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March 9, 1990

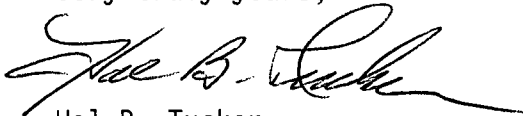
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Subject: Oconee Nuclear Station  
Docket No. 50-287  
Reactor Containment Building  
Integrated Leak Rate Test

Gentlemen:

Per requirements of 10CFR50, Appendix J and Oconee Nuclear Station  
Technical Specification 4.4.1.1.5, please find attached the Unit 3 Reactor  
Containment Building Integrated Leak Rate Test Report for December 1989.

Very truly yours,



Hal B. Tucker

PJN/102/kc

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DUKE POWER COMPANY  
OCONEE NUCLEAR STATION  
UNIT 3

REACTOR CONTAINMENT BUILDING  
INTEGRATED LEAK RATE TEST

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DECEMBER 1989

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## 1.0 Introduction and Summary

The periodic Containment Integrated Leak Rate Test (ILRT) of the Duke Power Company, Oconee Nuclear Station Unit 3 Containment Building was satisfactorily completed on December 9, 1989. The testing was conducted in accordance with Technical Specification 4.4, BN-TOP-1 (Bechtel Testing criteria for ILRT), and 10CFR50 Appendix J.

The absolute method of testing was used with containment temperatures measured at 24 locations and containment dewpoint temperatures measured at six locations. Leakage was measured at half the design basis accident pressure of approx. 29.5 psig. A measured induced leakage was used to verify the results.

Analysis of the final test data shows the results to be well within the specified limits for this containment, which has a maximum allowable leakage rate of 0.176 wt.%/day. The leakage rate for Oconee Unit 3 Containment was calculated, using the Total Time method, to be 0.086205 wt.%/day with the Upper Confidence Limit being 0.118797 wt.%/day.

## 2.0 TEST BACKGROUND INFORMATION

### 2.1 Description of Containment

The containment vessel completely encloses the reactor and reactor coolant system to limit the leakage of radioactive materials to the environment in the unlikely event of a loss of coolant accident.

The concrete/steel containment is a free standing structure and is constructed of reinforced concrete and structural liner plate steel with no separation between the two. It consists of a post-tensioned reinforced concrete cylinder and dome connected and supported by a massive reinforced concrete foundation slab. The entire interior surface of the structure is lined with a 1/4 in. thick welded ASTM A36 steel plate to assure a high degree of leak tightness. Numerous mechanical and electrical systems penetrate the containment structure wall through welded steel penetrations.

Principal dimensions are as follows:

Inside Diameter	116 ft
Inside Height	208.5 ft
Vertical Wall Thickness	3.75 ft
Dome Thickness	3.25 ft
Foundation Slab Thickness	8.5 ft
Liner Plate Thickness	0.25 in
Internal Free Volume	1,863,000 cu ft

Personnel and equipment access to the structure is provided by a double door personnel hatch with double seals on the outer door and by a 19 ft diameter double gasketed single door equipment hatch. A double door emergency hatch is also provided.

The Containment Building, access openings, and penetrations are designed to accommodate a pressure of 59 psig at 286°F and limit leakage to less than 0.25 % by volume in 24 hours at peak accident conditions.

### 2.2 Description of ILRT Instrumentation

Instrumentation was installed to permit leakage rate testing by the "absolute" method. Using this method, the actual mass of dry air within containment is calculated. The leakage rate becomes the rate of change of this mass. The mass of air (Q) is calculated according to the Ideal Gas Law as follows:

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

The primary measurement variables are absolute pressure, relative humidity, and temperature within containment. During the Verification test the imposed flow rate is also recorded.

Twenty-four RTD's, 6 Dewpoint Hygrometers, and 2 Pressure Sensors are installed in predetermined locations in containment to allow determination of weighted average temperatures, vapor pressures, and containment air pressures.

#### 2.2.1 Pressure Instrumentation

Two precision pressure gauges were installed outside the containment vessel, with pressure tubing connecting the gauges to containment atmosphere. The gauges used were Paroscientific Model 760-45A, 45 psia gauges, with the following specifications:

Range:	0 to 45 psia
Repeatability:	0.005% Full Scale
Accuracy:	0.01% Full Scale
Sensitivity:	1ppm FS
Hysteresis:	0.005% Full Scale

#### 2.2.2 Temperature Instrumentation

Twenty-four precision Resistance Temperature Detectors were located throughout containment to allow measurement of the weighted air temperature. The locations of the RTDs are shown in Appendix C. The RTDs used were Rosemount Model No. 78S, with the following specifications:

Range:	0 to 200°F
Accuracy:	+ 0.45°F over entire range
Sensitivity:	+ 0.09°F
Element:	Platinum
Resistance:	100 ohms at 32°F

#### 2.2.3 Humidity Instrumentation

Six Dewpoint Temperature Analyzers were located in containment. The locations of the dewpoint cells are shown in Appendix D. The instruments used were EG&G Dewtrack Model 200, with the following specifications:

Range:	-40 to 140°F
Accuracy:	+ 1°F
Sensitivity:	+ 0.36°F worst case
Output:	4-20 mA

#### 2.2.4 Data Acquisition System

The data acquisition system consists of a Fluke 2289A computer front end and a Fluke 2281A extender chassis, which interfaces with the IBM System 2 Model 80 computer. The required cards and



pertinent data are listed below.

Absolute Pressure - RS232 digital output to computer - instrument does not interface with Fluke data acquisition system.

#### Dewpoint - DC Current Measurement

Cards Required:	161 High Performance A/D
	162 Thermocouple/DC Volts
	171 Current Input Connector
Range:	$\pm 64 \mu\text{A}$
Resolution:	$0.6 \mu\text{A}$ (sensitivity)
Accuracy:	$\pm 0.05\%$ Reading, $\pm 5 \mu\text{A}$ for 1 yr. cal.
Repeatability:	$\pm 0.015\%$ Reading, $\pm 2 \mu\text{A}$

#### Temperature - RTD Resistance Measurement

Cards Required:	161 High Performance A/D
	163 RTD/Resistance Scanner
	177 RTD/Resistance Input Connector
Range:	256 ohms
Resolution:	2.4 mohms (sensitivity)
Accuracy:	$\pm 0.0175\%$ Reading, $\pm 5.7$ mohms for 1 yr cal (15 -35°C operating temperature)
Repeatability:	$\pm 0.005\%$ Input, $\pm 4$ mohms

#### 2.2.5 Flow Instrumentation

A rotameter was used to impose the leak during the verification test. The rotameter used was a Brooks Model #111010K3B1A with the following specifications:

Range:	0 - 20 SCFM
Accuracy:	1% of Reading

#### 2.2.6 Instrumentation Selection Guide

The Instrumentation Selection Guide (ISG) is an acceptable method to verify the ability of the instrumentation system to measure the containment integrated leakage rate. The ISG formula is described in ANSI/ANS-56.8-1987.

The maximum allowable value for the ISG is  $0.25 L_d$ , or 0.044 %/day for Ocone. The ISG calculated for this test (7-hour duration) was 0.0317 %/day.

### 2.3 Description of Computer Program

The ILRT Program actually consists of two separate programs. The main program is called LEAK.EXE. This is a totally generic program, in that it can be used at any facility with no changes required. It's "Personality" is derived from a configuration file, which must be developed for each test. The ILRT program includes the tools needed to create and edit the configuration file. The second program is called DATACQ.EXE. This program provides the interface with the data acquisition system. Although, it must be custom written for each data acquisition system, it does not contain any test specific information. It establishes a link with the data acquisition system to provide commands and send data to LEAK.EXE.

Test parameters to be measured are pressure, Dewpoint temperatures, and dry bulb temperature inside containment. Instrument readings taken by the data acquisition system are recorded on the hard drive in the computer. All data, raw and calibrated, can be displayed on the computer monitor. Use of the "Absolute" method as described in ANSI N45.4-1972 is the basis for the leakage calculations performed by the ILRT Program. The program provides the ability to perform Mass Point or Total Time Analysis' concurrently. A description of the calculations can be found in Appendix B.

### 2.4 Description of Pressurization Equipment

Containment pressurization was accomplished using two electric motor driven and three diesel driven air compressors operating in parallel. The compressed air, after passing through aftercoolers and air dryers, was routed through a common discharge header into containment. This equipment provided an average pressurization rate of 3 psi/hr. See Figure 4.5 for a schematic diagram of the pressurization system.

### 3.0 TEST RESULTS

#### 3.1 Description of Test Sequence

The Unit 3 Containment ILRT was performed in accordance with the Periodic Test Procedure PT/3/A/0150/03A on December 8-9, 1989.

Pressurization for the ILRT began at approximately 1600 hours on December 8, 1989 and was completed at approximately 0220 on December 9, 1989 with containment pressure at approximately 31.5 psig.

An inspection for leaks was performed when containment pressure was at approximately 10 psig. Small leaks were found on 3PR-87, 3PR-90, 3BA-5, 3PG-186, 3N-240, 3N-241, and 3PS-21. These leaks were minor so no corrective action was needed. The Emergency Personnel hatch was found to be pressurizing at the same rate as the Reactor Building, which indicated a problem with the inner door.

During this leak inspection some vent valves were found capped, when the procedure required them to be left uncapped to provide downstream penetration vents. After this was found, all valves located outside containment, that were left uncapped by procedure, were inspected to assure that the caps were removed. The valves inside containment, that were left uncapped by procedure, were inspected as soon as depressurization was complete. A penalty was added, to the final Upper Confidence Limit, which included the Local Leakage measured for the valves that were found inappropriately capped inside containment.

The stabilization phase of the test started at 0230 and ended at approximately 0745 on December 9, 1989.

RTD #7 failed at approximately 0245. The volume fraction assigned to RTD #7 was equally divided between RTD's #3 and #10.

The Total Time test was started at approximately 0745 and completed at approximately 1445 on December 9, 1989.

The verification test was started at 1745 and completed at 2150 on December 9, 1989. Much of the delay in starting the Verification test was due to problems with the Rotameter apparatus.

Depressurization was started at approx. 2255 and completed at approx. 0400 on December 10, 1989.

No equipment damage was found during the post-ILRT containment inspection.

### 3.2 Analysis and Interpretation

#### 3.2.1 Temperature Stabilization

Containment ventilation fans were run during the pressurization phase of the test to aid in mixing of containment air. Due to the slow rate of pressurization ( $\approx 3$ psi/hr) and the thorough mixing of the air during pressurization, the containment air mass stabilized fairly rapidly. Although the BN-TOP-1 Temperature Stabilization criteria was satisfied after four hours, Stabilization was continued for a total duration of five hours to assure that a good point was selected to start the Total Time test.

#### 3.2.2 Total Time Test

Due to the highly stable conditions inside containment following the temperature stabilization period, coupled with the leak tightness of the containment penetrations (no major leaks were found by the leakage survey teams), the Total Time acceptance criteria was satisfied after seven hours. See Appendix A for a summary of each of the Total Time acceptance criteria versus the actual test data. Generally the results are shown below:

	<u>wt %/day</u>
Calc. Leakage Rate.....	0.086205
95% UCL Leakage Rate.....	0.115797
Leakage Rate (95 UCL + Penalties).....	0.118797
Acceptance Criterion (75% $L_t$ ).....	0.132

It is worth noting that the 95% Upper Confidence Limit Mass Point leakage rate was well within acceptable limits approximately two hours after the start of the test.

#### 3.2.3 Verification Test

A superimposed leak, measured with a rotameter, equivalent to 0.172 wt %/day was added to the existing containment leakage. After the required one hour stabilization period and four hours of data accumulation, the verification test was terminated with the following results:

	<u>wt %/day</u>
Min. acceptable calculated leakage rate.....	0.214
Max. acceptable calculated leakage rate.....	0.302
Calc. leakage rate during Verification test..	0.254

#### 4.0 FIGURES

- 4.1 Pressurization Plots
- 4.2 Temperature Stabilization Plots
- 4.3 Total Time Test Plots
- 4.4 Verification Test Plots
- 4.5 Depressurization Plots
- 4.6 Miscellaneous Plots
- 4.7 Pressurization System Schematic

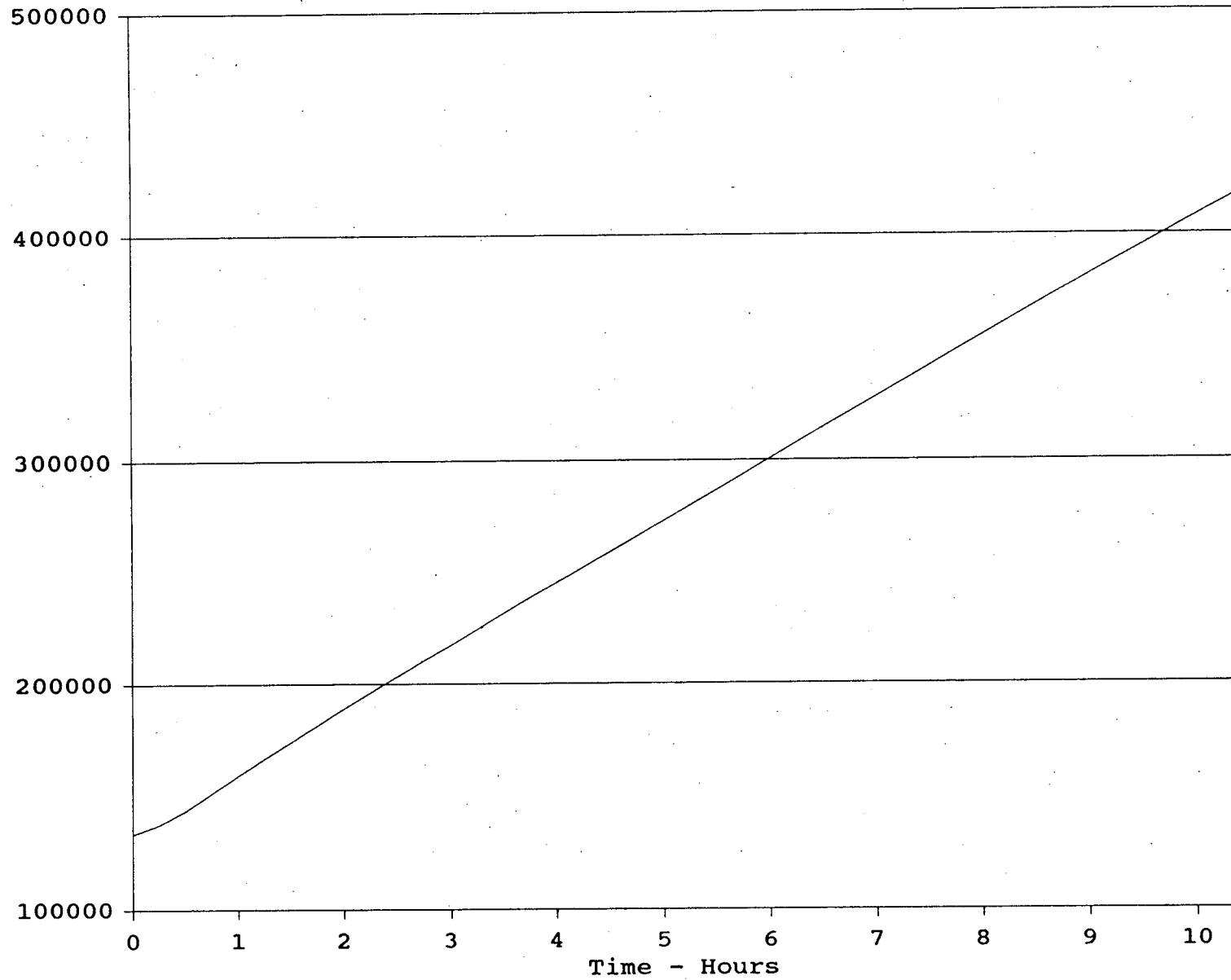
#### 5.0 APPENDICES

- A. BN-TOP-1 Total Time Test Termination Criteria
- B. Leak Rate Calculation Description
- C. RTD Locations
- D. Dewpoint Hygrometer Locations
- E. Leakage Penalty Analysis
- F. Local Leakage rate Testing Conducted since Last ILRT
- G. Test Data

#### 4.1 Pressurization Plots

	<u>Plot Description</u>	<u>Page No.</u>
4.1.1	Containment Mass.....	1-2
4.1.2	Pressure vs. Temperature.....	1-3

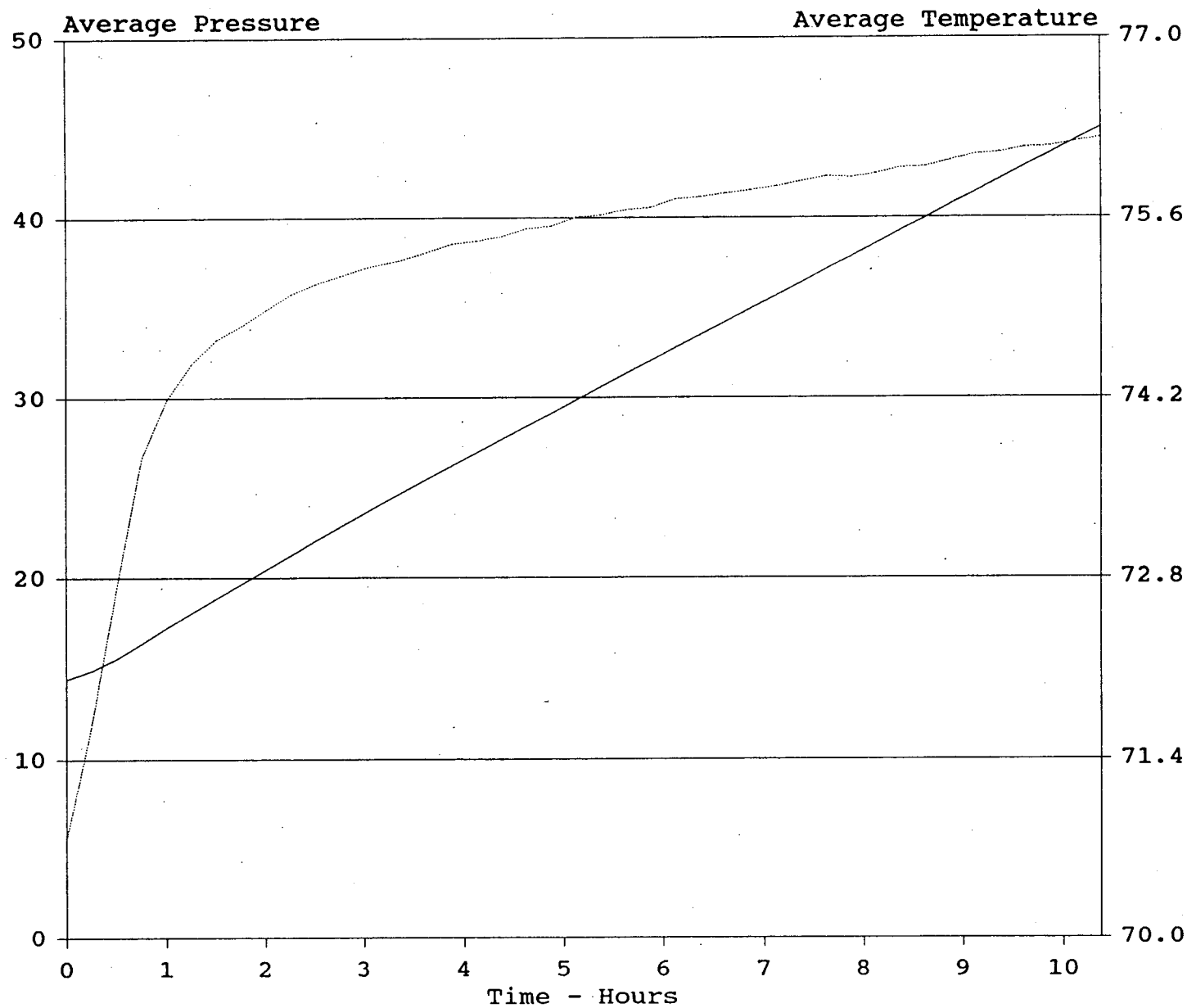
**Containment Mass**  
Oconee Nuclear Station  
Unit 3



