion. The isolated pathways were left isolated during the entire test. A Minimum Pathway As Found penalty was later assessed for each of these pathways.

It is ComEds policy to Type A test containments in as close to the Post LOCA condition as possible. The pathways were left isolated in this case for the following reasons:

For all cases, there were no direction dependency concerns. The leakage measured by the Type C tests performed after the Type A test can in all cases clearly be shown to yield results conservative relative to what would have been their actual contributions had they remained open during the Type A test.

The cumulative effect of suddenly opening all the pathways may have had the effect of destabilizing the containment atmosphere. This would have both extended the test duration and reduced the quality of the results.

It is always desirable to minimize the number of valve manipulations during ILRTs. This reduces the potential for line up errors and other unforeseen problems.

F.2 INDUCED LEAK RATE TEST

The Induced test was performed following the Statistical test which was performed in the 24 hour mass plot leak rate test. After a 1 hour period for stabilization of the known induced leak the induced test was started. The Induced test was completed in 4 hours with successful results. The statistically averaged composite leak rate was verified to be stable and within $\pm 0.25L_a$ of the sum of the statistically averaged measured leak rate and the average flowmeter induced leak rate. No abnormal containment response or significant events occurred during this test.

The results are as followed:

The initial imposed leak (L_m) rate as indicated on the flowmeter 7.6 scfm.
The revised leak rate (L_m) as calculated was 7.7 scfm.

$$L_m = L_o \left[\frac{P_c}{P_m} * \frac{T_m}{T_c} \right]^{1/2}$$

where

- P_c = calibrated pressure, psia (from flowmeter) 14.7 psia
- P_m = fluid pressure used during test, psia (flowmeter discharge pressure)
- T_c = calibrated temperature, °R (°F + 459.7) (from flowmeter)
- T_m = fluid temperature used during test, °R (°F + 459.7) (flowmeter discharge temp)
- L_m = flow recorded from instrument, scfm
- L_o = corrected flow N L_a or 7.7157 scfm

To correct for differences in actual versus calibrated fluid temperature and pressure the following is used:

$$L_o = L_m \left[\frac{P_m}{P_c} * \frac{T_c}{T_m} \right]^{1/2}$$

Corrected imposed leak rate (L_o) = 7.59 scfm

To convert the L_o from SCFM to wt%/days the following equation is used:

$$L_o \text{ \%/day} = \frac{L_o \text{ scfm} * .1\%/day}{7.7157}$$

The target induced leak rate L_o was .098488 %/day

The measured induced leak rate L_o was .083421 %/day

The measured composite least square statistical leakage rate (L_{am} .044998 %/day) including the imposed target leak rate (L_o .098488 %/day) = L_o .14349 %/day.

The measured composite least square statistical leakage rate (L_{am} .044998 %/day) including the measured imposed leak rate (L_o .083421 %/day) = L_o .128419.

The measured leak rate value is within the combined statistical leak rate and the target leak rate value. The leakage is between the acceptable limits of the required tolerances of $\pm .25 L_a$.

$$(L_o + L_{am} - .25 * L_a) \leq L_o \leq (L_o + L_{am} + .25 * L_a)$$

$$.11849 \leq .14349 \leq .16849$$

where

L_o = measured composite least square statistical leakage rate including the imposed leak rate.
 L_o = imposed leak rate
 L_a = maximum allowable leak rate of the containment at 44.4 psig (.1 %/day).
 L_{am} = the final statistical leak rate measured.

F.3 COMPARISON TO PREVIOUS TEST RESULTS

This was the third ILRT performed at Braidwood Unit 1. The previous test was performed February 2 to March 5, 1991 which was the first refuel outage for Braidwood Unit 1.

The statistical average containment leakage rate during the 1991 test was 0.05153 wt%/day after a 24 hour Mass Plot test. The 95% upper confidence limit of the containment leakage rate was 0.05286 wt%/day.

The induced leak rate during the 1991 test was .1631%/day after 3.5 hours. This was within the 0.25 L_a of the sum of the statistical average leakrate and the induced leak rate.

F.4 TYPE B AND C TEST RESULTS FOR A1R04

Local leak rates performed during A1R04 can be reviewed in Appendix G.

F.5 TYPE B AND C TEST RESULTS FOR A1R03

Local leak rates performed during A1R03 can be reviewed in Appendix G.

APPENDIX A - INSTRUMENT SPECIFICATIONS

The computer used was a 486/25ms lap top with a math coprocessor and modem

Instruments used :

- 31 Graftel model 9202 temperature sensors range 32-150 °F
accuracy $\pm .5$ degree F
- 9 Graftel model 9203 relative humidity sensors range 30-90%
accuracy $\pm 5\%$
- 2 Paroscientific precision pressure monitors model 760-100-A range
0-100 psia accuracy $\pm .020\%$ of span
- 1 Fisher Porter flowmeter model 10A3555-S range 0-10.2 scfm
accuracy $\pm 1\%$ max flow

APPENDIX B STATISTICAL LEAK RATE TEST ANALYSIS METHODS

Mass Point Calculations

This method calculates the rate of change with respect to time of dry air mass using the mass point Method.

Then the least squares fit at 95% UCL of the mass point leakrates are calculated as shown below.

$$B = \frac{\sum M_i - A \sum t_i}{N}$$

$$A = \frac{(N \sum t_i M_i - \sum t_i \sum M_i)}{N \sum (t_i)^2 - (\sum t_i)^2}$$

N = Number of data sets to be Least Squares Fit.

$$L = B + At$$

$$T = \frac{1.6449(N-2) + 3.5283 + 0.85602/(N-2)}{(N-2) + 1.2209 - 1.5162/(N-2)}$$

$$\sigma = \left[\frac{1}{(N-2)} \left(\frac{N \sum M_i^2 - (\sum M_i)^2}{N \sum t_i^2 - (\sum t_i)^2} \right) \right]^{1/2} \frac{2400}{B+At} \text{ (weight \% per day)}$$

$$UCL = L + T\sigma$$

APPENDIX C TEMPERATURE STABILIZATION DATA

The following tables present the data for the temperature stabilization phase of the ILRT. The temperature stabilization phase is defined as data collected from data sets 90 to 338. The following data is included:

1. Containment Mass
2. Containment Pressure in psia
3. Containment Temperature in deg F
4. Containment Dew point in deg F

Mass Plot during Temperature Stabilization

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Braidwood Unit 1

A1R04

RDG	TIME	Mass lbm
90	Mar 15 09:56:29	829600.4035
91	Mar 15 10:01:29	829585.5148
92	Mar 15 10:06:30	829575.0272
93	Mar 15 10:11:30	829571.5305
94	Mar 15 10:16:30	829549.1786
95	Mar 15 10:21:30	829532.5898
96	Mar 15 10:26:30	829526.1659
97	Mar 15 10:31:30	829541.2783
98	Mar 15 10:36:31	829539.6532
99	Mar 15 10:41:31	829523.5314
100	Mar 15 10:46:31	829511.0777
101	Mar 15 10:51:31	829500.5357
102	Mar 15 10:56:31	829502.3796
103	Mar 15 11:01:31	829496.7191
104	Mar 15 11:06:32	829515.6811
105	Mar 15 11:11:32	829495.9127
106	Mar 15 11:16:32	829487.2023
107	Mar 15 11:21:32	829482.6035
108	Mar 15 11:26:32	829477.6670
109	Mar 15 11:31:32	829445.5601
110	Mar 15 11:36:33	829437.7574
111	Mar 15 11:41:33	829442.3351
112	Mar 15 11:46:33	829450.9942
113	Mar 15 11:51:33	829454.5954
114	Mar 15 11:56:33	829451.5858
115	Mar 15 12:01:33	829417.5589
116	Mar 15 12:06:34	829415.2887
117	Mar 15 12:11:34	829409.3961
118	Mar 15 12:16:34	829411.9162
119	Mar 15 12:21:34	829391.6071
120	Mar 15 12:26:34	829392.3437
121	Mar 15 12:31:34	829397.4282
122	Mar 15 12:36:35	829410.1448
123	Mar 15 12:41:35	829402.4334
124	Mar 15 12:46:35	829381.8868
125	Mar 15 12:51:35	829393.8807
126	Mar 15 12:56:35	829394.9573
127	Mar 15 13:01:35	829410.2115
128	Mar 15 13:06:36	829397.9989
129	Mar 15 13:11:36	829350.1090
130	Mar 15 13:16:36	829333.5179
131	Mar 15 13:21:36	829374.4687
132	Mar 15 13:26:36	829389.7632
133	Mar 15 13:31:36	829342.0278
134	Mar 15 13:36:37	829324.5221
135	Mar 15 13:41:37	829311.3821
136	Mar 15 13:46:37	829321.3434
137	Mar 15 13:51:37	829359.5943
138	Mar 15 13:56:37	829380.2316

Mass Plot during Temperature Stabilization

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Braidwood Unit 1
A1R04

RDG	TIME	Mass lbm
139	Mar 15 14:01:37	829369.3843
140	Mar 15 14:06:38	829332.6153
141	Mar 15 14:11:38	829352.6385
142	Mar 15 14:16:38	829297.5413
143	Mar 15 14:21:38	829294.7078
144	Mar 15 14:26:38	829294.5640
145	Mar 15 14:31:38	829299.3886
146	Mar 15 14:36:39	829295.8369
147	Mar 15 14:41:39	829250.2909
148	Mar 15 14:46:39	829245.5654
149	Mar 15 14:51:39	829260.5390
150	Mar 15 14:56:39	829271.3801
151	Mar 15 15:01:39	829274.4855
152	Mar 15 15:06:40	829272.5347
153	Mar 15 15:11:40	829255.7974
154	Mar 15 15:16:40	829263.8108
155	Mar 15 15:21:40	829250.8658
156	Mar 15 15:26:40	829237.7658
157	Mar 15 15:31:40	829245.7054
158	Mar 15 15:36:41	829251.0659
159	Mar 15 15:41:41	829244.7928
160	Mar 15 15:46:41	829255.1263
161	Mar 15 15:51:41	829234.2722
162	Mar 15 15:56:41	829218.7729
163	Mar 15 16:01:41	829232.2828
164	Mar 15 16:06:42	829222.8086
165	Mar 15 16:11:42	829192.4056
166	Mar 15 16:16:42	829197.8343
167	Mar 15 16:21:42	829227.4036
168	Mar 15 16:26:42	829212.7459
169	Mar 15 16:31:42	829225.2196
170	Mar 15 16:36:43	829232.2462
171	Mar 15 16:41:43	829226.3145
172	Mar 15 16:46:43	829239.2205
173	Mar 15 16:51:43	829208.3657
174	Mar 15 16:56:43	829194.0779
175	Mar 15 17:01:43	829201.2717
176	Mar 15 17:06:44	829220.9913
177	Mar 15 17:11:44	829201.4649
178	Mar 15 17:16:44	829178.7236
179	Mar 15 17:21:44	829181.6978
180	Mar 15 17:26:44	829187.8986
181	Mar 15 17:31:44	829189.4076
182	Mar 15 17:36:45	829185.2304
183	Mar 15 17:41:45	829181.7104
184	Mar 15 17:46:45	829153.9811
185	Mar 15 17:51:45	829166.7665
186	Mar 15 17:56:45	829180.9168
187	Mar 15 18:01:46	829170.9361