1-2

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**Average Pressure & Average Temperature**  
Oconee Nuclear Station  
Unit 3



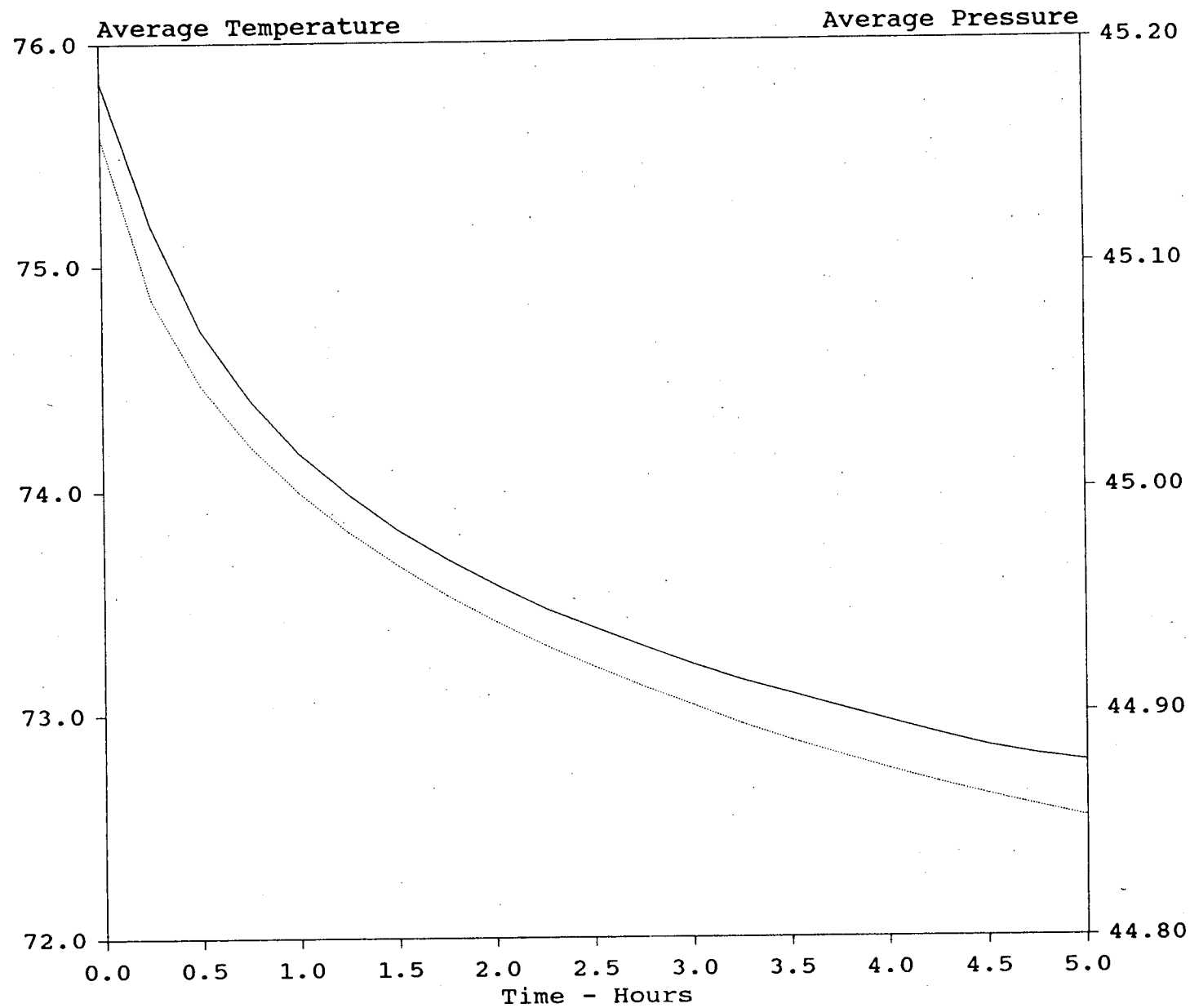


## 4.2 Temperature Stabilization Plots

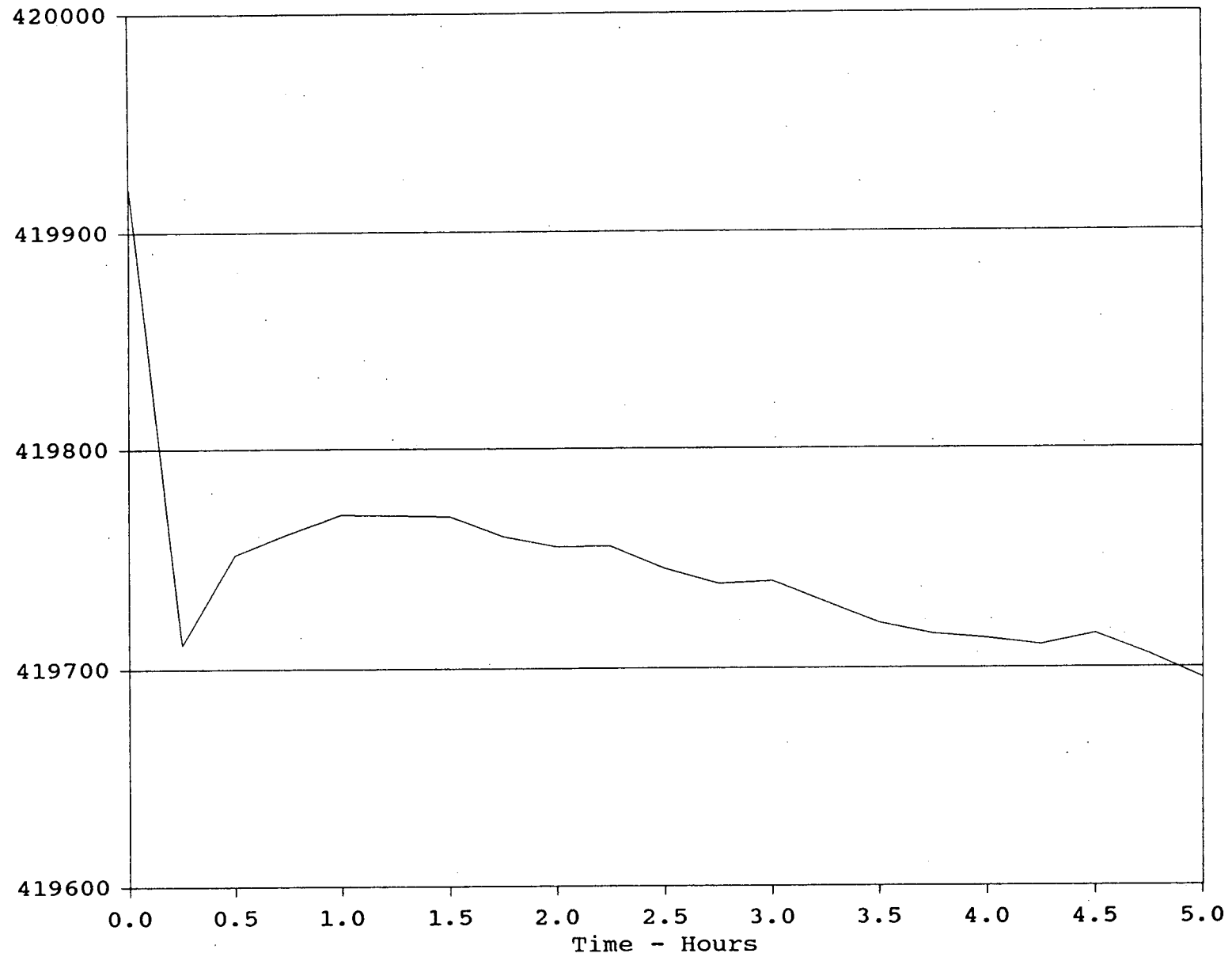
	<u>Plot Description</u>	<u>Page No.</u>
4.2.1	Temperature vs. Pressure Plot.....	2-2
4.2.2	Containment Mass Plot.....	2-3

# Average Temperature & Average Pressure

Oconee Nuclear Station  
Unit 3



**Containment Mass**  
Oconee Nuclear Station  
Unit 3

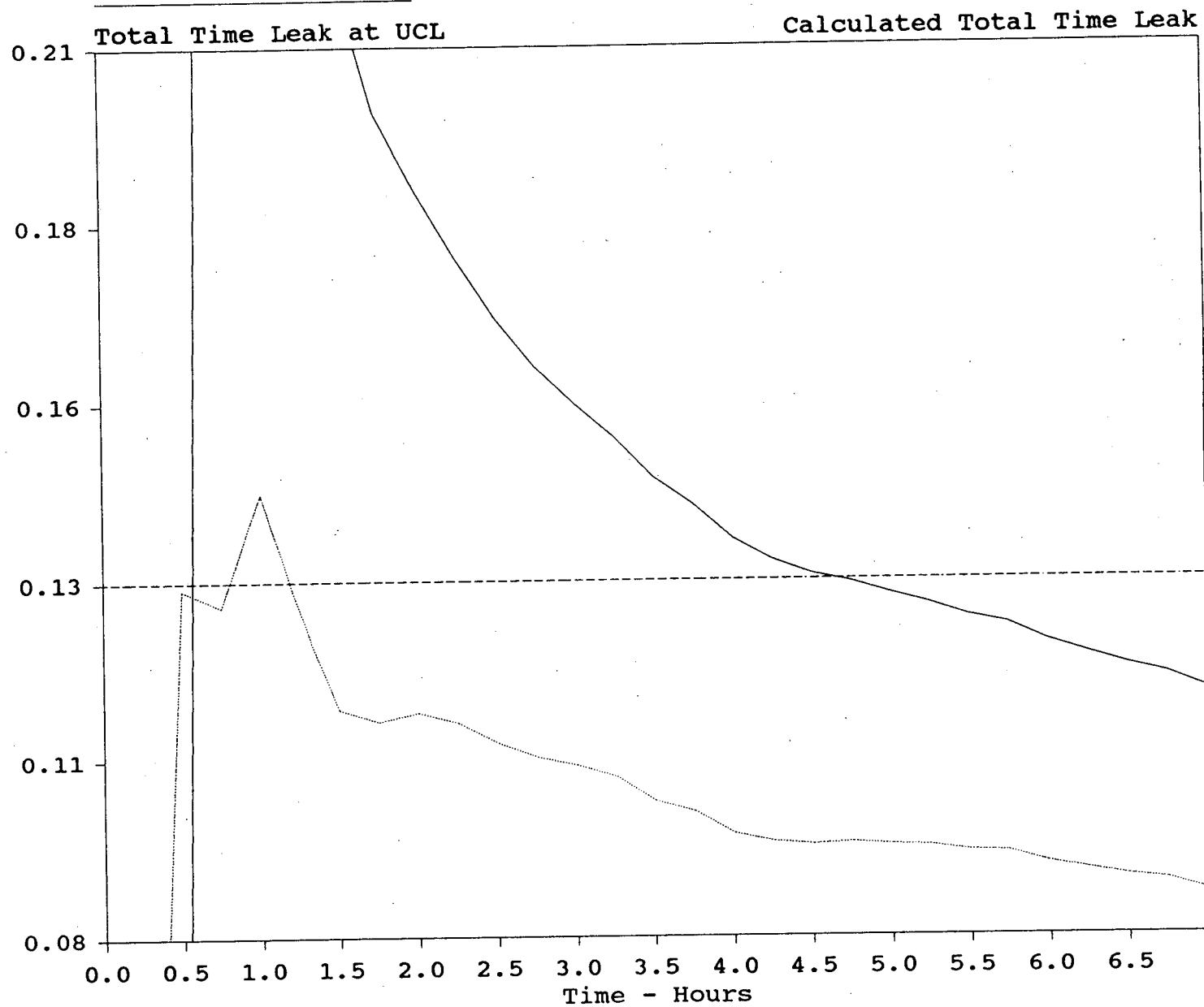


2-3  
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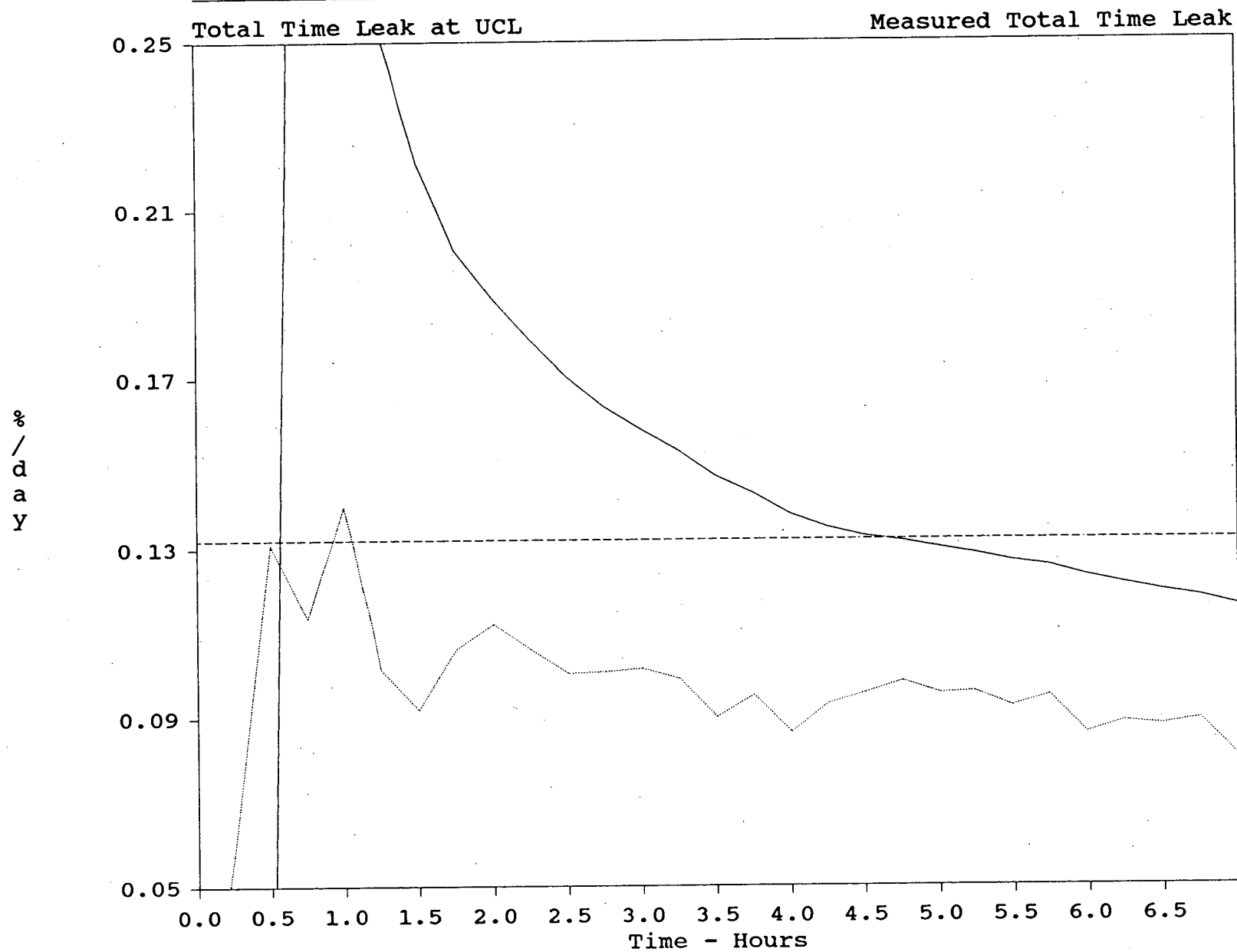
### 4.3 Total Time Test Plots

	<u>Plot Description</u>	<u>Page No.</u>
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4.3.4	Dew Point vs. Temperature.....	3-5
4.3.5	Containment Mass.....	3-6
4.3.6	Pressure.....	3-7

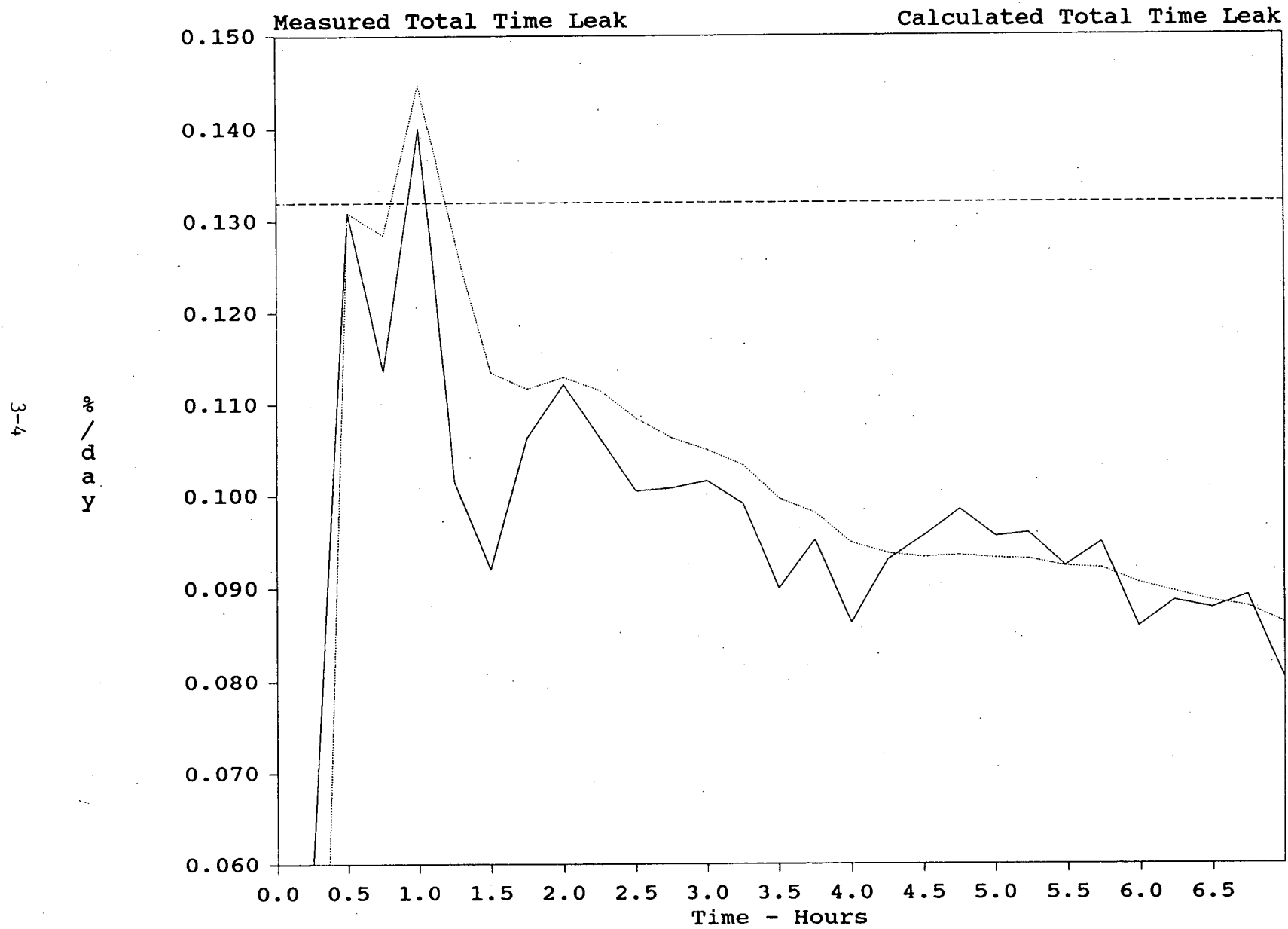
**Total Time Leak at UCL & Calculated Total Time Leak**  
Oconee Nuclear Station  
Unit 3



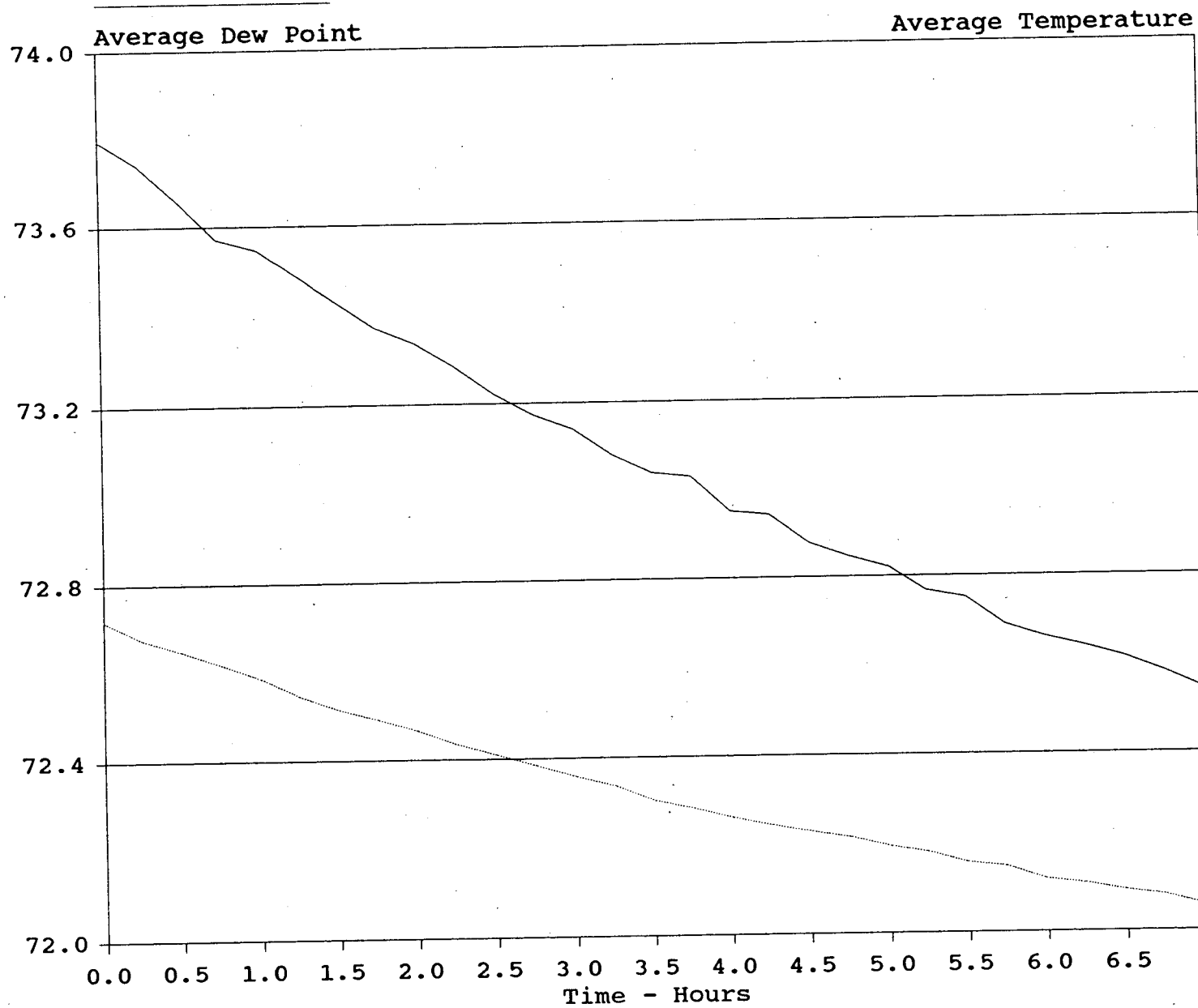
**Total Time Leak at UCL & Measured Total Time Leak**  
Oconee Nuclear Station  
Unit 3