Mass Plot during Temperature Stabilization

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Braidwood Unit 1
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RDG	TIME	Mass lbm
188	Mar 15 18:06:46	829165.7850
189	Mar 15 18:11:46	829140.5730
190	Mar 15 18:16:46	829158.8385
191	Mar 15 18:21:46	829139.6483
192	Mar 15 18:26:46	829170.7078
193	Mar 15 18:31:47	829172.9072
194	Mar 15 18:36:47	829168.9286
195	Mar 15 18:41:47	829160.6357
196	Mar 15 18:46:47	829163.2813
197	Mar 15 18:51:47	829166.8269
198	Mar 15 18:56:47	829169.7377
199	Mar 15 19:01:48	829153.7742
200	Mar 15 19:06:48	829112.2885
201	Mar 15 19:11:48	829143.3735
202	Mar 15 19:16:48	829111.6495
203	Mar 15 19:21:48	829128.5307
204	Mar 15 19:26:48	829129.3897
205	Mar 15 19:31:49	829130.5301
206	Mar 15 19:36:49	829135.5154
207	Mar 15 19:41:49	829111.1431
208	Mar 15 19:46:49	829109.3301
209	Mar 15 19:51:49	829116.1339
210	Mar 15 19:56:49	829092.8283
211	Mar 15 20:01:50	829096.3763
212	Mar 15 20:06:50	829083.0997
213	Mar 15 20:11:50	829102.3297
214	Mar 15 20:16:50	829077.0764
215	Mar 15 20:21:50	829065.7626
216	Mar 15 20:26:50	829098.6412
217	Mar 15 20:31:51	829115.5161
218	Mar 15 20:36:51	829087.9536
219	Mar 15 20:41:51	829092.3911
220	Mar 15 20:46:51	829096.1035
221	Mar 15 20:51:51	829104.7814
222	Mar 15 20:56:51	829119.9081
223	Mar 15 21:01:52	829119.3378
224	Mar 15 21:06:52	829116.8017
225	Mar 15 21:11:52	829123.4752
226	Mar 15 21:16:52	829111.7912
227	Mar 15 21:21:52	829106.9183
228	Mar 15 21:26:52	829105.7431
229	Mar 15 21:31:54	829101.8393
230	Mar 15 21:36:54	829089.9086
231	Mar 15 21:41:54	829090.1165
232	Mar 15 21:46:54	829086.8677
233	Mar 15 21:51:54	829081.2405
234	Mar 15 21:56:54	829090.2114
235	Mar 15 22:01:55	829064.6790
236	Mar 15 22:06:55	829064.5082

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Braidwood Unit 1
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RDG	TIME	Mass lbm
237	Mar 15 22:11:55	829056.0332
238	Mar 15 22:16:55	829073.8259
239	Mar 15 22:21:55	829073.2518
240	Mar 15 22:26:55	829055.9999
241	Mar 15 22:31:56	829063.4883
242	Mar 15 22:36:56	829061.1096
243	Mar 15 22:41:56	829051.7438
244	Mar 15 22:46:56	829040.1554
245	Mar 15 22:51:56	829049.5025
246	Mar 15 22:56:57	829045.0374
247	Mar 15 23:01:57	829067.6690
248	Mar 15 23:06:57	829041.7868
249	Mar 15 23:11:57	829044.3200
250	Mar 15 23:16:57	829053.7147
251	Mar 15 23:21:57	829053.2040
252	Mar 15 23:26:58	829038.9934
253	Mar 15 23:31:58	829037.8997
254	Mar 15 23:36:58	829040.7595
255	Mar 15 23:41:59	829046.0229
256	Mar 15 23:46:59	829014.4084
257	Mar 15 23:51:59	829026.2735
258	Mar 15 23:57:00	829038.5348
259	Mar 16 00:02:11	829031.7313
260	Mar 16 00:07:11	829019.4331
261	Mar 16 00:12:12	829013.7299
262	Mar 16 00:17:12	829018.5229
263	Mar 16 00:22:13	828999.1103
264	Mar 16 00:27:14	829007.7362
265	Mar 16 00:32:14	829022.5287
266	Mar 16 00:37:14	829009.6500
267	Mar 16 00:42:14	828998.7598
268	Mar 16 00:47:15	828999.1439
269	Mar 16 00:52:15	828990.8372
270	Mar 16 00:57:15	829002.0433
271	Mar 16 01:02:15	828976.3868
272	Mar 16 01:07:15	828992.8074
273	Mar 16 01:12:15	828991.7464
274	Mar 16 01:17:16	829007.3414
275	Mar 16 01:22:17	828999.0456
276	Mar 16 01:27:18	828987.0870
277	Mar 16 01:32:18	828987.2782
278	Mar 16 01:37:18	828979.8912
279	Mar 16 01:42:18	828984.5294
280	Mar 16 01:47:20	828978.5043
281	Mar 16 01:52:20	828955.8034
282	Mar 16 01:57:20	828973.6750
283	Mar 16 02:02:20	828968.4825
284	Mar 16 02:07:20	828969.2923
285	Mar 16 02:12:20	828958.5651

Mass Plot during Temperature Stabilization

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Braidwood Unit 1

A1R04

RDG	TIME	Mass lbm
286	Mar 16 02:17:21	828969.1544
287	Mar 16 02:22:21	828966.9962
288	Mar 16 02:27:21	828938.1136
289	Mar 16 02:32:21	828949.2480
290	Mar 16 02:37:22	828947.2566
291	Mar 16 02:42:22	828951.7602
292	Mar 16 02:47:22	828935.7884
293	Mar 16 02:52:22	828924.7331
294	Mar 16 02:57:22	828937.5789
295	Mar 16 03:02:22	828945.2857
296	Mar 16 03:07:22	828940.5425
297	Mar 16 03:12:23	828934.4839
298	Mar 16 03:17:23	828947.7490
299	Mar 16 03:22:23	828955.2743
300	Mar 16 03:27:23	828949.8867
301	Mar 16 03:32:23	828946.1396
302	Mar 16 03:37:23	828923.8111
303	Mar 16 03:42:24	828920.7771
304	Mar 16 03:47:24	828941.8508
305	Mar 16 03:52:24	828947.3242
306	Mar 16 03:57:24	828927.1757
307	Mar 16 04:02:24	828914.9683
308	Mar 16 04:07:24	828911.5532
309	Mar 16 04:12:25	828931.6304
310	Mar 16 04:17:25	828916.4952
311	Mar 16 04:22:25	828914.7551
312	Mar 16 04:27:25	828920.7297
313	Mar 16 04:32:25	828926.8751
314	Mar 16 04:37:25	828923.8713
315	Mar 16 04:42:26	828908.6873
316	Mar 16 04:47:26	828900.9072
317	Mar 16 04:52:26	828895.1079
318	Mar 16 04:57:26	828888.3795
319	Mar 16 05:02:26	828888.8481
320	Mar 16 05:07:27	828897.6038
321	Mar 16 05:12:27	828892.6724
322	Mar 16 05:17:28	828890.6716
323	Mar 16 05:22:29	828906.6960
324	Mar 16 05:27:29	828904.0480
325	Mar 16 05:32:29	828882.3518
326	Mar 16 05:37:29	828873.2134
327	Mar 16 05:42:29	828879.9776
328	Mar 16 05:47:29	828884.8408
329	Mar 16 05:52:30	828888.2817
330	Mar 16 05:57:30	828874.7991
331	Mar 16 06:02:30	828874.4052
332	Mar 16 06:07:41	828882.5219
333	Mar 16 06:12:32	828886.0172
334	Mar 16 06:17:32	828897.0557

Mass Plot during Temperature Stabilization

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Braidwood Unit 1
A1R04

RDG	TIME	Mass lbm
335	Mar 16 06:22:32	828883.7572
336	Mar 16 06:27:32	828866.8404
337	Mar 16 06:32:32	828872.5131
338	Mar 16 06:37:32	828881.6273

Temperature Stabilization

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press	Comp 1	Comp 1 DP
90	Mar 15 09:56:29	60.410	80.653	64.850
91	Mar 15 10:01:29	60.386	80.432	65.038
92	Mar 15 10:06:30	60.365	80.234	65.147
93	Mar 15 10:11:30	60.345	80.061	65.168
94	Mar 15 10:16:30	60.328	79.910	65.229
95	Mar 15 10:21:30	60.312	79.764	65.353
96	Mar 15 10:26:30	60.297	79.636	65.347
97	Mar 15 10:31:30	60.284	79.505	65.381
98	Mar 15 10:36:31	60.271	79.397	65.377
99	Mar 15 10:41:31	60.260	79.300	65.460
100	Mar 15 10:46:31	60.250	79.207	65.523
101	Mar 15 10:51:31	60.240	79.118	65.580
102	Mar 15 10:56:31	60.230	79.034	65.567
103	Mar 15 11:01:31	60.222	78.956	65.616
104	Mar 15 11:06:32	60.214	78.880	65.539
105	Mar 15 11:11:32	60.206	78.819	65.586
106	Mar 15 11:16:32	60.199	78.760	65.591
107	Mar 15 11:21:32	60.193	78.697	65.669
108	Mar 15 11:26:32	60.186	78.642	65.657
109	Mar 15 11:31:32	60.179	78.597	65.720
110	Mar 15 11:36:33	60.173	78.547	65.729
111	Mar 15 11:41:33	60.168	78.501	65.657
112	Mar 15 11:46:33	60.162	78.445	65.680
113	Mar 15 11:51:33	60.157	78.397	65.674
114	Mar 15 11:56:33	60.152	78.351	65.666
115	Mar 15 12:01:33	60.147	78.324	65.700
116	Mar 15 12:06:34	60.141	78.277	65.673
117	Mar 15 12:11:34	60.136	78.238	65.645
118	Mar 15 12:16:34	60.131	78.199	65.602
119	Mar 15 12:21:34	60.127	78.165	65.673
120	Mar 15 12:26:34	60.123	78.129	65.669
121	Mar 15 12:31:34	60.119	78.090	65.677
122	Mar 15 12:36:35	60.115	78.051	65.631
123	Mar 15 12:41:35	60.112	78.023	65.632
124	Mar 15 12:46:35	60.108	78.001	65.652
125	Mar 15 12:51:35	60.104	77.963	65.634
126	Mar 15 12:56:35	60.101	77.935	65.600
127	Mar 15 13:01:35	60.097	77.894	65.587
128	Mar 15 13:06:36	60.093	77.864	65.632
129	Mar 15 13:11:36	60.090	77.857	65.695
130	Mar 15 13:16:36	60.087	77.839	65.694
131	Mar 15 13:21:36	60.084	77.792	65.641
132	Mar 15 13:26:36	60.081	77.762	65.578
133	Mar 15 13:31:36	60.078	77.756	65.661
134	Mar 15 13:36:37	60.074	77.737	65.649
135	Mar 15 13:41:37	60.071	77.716	65.652
136	Mar 15 13:46:37	60.068	77.688	65.584
137	Mar 15 13:51:37	60.066	77.647	65.544
138	Mar 15 13:56:37	60.063	77.616	65.481