**Measured Total Time Leak & Calculated Total Time Leak**  
Oconee Nuclear Station  
Unit 3

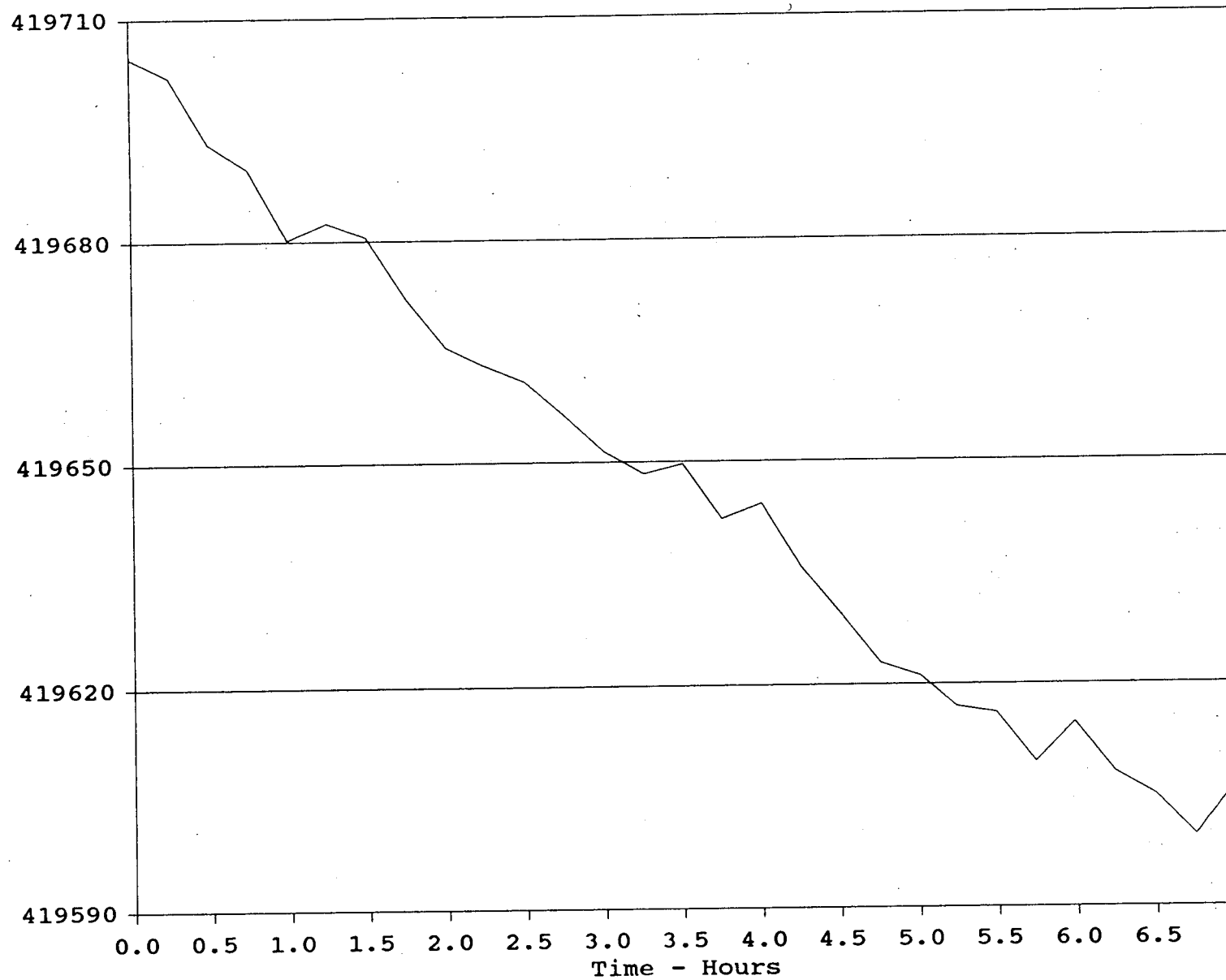


**Average Dew Point & Average Temperature**  
Oconee Nuclear Station  
Unit 3

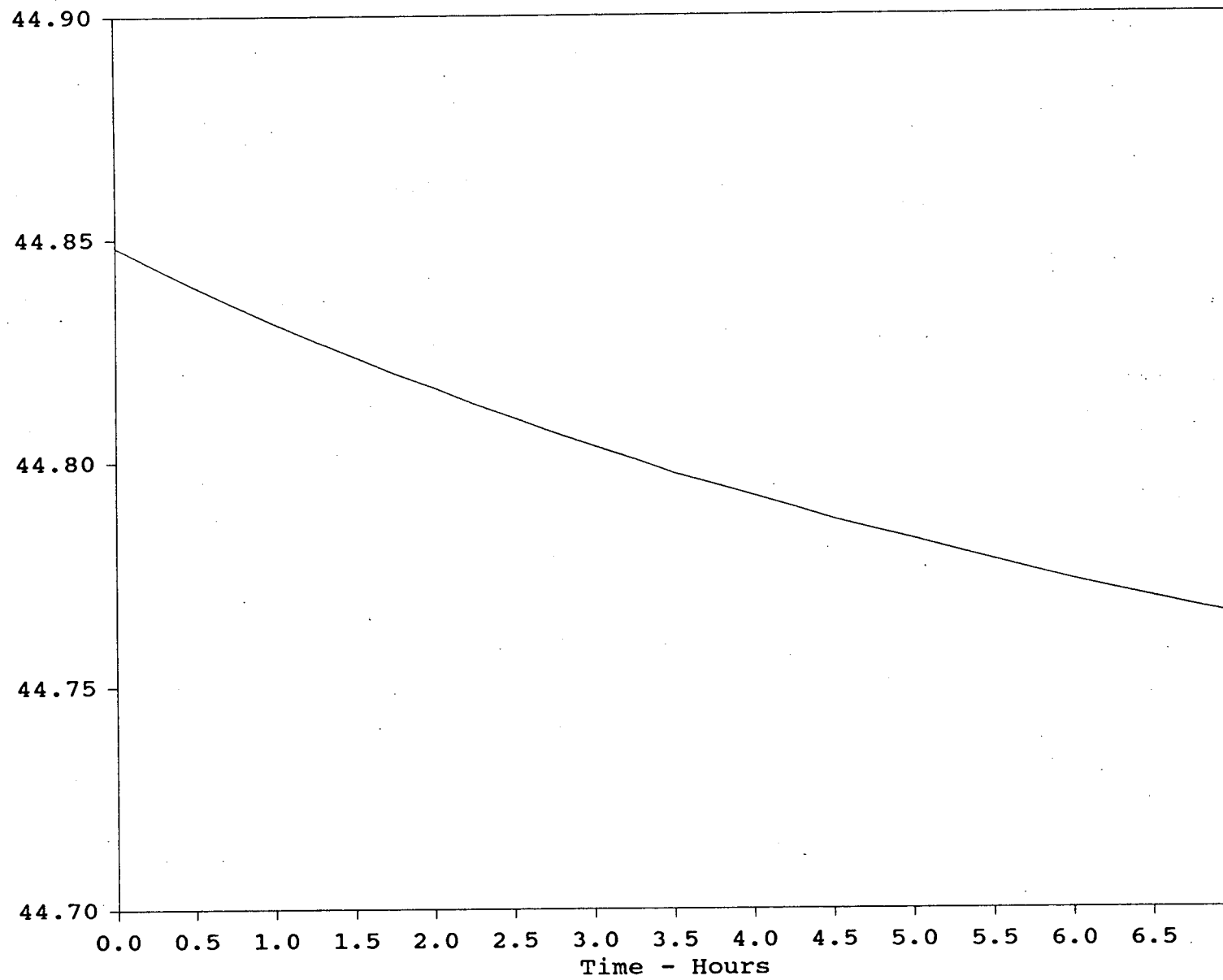




**Containment Mass**  
Oconee Nuclear Station  
Unit 3



**Average Pressure**  
Oconee Nuclear Station  
Unit 3



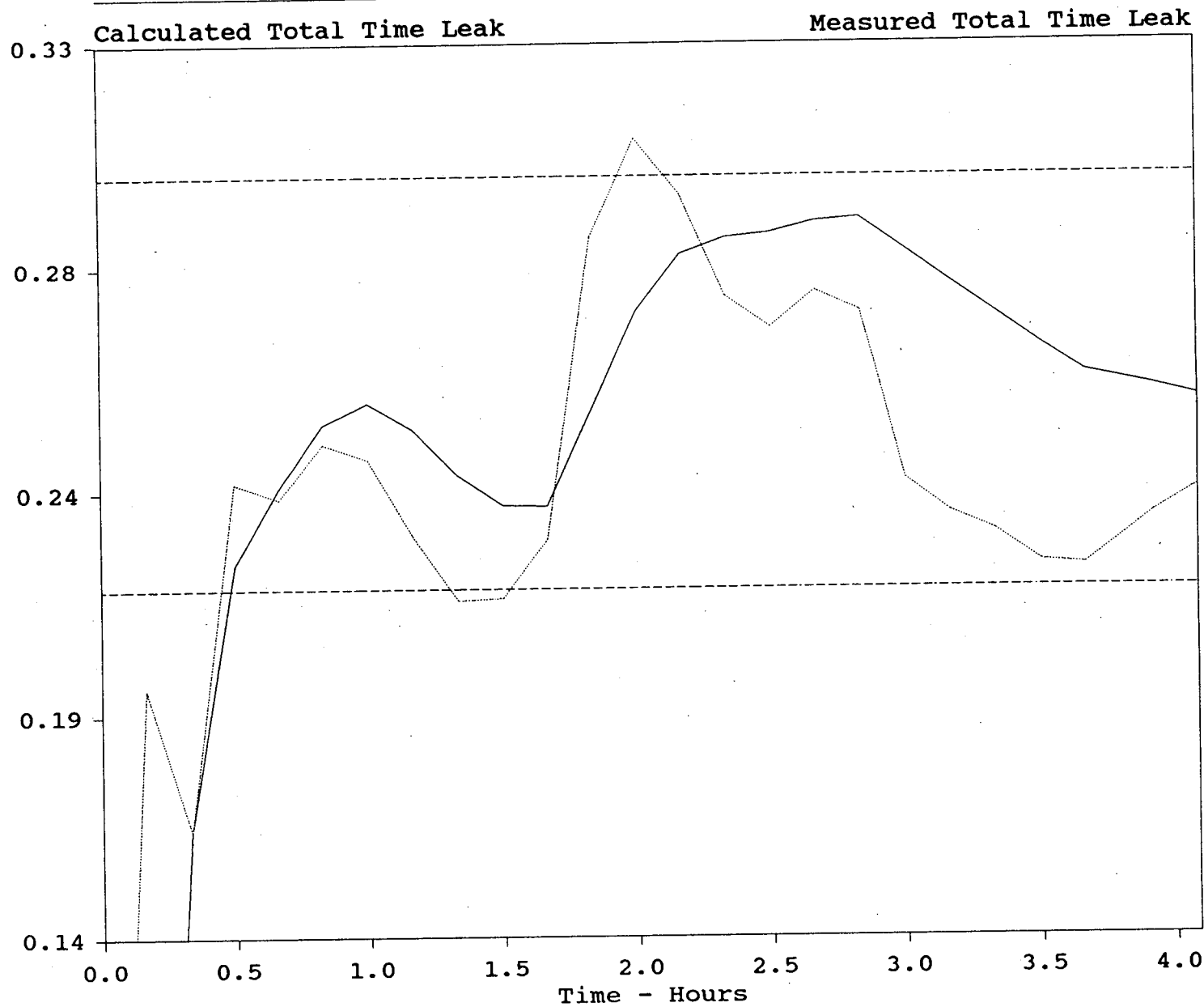
3-7

#### 4.4 Verification Test Plots

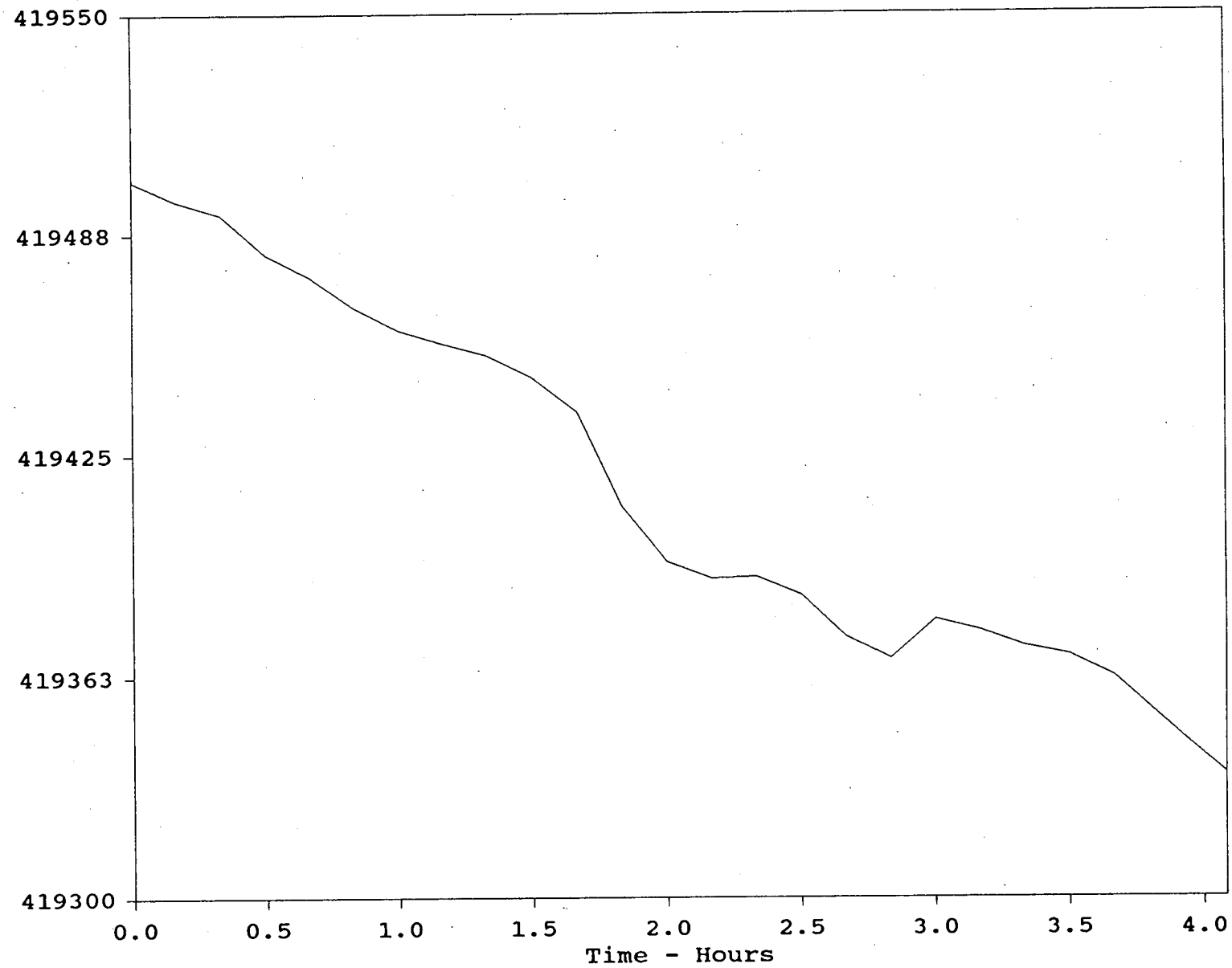
	<u>Plot Description</u>	<u>Page No.</u>
4.4.1	Calculated Leak vs. Measured Leak....	4-2
4.4.2	Containment Mass.....	4-3
4.4.3	Dew Point vs. Temperature.....	4-4
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# Calculated Total Time Leak & Measured Total Time Leak

Oconee Nuclear Station  
Unit 3



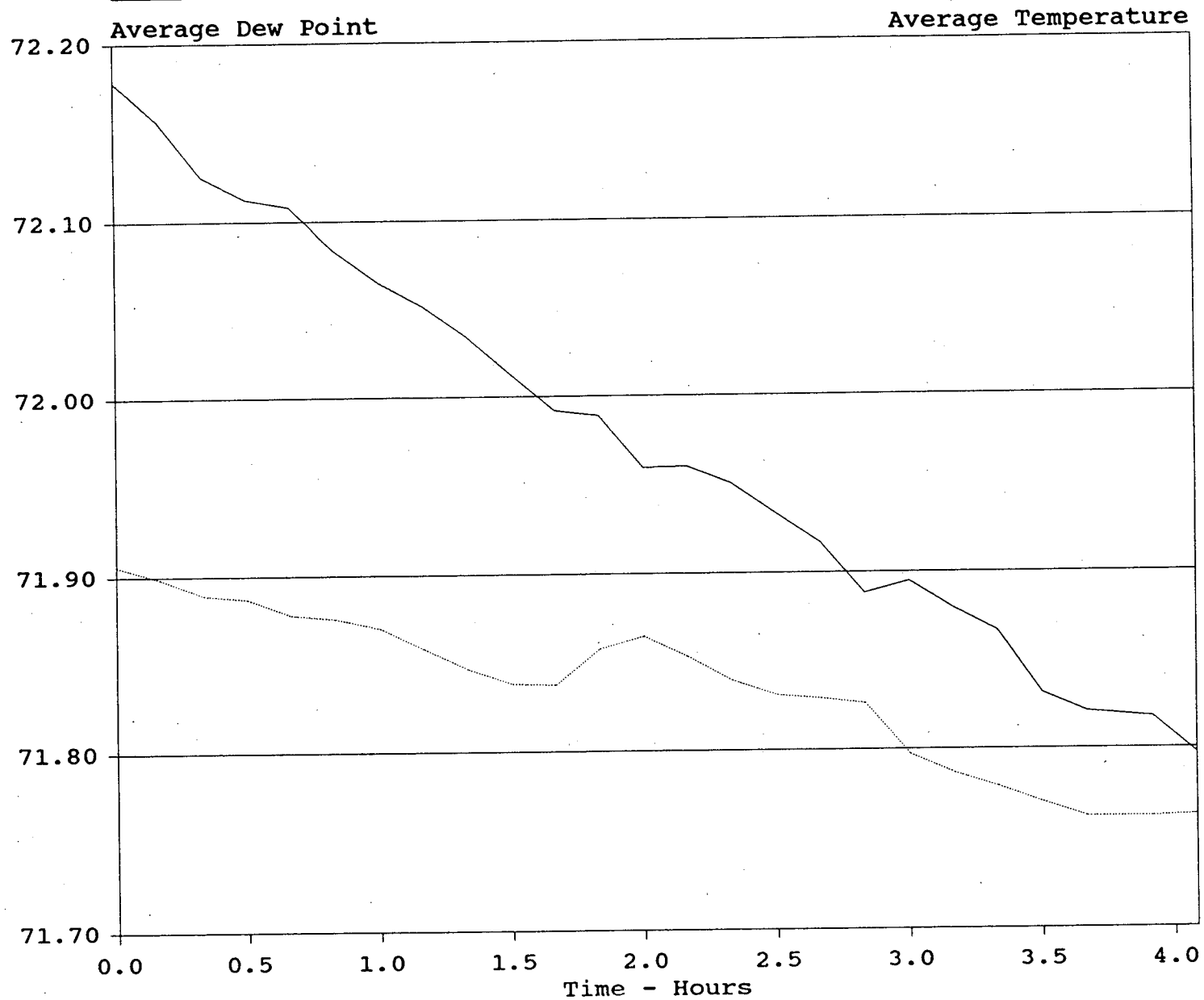
**Containment Mass**  
Oconee Nuclear Station  
Unit 3



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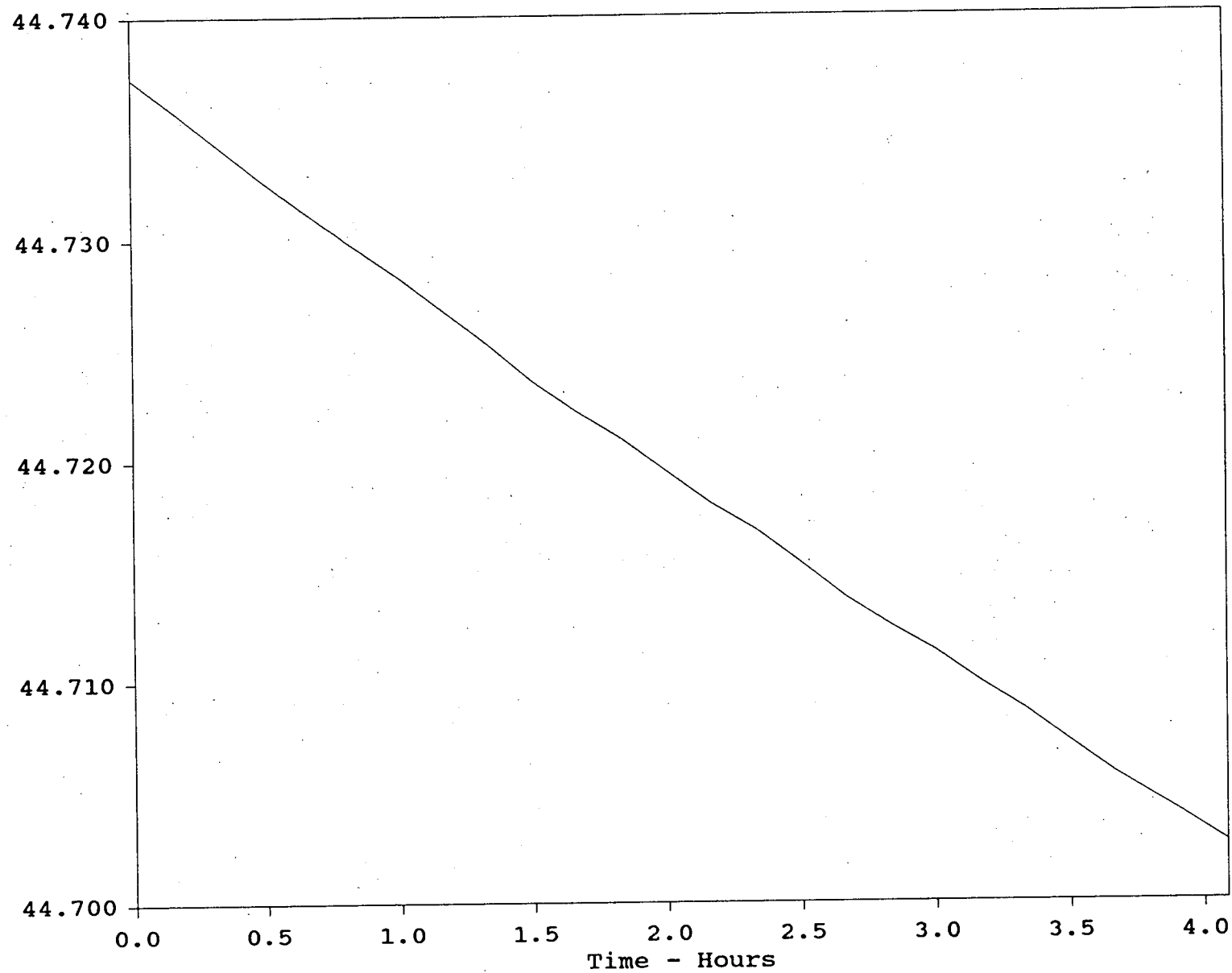
**Average Dew Point & Average Temperature**  
Oconee Nuclear Station  
Unit 3



**Average Pressure**  
Oconee Nuclear Station  
Unit 3

4-5

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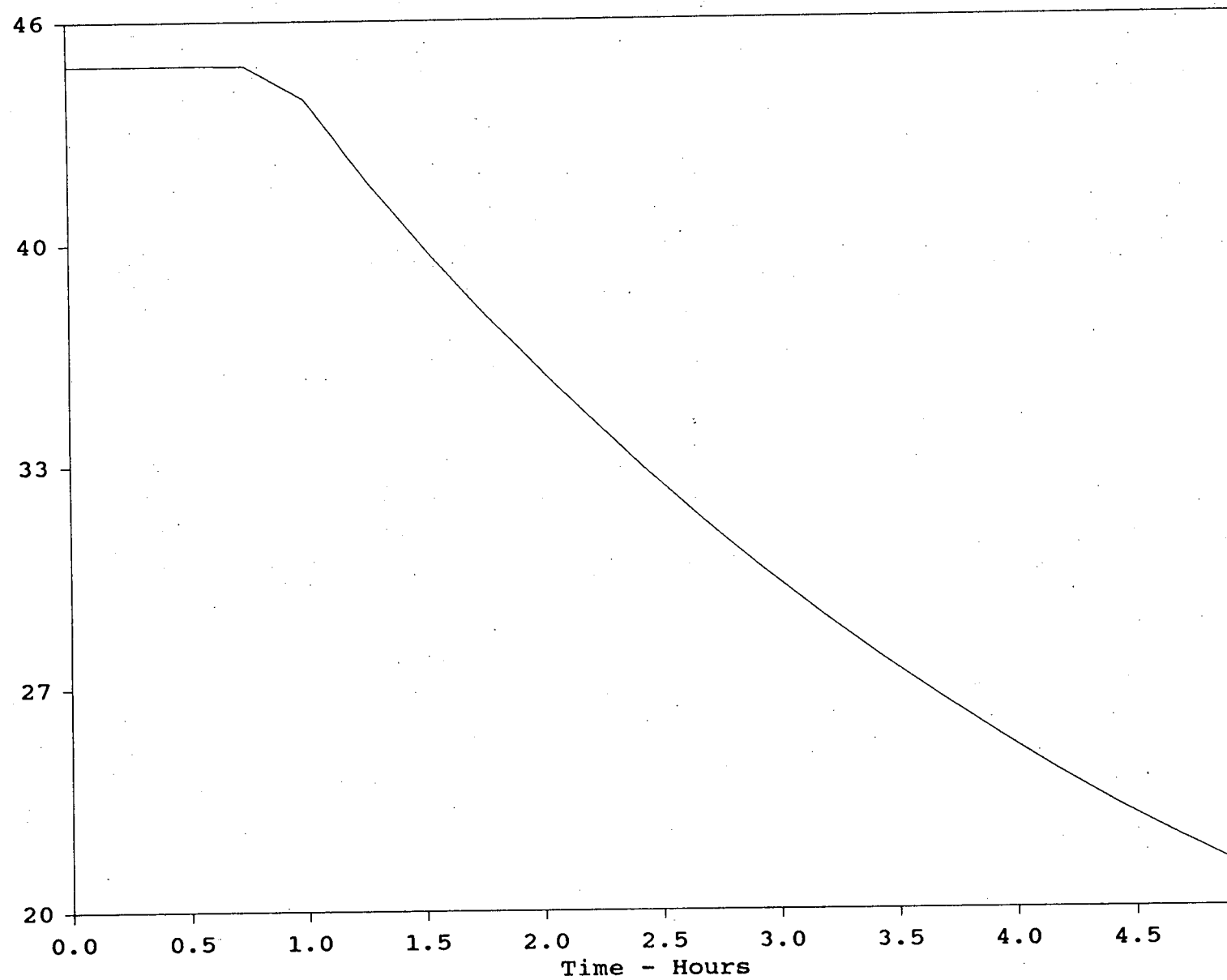
#### 4.5 Depressurization Plots

	<u>Plot Description</u>	<u>Page No.</u>
4.5.1	Pressure.....	5-2
4.5.2	Containment Mass.....	5-3
4.5.3	Dew Point vs. Temperature.....	5-4

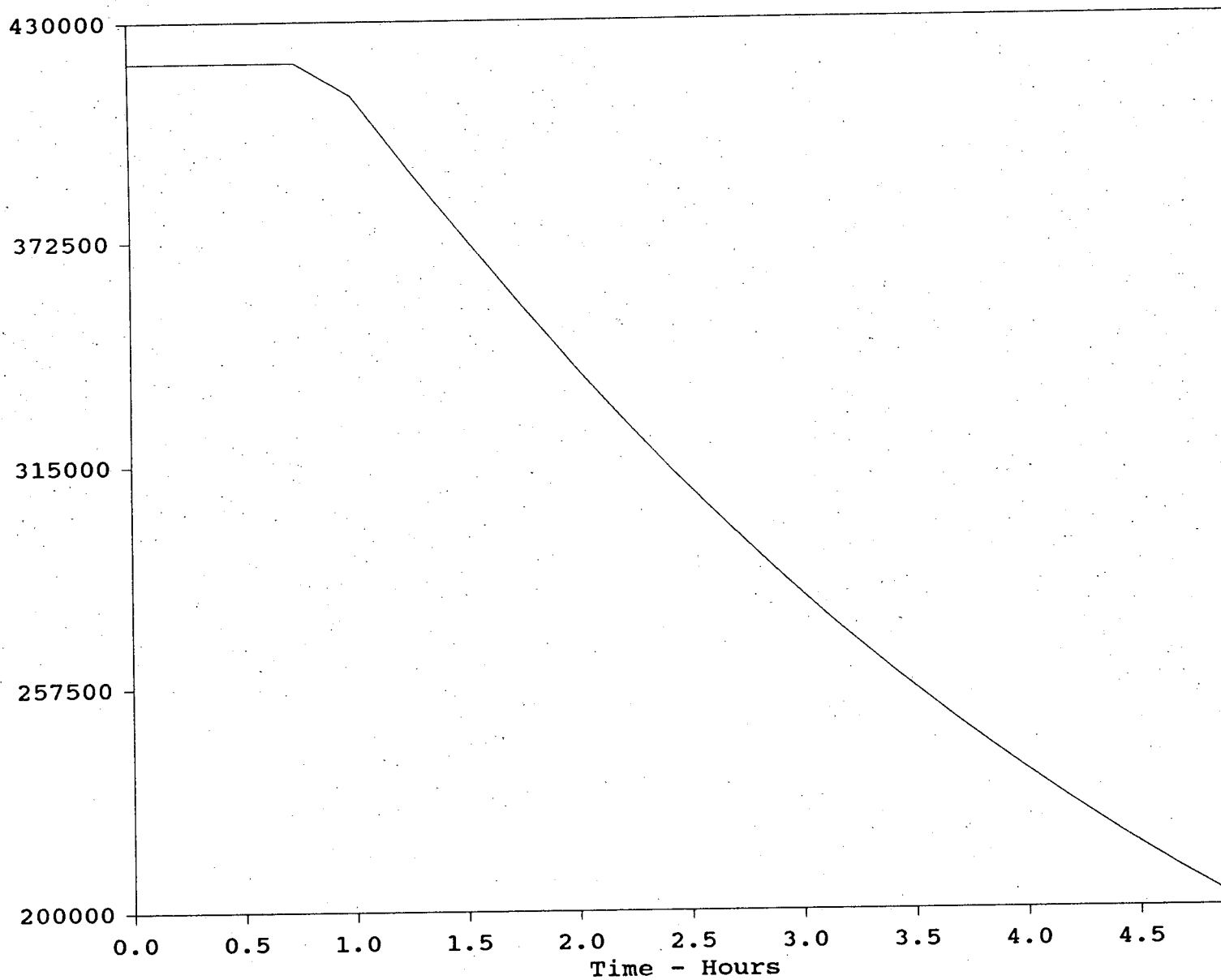


**Average Pressure**  
Oconee Nuclear Station  
Unit 3

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**Containment Mass**  
Oconee Nuclear Station  
Unit 3

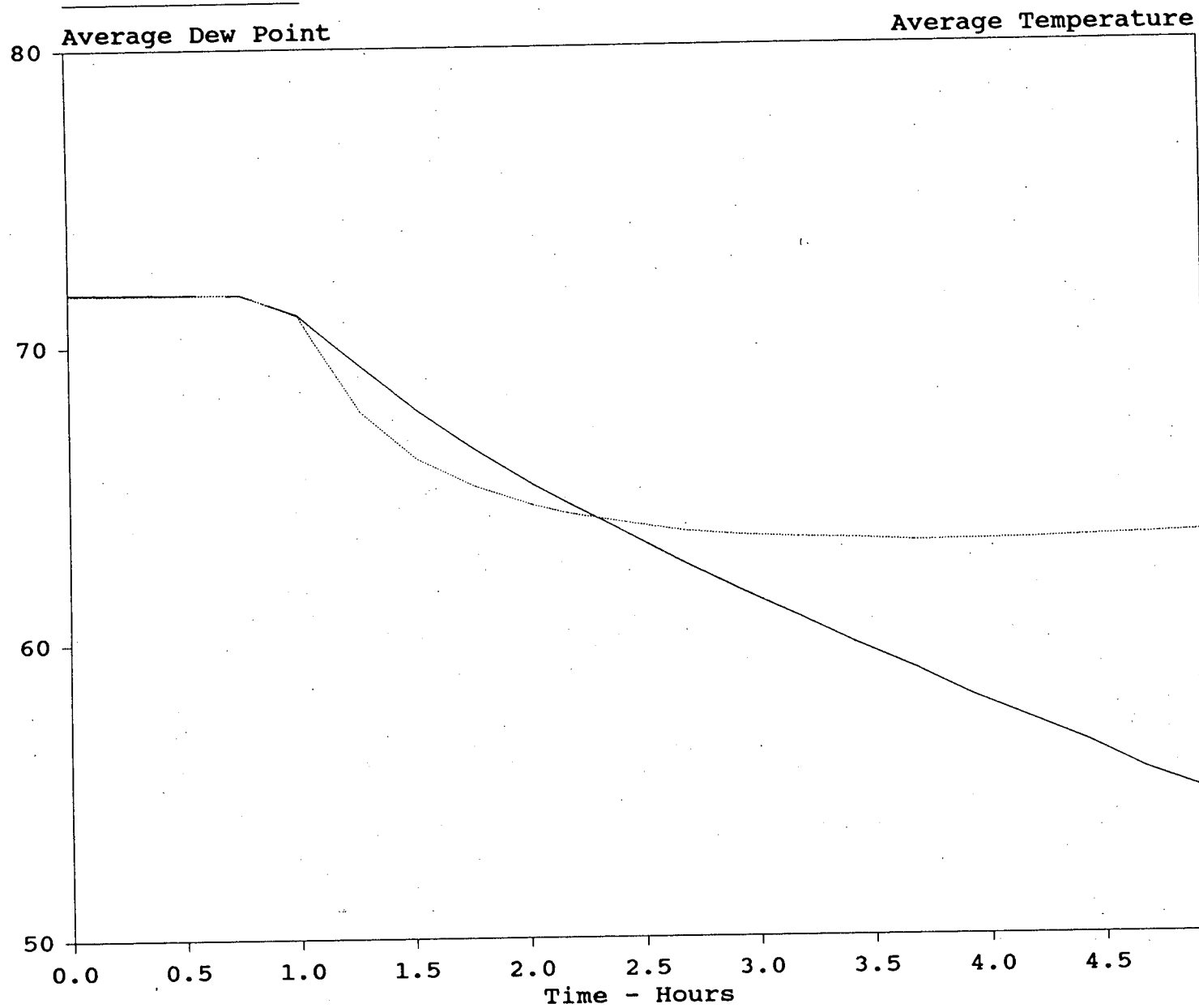


5-3

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# Average Dew Point & Average Temperature

Oconee Nuclear Station  
Unit 3

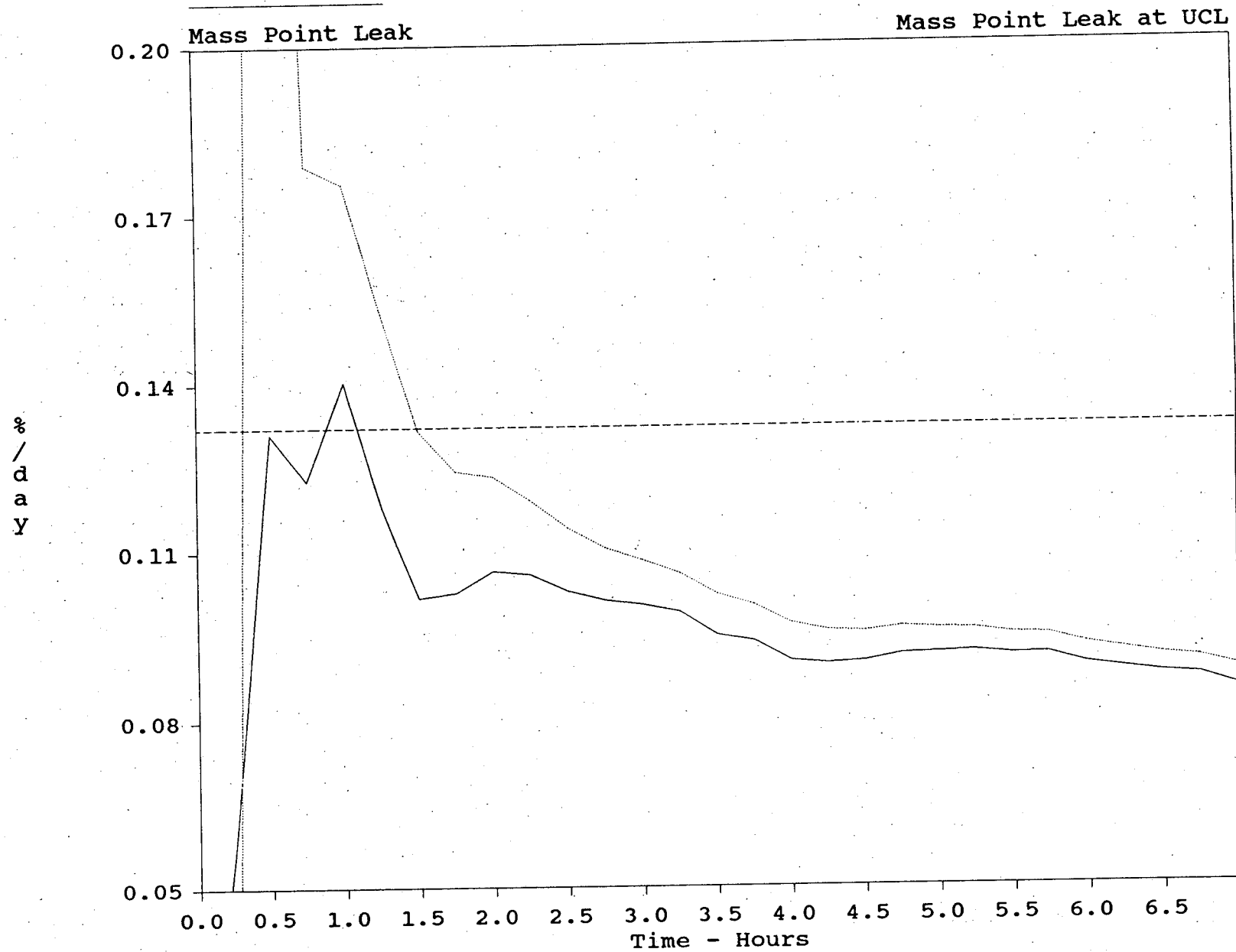


5-4

#### 4.6 Miscellaneous Plots

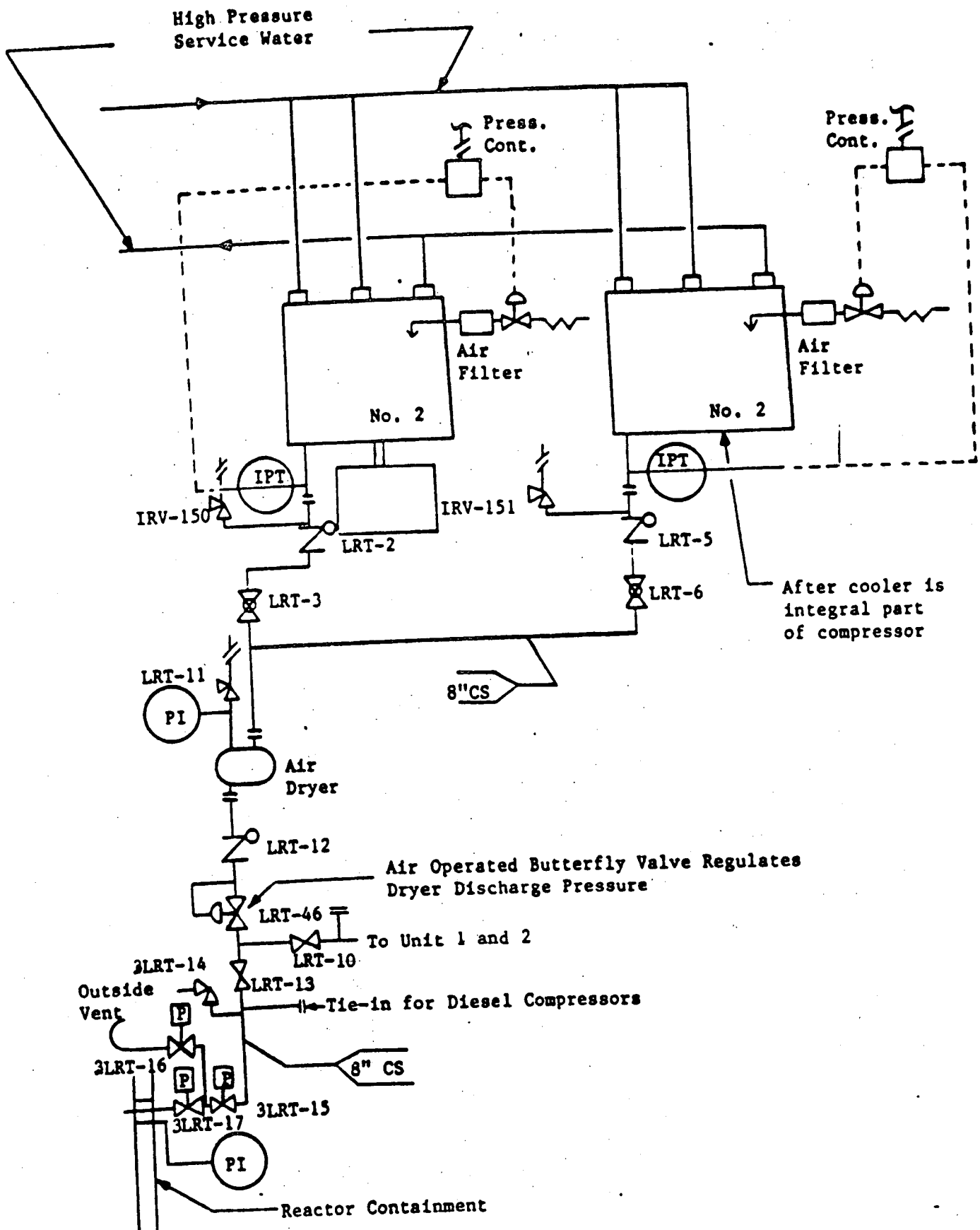
	<u>Plot Description</u>	<u>Page No.</u>
4.6.1	Mass Point Leak vs..... Mass Point Leak at UCL	6-2

Mass Point Leak & Mass Point Leak at UCL  
Oconee Nuclear Station  
Unit 3



#### 4.7 Pressurization System Schematic

# REACTOR BUILDING PRESSURIZATION SYSTEM



**APPENDIX A**

**BN-TOP-1 Total Time Test Termination Criteria**



**BN-TOP-1 Termination Criteria**  
Oconee Nuclear Station  
Unit 3

Page 1 of 1

**BN-TOP-1 Termination Criteria Evaluation for Reading # 93**

1. The Trend Report based on Total Time calculations shall indicate that the magnitude of the calculated leak rate is tending to stabilize at a value less than the maximum allowable leak rate ( $<.75La$ ).

Required Value: 0.132000 %/day    Actual Value: 0.086205 %/day

(Note: The magnitude of the calculated leak rate may be increasing slightly as it tends to stabilize. In this case the average rate of increase of the calculated leak rate shall be determined from the accumulated data over the last five hours or last twenty data points, whichever provides the most points. Using this average rate, the calculated leak rate can then be linearly extrapolated to the 24th hour data point. If this extrapolated value of the calculated leak rate exceeds 75% of the maximum allowable leak rate ( $La$ ) then the leak rate test is continued.)

Required Value: 0.132000 %/day    Actual Value: 0.000532 %/day

2. The end of test upper 95% confidence limit for the calculated leak rate based on Total Time calculations shall be less than the maximum allowable leak rate ( $<.75La$ ).

Required Value: 0.132000 %/day    Actual Value: 0.115797 %/day

3. The mean of the measured leak rates based on Total Time calculations over the last five hours of test or last twenty data points, whichever provides the most data, shall be less than the maximum allowable leak rate ( $<.75La$ ).

Required Value: 0.132000 %/day    Actual Value: 0.094693 %/day

4. Data shall be recorded at approximately equal intervals and in no case at intervals greater than one hour.

Required Interval:  $\leq 1$  hr    Maximum Actual Interval: 0.26 hr

5. At least twenty (20) data points shall be provided for proper statistical analysis.

Required # Data Points:  $\geq 20$     Actual Data Points: 29

6. In no case shall the minimum test duration be less than six (6) hours.

Required Minimum Duration: 6 hr    Actual Duration: 7.0 hr

## APPENDIX B

### Leak Rate Calculation Description

## APPENDIX C

	<u>RTD Locations</u>	<u>Page No.</u>
1.	Volume Fractions.....	C-2
2.	Basement Floor Elevation.....	C-3
3.	Intermediate Floor Elevation.....	C-4
4.	Operating Floor Elevation.....	C-5
5.	Shielding Floor Elevation.....	C-6
6.	Dome.....	C-7

## VOLUME FRACTIONS

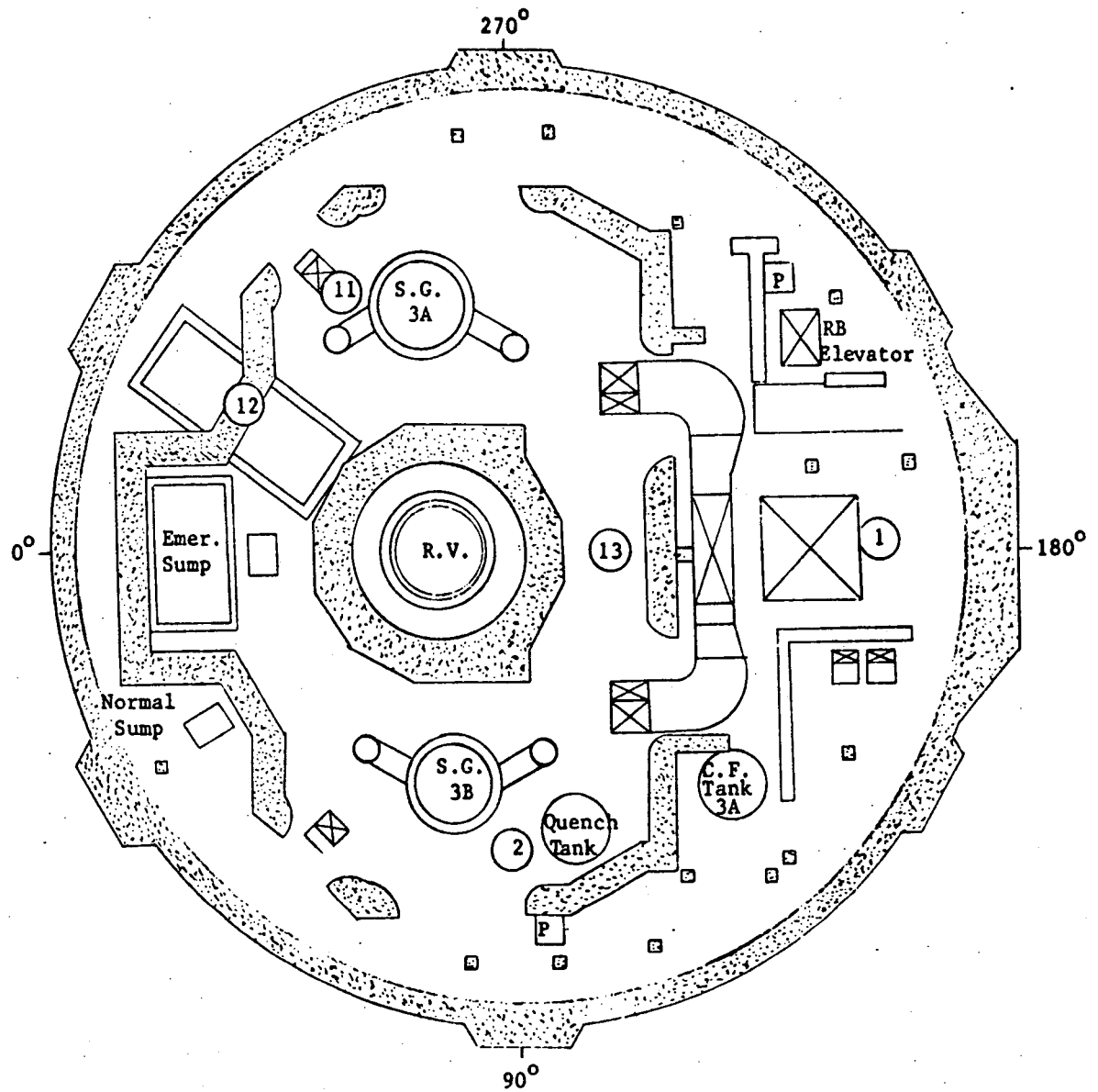
### Volume Fractions for RTDS

<u>RTD #</u>	<u>Volume Fraction</u>
1	.03
2	.02
3	.02
4	.05
5	.02
6	.03
7	.01
8	.08
9	.05
10	.05
11	.02
12	.02
13	.01
14	.02
15	.02
16	.01
17	.05
18	.09
19	.11
20	.01
21	.01
22	.09
23	.11
24	.07
Total	<u>1.00</u>