Temperature Stabilization

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Braidwood Unit 1
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RDG	TIME	Comp 1 Press	Comp 1	Comp 1 DP
139	Mar 15 14:01:37	60.060	77.596	65.494
140	Mar 15 14:06:38	60.057	77.585	65.571
141	Mar 15 14:11:38	60.054	77.550	65.535
142	Mar 15 14:16:38	60.051	77.552	65.608
143	Mar 15 14:21:38	60.048	77.533	65.553
144	Mar 15 14:26:38	60.045	77.505	65.563
145	Mar 15 14:31:38	60.043	77.480	65.560
146	Mar 15 14:36:39	60.040	77.461	65.524
147	Mar 15 14:41:39	60.037	77.459	65.583
148	Mar 15 14:46:39	60.035	77.441	65.566
149	Mar 15 14:51:39	60.032	77.411	65.538
150	Mar 15 14:56:39	60.030	77.388	65.511
151	Mar 15 15:01:39	60.028	77.370	65.468
152	Mar 15 15:06:40	60.025	77.351	65.457
153	Mar 15 15:11:40	60.023	77.334	65.510
154	Mar 15 15:16:40	60.021	77.310	65.505
155	Mar 15 15:21:40	60.018	77.296	65.513
156	Mar 15 15:26:40	60.016	77.288	65.489
157	Mar 15 15:31:40	60.014	77.263	65.478
158	Mar 15 15:36:41	60.012	77.241	65.480
159	Mar 15 15:41:41	60.010	77.232	65.424
160	Mar 15 15:46:41	60.008	77.207	65.421
161	Mar 15 15:51:41	60.006	77.201	65.447
162	Mar 15 15:56:41	60.003	77.188	65.443
163	Mar 15 16:01:41	60.001	77.162	65.425
164	Mar 15 16:06:42	59.999	77.151	65.414
165	Mar 15 16:11:42	59.997	77.146	65.484
166	Mar 15 16:16:42	59.995	77.124	65.470
167	Mar 15 16:21:42	59.993	77.097	65.404
168	Mar 15 16:26:42	59.992	77.089	65.410
169	Mar 15 16:31:42	59.990	77.065	65.408
170	Mar 15 16:36:43	59.988	77.049	65.374
171	Mar 15 16:41:43	59.986	77.036	65.372
172	Mar 15 16:46:43	59.984	77.011	65.358
173	Mar 15 16:51:43	59.982	77.011	65.392
174	Mar 15 16:56:43	59.981	77.005	65.390
175	Mar 15 17:01:43	59.979	76.988	65.363
176	Mar 15 17:06:44	59.978	76.968	65.348
177	Mar 15 17:11:44	59.976	76.959	65.386
178	Mar 15 17:16:44	59.974	76.958	65.383
179	Mar 15 17:21:44	59.972	76.940	65.387
180	Mar 15 17:26:44	59.971	76.926	65.352
181	Mar 15 17:31:44	59.969	76.908	65.349
182	Mar 15 17:36:45	59.967	76.896	65.348
183	Mar 15 17:41:45	59.966	76.883	65.359
184	Mar 15 17:46:45	59.964	76.888	65.346
185	Mar 15 17:51:45	59.963	76.867	65.331
186	Mar 15 17:56:45	59.961	76.844	65.300
187	Mar 15 18:01:46	59.959	76.836	65.320

Temperature Stabilization

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Braidwood Unit 1
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RDG		TIME	Comp 1 Press	Comp 1	Comp 1 DP
188	Mar	15 18:06:46	59.958	76.827	65.320
189	Mar	15 18:11:46	59.956	76.825	65.342
190	Mar	15 18:16:46	59.955	76.801	65.308
191	Mar	15 18:21:46	59.953	76.802	65.324
192	Mar	15 18:26:46	59.952	76.774	65.266
	Mar	15 18:31:47	59.951	76.761	65.274
194	Mar	15 18:36:47	59.949	76.746	65.309
195	Mar	15 18:41:47	59.948	76.738	65.313
196	Mar	15 18:46:47	59.946	76.726	65.281
197	Mar	15 18:51:47	59.945	76.713	65.268
198	Mar	15 18:56:47	59.944	76.702	65.237
199	Mar	15 19:01:48	59.942	76.696	65.288
200	Mar	15 19:06:48	59.941	76.704	65.314
201	Mar	15 19:11:48	59.939	76.678	65.268
202	Mar	15 19:16:48	59.938	76.683	65.283
203	Mar	15 19:21:48	59.936	76.661	65.269
204	Mar	15 19:26:48	59.935	76.648	65.277
205	Mar	15 19:31:49	59.933	76.635	65.245
206	Mar	15 19:36:49	59.932	76.620	65.245
207	Mar	15 19:41:49	59.931	76.623	65.249
208	Mar	15 19:46:49	59.930	76.614	65.241
209	Mar	15 19:51:49	59.928	76.597	65.236
210	Mar	15 19:56:49	59.927	76.600	65.246
211	Mar	15 20:01:50	59.925	76.587	65.227
212	Mar	15 20:06:50	59.925	76.586	65.252
213	Mar	15 20:11:50	59.923	76.565	65.208
214	Mar	15 20:16:50	59.922	76.569	65.225
215	Mar	15 20:21:50	59.921	76.563	65.230
216	Mar	15 20:26:50	59.919	76.535	65.198
217	Mar	15 20:31:51	59.919	76.516	65.202
218	Mar	15 20:36:51	59.918	76.523	65.214
219	Mar	15 20:41:51	59.916	76.511	65.212
220	Mar	15 20:46:51	59.915	76.498	65.214
221	Mar	15 20:51:51	59.914	76.486	65.183
222	Mar	15 20:56:51	59.913	76.471	65.142
223	Mar	15 21:01:52	59.912	76.464	65.124
224	Mar	15 21:06:52	59.911	76.454	65.107
225	Mar	15 21:11:52	59.910	76.443	65.088
226	Mar	15 21:16:52	59.909	76.437	65.115
227	Mar	15 21:21:52	59.907	76.424	65.159
228	Mar	15 21:26:52	59.906	76.415	65.155
229	Mar	15 21:31:54	59.905	76.408	65.160
230	Mar	15 21:36:54	59.904	76.406	65.155
231	Mar	15 21:41:54	59.903	76.399	65.115
232	Mar	15 21:46:54	59.902	76.393	65.117
233	Mar	15 21:51:54	59.901	76.384	65.128
234	Mar	15 21:56:54	59.900	76.374	65.078
235	Mar	15 22:01:55	59.898	76.375	65.125
236	Mar	15 22:06:55	59.897	76.363	65.134

Temperature Stabilization

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Braidwood Unit 1
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RDG	TIME	Comp 1 Press	Comp 1	Comp 1 DP
237	Mar 15 22:11:55	59.896	76.358	65.131
238	Mar 15 22:16:55	59.895	76.338	65.090
239	Mar 15 22:21:55	59.893	76.330	65.056
240	Mar 15 22:26:55	59.892	76.328	65.079
241	Mar 15 22:31:56	59.891	76.314	65.074
242	Mar 15 22:36:56	59.890	76.308	65.084
243	Mar 15 22:41:56	59.889	76.305	65.075
244	Mar 15 22:46:56	59.888	76.304	65.084
245	Mar 15 22:51:56	59.888	76.295	65.062
246	Mar 15 22:56:57	59.887	76.288	65.082
247	Mar 15 23:01:57	59.886	76.268	65.055
248	Mar 15 23:06:57	59.885	76.274	65.071
249	Mar 15 23:11:57	59.884	76.261	65.067
250	Mar 15 23:16:57	59.883	76.250	65.046
251	Mar 15 23:21:57	59.882	76.241	65.037
252	Mar 15 23:26:58	59.881	76.244	65.013
253	Mar 15 23:31:58	59.880	76.235	65.028
254	Mar 15 23:36:58	59.879	76.223	65.025
255	Mar 15 23:41:59	59.878	76.214	65.015
256	Mar 15 23:46:59	59.877	76.223	65.047
257	Mar 15 23:51:59	59.876	76.211	65.008
258	Mar 15 23:57:00	59.875	76.198	64.977
259	Mar 16 00:02:11	59.874	76.191	64.997
260	Mar 16 00:07:11	59.873	76.190	65.000
261	Mar 16 00:12:12	59.872	76.184	64.969
262	Mar 16 00:17:12	59.871	76.171	64.950
263	Mar 16 00:22:13	59.870	76.171	65.005
264	Mar 16 00:27:14	59.869	76.156	64.994
265	Mar 16 00:32:14	59.868	76.143	64.970
266	Mar 16 00:37:14	59.867	76.142	64.972
267	Mar 16 00:42:14	59.866	76.139	64.997
268	Mar 16 00:47:15	59.865	76.130	65.007
269	Mar 16 00:52:15	59.865	76.131	65.015
270	Mar 16 00:57:15	59.864	76.117	64.983
271	Mar 16 01:02:15	59.863	76.123	64.991
272	Mar 16 01:07:15	59.862	76.106	64.971
273	Mar 16 01:12:15	59.861	76.098	64.991
274	Mar 16 01:17:16	59.860	76.083	64.961
275	Mar 16 01:22:17	59.860	76.083	64.989
276	Mar 16 01:27:18	59.859	76.081	65.003
277	Mar 16 01:32:18	59.858	76.071	65.013
278	Mar 16 01:37:18	59.857	76.072	64.992
279	Mar 16 01:42:18	59.856	76.059	65.000
280	Mar 16 01:47:20	59.855	76.055	64.995
281	Mar 16 01:52:20	59.854	76.061	64.997
282	Mar 16 01:57:20	59.854	76.043	64.994
283	Mar 16 02:02:20	59.853	76.039	65.000
284	Mar 16 02:07:20	59.852	76.033	64.959
285	Mar 16 02:12:20	59.851	76.033	64.962