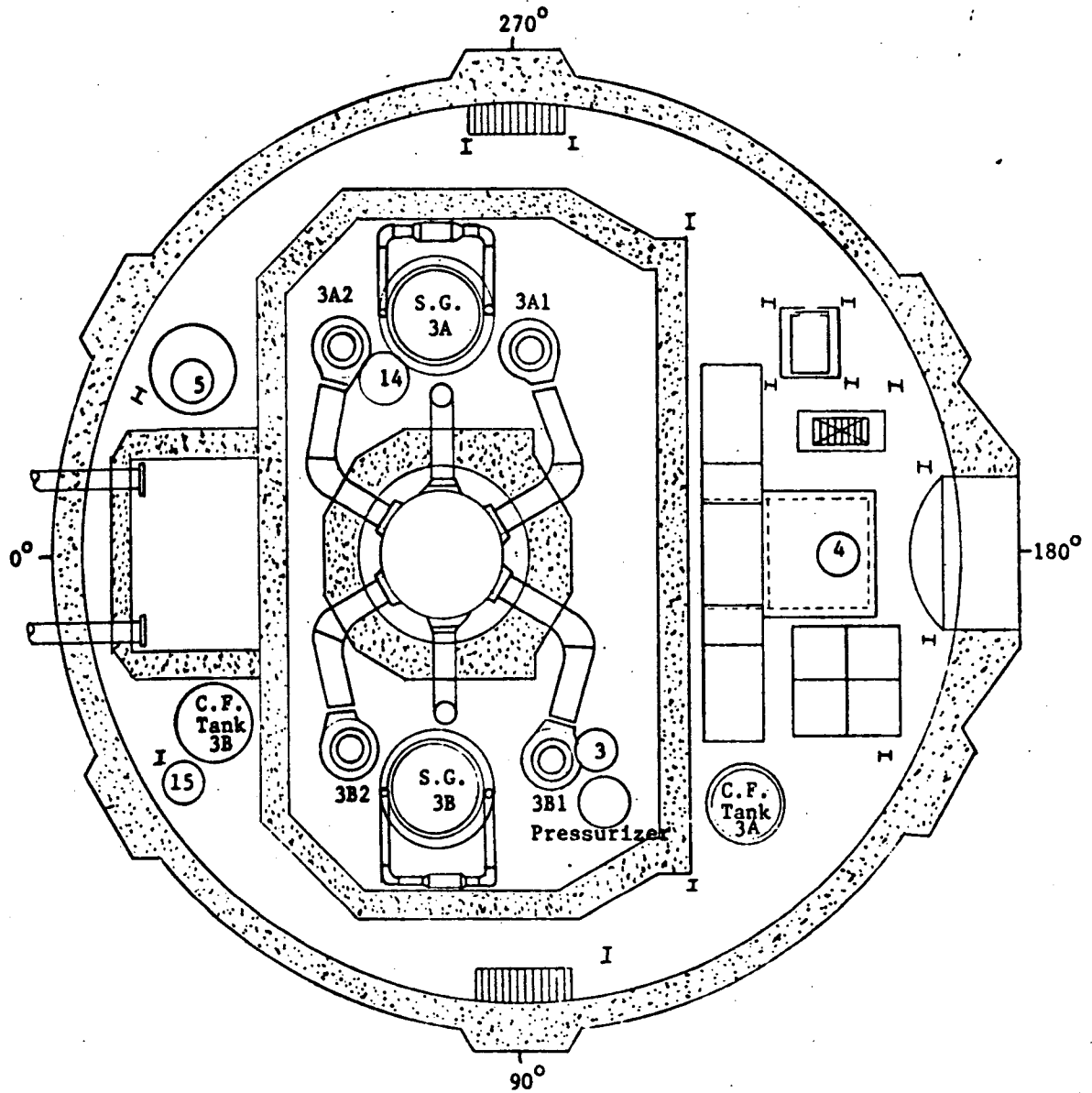
### Dewpoint Sensors Volume Fraction

<u>Dewpoint Sensor #</u>	<u>Volume Fraction</u>
1	.15
2	.15
3	.15
4	.15
5	.20
6	.20
Total	<u>1.00</u>

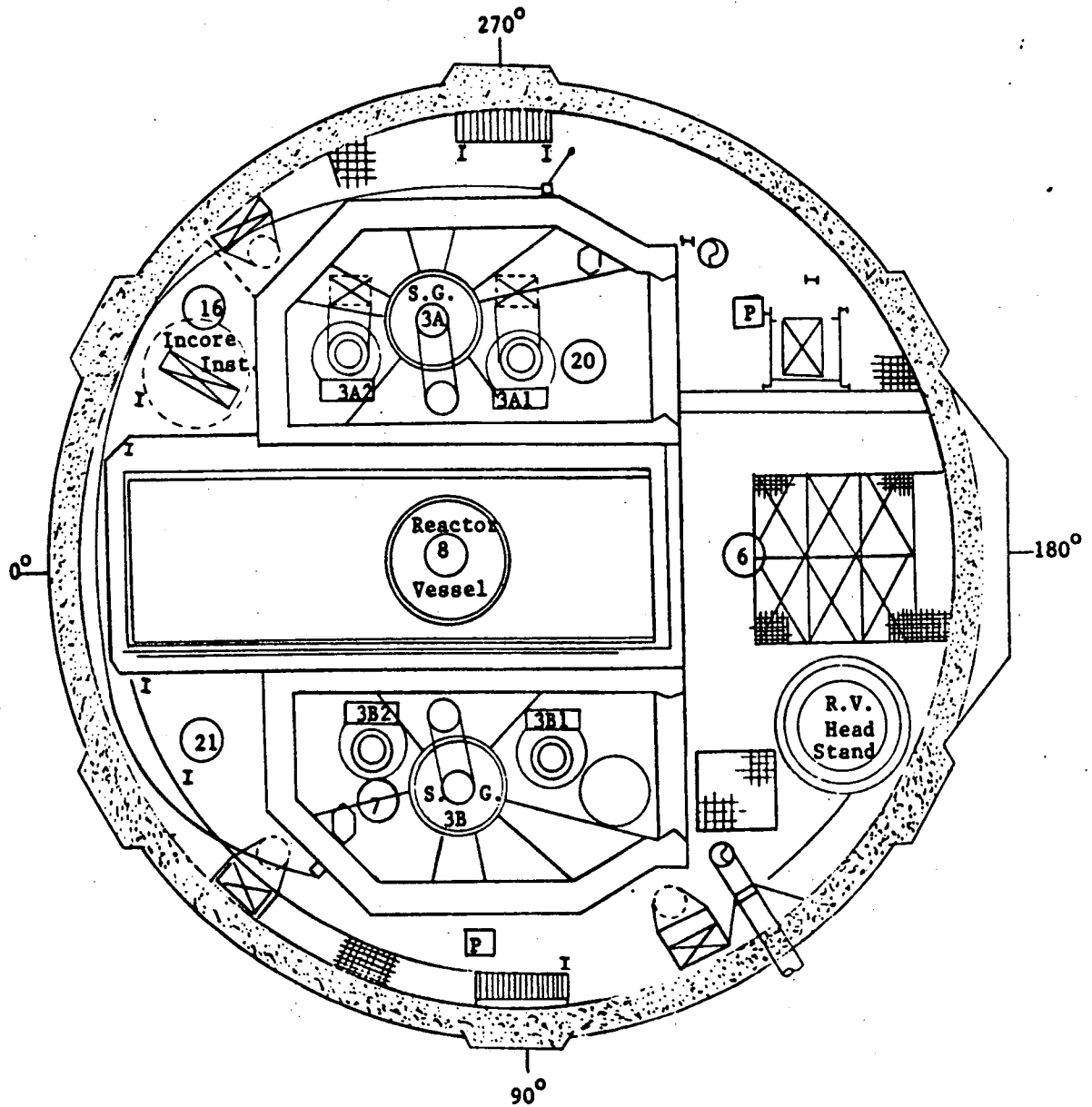
REACTOR BUILDING  
BASEMENT FLOOR  
ELEVATION 787'



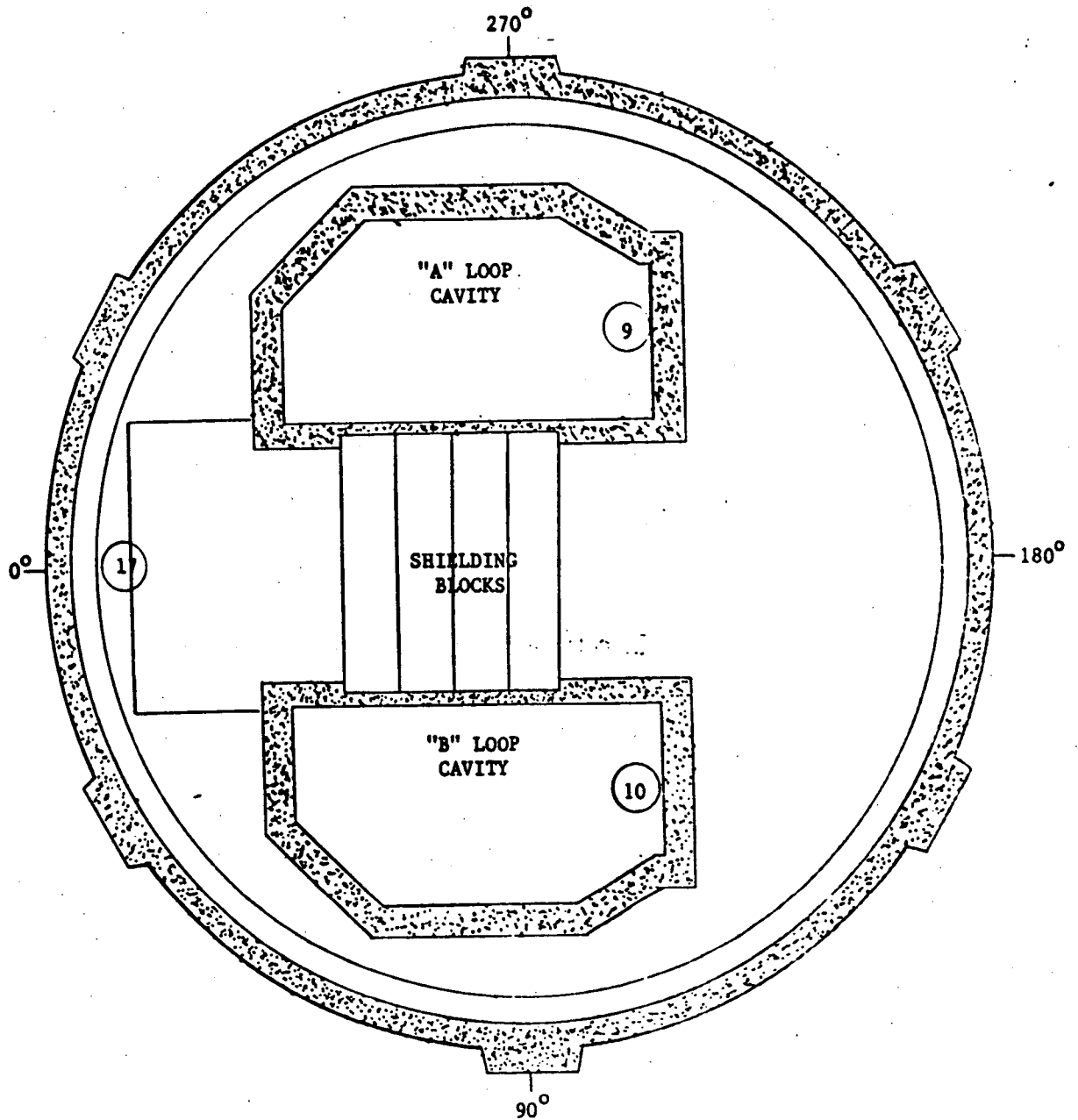
REACTOR BUILDING  
INTERMEDIATE FLOOR  
ELEVATION 830'



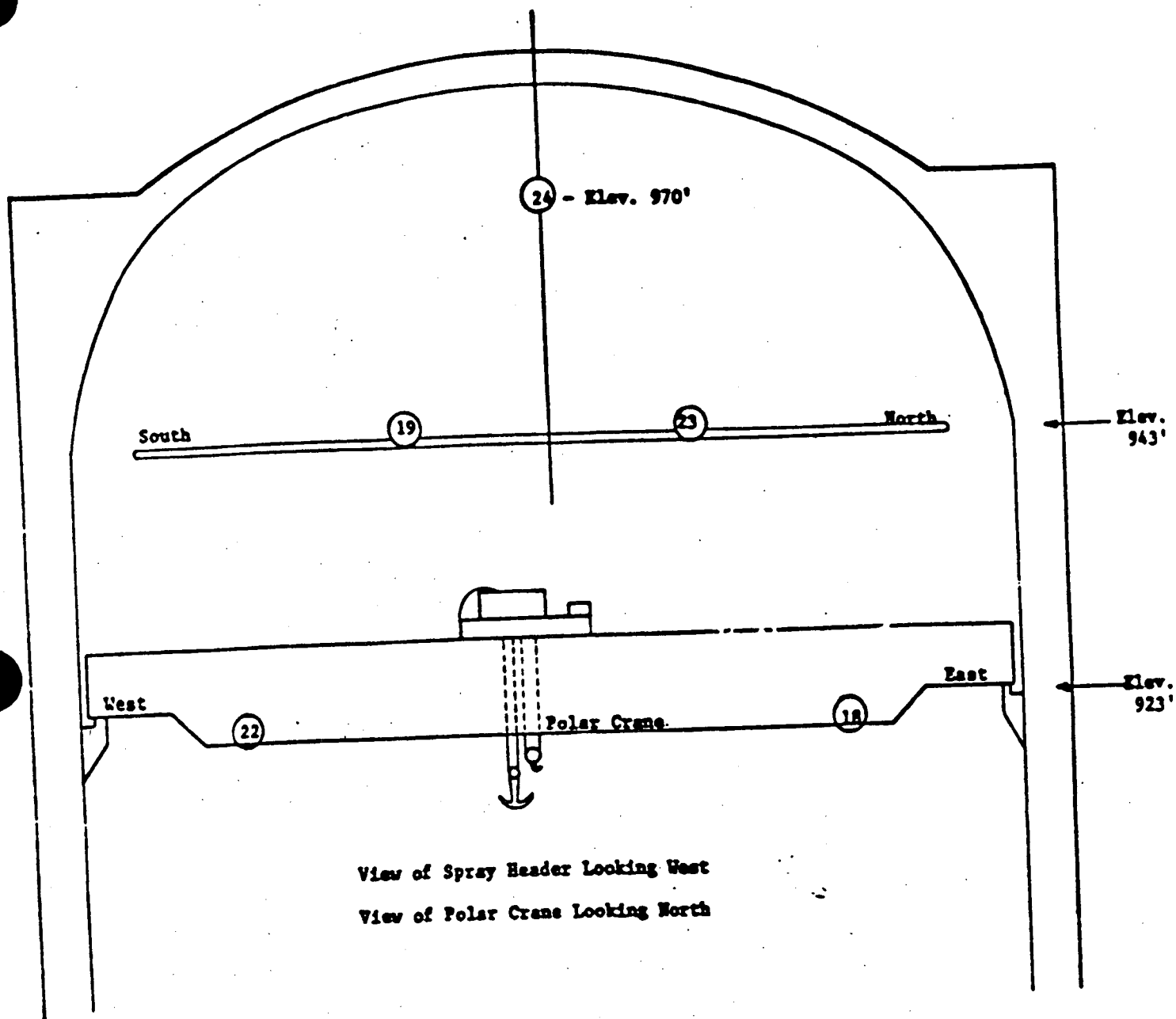
REACTOR BUILDING  
OPERATING FLOOR  
ELEVATION 850'



REACTOR BUILDING  
SHIELDING FLOOR  
ELEVATION 866'



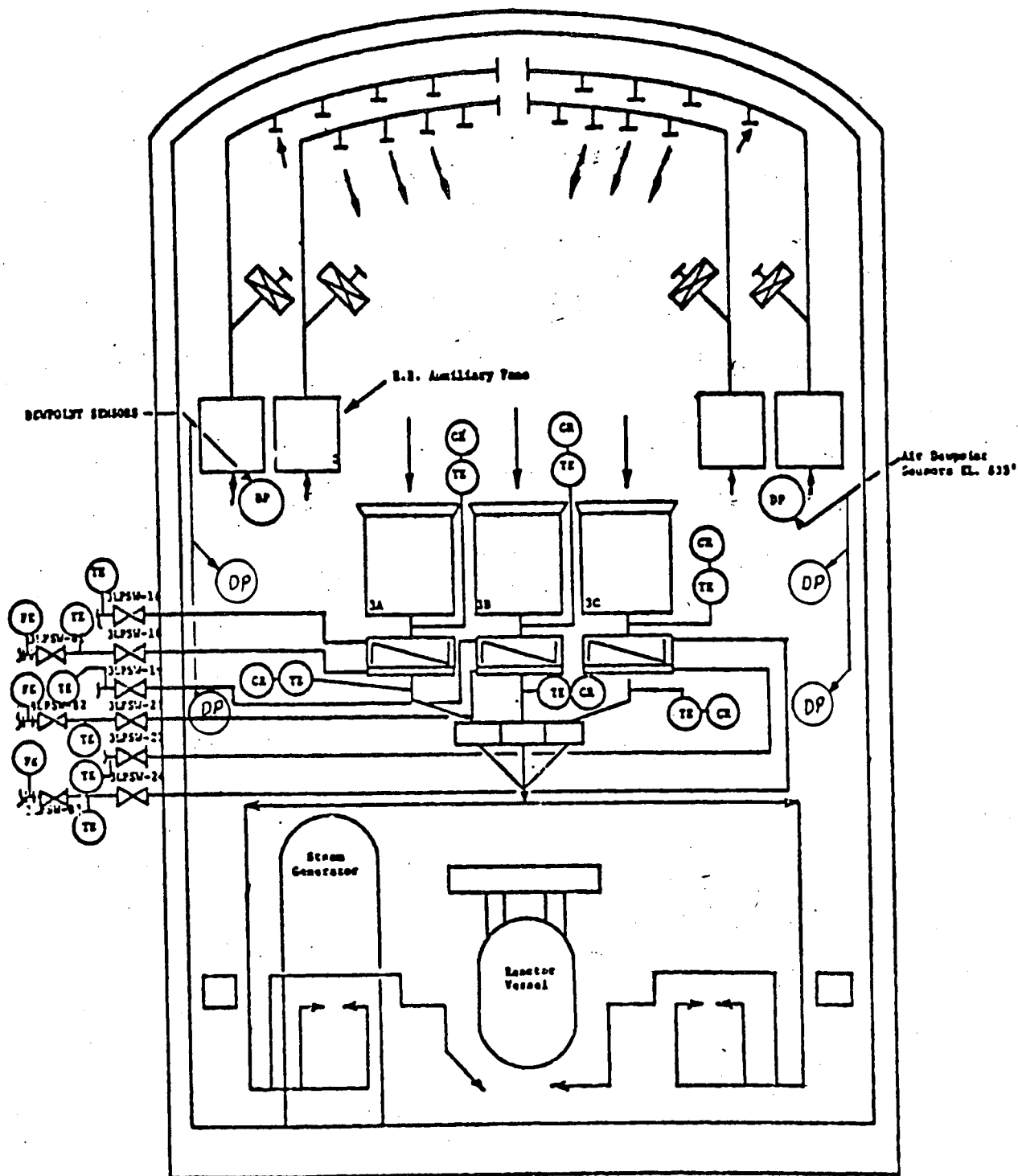




## APPENDIX D

### Dew Point Hygrometer Locations

# REACTOR BUILDING AIR RECIRCULATION SYSTEM



## APPENDIX E

### Leakage Penalty Analysis

### Leakage Penalty Analysis

After the ILRT was completed the following problems were discovered that added penalties to the results of the ILRT.