Temperature Stabilization

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press	Comp 1	Comp 1 DP
286	Mar 16 02:17:21	59.850	76.021	64.934
287	Mar 16 02:22:21	59.849	76.015	64.932
288	Mar 16 02:27:21	59.848	76.021	64.978
289	Mar 16 02:32:21	59.848	76.010	64.941
290	Mar 16 02:37:22	59.847	76.002	64.958
291	Mar 16 02:42:22	59.846	75.995	64.937
292	Mar 16 02:47:22	59.845	75.993	64.963
293	Mar 16 02:52:22	59.844	75.992	64.970
294	Mar 16 02:57:22	59.843	75.978	64.934
295	Mar 16 03:02:22	59.842	75.969	64.901
296	Mar 16 03:07:22	59.842	75.965	64.910
297	Mar 16 03:12:23	59.841	75.959	64.933
298	Mar 16 03:17:23	59.840	75.948	64.887
299	Mar 16 03:22:23	59.839	75.937	64.878
300	Mar 16 03:27:23	59.838	75.931	64.852
301	Mar 16 03:32:23	59.837	75.925	64.891
302	Mar 16 03:37:23	59.837	75.932	64.899
303	Mar 16 03:42:24	59.836	75.920	64.941
304	Mar 16 03:47:24	59.835	75.908	64.884
305	Mar 16 03:52:24	59.835	75.903	64.857
306	Mar 16 03:57:24	59.834	75.907	64.901
307	Mar 16 04:02:24	59.833	75.907	64.904
308	Mar 16 04:07:24	59.832	75.902	64.899
309	Mar 16 04:12:25	59.832	75.886	64.849
310	Mar 16 04:17:25	59.831	75.884	64.880
311	Mar 16 04:22:25	59.830	75.875	64.880
312	Mar 16 04:27:25	59.829	75.868	64.858
313	Mar 16 04:32:25	59.828	75.861	64.793
314	Mar 16 04:37:25	59.828	75.858	64.815
315	Mar 16 04:42:26	59.827	75.857	64.835
316	Mar 16 04:47:26	59.826	75.850	64.882
317	Mar 16 04:52:26	59.825	75.846	64.890
318	Mar 16 04:57:26	59.824	75.844	64.878
319	Mar 16 05:02:26	59.823	75.836	64.882
320	Mar 16 05:07:27	59.823	75.826	64.876
321	Mar 16 05:12:27	59.822	75.823	64.858
322	Mar 16 05:17:28	59.821	75.819	64.843
323	Mar 16 05:22:29	59.821	75.806	64.815
324	Mar 16 05:27:29	59.820	75.801	64.817
325	Mar 16 05:32:29	59.819	75.807	64.829
326	Mar 16 05:37:29	59.818	75.803	64.843
327	Mar 16 05:42:29	59.817	75.790	64.834
328	Mar 16 05:47:29	59.816	75.781	64.817
329	Mar 16 05:52:30	59.816	75.775	64.794
330	Mar 16 05:57:30	59.815	75.780	64.789
331	Mar 16 06:02:30	59.814	75.771	64.794
332	Mar 16 06:07:41	59.813	75.760	64.783
333	Mar 16 06:12:32	59.813	75.755	64.755
334	Mar 16 06:17:32	59.812	75.744	64.742

Temperature Stabilization

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press	Comp 1	Comp 1 DP
335	Mar 16 06:22:32	59.811	75.745	64.750
336	Mar 16 06:27:32	59.811	75.745	64.774
337	Mar 16 06:32:32	59.810	75.738	64.760
338	Mar 16 06:37:32	59.809	75.726	64.753

APPENDIX D STATISTICAL LEAK RATE TEST DATA

The following tables present the data for the leak test phases of the ILRT using the Mass Plot Method. The measured leak test is defined as the interval between data sets 338 to 632 inclusive. This corresponds to a 24 hour and 32 minute test duration. The following data is included:

1. Containment Mass Plot Leak Rate
2. Containment Average Pressure in psia
3. Containment Average Temperature in deg F
4. Containment Average Dew Point in deg F

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
338	0.00	1.000000	-	-
339	5.03	0.999996	0.125619	-
340	10.03	0.999986	0.200284	0.570754
341	15.03	0.999977	0.227006	0.299973
342	20.03	0.999982	0.157130	0.258052
343	25.05	0.999987	0.094664	0.192061
344	30.05	0.999978	0.090036	0.155362
345	35.05	0.999977	0.082894	0.130536
346	40.05	0.999969	0.088917	0.125503
347	45.05	0.999929	0.150734	0.223051
348	50.05	0.999947	0.153781	0.212084
349	55.07	0.999962	0.132651	0.185464
350	60.07	0.999954	0.123247	0.168537
351	65.07	0.999959	0.109394	0.150440
352	70.07	0.999968	0.091785	0.131433
353	75.07	0.999957	0.084970	0.120144
354	80.08	0.999960	0.076664	0.108662
355	85.08	0.999981	0.059053	0.092472
356	90.08	0.999959	0.055258	0.085285
357	95.08	0.999966	0.048768	0.076471
358	100.08	0.999966	0.043396	0.068953
359	105.08	0.999975	0.035709	0.060111
360	110.10	0.999984	0.026736	0.050681
361	115.10	0.999942	0.031602	0.054027
362	120.10	0.999942	0.035318	0.056233
363	125.10	0.999951	0.035594	0.054866
364	130.10	0.999955	0.034527	0.052372
365	135.10	0.999936	0.037461	0.054256
366	140.12	0.999927	0.041393	0.057478
367	145.12	0.999913	0.046998	0.062969
368	150.12	0.999921	0.049919	0.065113
369	155.12	0.999940	0.048957	0.063216
370	160.12	0.999917	0.051423	0.065021
371	165.12	0.999890	0.057146	0.071102
372	170.13	0.999917	0.057875	0.071040
373	175.13	0.999934	0.056112	0.068653
374	180.13	0.999940	0.053646	0.065741
375	185.13	0.999924	0.053161	0.064621
376	190.13	0.999914	0.053676	0.064551
377	195.13	0.999903	0.055076	0.065489
378	200.15	0.999903	0.056021	0.065962
379	205.15	0.999905	0.056531	0.066006
380	210.15	0.999930	0.054501	0.063743

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
381	215.15	0.999919	0.053516	0.062384
382	220.15	0.999910	0.053240	0.061714
383	225.15	0.999910	0.052824	0.060936
384	230.17	0.999894	0.053605	0.061404
385	235.17	0.999872	0.055781	0.063544
386	240.17	0.999865	0.058021	0.065774
387	245.17	0.999883	0.058679	0.066145
388	250.17	0.999883	0.059112	0.066295
389	255.17	0.999875	0.059845	0.066785
390	260.18	0.999869	0.060775	0.067511
391	265.18	0.999868	0.061493	0.068014
392	270.18	0.999874	0.061678	0.067962
393	275.18	0.999867	0.062113	0.068185
394	280.18	0.999851	0.063232	0.069188
395	285.18	0.999856	0.063883	0.069667
396	290.20	0.999849	0.064705	0.070347
397	295.20	0.999866	0.064562	0.070016
398	300.20	0.999881	0.063625	0.068976
399	305.20	0.999886	0.062437	0.067739
400	310.20	0.999874	0.061794	0.066964
401	315.20	0.999846	0.062286	0.067315
402	320.22	0.999826	0.063435	0.068432
403	325.22	0.999847	0.063600	0.068447
404	330.22	0.999837	0.064025	0.068744
405	335.22	0.999848	0.063954	0.068534
406	340.22	0.999862	0.063300	0.067791
407	345.22	0.999849	0.063076	0.067442
408	350.23	0.999841	0.063069	0.067312
409	355.23	0.999838	0.063087	0.067211
410	360.23	0.999845	0.062820	0.066839
411	365.23	0.999836	0.062777	0.066686
412	370.23	0.999829	0.062876	0.066682
413	375.25	0.999840	0.062575	0.066292
414	380.25	0.999832	0.062475	0.066096
415	385.25	0.999811	0.062914	0.066466
416	390.25	0.999817	0.063090	0.066556
417	395.25	0.999835	0.062716	0.066113
418	400.25	0.999842	0.062118	0.065481
419	405.27	0.999813	0.062252	0.065534
420	410.27	0.999788	0.062947	0.066219
421	415.27	0.999809	0.063034	0.066229
422	420.27	0.999819	0.062828	0.065954
423	425.27	0.999803	0.062954	0.066008

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
424	430.27	0.999798	0.063131	0.066120
425	435.28	0.999799	0.063220	0.066141
426	440.28	0.999799	0.063259	0.066115
427	445.28	0.999793	0.063379	0.066174
428	450.28	0.999808	0.063140	0.065882
429	455.28	0.999813	0.062761	0.065468
430	460.28	0.999797	0.062677	0.065327
431	465.30	0.999796	0.062592	0.065187
432	470.30	0.999800	0.062383	0.064930
433	475.30	0.999799	0.062164	0.064667
434	480.30	0.999799	0.061921	0.064383
435	485.30	0.999811	0.061451	0.063905
436	490.30	0.999813	0.060921	0.063378
437	495.32	0.999785	0.060867	0.063275
438	500.32	0.999788	0.060739	0.063102
439	505.32	0.999768	0.060907	0.063229
440	510.32	0.999747	0.061377	0.063697
441	515.32	0.999776	0.061318	0.063595
442	520.32	0.999765	0.061401	0.063636
443	525.33	0.999775	0.061301	0.063495
444	530.33	0.999787	0.060996	0.063169
445	535.33	0.999770	0.060918	0.063052
446	540.33	0.999753	0.061061	0.063160
447	545.33	0.999766	0.060988	0.063050
448	550.33	0.999785	0.060619	0.062674
449	555.35	0.999761	0.060569	0.062588
450	560.35	0.999748	0.060671	0.062656
451	565.35	0.999739	0.060862	0.062820
452	570.35	0.999735	0.061059	0.062993
453	575.35	0.999734	0.061236	0.063144
454	580.35	0.999748	0.061203	0.063079
455	585.37	0.999757	0.061038	0.062889
456	590.37	0.999759	0.060825	0.062656
457	595.37	0.999755	0.060652	0.062459
458	600.37	0.999743	0.060595	0.062373
459	605.37	0.999735	0.060609	0.062358
460	610.37	0.999746	0.060479	0.062204
461	615.38	0.999757	0.060203	0.061920
462	620.38	0.999750	0.059994	0.061695
463	625.38	0.999751	0.059762	0.061451
464	630.38	0.999739	0.059651	0.061317
465	635.38	0.999717	0.059755	0.061398
466	640.38	0.999716	0.059841	0.061461

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
467	645.40	0.999708	0.059982	0.061582
468	650.40	0.999723	0.059950	0.061526
469	655.40	0.999742	0.059708	0.061277
470	660.40	0.999724	0.059632	0.061179
471	665.40	0.999738	0.059407	0.060946
472	670.40	0.999747	0.059089	0.060636
473	675.42	0.999746	0.058775	0.060328
474	680.42	0.999724	0.058651	0.060186
475	685.42	0.999719	0.058559	0.060074
476	690.42	0.999709	0.058545	0.060038
477	695.42	0.999697	0.058618	0.060091
478	700.42	0.999706	0.058592	0.060044
479	705.43	0.999718	0.058449	0.059887
480	710.43	0.999703	0.058420	0.059839
481	715.43	0.999702	0.058385	0.059784
482	720.43	0.999697	0.058378	0.059757
483	725.43	0.999704	0.058300	0.059662
484	730.43	0.999697	0.058261	0.059606
485	735.45	0.999707	0.058130	0.059463
486	740.45	0.999702	0.058027	0.059345
487	745.45	0.999684	0.058050	0.059351
488	750.45	0.999685	0.058052	0.059335
489	755.45	0.999696	0.057956	0.059226
490	760.45	0.999689	0.057896	0.059151
491	765.47	0.999694	0.057791	0.059033
492	770.47	0.999699	0.057639	0.058873
493	775.47	0.999692	0.057530	0.058753
494	780.47	0.999679	0.057498	0.058706
495	785.47	0.999680	0.057449	0.058643
496	790.47	0.999656	0.057550	0.058733
497	795.48	0.999652	0.057659	0.058831
498	800.48	0.999676	0.057593	0.058752
499	805.48	0.999700	0.057358	0.058525
500	810.48	0.999679	0.057257	0.058414
501	815.48	0.999661	0.057259	0.058401
502	820.48	0.999676	0.057154	0.058287
503	825.50	0.999669	0.057085	0.058206
504	830.50	0.999657	0.057084	0.058192
505	835.50	0.999688	0.056879	0.057991
506	840.50	0.999690	0.056659	0.057778
507	845.50	0.999662	0.056602	0.057708
508	850.50	0.999660	0.056545	0.057640
509	855.52	0.999688	0.056317	0.057421

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
510	860.52	0.999673	0.056170	0.057270
511	865.52	0.999676	0.056000	0.057099
512	870.52	0.999690	0.055747	0.056861
513	875.52	0.999672	0.055590	0.056701
514	880.52	0.999655	0.055521	0.056621
515	885.53	0.999653	0.055456	0.056545
516	890.53	0.999669	0.055297	0.056385
517	895.53	0.999648	0.055243	0.056321
518	900.53	0.999657	0.055135	0.056206
519	905.53	0.999679	0.054907	0.055988
520	910.53	0.999682	0.054660	0.055754
521	915.55	0.999674	0.054452	0.055553
522	920.55	0.999641	0.054406	0.055496
523	925.55	0.999652	0.054298	0.055381
524	931.55	0.999678	0.054058	0.055153
525	936.55	0.999666	0.053871	0.054969
526	941.57	0.999628	0.053864	0.054951
527	946.57	0.999650	0.053745	0.054826
528	951.57	0.999661	0.053571	0.054653
529	956.57	0.999645	0.053466	0.054542
530	961.57	0.999649	0.053337	0.054409
531	966.57	0.999649	0.053204	0.054272
532	971.58	0.999658	0.053027	0.054097
533	976.58	0.999638	0.052936	0.053999
534	981.58	0.999631	0.052871	0.053925
535	986.58	0.999628	0.052811	0.053855
536	991.58	0.999614	0.052809	0.053843
537	996.58	0.999619	0.052777	0.053801
538	1001.60	0.999648	0.052612	0.053638
539	1006.60	0.999659	0.052398	0.053434
540	1011.60	0.999620	0.052346	0.053373
541	1016.60	0.999632	0.052240	0.053262
542	1021.60	0.999642	0.052090	0.053112
543	1026.60	0.999648	0.051910	0.052937
544	1031.62	0.999622	0.051833	0.052852
545	1036.62	0.999627	0.051729	0.052744
546	1041.62	0.999640	0.051573	0.052589
547	1046.80	0.999628	0.051459	0.052471
548	1051.80	0.999658	0.051225	0.052252
549	1056.80	0.999650	0.051022	0.052057
550	1061.82	0.999625	0.050914	0.051945
551	1066.82	0.999624	0.050804	0.051830
552	1071.82	0.999636	0.050647	0.051675

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
553	1076.82	0.999630	0.050511	0.051537
554	1081.82	0.999607	0.050455	0.051473
555	1086.82	0.999593	0.050446	0.051455
556	1091.83	0.999611	0.050367	0.051369
557	1096.83	0.999587	0.050367	0.051360
558	1101.83	0.999582	0.050378	0.051362
559	1106.83	0.999596	0.050335	0.051311
560	1111.83	0.999619	0.050207	0.051182
561	1116.83	0.999611	0.050105	0.051076
562	1121.85	0.999573	0.050130	0.051093
563	1126.85	0.999593	0.050079	0.051034
564	1131.85	0.999606	0.049981	0.050933
565	1136.85	0.999618	0.049840	0.050792
566	1141.85	0.999587	0.049798	0.050743
567	1146.85	0.999588	0.049749	0.050687
568	1151.87	0.999594	0.049677	0.050609
569	1156.87	0.999597	0.049590	0.050518
570	1161.87	0.999609	0.049461	0.050389
571	1166.87	0.999611	0.049324	0.050253
572	1171.87	0.999607	0.049199	0.050128
573	1176.87	0.999594	0.049111	0.050036
574	1181.88	0.999597	0.049012	0.049934
575	1186.88	0.999609	0.048874	0.049798
576	1191.88	0.999596	0.048773	0.049694
577	1196.88	0.999586	0.048698	0.049614
578	1201.88	0.999599	0.048583	0.049498
579	1206.88	0.999598	0.048467	0.049382
580	1211.90	0.999563	0.048451	0.049358
581	1216.90	0.999581	0.048379	0.049281
582	1221.90	0.999593	0.048269	0.049170
583	1226.90	0.999581	0.048191	0.049088
584	1231.90	0.999593	0.048078	0.048974
585	1236.90	0.999598	0.047948	0.048845
586	1241.92	0.999580	0.047866	0.048759
587	1246.92	0.999574	0.047799	0.048687
588	1251.92	0.999573	0.047730	0.048614
589	1256.92	0.999562	0.047689	0.048567
590	1261.92	0.999567	0.047632	0.048504
591	1266.92	0.999576	0.047546	0.048416
592	1271.93	0.999574	0.047466	0.048332
593	1276.93	0.999552	0.047439	0.048299
594	1281.93	0.999535	0.047454	0.048307
595	1286.93	0.999571	0.047370	0.048220

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
596	1291.93	0.999566	0.047297	0.048143
597	1296.93	0.999558	0.047242	0.048083
598	1301.95	0.999581	0.047127	0.047969
599	1306.95	0.999567	0.047044	0.047884
600	1311.95	0.999545	0.047014	0.047848
601	1316.95	0.999562	0.046940	0.047770
602	1321.95	0.999534	0.046931	0.047755
603	1326.95	0.999539	0.046907	0.047725
604	1331.97	0.999559	0.046831	0.047646
605	1336.97	0.999559	0.046752	0.047565
606	1341.97	0.999551	0.046690	0.047499
607	1346.97	0.999561	0.046603	0.047410
608	1351.97	0.999547	0.046547	0.047350
609	1356.97	0.999542	0.046498	0.047297
610	1361.98	0.999548	0.046435	0.047230
611	1366.98	0.999558	0.046347	0.047140
612	1371.98	0.999546	0.046284	0.047074
613	1376.98	0.999540	0.046230	0.047016
614	1381.98	0.999566	0.046118	0.046905
615	1386.98	0.999574	0.045985	0.046777
616	1392.00	0.999535	0.045939	0.046726
617	1397.00	0.999538	0.045883	0.046667
618	1402.00	0.999545	0.045810	0.046591
619	1407.00	0.999537	0.045751	0.046529
620	1412.00	0.999525	0.045716	0.046489
621	1417.00	0.999550	0.045626	0.046398
622	1422.02	0.999554	0.045527	0.046299
623	1427.02	0.999552	0.045429	0.046202
624	1432.02	0.999501	0.045436	0.046203
625	1437.02	0.999532	0.045375	0.046140
626	1442.02	0.999550	0.045277	0.046042
627	1447.02	0.999527	0.045224	0.045985
628	1452.03	0.999523	0.045176	0.045933
629	1457.03	0.999521	0.045130	0.045883
630	1462.03	0.999501	0.045123	0.045871
631	1467.03	0.999526	0.045063	0.045808
632	1472.03	0.999528	0.044998	0.045741