Some vent valves within the containment boundary, inside the Reactor Building, were found capped instead of uncapped as required by procedure. The procedure left them uncapped to assure the vent valve was challenged by test pressure. The leakage measured for all these vent valves during the Type C tests was added to the Upper Confidence Limit determined during the Type A test.

The Core Flood Tank (CFT) '3A' was determined to be partially full through the duration of the test. A valve between the Reactor Coolant System (RCS) and the CFT allowed RCS inventory to leak into the CFT. The level found in the CFT prevented the CFT sample line penetration from being adequately drained and challenged as required. In order to compensate for this unexpected level, a Type C test was performed on the outside penetration valves to quantify leakage and assign a penalty. This penalty was then added to the Upper Confidence Limit determined during the Type A test.

The ILRT pressure instrumentation used penetration 45 to access the containment atmosphere, therefore a penalty for that penetration will also be added to the UCL determined to during the Type A test.

The following is a summary of the results of the Type C tests penalties and the amended UCL for the ILRT.

PENETRATION NO.	VALVE NO.	MEASURED LEAK	PENALTY (wt%/day)
* 29	3CS-24	2 sccm	1.8227E-6
* 53	3CF-43	0 sccm	0
* 39	3CF-45	0 sccm	0
* 53b	3N-247	0 sccm	0
** 59	3CF-7	2180 sccm	0.0020
	3CF-19	1070 sccm	0.0010
*** 45	3LRT-24	10.2 sccm	9.2959E-6
	3LRT-25	18.8 sccm	1.7134E-5
Total Penalty			0.0030

- \* Penalty due to vent being capped during ILRT
- \*\* Penalty due to Core Flood Tank level during ILRT
- \*\*\* Penalty due to Pressure instrumentation for ILRT

## APPENDIX F

	<u>Section Description</u>	<u>Page No.</u>
1.	Analysis of Local Leakage Testing Data.....	F-2
2.	Total Adjusted Leakage Summary.....	F-3
3.	Testing Data from End of Cycle 10 RFO.....	F-4
4.	Testing Data from End of Cycle 11 RFO.....	F-10
5.	Miscellaneous Testing Data.....	F-16
6.	Local Leakage Test Failure Data.....	F-19

## 1. Analysis of Local Leakage Testing Data

The purpose of the Local Leakage Testing Program is to systematically verify the integrity of valves, electrical penetrations, and hatches that are part of the Containment boundary. These tests, specified by section 4.4.1.2 of Technical Specifications, have a combined acceptance criteria of less than or equal to 0.125% of the Reactor Building atmosphere in 24 hours. Final analysis of all penetration leakage shows that the total minimum path leakage rate was never found to be in excess of 19% of the allowable leakage for containment penetrations (See page F-3 for simplified summary of the total penetration leakage identified by local leakage testing).

A summary of scheduled type "B" and "C" test results can be found in sections two and three of this Appendix. A summary of type "B" and "C" test failures can be found in section five of this Appendix. The testing and failures associated with maintenance between refueling outages is not listed.

# TOTAL ADJUSTED LEAKAGE SUMMARY

DATE	MECH	PURGE	PERSONNEL	PERSONNEL	TOTAL	PERCENT OF ALLOWABLE
	LEAKAGE (lbm/hr)	LEAKAGE (lbm/hr)	HATCH (lbm/hr)	HATCH 'O' RING (lbm/hr)	ADJUSTED LEAKAGE (lbm/hr)	
3/26/87	0.5138	1.13305	2.8133	0.00172	1.68691	4.79%
3/29/87	0.50103	1.13305	2.8133	0.0008	1.66925	4.74%
3/31/87	0.50103	1.13305	2.8133	0.0008	1.66925	4.74%
4/8/87	0.5138	1.13305	2.8133	0.0008	1.68595	4.78%
4/9/87	0.5138	1.54525	2.8133	0.0008	2.09819	5.95%
4/10/87	0.5138	1.54525	0	0.0008	2.09655	5.95%
4/13/87	0.5138	1.54525	0	0.00096	2.09339	5.94%
4/14/87	0.5138	1.54525	0	0.0019	2.09339	5.94%
4/30/87	0.5138	2.0222	0	0.0012	2.5401	7.21%
10/2/87	0.5138	2.0222	0.8197	0.0004	2.5401	7.21%
10/22/87	0.5138	2.0222	0.8197	0.0024	2.5425	7.21%
3/1/88	0.5138	2.0222	0	0.0028	2.53731	7.20%
5/3/88	0.5138	5.9442	0	0.0028	6.45926	18.33%
5/4/88	0.51582	5.9442	0.8411	0.0028	6.46408	18.34%
5/7/88	0.51582	5.9442	0	0	6.46404	18.34%
9/18/88	1.0876	1.33745	0	0.00084	2.42701	6.89%
9/19/88	1.0876	1.33745	8.2875	0	2.42615	6.88%
9/19/88	1.0876	1.33745	5.8225	0	2.42615	6.88%
3/14/89	1.0876	1.33745	0	0.0014	2.53436	7.19%
10/6/89	4.7945	1.33745	0	0.0014	6.13265	17.40%
12/15/89	2.1619	1.11965	5.8766	0.0012	3.28585	9.32%

Note: 1. Leakage is adjusted for minimum path on Purge penetrations and Personnel Hatch.

2. Total Leakage includes values not shown on table in addition to those shown. These values are not major contributors to total leakage and are deleted for simplicity sake.



### 3. Testing Data From End of Cycle 10 Refueling Outage

## UNIT 3 EOC10 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 9/88	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
=====								
3	2	3FDW-106	5 M		200	20	200	
		3FDW-117						
		3FDW-118						
-----								
		3FDW-105	0 M		200	20	200	200
=====								
3	3	3CC-20	125 M		200	20	200	
		3CC-21	0 M		200	20	200	
		3CC-22	0 M		200	20	200	
		3CC-24	1605 M		200	20	1625	1625
=====								
3	4 & 43	3FDW-329	M		200	20	200	
		3FDW-331						
-----								
		3FDW-103	M		200	20	200	
		3FDW-334						
-----								
		3FDW-104	M		200	20	200	
		3FDW-335						400
=====								
3	5a	3LWD-28	0.6					
-----								
		3LWD-1	5					
		3LWD-2						
		3LWD-27						
		3LWD-29						5
=====								
3	5b	3RC-164	53 M		200	20	200	
		3RC-165	0 M		200	20	200	200
=====								
3	6	3HP-5	250 M		200	20	270	
		3HP-36						
		3HP-37						
-----								
		3HP-3	8 M		200	20	200	
		3HP-4	5 M		200	20	200	400
=====								
3	7	3HP-21	0 M		200	20	200	
		3HP-68						
		3HP-69						
-----								
		3HP-20	22 M		200	20	200	200
=====								
3	10a	3HP-216	0 L		20	2	20	
-----								
		3HP-146	12.3 L		20	2	20	
		3HP-218						
		3HP-286						40
=====								
3	10b	3HP-223	0 L		20	2	20	
-----								

## UNIT 3 EOC10 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 9/88	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
		3HP-147	27.9 L		20	2	29.9	
		3HP-225						
		3HP-285						49.9
3	11a	TUBE	0 M		200	20	200	200
3	11b	3SF-98	0 M		200	20	200	
		3SF-99	0 M		200	20	200	
		3SF-82	0 M		200	20	200	
		3SF-97	0 M		200	20	200	600
3	11c	3SF-72	0 M		200	20	200	
		3SF-73						
		3SF-74	0 M		200	20	200	200
3	12a	TUBE	0 M		200	20	200	200
3	12b	3SF-425	17 M		200	20	200	
		3SF-423	10 M		200	20	200	
		3SF-426	0 M		200	20	200	
		3SF-417	21 M		200	20	200	
		3SF-405	0 M		200	20	200	
		3SF-428	0 M		200	20	200	1000
3	18	3GWD-10	15 M		200	20	200	
		3GWD-11	33 M		200	20	200	
		3GWD-12						
		3GWD-13						400
3	19	3PR-29	15.7					
		3PR-5	5719					
		3PR-6						5734.7
3	20	3PR-27	5.6					
		3PR-1	11043					
		3PR-2						11048.6
3	22	3LPSW-145	0 L		20	2	20	
		3LPSW-15	880 M		200	20	900	
		3LPSW-144						
		3PG-190						920
3	23a	3HP-209	6.1 L		20	2	20	

## UNIT 3 EOC10 REFUELING OUTAGE

UNIT	TYPE	VALVES	MEASURED LEAK RATE 9/88	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	E R R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
		3HP-145	1170 M		200	20	1190	
		3HP-211						
		3HP-283						1210
3	23b	3HP-202	5.6 L		20	2	20	
		3HP-144	165 M		200	20	200	
		3HP-204						
		3HP-284						220
3	24	3PR-81	0 L		20	2	20	20
		3PR-84	12.2 L		20	2	20	20
3	29	3CS-24	33 L		20	2	35	
		3CS-5	47 L		20	2	49	
		3CS-6						
		3CS-23						
		3CS-25						84
3	38	3CS-12	2.6 L		20	2	20	
		3CS-18	3.5 L		20	2	20	
		3CS-11	261 M		200	20	281	
		3CS-17						301
3	41	3IA-90	425 M		200	20	445	
		3IA-91	250 M		200	20	270	445
3	42	3PR-87	8 L		20	2	20	20
		3PR-90	0 L		20	2	20	20
3	44	3CC-77	695 M		200	20	715	
		3CC-82	330 M		200	20	350	
		3CC-80	17.5 L		20	2	20	
		3CC-76	830 M		200	20	850	1085
3	45a	3LRT-24	0 L		20	2	20	
		3LRT-25	0 L		20	2	20	20
3	45b	3LRT-39	0 L		20	2	20	
		3LRT-38	0 L		20	2	20	20
3	45c	3LRT-37	0 L		20	2	20	

## UNIT 3 EOC10 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 9/88	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
=====								
		3LRT-36	0 L		20	2	20	20
=====								
3	46	3FW-66	0 M		200	20	200	
-----								
		3FW-64	0 M		200	20	200	
		3FW-65						400
=====								
3	48	3BA-33	0 M		200	20	200	
-----								
		3BA-5	0 M		200	20	200	200
=====								
3	51	3LRT-54	0 L		20	2	20	
		3LRT-17	0 M		200	20	200	220
=====								
3	53	3N-246	125 M		200	20	200	
		3N-247	0 M		200	20	200	
-----								
		3N-263	145 L		20	2	147	400
=====								
3	54	3CC-56	4 M		200	20	200	
-----								
		3CC-7	542 M		200	20	562	
		3CC-8						
		3CC-54						
		3CC-55						762
=====								
3	55	3DW-59	12 M		200	20	200	
-----								
		3DW-60	0 M		200	20	200	200
=====								
3	58a	3RC-7	1 L		20	2	20	
		3RC-49						
		3RC-50						
-----								
		3RC-5	1 L		20	2	20	
		3RC-6	3 L		20	2	20	40
=====								
3	58b	3FDW-108	8 M		200	20	200	
		3FDW-122						
		3FDW-123						
-----								
		3FDW-107	9 L		20	2	20	200
=====								
3	60	3PR-23	0 M		200	20	200	
-----								
		3PR-7	0 M		200	20	200	
		3PR-8						
		3PR-59						
		3PR-68						400
=====								

# UNIT 3 EOC10 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 9/88	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
3	61	3PR-25	0	M	200	20	200	
		3PR-9	5	M	200	20	200	
		3PR-10						
		3PR-60						400
								30130.2

#### 4. Testing Data From End of Cycle 11 Refueling Outage

## UNIT 3 EOC11 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 12/89	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
3	2	3FDW-106	6.4 L		20	2	20	
		3FDW-117						
		3FDW-118						
		3FDW-105	13.5 L		20	2	20	20
3	3	3CC-20	638 M		200	20	658	
		3CC-21	30 M		200	20	200	
		3CC-22	0 L		20	2	20	
		3CC-24	334 M		200	20	354	878
3	4& 43	3FDW-329	263 M		200	20	283	
		3FDW-331						
		3FDW-103	210 M		200	20	230	
		3FDW-334						
		3FDW-104	89 M		200	20	200	
		3FDW-335						430
3	5a	3LWD-28	6.3					
		3LWD-1	22					
		3LWD-2						
		3LWD-27						
		3LWD-29						22
3	5b	3RC-164	5.5 L		20	2	20	
		3RC-165	0 L		20	2	20	20
3	6	3HP-5	25 L		20	2	27	
		3HP-36						
		3HP-37						
		3HP-3	2 L		20	2	20	
		3HP-4	3 L		20	2	20	40
3	7	3HP-21	0 L		20	2	20	
		3HP-68						
		3HP-69						
		3HP-20	0 L		20	2	20	20
3	10a	3HP-216	0 L		20	2	20	
		3HP-146	1.4 L		20	2	20	
		3HP-218						
		3HP-286						40
3	10b	3HP-223	1.5 L		20	2	20	



## UNIT 3 EOC11 REFUELING OUTAGE

UNIT	P E N	VALVES	MEASURED	SCALE	RANGE	E R R	REPORTED	MAXIMUM
			LEAK RATE	USED	LOWER		LEAKAGE	PATH
			12/89	(H/M/L)	LIMIT		(sccm)	LEAK RATE
			(sccm)			(sccm)		
=====								
		3HP-147	710 M		200	20	730	
		3HP-225						
		3HP-285						750
=====								
3	11a	TUBE	0 L		20	2	20	20
-----								
3	11b	3SF-98	2 L		20	2	20	
		3SF-99	0 L		20	2	20	
		3SF-82	11 L		20	2	20	
-----								
		3SF-97	85 L		20	2	87	87
=====								
3	11c	3SF-72	4.5 L		20	2	20	
		3SF-73						
-----								
		3SF-74	0 L		20	2	20	20
=====								
3	12a	TUBE	2 L		20	2	20	20
-----								
3	12b	3SF-425	9 L		20	2	20	
		3SF-423	38 M		200	20	200	
		3SF-426	38 M		200	20	200	
		3SF-417	1 L		20	2	20	
		3SF-405	3.2 L		20	2	20	
-----								
		3SF-428	120 H		2000	200	2000	2000
=====								
3	18	3GWD-10	19.8 L		20	2	21.8	
-----								
		3GWD-11	20 M		200	20	200	
		3GWD-12						
		3GWD-13						221.8
=====								
3	19	3PR-29	0.6				0.6	
-----								
		3PR-5	4136				4136	
		3PR-6						4136.6
=====								
3	20	3PR-27	0.3				0.3	
-----								
		3PR-1	9914				9914	
		3PR-2						9914.3
=====								
3	22	3LPSW-145	0 L		20	2	20	
-----								
		3LPSW-15	668 M		200	20	688	
		3LPSW-144						
		3PG-190						708
=====								
3	23a	3HP-209	4 L		20	2	20	
-----								

## UNIT 3 EOC11 REFUELING OUTAGE

UNIT	POSITION	VALVES	MEASURED LEAK RATE 12/89	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
		3HP-145	1018 M		200	20	1038	
		3HP-211						
		3HP-283						1058
3	23b	3HP-202	0 L		20	2	20	
		3HP-144	3440 H		2000	200	3640	
		3HP-204						
		3HP-284						3660
3	24	3PR-81	1.2 L		20	2	20	20
		3PR-84	0 L		20	2	20	20
3	29	3CS-24	2 L		20	2	20	
		3CS-5	0 L		20	2	20	
		3CS-6						
		3CS-23						
		3CS-25						40
3	38	3CS-12	3.8 L		20	2	20	
		3CS-18	0.6 L		20	2	20	
		3CS-11	284 M		200	20	304	
		3CS-17						324
3	39	3CF-45	0 L		20	2	20	
		3CF-44	136 M		200	20	200	
		3CA-29	184 M		200	20	204	
		3CF-41						
		3HP-156						
		3N-131						220
3	41	31A-90	63 M		200	20	200	
		31A-91	77 M		200	20	200	200
3	42	3PR-87	8 L		20	2	20	20
		3PR-90	0 L		20	2	20	20
3	44	3CC-77	168 M		200	20	200	
		3CC-82	1 L		20	2	20	
		3CC-80	0.5 L		20	2	20	
		3CC-76	458 M		200	20	478	478
3	45a	3LRT-24	10.2 L		20	2	20	

## UNIT 3 EOC11 REFUELING OUTAGE

UNIT	PIPE	VALVES	MEASURED LEAK RATE 12/89	SCALE USED (H/M/L)	RANGE LOWER LIMIT (sccm)	ERR R	REPORTED LEAKAGE (sccm)	MAXIMUM PATH LEAK RATE (sccm)
		3LRT-25	18.8 L		20	2	20.8	20.8
3	45b	3LRT-39	0 L		20	2	20	
		3LRT-38	0 L		20	2	20	20
3	45c	3LRT-37	0 L		20	2	20	
		3LRT-36	1.9 L		20	2	20	20
3	46	3FW-66	0 L		20	2	20	
		3FW-64	197 M		200	20	217	
		3FW-65						237
3	48	3BA-33	28 L		20	2	30	
		3BA-5	13.8 L		20	2	20	30
3	51	3LRT-54	0 L		20	2	20	
		3LRT-17	64.2 L		20	2	66.2	86.2
3	53	3CF-43	0 L		20	2	20	
		3CF-42	46 M		200	20	200	
		3CA-27	3.8 L		20	2	20	
		3CF-47						
		3HP-155						
		3N-129						220
3	53b	3N-246	125 L		20	2	127	
		3N-247	0 L		20	2	20	
		3N-263	105 L		20	2	107	147
3	54	3CC-56	0 L		20	2	20	
		3CC-7	4380 H		2000	200	4580	
		3CC-8						
		3CC-54						
		3CC-55						4600
3	55	3DW-59	3 L		20	2	20	
		3DW-60	5 L		20	2	20	20
3	58a	3RC-7	1 L		20	2	20	
		3RC-49						
		3RC-50						