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
338	Mar 16 06:37:32	59.8092	75.7256	64.7532
339	Mar 16 06:42:34	59.8085	75.7175	64.7965
340	Mar 16 06:47:34	59.8080	75.7180	64.8030
341	Mar 16 06:52:34	59.8072	75.7141	64.8201
342	Mar 16 06:57:34	59.8066	75.7104	64.7684
343	Mar 16 07:02:35	59.8056	75.6987	64.7694
344	Mar 16 07:07:35	59.8050	75.6957	64.7946
345	Mar 16 07:12:35	59.8041	75.6891	64.7842
346	Mar 16 07:17:35	59.8035	75.6876	64.7915
347	Mar 16 07:22:35	59.8030	75.7028	64.8127
348	Mar 16 07:27:35	59.8022	75.6865	64.8015
349	Mar 16 07:32:36	59.8014	75.6733	64.7779
350	Mar 16 07:37:36	59.8005	75.6688	64.7902
351	Mar 16 07:42:36	59.7996	75.6593	64.7709
352	Mar 16 07:47:36	59.7988	75.6499	64.7527
353	Mar 16 07:52:36	59.7982	75.6492	64.7647
354	Mar 16 07:57:37	59.7976	75.6431	64.7525
355	Mar 16 08:02:37	59.7971	75.6306	64.7156
356	Mar 16 08:07:37	59.7961	75.6346	64.7045
357	Mar 16 08:12:37	59.7950	75.6246	64.6658
358	Mar 16 08:17:37	59.7942	75.6167	64.6732
359	Mar 16 08:22:37	59.7936	75.6078	64.6538
360	Mar 16 08:27:38	59.7929	75.5988	64.6332
361	Mar 16 08:32:38	59.7921	75.6103	64.6723
362	Mar 16 08:37:38	59.7912	75.6036	64.6669
363	Mar 16 08:42:38	59.7905	75.5949	64.6378
364	Mar 16 08:47:38	59.7901	75.5881	64.6421
365	Mar 16 08:52:38	59.7893	75.5893	64.6659
366	Mar 16 08:57:39	59.7888	75.5886	64.6778
367	Mar 16 09:02:39	59.7881	75.5871	64.7090
368	Mar 16 09:07:39	59.7877	75.5792	64.7040
369	Mar 16 09:12:39	59.7871	75.5656	64.6891
370	Mar 16 09:17:39	59.7868	75.5726	64.7112
371	Mar 16 09:22:39	59.7862	75.5802	64.7270
372	Mar 16 09:27:40	59.7856	75.5643	64.6865
373	Mar 16 09:32:40	59.7848	75.5506	64.6581
374	Mar 16 09:37:40	59.7843	75.5454	64.6361
375	Mar 16 09:42:40	59.7834	75.5421	64.6737
376	Mar 16 09:47:40	59.7827	75.5434	64.6516
377	Mar 16 09:52:40	59.7821	75.5414	64.6732
378	Mar 16 09:57:41	59.7812	75.5316	64.6876
379	Mar 16 10:02:41	59.7804	75.5245	64.6842
380	Mar 16 10:07:41	59.7798	75.5071	64.6642
381	Mar 16 10:12:41	59.7792	75.5084	64.6588
382	Mar 16 10:17:41	59.7785	75.5066	64.6569
383	Mar 16 10:22:41	59.7779	75.5017	64.6495
384	Mar 16 10:27:42	59.7772	75.5031	64.6688
385	Mar 16 10:32:42	59.7764	75.5069	64.6776
386	Mar 16 10:37:42	59.7755	75.5024	64.6764

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
387	Mar 16 10:42:42	59.7748	75.4898	64.6390
388	Mar 16 10:47:42	59.7741	75.4831	64.6414
389	Mar 16 10:52:42	59.7734	75.4824	64.6251
390	Mar 16 10:57:43	59.7727	75.4762	64.6616
391	Mar 16 11:02:43	59.7717	75.4671	64.6643
392	Mar 16 11:07:43	59.7711	75.4612	64.6400
393	Mar 16 11:12:43	59.7705	75.4603	64.6322
394	Mar 16 11:17:43	59.7698	75.4593	64.6630
395	Mar 16 11:22:43	59.7691	75.4532	64.6331
396	Mar 16 11:27:44	59.7684	75.4499	64.6419
397	Mar 16 11:32:44	59.7675	75.4346	64.6293
398	Mar 16 11:37:44	59.7672	75.4252	64.6127
399	Mar 16 11:42:44	59.7669	75.4214	64.5930
400	Mar 16 11:47:44	59.7663	75.4208	64.6123
401	Mar 16 11:52:44	59.7654	75.4268	64.6223
402	Mar 16 11:57:45	59.7650	75.4302	64.6590
403	Mar 16 12:02:45	59.7642	75.4146	64.6327
404	Mar 16 12:07:45	59.7638	75.4169	64.6233
405	Mar 16 12:12:45	59.7632	75.4044	64.6352
406	Mar 16 12:17:45	59.7626	75.3968	64.5783
407	Mar 16 12:22:45	59.7618	75.3958	64.5856
408	Mar 16 12:27:46	59.7609	75.3895	64.6180
409	Mar 16 12:32:46	59.7604	75.3875	64.6075
410	Mar 16 12:37:46	59.7599	75.3796	64.6057
411	Mar 16 12:42:46	59.7594	75.3807	64.5959
412	Mar 16 12:47:46	59.7588	75.3766	64.6163
413	Mar 16 12:52:47	59.7583	75.3690	64.5861
414	Mar 16 12:57:47	59.7577	75.3680	64.5865
415	Mar 16 13:02:47	59.7570	75.3701	64.6170
416	Mar 16 13:07:47	59.7565	75.3641	64.6027
417	Mar 16 13:12:47	59.7561	75.3531	64.5787
418	Mar 16 13:17:47	59.7554	75.3472	64.5322
419	Mar 16 13:22:48	59.7546	75.3524	64.5676
420	Mar 16 13:27:48	59.7538	75.3541	64.6115
421	Mar 16 13:32:48	59.7531	75.3406	64.5693
422	Mar 16 13:37:48	59.7528	75.3329	64.5697
423	Mar 16 13:42:48	59.7522	75.3351	64.5798
424	Mar 16 13:47:48	59.7518	75.3328	64.5932
425	Mar 16 13:52:49	59.7511	75.3290	64.5554
426	Mar 16 13:57:49	59.7503	75.3218	64.5559
427	Mar 16 14:02:49	59.7497	75.3191	64.5673
428	Mar 16 14:07:49	59.7493	75.3101	64.5355
429	Mar 16 14:12:49	59.7486	75.3021	64.5267
430	Mar 16 14:17:49	59.7483	75.3055	64.5528
431	Mar 16 14:22:50	59.7479	75.3023	64.5540
432	Mar 16 14:27:50	59.7474	75.2969	64.5369
433	Mar 16 14:32:50	59.7464	75.2901	64.5193
434	Mar 16 14:37:50	59.7457	75.2853	64.5083
435	Mar 16 14:42:50	59.7453	75.2774	64.4856

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
436	Mar 16 14:47:50	59.7449	75.2737	64.4744
437	Mar 16 14:52:51	59.7443	75.2813	64.4964
438	Mar 16 14:57:51	59.7441	75.2771	64.5079
439	Mar 16 15:02:51	59.7435	75.2782	64.5450
440	Mar 16 15:07:51	59.7427	75.2794	64.5822
441	Mar 16 15:12:51	59.7424	75.2636	64.5486
442	Mar 16 15:17:51	59.7417	75.2636	64.5495
443	Mar 16 15:22:52	59.7412	75.2570	64.5167
444	Mar 16 15:27:52	59.7406	75.2475	64.4884
445	Mar 16 15:32:52	59.7399	75.2485	64.5091
446	Mar 16 15:37:52	59.7394	75.2514	64.5277
447	Mar 16 15:42:52	59.7386	75.2410	64.4906
448	Mar 16 15:47:52	59.7385	75.2295	64.4873
449	Mar 16 15:52:53	59.7377	75.2347	64.4972
450	Mar 16 15:57:53	59.7373	75.2366	64.5088
451	Mar 16 16:02:53	59.7368	75.2381	64.5025
452	Mar 16 16:07:53	59.7358	75.2305	64.5078
453	Mar 16 16:12:53	59.7355	75.2287	64.5007
454	Mar 16 16:17:53	59.7348	75.2155	64.4948
455	Mar 16 16:22:54	59.7342	75.2096	64.4550
456	Mar 16 16:27:54	59.7334	75.2020	64.4453
457	Mar 16 16:32:54	59.7329	75.1982	64.4632
458	Mar 16 16:37:54	59.7325	75.1997	64.4730
459	Mar 16 16:42:54	59.7319	75.1994	64.4650
460	Mar 16 16:47:54	59.7314	75.1882	64.4709
461	Mar 16 16:52:55	59.7310	75.1807	64.4466
462	Mar 16 16:57:55	59.7299	75.1749	64.4435
463	Mar 16 17:02:55	59.7292	75.1661	64.4645
464	Mar 16 17:07:55	59.7290	75.1722	64.4564
465	Mar 16 17:12:55	59.7282	75.1759	64.4667
466	Mar 16 17:17:55	59.7274	75.1681	64.4727
467	Mar 16 17:22:56	59.7265	75.1648	64.4710
468	Mar 16 17:27:56	59.7258	75.1512	64.4656
469	Mar 16 17:32:56	59.7255	75.1399	64.4471
470	Mar 16 17:37:56	59.7251	75.1429	64.4791
471	Mar 16 17:42:56	59.7244	75.1327	64.4422
472	Mar 16 17:47:56	59.7239	75.1246	64.4251
473	Mar 16 17:52:57	59.7235	75.1221	64.4235
474	Mar 16 17:57:57	59.7228	75.1258	64.4389
475	Mar 16 18:02:57	59.7223	75.1240	64.4335
476	Mar 16 18:07:57	59.7214	75.1236	64.4103
477	Mar 16 18:12:57	59.7210	75.1226	64.4508
478	Mar 16 18:17:57	59.7200	75.1083	64.4604
479	Mar 16 18:22:58	59.7196	75.1031	64.4106
480	Mar 16 18:27:58	59.7188	75.1039	64.4102
481	Mar 16 18:32:58	59.7184	75.0994	64.4216
482	Mar 16 18:37:58	59.7177	75.0948	64.4326
483	Mar 16 18:42:58	59.7173	75.0903	64.4084
484	Mar 16 18:47:58	59.7166	75.0869	64.4106

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG		TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
485	Mar 16	18:52:59	59.7161	75.0790	64.3952
486	Mar 16	18:57:59	59.7155	75.0763	64.3942
487	Mar 16	19:02:59	59.7150	75.0802	64.4079
488	Mar 16	19:07:59	59.7141	75.0704	64.4212
489	Mar 16	19:12:59	59.7138	75.0634	64.4049
490	Mar 16	19:17:59	59.7132	75.0627	64.3910
491	Mar 16	19:23:00	59.7125	75.0521	64.4059
492	Mar 16	19:28:00	59.7119	75.0459	64.3849
493	Mar 16	19:33:00	59.7113	75.0448	64.3853
494	Mar 16	19:38:00	59.7108	75.0445	64.4074
495	Mar 16	19:43:00	59.7103	75.0398	64.4107
496	Mar 16	19:48:00	59.7098	75.0466	64.4213
497	Mar 16	19:53:01	59.7090	75.0409	64.4252
498	Mar 16	19:58:01	59.7086	75.0253	64.4185
499	Mar 16	20:03:01	59.7083	75.0129	64.3849
500	Mar 16	20:08:01	59.7074	75.0142	64.4102
501	Mar 16	20:13:01	59.7068	75.0174	64.4188
502	Mar 16	20:18:01	59.7064	75.0095	64.3795
503	Mar 16	20:23:02	59.7061	75.0118	64.3616
504	Mar 16	20:28:02	59.7053	75.0090	64.3881
505	Mar 16	20:33:02	59.7051	74.9926	64.3622
506	Mar 16	20:38:02	59.7047	74.9913	64.3336
507	Mar 16	20:43:02	59.7036	74.9938	64.3604
508	Mar 16	20:48:02	59.7030	74.9871	64.3803
509	Mar 16	20:53:03	59.7026	74.9720	64.3481
510	Mar 16	20:58:03	59.7020	74.9742	64.3513
511	Mar 16	21:03:03	59.7014	74.9670	64.3588
512	Mar 16	21:08:03	59.7011	74.9565	64.3538
513	Mar 16	21:13:03	59.7005	74.9626	64.3309
514	Mar 16	21:18:03	59.6996	74.9614	64.3602
515	Mar 16	21:23:04	59.6991	74.9566	64.3700
516	Mar 16	21:28:04	59.6990	74.9474	64.3688
517	Mar 16	21:33:04	59.6984	74.9533	64.3708
518	Mar 16	21:38:04	59.6980	74.9485	64.3335
519	Mar 16	21:43:04	59.6975	74.9335	64.3163
520	Mar 16	21:48:04	59.6969	74.9270	64.3134
521	Mar 16	21:53:05	59.6962	74.9253	64.3062
522	Mar 16	21:58:05	59.6956	74.9371	64.3103
523	Mar 16	22:03:05	59.6949	74.9213	64.3488
524	Mar 16	22:09:05	59.6946	74.9081	64.3168
525	Mar 16	22:14:05	59.6939	74.9088	64.3058
526	Mar 16	22:19:06	59.6931	74.9172	64.3622
527	Mar 16	22:24:06	59.6927	74.9029	64.3466
528	Mar 16	22:29:06	59.6924	74.8981	64.3084
529	Mar 16	22:34:06	59.6918	74.8994	64.3319
530	Mar 16	22:39:06	59.6914	74.8929	64.3338
531	Mar 16	22:44:06	59.6906	74.8871	64.3240
532	Mar 16	22:49:07	59.6905	74.8822	64.3118
533	Mar 16	22:54:07	59.6897	74.8869	64.3033

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
534	Mar 16 22:59:07	59.6892	74.8845	64.3157
535	Mar 16 23:04:07	59.6885	74.8808	64.3079
536	Mar 16 23:09:07	59.6881	74.8836	64.3235
537	Mar 16 23:14:07	59.6875	74.8768	64.3051
538	Mar 16 23:19:08	59.6869	74.8589	64.2696
539	Mar 16 23:24:08	59.6861	74.8489	64.2364
540	Mar 16 23:29:08	59.6853	74.8597	64.2720
541	Mar 16 23:34:08	59.6845	74.8446	64.2909
542	Mar 16 23:39:08	59.6843	74.8367	64.2999
543	Mar 16 23:44:08	59.6839	74.8302	64.2889
544	Mar 16 23:49:09	59.6834	74.8385	64.3064
545	Mar 16 23:54:09	59.6829	74.8305	64.3074
546	Mar 16 23:59:09	59.6826	74.8242	64.2813
547	Mar 17 00:04:20	59.6818	74.8238	64.2737
548	Mar 17 00:09:20	59.6814	74.8078	64.2339
549	Mar 17 00:14:20	59.6812	74.8104	64.2334
550	Mar 17 00:19:21	59.6805	74.8158	64.2497
551	Mar 17 00:24:21	59.6800	74.8096	64.2731
552	Mar 17 00:29:21	59.6795	74.7998	64.2595
553	Mar 17 00:34:21	59.6788	74.7984	64.2462
554	Mar 17 00:39:21	59.6781	74.8023	64.2689
555	Mar 17 00:44:21	59.6778	74.8040	64.2980
556	Mar 17 00:49:22	59.6775	74.7938	64.2795
557	Mar 17 00:54:22	59.6768	74.7995	64.2864
558	Mar 17 00:59:22	59.6762	74.7956	64.2924
559	Mar 17 01:04:22	59.6756	74.7851	64.2693
560	Mar 17 01:09:22	59.6751	74.7712	64.2430
561	Mar 17 01:14:22	59.6746	74.7716	64.2340
562	Mar 17 01:19:23	59.6736	74.7789	64.2877
563	Mar 17 01:24:23	59.6735	74.7675	64.2720
564	Mar 17 01:29:23	59.6729	74.7578	64.2517
565	Mar 17 01:34:23	59.6726	74.7497	64.2334
566	Mar 17 01:39:23	59.6720	74.7587	64.2564
567	Mar 17 01:44:23	59.6713	74.7531	64.2504
568	Mar 17 01:49:24	59.6708	74.7454	64.2492
569	Mar 17 01:54:24	59.6704	74.7386	64.2649
570	Mar 17 01:59:24	59.6701	74.7312	64.2402
571	Mar 17 02:04:24	59.6698	74.7289	64.2296
572	Mar 17 02:09:24	59.6693	74.7285	64.2120
573	Mar 17 02:14:24	59.6687	74.7294	64.2151
574	Mar 17 02:19:25	59.6683	74.7220	64.2373
575	Mar 17 02:24:25	59.6680	74.7151	64.2149
576	Mar 17 02:29:25	59.6675	74.7172	64.2165
577	Mar 17 02:34:25	59.6668	74.7174	64.2063
578	Mar 17 02:39:25	59.6664	74.7091	64.1852
579	Mar 17 02:44:25	59.6662	74.7070	64.1921
580	Mar 17 02:49:26	59.6655	74.7135	64.2495
581	Mar 17 02:54:26	59.6652	74.7026	64.2353
582	Mar 17 02:59:26	59.6648	74.6934	64.2270

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

ROG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
583	Mar 17 03:04:26	59.6642	74.6949	64.2250
584	Mar 17 03:09:26	59.6638	74.6851	64.2257
585	Mar 17 03:14:26	59.6634	74.6809	64.2023
586	Mar 17 03:19:27	59.6627	74.6836	64.2074
587	Mar 17 03:24:27	59.6623	74.6814	64.2240
588	Mar 17 03:29:27	59.6620	74.6825	64.1871
589	Mar 17 03:34:27	59.6615	74.6825	64.2073
590	Mar 17 03:39:27	59.6614	74.6788	64.2056
591	Mar 17 03:44:27	59.6606	74.6688	64.1867
592	Mar 17 03:49:28	59.6605	74.6683	64.1990
593	Mar 17 03:54:28	59.6597	74.6740	64.1835
594	Mar 17 03:59:28	59.6588	74.6731	64.2044
595	Mar 17 04:04:28	59.6585	74.6534	64.1792
596	Mar 17 04:09:28	59.6582	74.6537	64.1745
597	Mar 17 04:14:28	59.6578	74.6511	64.2060
598	Mar 17 04:19:29	59.6575	74.6410	64.1615
599	Mar 17 04:24:29	59.6570	74.6436	64.1627
600	Mar 17 04:29:29	59.6562	74.6449	64.1983
601	Mar 17 04:34:29	59.6560	74.6346	64.1924
602	Mar 17 04:39:29	59.6556	74.6450	64.1987
603	Mar 17 04:44:29	59.6551	74.6353	64.2252
604	Mar 17 04:49:30	59.6547	74.6252	64.1864
605	Mar 17 04:54:30	59.6544	74.6226	64.1826
606	Mar 17 04:59:30	59.6541	74.6229	64.1950
607	Mar 17 05:04:30	59.6536	74.6158	64.1692
608	Mar 17 05:09:30	59.6530	74.6156	64.1889
609	Mar 17 05:14:30	59.6526	74.6136	64.2055
610	Mar 17 05:19:31	59.6523	74.6080	64.2031
611	Mar 17 05:24:31	59.6519	74.6028	64.1623
612	Mar 17 05:29:31	59.6517	74.6066	64.1648
613	Mar 17 05:34:31	59.6513	74.6050	64.1744
614	Mar 17 05:39:31	59.6510	74.5922	64.1436
615	Mar 17 05:44:31	59.6504	74.5845	64.1168
616	Mar 17 05:49:32	59.6496	74.5962	64.1376
617	Mar 17 05:54:32	59.6486	74.5860	64.1377
618	Mar 17 05:59:32	59.6483	74.5801	64.1252
619	Mar 17 06:04:32	59.6481	74.5824	64.1254
620	Mar 17 06:09:32	59.6479	74.5861	64.1397
621	Mar 17 06:14:32	59.6477	74.5720	64.1284
622	Mar 17 06:19:33	59.6473	74.5682	64.1063
623	Mar 17 06:24:33	59.6467	74.5646	64.0955
624	Mar 17 06:29:33	59.6460	74.5808	64.1519
625	Mar 17 06:34:33	59.6457	74.5612	64.1493
626	Mar 17 06:39:33	59.6454	74.5518	64.1214
627	Mar 17 06:44:33	59.6446	74.5568	64.1220
628	Mar 17 06:49:34	59.6438	74.5524	64.1175
629	Mar 17 06:54:34	59.6434	74.5472	64.1414
630	Mar 17 06:59:34	59.6429	74.5518	64.1596
631	Mar 17 07:04:34	59.6424	74.5358	64.1458

Statistical Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
632	Mar 17 07:09:34	59.6422	74.5344	64.1274

APPENDIX E INDUCED LEAK RATE DATA

The following tables present the data for the induced leakage phase of the ILRT. The induced leakage test is defined as the interval between data sets 647 to 696 inclusive. This corresponds to a 4 hour and 6 minute test duration. The following data is included:

1. Containment Mass Plot Leak Rate
2. Containment Average Pressure in psia
3. Containment Average Temperature in deg F
4. Containment Average Dew Point in deg F

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
647	0.00	1.000000	-	-
648	5.00	1.000020	-0.580979	-
649	11.00	1.000021	-0.261745	1.129635
650	16.00	1.000007	-0.056135	0.365354
651	21.02	1.000011	-0.023216	0.180472
652	26.02	1.000000	0.032545	0.173968
653	31.02	0.999982	0.101821	0.228140
654	36.02	0.999980	0.128962	0.225550
655	41.02	0.999954	0.180787	0.274094
656	46.02	0.999958	0.191507	0.265779
657	51.03	0.999971	0.172272	0.235667
658	56.03	0.999976	0.150028	0.207350
659	61.03	0.999967	0.139379	0.188746
660	66.03	0.999920	0.167012	0.217876
661	71.03	0.999931	0.172898	0.217139
662	76.03	0.999928	0.175206	0.213798
663	81.05	0.999932	0.171425	0.205546
664	86.05	0.999926	0.168768	0.199103
665	91.05	0.999944	0.155946	0.185931
666	96.05	0.999945	0.144021	0.173478
667	101.05	0.999907	0.147210	0.173984
668	106.05	0.999894	0.152288	0.177095
669	111.07	0.999879	0.159203	0.182831
670	116.07	0.999914	0.153047	0.175514
671	121.07	0.999835	0.151795	0.172465
672	126.07	0.999862	0.157730	0.177665
673	131.07	0.999870	0.159332	0.177831
674	136.07	0.999865	0.160369	0.177554
675	141.08	0.999881	0.157037	0.173349
676	146.08	0.999884	0.152698	0.168493
677	151.08	0.999892	0.146943	0.162749
678	156.08	0.999872	0.144596	0.159577
679	161.08	0.999866	0.142711	0.156892
680	166.08	0.999876	0.139023	0.152838
681	171.10	0.999873	0.135766	0.149165
682	176.10	0.999862	0.133813	0.146601
683	181.10	0.999855	0.132376	0.144544
684	186.10	0.999859	0.130145	0.141869
685	191.10	0.999853	0.128492	0.139724
686	196.10	0.999864	0.125365	0.136455
687	201.12	0.999848	0.123920	0.134556
688	206.12	0.999819	0.124961	0.135136
689	211.12	0.999810	0.126276	0.136056

Mass Point Leak Rate Analysis

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Braidwood Unit 1
A1R04

RDG	TIME (MINUTES)	NORM. MASS	MEASURED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
690	216.12	0.999817	0.126431	0.135763
691	221.12	0.999797	0.127881	0.136904
692	226.12	0.999809	0.127841	0.136468
693	231.13	0.999795	0.128583	0.136870
694	236.13	0.999800	0.128470	0.136409
695	241.13	0.999793	0.128602	0.136215
696	246.13	0.999793	0.128419	0.135727

Induced Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
647	Mar 17 08:24:37	59.6324	74.4827	64.0987
648	Mar 17 08:29:37	59.6323	74.4717	64.0917
649	Mar 17 08:35:37	59.6313	74.4641	64.0780
650	Mar 17 08:40:37	59.6307	74.4663	64.0708
651	Mar 17 08:45:38	59.6300	74.4583	64.0719
652	Mar 17 08:50:38	59.6291	74.4559	64.0735
653	Mar 17 08:55:38	59.6281	74.4541	64.0937
654	Mar 17 09:00:38	59.6277	74.4515	64.0959
655	Mar 17 09:05:38	59.6269	74.4579	64.1011
656	Mar 17 09:10:38	59.6261	74.4485	64.0957
657	Mar 17 09:15:39	59.6255	74.4383	64.0772
658	Mar 17 09:20:39	59.6249	74.4332	64.0447
659	Mar 17 09:25:39	59.6239	74.4307	64.0327
660	Mar 17 09:30:39	59.6232	74.4441	64.0870
661	Mar 17 09:35:39	59.6228	74.4347	64.0801
662	Mar 17 09:40:39	59.6222	74.4313	64.0871
663	Mar 17 09:45:40	59.6214	74.4211	64.0938
664	Mar 17 09:50:40	59.6208	74.4171	64.1135
665	Mar 17 09:55:40	59.6204	74.4094	64.0521
666	Mar 17 10:00:40	59.6195	74.4050	64.0074
667	Mar 17 10:05:40	59.6190	74.4164	64.0460
668	Mar 17 10:10:40	59.6181	74.4139	64.0607
669	Mar 17 10:15:41	59.6171	74.4121	64.0701
670	Mar 17 10:20:41	59.6165	74.3909	64.0408
671	Mar 17 10:25:41	59.6158	74.3945	64.0516
672	Mar 17 10:30:41	59.6149	74.3995	64.0989
673	Mar 17 10:35:41	59.6145	74.3928	64.0800
674	Mar 17 10:40:41	59.6137	74.3895	64.0685
675	Mar 17 10:45:42	59.6131	74.3790	64.0340
676	Mar 17 10:50:42	59.6125	74.3728	64.0189
677	Mar 17 10:55:42	59.6120	74.3685	63.9791
678	Mar 17 11:00:42	59.6111	74.3688	64.0024
679	Mar 17 11:05:42	59.6106	74.3650	64.0211
680	Mar 17 11:10:42	59.6098	74.3537	64.0100
681	Mar 17 11:15:43	59.6090	74.3504	63.9927
682	Mar 17 11:20:43	59.6085	74.3510	63.9960
683	Mar 17 11:25:43	59.6079	74.3488	64.0030
684	Mar 17 11:30:43	59.6073	74.3421	63.9940
685	Mar 17 11:35:43	59.6067	74.3419	63.9766
686	Mar 17 11:40:43	59.6060	74.3300	63.9690
687	Mar 17 11:45:44	59.6054	74.3328	63.9728
688	Mar 17 11:50:44	59.6045	74.3368	64.0101
689	Mar 17 11:55:44	59.6039	74.3344	64.0231
690	Mar 17 12:00:44	59.6034	74.3310	63.9770
691	Mar 17 12:05:44	59.6021	74.3293	63.9848
692	Mar 17 12:10:44	59.6016	74.3173	63.9916
693	Mar 17 12:15:45	59.6011	74.3210	63.9923
694	Mar 17 12:20:45	59.6004	74.3114	63.9931
695	Mar 17 12:25:45	59.5999	74.3119	63.9848

Induced Leak Rate Test Data

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Braidwood Unit 1
A1R04

RDG	TIME	Comp 1 Press Psia	Comp 1 Temp	Comp 1 DP
696	Mar 17 12:30:45	59.5993	74.3052	63.9936

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APPENDIX F TYPE A TEST CORRECTIONS

The following table presents the Type A Test corrections for leakage pathways isolated during the ILRT.

<u>Pen No.</u>	<u>Description</u>	<u>Local Leak Rate Test No.</u>	<u>Minpath leakrate</u>
56	Service Air	1BwVS 6.1.2.d-1.16	26.970 scfh
70	SI Accumulator	1BwVS 6.1.2.d-1.8	0.420 scfh
	Tank Process		
	Sample		
70	Pressurizer Steam	1BwVS 6.1.2.d-1.8	0.021 scfh
	Process Sample		
Total			27.411 scfh

UNIT 1 ILRT FINAL REPORT

APPENDIX G TYPE B AND C LOCAL LEAK RATE DATA

Local leak rate testing has been performed once (A1R03) since the last ILRT performed in 1991 (A1R02), and were performed after the ILRT performed in March of 1994 (A1R04). Results indicated for A1R03 and A1R04 are "AS LEFT" LLRT values performed during the outages. Several Containment penetrations, including the containment airlocks and purge valves, are tested at more frequent intervals, as specified by the stations Technical Specifications. The results below represent the periodic Type B and C LLRTs performed at 18 month intervals as specified in 10CFR50 Appendix J.

<u>PENETRATIONS</u>	<u>SYSTEM</u>	<u>LLRT RESULTS (SCCM)</u>	
		<u>A1R03 9/92</u>	<u>A1R04 3/94</u>
ZONE 1	ELEC	84.7	12.0
ZONE 2	ELEC	735.0	680.0
ZONE 3	ELEC	151.7	11.9
ZONE 4	ELEC	112.0	10.8
FUEL X-FER TUBE		10.5	20.1
FUEL X-FER BELLOWS		348.0	62.4
EQUIPMENT HATCH		13.5	33.4
I-3	VQ	25.2	3.5
I-3	VQ	9.5	7.8
P-70	PS	130.5	10.0
P-70	PS	145.1	1900.0
P-70	PS	10.2	8.6
P-70	PS	12.3	1200.0
P-45	PS	23.5	35.0
P-45	PS	1096.0	640.0
P-36	PS	146.8	28.0
P-36	PS	745.0	74.3
P-41	CV	218.0	108.4
P-28	CV	18.2	60.0
P-11	RE	40.2	600.0
P-65	RE	12.5	27.8
P-65	RE	599.0	8.1
P-27	RY	160.0	151.6
P-27	RY	3870.0	3870.0
P-44	RY	10.8	33.2
I-5	RY	18.2	30.0
P-21	CC	175.0	780.0
P-24	CC	1454.0	320.0
P-25	CC	9.6	140.0
P-32	FC	260.0	10.1
P-57	FC	240.0	22.2
P-1	CS	324.0	103.3
P-16	CS	493.0	586.0
P-39	IA	315.0	269.0
P-56	SA	2200.0	10.0
P-30	WM	493.0	310.0
P-47	RF	220.0	25.5
P-13	OG	35.0	65.0
P-69	OG	156.0	11.0
P-13	OG	165.0	75.0
P-23	OG	60.0	475.0
P-52	PR	155.1	30.0

UNIT 1 ILRT FINAL REPORT

APPENDIX G TYPE B AND C LOCAL LEAK RATE TEST DATA cont.

<u>PENETRATIONS</u>	<u>SYSTEM</u>	<u>LLRT RESULTS (SCCM)</u>	
		<u>AIR03 9/92</u>	<u>AIR04 3/94</u>
P-52	PR	185.8	2290.0
EQUIP. HATCH	PR	113.0	3.8
	PR	177.0	39.0
EMERG. HATCH	PR	115.0	30.0
	PR	400.0	633.0
P-5	WO	86.0	241.0
P-8	WO	586.0	280.0
P-6	WO	1183.0	620.0
P-10	WO	3220.0	1900.0
P-55	SI	168.3	105.0
P-55	SI	25.6	72.0
P-4	CPP	68.4	60.0
P-63	SPARE	22.5	8.9
P-64	SPARE	23.5	7.2
P-74	SPARE	29.6	11.8
EQUIP HATCH AIRLOCK		5580.0	4900.0
FLANGE		8.1	1.7
EMERG HATCH AIRLOCK		3850.0	3250.0
FLANGE #1		12.5	395.0
FLANGE #2		11.5	390.0
P-97	VQ	2500.0	2410.0
P-95	VQ	1415.0	475.0
P-96	VQ	62.0	100.0
P-94	VQ	775.0	15.0