## UNIT 3 EOC11 REFUELING OUTAGE

UNIT	PUMP	VALVES	MEASURED	SCALE	RANGE	E	REPORTED	MAXIMUM
			LEAK RATE	USED	LOWER		LEAKAGE	PATH
T	N		12/89	(H/M/L)	(sccm)	R	(sccm)	(sccm)
		3RC-5	2 L		20	2	20	
		3RC-6	0 L		20	2	20	40
3	58b	3FDW-108	29.6 L		20	2	31.6	
		3FDW-122						
		3FDW-123						
		3FDW-107	16.1 L		20	2	20	31.6
3	60	3PR-23	6.6 L		20	2	20	
		3PR-7	64.3 L		20	2	66.3	
		3PR-8						
		3PR-59						
		3PR-68						86.3
3	61	3PR-25	0 L		20	2	20	
		3PR-9	0 L		20	2	20	
		3PR-10						
		3PR-60						40
								31006.6

## **5. Miscellaneous testing Data**

TYPE "B" LEAKAGE RATE TESTING SINCE LAST ILRT

PENETRATION	TEST DATE	MEASURED LEAKAGE (lbm/hr)	MEASURED LEAKAGE (sccm)
EQUIPMENT	04/08/87	0.0003	1.88
HATCH	04/30/87	0.00007	0.44
	05/03/88	0.00002	0.13
	08/10/88	0.0001	0.63
	09/16/88	0.00011	0.69
	12/07/89	0	0.00
EMERGENCY	04/29/87	0	0.00
HATCH	09/29/87	0	0.00
	02/24/88	0	0.00
	05/02/88	0	0.00
	09/14/88	0	0.00
	02/16/89	0.1096	687.68
	08/16/89	0	0.00
	12/06/89	0	0.00
PERSONNEL	03/26/87	2.8133	17651.97
HATCH	04/10/87	0	0.00
	05/01/87	0	0.00
	10/01/87	0.8197	5143.18
	03/01/88	0	0.00
	05/03/88	0.8411	5277.46
	05/07/88	0	0.00
	09/19/88	8.2876	52000.30
	09/19/88	5.8225	36533.10
	03/14/89	0	0.00
	09/14/89	0	0.00
	12/08/89	3.78	23717.50
PERSONNEL	03/29/87	0.0008	5.02
HATCH	04/12/87	0.00096	6.02
"O" RING	04/14/87	0.0019	11.92
	04/17/87	0.0012	7.53
	05/03/87	0.00088	5.52
	08/27/87	0.0004	2.51
	10/22/87	0.0024	15.06
	11/19/87	0.00068	4.27
	11/26/87	0.0012	7.53
	02/17/88	0.0028	17.57
	05/09/88	0.00136	8.53
	07/20/88	0.00084	5.27
	09/22/88	0.0009	5.65
	09/23/88	0.0008	5.02
	09/27/88	0.0004	2.51
	10/07/88	0.0009	5.65
	11/02/88	0.0016	10.04
	11/15/88	0.00084	5.27
	11/25/88	0.0002	1.25
	01/06/89	0.0032	20.08
	01/10/89	0.0038	23.84
	01/14/89	0.0038	23.84
	01/16/89	0.001	6.27

TYPE "B" LEAKAGE RATE TESTING SINCE LAST ILRT

PENETRATION	TEST DATE	MEASURED LEAKAGE (lbm/hr)	MEASURED LEAKAGE (sccm)
	01/22/89	0.001	6.27
	01/25/89	0.0004	2.51
	01/27/89	0.0009	5.65
	02/05/89	0.0936	587.29
	02/07/89	0.0008	5.02
	02/17/89	0.0031	19.45
	03/08/89	0.0014	8.78
	03/23/89	0.0012	7.53
	04/12/89	0.00132	8.28
	05/04/89	0.0012	7.53
	05/10/89	0.0025	15.69
	05/12/89	0.0012	7.53
	06/09/89	0.001	6.27
	07/12/89	0.0024	15.06
	09/07/89	0.001	6.27
	09/28/89	0.001	6.27
	10/14/89	0.0011	6.90
	11/03/89	0.0012	7.53
ELECTRICAL	09/06/88	0.0007	4.39
PENETRATIONS	11/23/89	0.0043	26.98

## 6. Local Leakage Test Failure Data



Local Leak Test Failures since the last ILRT

Pen No	Valve No.	Test Date	Cause of Failure	Repair
11B	3SF-82	08/17/88	Failed in open pos'n	Refurberd operator
12b	3HP-405	12/05/89	Valve would not close	Adjusted torque switch
19	3PR-6	04/09/87	Seat leak	Cleaned seat
19	3PR-6	04/30/87	Seat leak	Replaced disk assembly
2	3FDW-117	08/17/88	Seat leak	Replaced valve
2	3FDW-118	08/16/88	Seat leak	Cleaned seat and disk
20	3PR-1	09/16/88	Seat leak	Repair next opportunity
20	3PR-1	12/07/89	Hub Seal leak	
20	3PR-2	03/21/87	Hub Seal Ring leak	
20	3PR-2	04/08/87	Hub Seal Ring leak	
20	3PR-2	04/30/87	Seat Leak	Adjusted seat
20	3PR-2	08/11/88	Hub Seal leak	Replaced Hub Seal
23a	3HP-283	11/15/89	Seat leak	Cleaned seat
23b	3HP-284	11/18/89	Seat leak	Repair next opportunity
3	3CC-20	11/24/89	Seat leak	Repaired Seat
3	3CC-24	08/19/88	Valve would not close	Adjusted Counterweight
3	3CC-24	11/24/89	Seat leak	Repair Seat Ring
38	3CS-11	11/16/89	Seat leak	Cleaned valve
38	3CS-12	08/17/88	Seat leak	Replaced valve
38	3CS-12	11/16/89	Valve would not close	Replace valve
39	3CF-44	12/03/89	Seat leak	Replaced valve
39	3CF-56	12/03/89	Seat leak	Reassemble valve correctly
39	3N-131	12/06/89	Seat leak	Cleaned valve seat
44	3CC-76	11/24/89	Seat leak	Repaired disk
44	3CC-82	08/19/88	Seat leak	Valve was replaced
53	3N-129	12/03/89	Seat leak	Replace valve
54	3CC-56	08/19/88	Seat leak (scarred disk)	Polished disk
54	3CC-7	08/19/88	Seat leak	Replaced Seat and Seat Ring
54	3CC-7	11/17/89	Valve would not close	Replaced valve seat
5a	3LWD-1	11/29/89	Seat leak	Cleaned valve
5a	3LWD-28	11/29/89	Seat leak	Cleaned seat

## APPENDIX G

	<u>Section Description</u>	<u>Page No.</u>
1.	Total Time Leak Rate Analysis.....	G-2
2.	Containment Calculated Values.....	G-4
3.	Calibrated Instrument Data.....	G-11
4.	Raw Instrument Data.....	G-18
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6.	BN-TOP-1 Temperature Stabilization.....	G-27

## 1. Total Time Leak Rate Analysis

# Total Time Leak Rate Analysis

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Oconee Nuclear Station  
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RDG	TIME (MINUTES)	MEASURED LEAK (WT %/DAY)	CALCULATED LEAK (WT %/DAY)	UCL LEAK (WT %/DAY)
65	0.00	-	-	-
66	15.02	0.059273	-	-
67	30.02	0.130977	0.130977	-
68	45.03	0.113607	0.128449	0.480867
69	60.03	0.140052	0.144715	0.277380
70	75.05	0.101555	0.127817	0.252827
71	90.05	0.091921	0.113472	0.221280
72	105.07	0.106307	0.111697	0.200500
73	120.08	0.112132	0.112940	0.189132
74	135.08	0.106212	0.111457	0.179170
75	150.08	0.100463	0.108406	0.170211
76	165.10	0.100778	0.106306	0.163221
77	180.10	0.101545	0.104980	0.157814
78	195.12	0.099028	0.103290	0.152820
79	210.13	0.089908	0.099647	0.146951
80	225.13	0.095148	0.098071	0.142919
81	240.15	0.086264	0.094807	0.137923
82	255.15	0.092964	0.093637	0.134830
83	270.17	0.095536	0.093228	0.132749
84	285.17	0.098408	0.093471	0.131598
85	300.17	0.095504	0.093153	0.129938
86	313.93	0.095843	0.093011	0.128568
87	329.02	0.092293	0.092247	0.126685
88	344.03	0.094889	0.092032	0.125478
89	359.03	0.085865	0.090453	0.123041
90	374.05	0.088600	0.089506	0.121223
91	389.78	0.087793	0.088544	0.119462
92	404.87	0.089138	0.087934	0.118102
93	419.88	0.080248	0.086205	0.115797

## 2. Containment Calculated Values

**Containment Calculated Values**

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RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
1	15:52:50	133649.50	70.778	0.3170	14.4154
2	16:07:55	137878.56	71.648	0.3222	14.8906
3	16:22:56	143902.89	72.725	0.3274	15.5631
4	16:37:56	151555.60	73.730	0.3366	16.4128
5	16:52:57	159227.27	74.183	0.3408	17.2452
6	17:07:57	166797.73	74.469	0.3445	18.0620
7	17:22:58	174254.34	74.656	0.3497	18.8658
8	17:37:58	181661.82	74.760	0.3551	19.6621
9	17:52:59	189007.73	74.889	0.3590	20.4515
10	18:07:59	196294.02	75.010	0.3626	21.2344
11	18:23:00	203484.58	75.085	0.3684	22.0078
12	18:38:00	210620.73	75.148	0.3748	22.7757
13	18:53:01	217716.10	75.208	0.3774	23.5356
14	19:00:01	221020.79	75.230	0.3779	23.8885
15	19:15:07	228103.95	75.271	0.3809	24.6468
16	19:30:07	235074.45	75.331	0.3876	25.3980
17	19:45:08	242029.14	75.399	0.3904	26.1439
18	20:00:08	248959.55	75.421	0.3933	26.8853
19	20:15:09	255888.03	75.452	0.3952	27.6261
20	20:30:09	262739.85	75.513	0.3994	28.3626
21	20:45:10	269603.16	75.533	0.4024	29.0972
22	21:00:10	276475.46	75.603	0.4036	29.8336
23	21:15:11	283321.50	75.620	0.4088	30.5685
24	21:30:11	290180.50	75.661	0.4100	31.3023
25	21:45:12	297005.06	75.680	0.4125	32.0324
26	22:00:12	303773.60	75.744	0.4145	32.7589
27	22:15:13	310571.38	75.760	0.4158	33.4850
28	22:30:13	317384.32	75.788	0.4155	34.2118
29	22:45:14	324170.34	75.814	0.4193	34.9399
30	23:00:14	330937.41	75.840	0.4211	35.6641
31	23:15:15	337688.46	75.882	0.4222	36.3869
32	23:30:15	344418.68	75.920	0.4252	37.1094
33	23:45:16	351179.96	75.909	0.4265	37.8300
34	00:00:16	357908.44	75.940	0.4257	38.5480
35	00:15:17	364570.33	75.985	0.4282	39.2634
36	00:30:17	371261.42	75.992	0.4305	39.9790

# Containment Calculated Values

Oconee Nuclear Station  
Unit 3

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RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
37	00:45:18	377921.88	76.042	0.4317	40.6934
38	01:00:18	384595.34	76.085	0.4330	41.4090
39	01:15:19	391249.24	76.102	0.4336	42.1198
40	01:29:59	397705.26	76.137	0.4364	42.8133
41	01:45:04	404433.98	76.145	0.4361	43.5306
42	02:00:05	411075.63	76.182	0.4370	44.2422
43	02:15:05	417701.24	76.210	0.4378	44.9513

**Containment Calculated Values**

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RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
44	02:30:06	419920.71	75.830	0.4398	45.1581
45	02:45:06	419711.27	75.179	0.4433	45.0851
46	03:00:07	419752.63	74.714	0.4400	45.0473
47	03:15:07	419762.24	74.410	0.4375	45.0204
48	03:30:08	419770.57	74.169	0.4354	44.9991
49	03:45:04	419770.19	73.984	0.4332	44.9814
50	04:00:10	419769.54	73.823	0.4317	44.9664
51	04:15:10	419760.54	73.691	0.4302	44.9529
52	04:30:11	419755.82	73.574	0.4285	44.9410
53	04:45:11	419756.19	73.466	0.4268	44.9303
54	05:00:12	419745.89	73.379	0.4254	44.9205
55	05:15:12	419738.83	73.297	0.4239	44.9115
56	05:30:13	419740.03	73.214	0.4225	44.9033
57	05:45:13	419730.19	73.141	0.4212	44.8948
58	06:00:14	419720.84	73.082	0.4198	44.8875
59	06:15:04	419715.53	73.020	0.4189	44.8808
60	06:30:10	419713.48	72.962	0.4174	44.8743
61	06:45:06	419710.51	72.903	0.4168	44.8685
62	07:00:11	419715.56	72.847	0.4155	44.8631
63	07:15:11	419706.14	72.806	0.4147	44.8578
64	07:30:12	419694.79	72.776	0.4135	44.8529



# Containment Calculated Values

Oconee Nuclear Station  
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RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
65	07:45:12	419704.69	72.718	0.4127	44.8483
66	08:00:13	419702.09	72.675	0.4119	44.8437
67	08:15:13	419693.23	72.649	0.4108	44.8395
68	08:30:14	419689.78	72.618	0.4096	44.8353
69	08:45:14	419680.18	72.586	0.4092	44.8312
70	09:00:15	419682.47	72.545	0.4084	44.8273
71	09:15:15	419680.56	72.514	0.4076	44.8237
72	09:30:16	419672.13	72.490	0.4068	44.8200
73	09:45:17	419665.44	72.465	0.4063	44.8167
74	10:00:17	419662.87	72.434	0.4056	44.8131
75	10:15:17	419660.74	72.409	0.4048	44.8099
76	10:30:18	419656.19	72.383	0.4041	44.8066
77	10:45:18	419651.38	72.358	0.4037	44.8036
78	11:00:19	419648.37	72.335	0.4029	44.8006
79	11:15:20	419649.62	72.301	0.4023	44.7972
80	11:30:20	419642.25	72.283	0.4022	44.7949
81	11:45:21	419644.31	72.262	0.4011	44.7923
82	12:00:21	419635.55	72.244	0.4010	44.7897
83	12:15:22	419629.46	72.229	0.4001	44.7869
84	12:30:22	419622.90	72.214	0.3997	44.7846
85	12:45:22	419621.13	72.194	0.3993	44.7823
86	12:59:08	419616.99	72.181	0.3986	44.7801
87	13:14:13	419616.18	72.157	0.3984	44.7779
88	13:29:14	419609.54	72.147	0.3976	44.7755
89	13:44:14	419614.83	72.119	0.3972	44.7733
90	13:59:15	419608.10	72.107	0.3969	44.7714
91	14:14:59	419604.95	72.091	0.3966	44.7694
92	14:30:04	419599.50	72.079	0.3961	44.7673
93	14:45:05	419606.48	72.057	0.3956	44.7657

## Containment Calculated Values

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Oconee Nuclear Station  
Unit 3

RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
111	17:45:11	419502.74	71.906	0.3908	44.7373
112	17:55:11	419497.11	71.899	0.3905	44.7358
113	18:05:11	419493.24	71.889	0.3901	44.7342
114	18:15:12	419482.02	71.887	0.3899	44.7326
115	18:25:12	419475.52	71.878	0.3899	44.7311
116	18:35:12	419467.03	71.876	0.3895	44.7297
117	18:45:13	419460.44	71.870	0.3893	44.7283
118	18:55:13	419456.68	71.858	0.3891	44.7268
119	19:05:13	419453.36	71.847	0.3889	44.7252
120	19:15:14	419447.04	71.838	0.3886	44.7235
121	19:25:14	419437.18	71.837	0.3883	44.7222
122	19:35:14	419410.09	71.858	0.3883	44.7209
123	19:45:15	419394.31	71.865	0.3879	44.7195
124	19:55:15	419389.73	71.853	0.3879	44.7180
125	20:05:15	419390.09	71.839	0.3878	44.7168
126	20:15:16	419384.99	71.831	0.3876	44.7153
127	20:25:16	419373.45	71.829	0.3873	44.7137
128	20:35:16	419367.52	71.826	0.3870	44.7125
129	20:45:17	419378.27	71.797	0.3871	44.7113
130	20:55:17	419375.22	71.786	0.3869	44.7099
131	21:05:17	419370.79	71.779	0.3867	44.7086
132	21:15:18	419368.26	71.770	0.3862	44.7072
133	21:25:18	419362.34	71.762	0.3861	44.7057
134	21:40:19	419345.37	71.762	0.3860	44.7039
135	21:50:10	419334.91	71.763	0.3858	44.7026

# Containment Calculated Values

Oconee Nuclear Station  
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RDG	TIME	MASS	TEMP	VAPOR PRESS	PRESSURE
136	22:05:15	419337.12	71.749	0.3857	44.7016
137	22:20:16	419343.66	71.732	0.3854	44.7005
138	22:35:16	419333.85	71.733	0.3851	44.6993
139	22:50:17	419332.50	71.728	0.3847	44.6984
140	23:05:17	410760.58	71.019	0.3760	43.7259
141	23:21:21	390259.38	67.743	0.3545	41.2866
142	23:36:26	371984.33	66.106	0.3362	39.2303
143	23:51:27	354567.16	65.160	0.3209	37.3273
144	00:06:27	338001.76	64.521	0.3078	35.5422
145	00:15:26	328531.63	64.221	0.3010	34.5287
146	00:30:31	313246.44	63.899	0.2902	32.9054
147	00:45:31	298907.39	63.594	0.2802	31.3843
148	01:00:32	285308.68	63.438	0.2713	29.9514
149	01:15:33	272457.07	63.354	0.2632	28.6018
150	01:30:33	260360.94	63.295	0.2548	27.3322
151	01:45:34	249004.46	63.195	0.2474	26.1388
152	02:00:34	238308.50	63.212	0.2392	25.0193
153	02:15:35	228295.96	63.220	0.2325	23.9718
154	02:30:35	218892.58	63.293	0.2261	22.9908
155	02:45:36	210156.52	63.350	0.2185	22.0770
156	03:00:36	201992.84	63.420	0.2131	21.2253

### 3. Calibrated Instrument Data

**Calibrated Instrument Data**  
Oconee Nuclear Station  
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Reading # 65 - Dec 09 07:45:12

1.. 3	44.848	44.849	14.253		Pressures (PSIA)					
					Dew Points (°F)					
1.. 6	72.61	74.006	76.209	72.125	74.532	73.239				
					Temperatures (°F)					
1..10	65.523	65.689	71.341	71.666	73.89	73.607	588.6	73.855	73.914	73.895
11..20	65.75	65.134	65.686	70.212	69.283	70.56	73.675	73.829	74.441	74.493
21..24	72.978	73.072	74.339	74.5						

Reading # 66 - Dec 09 08:00:13

1.. 3	44.843	44.844	14.261		Pressures (PSIA)					
					Dew Points (°F)					
1.. 6	72.531	73.948	76.157	72.066	74.472	73.207				
					Temperatures (°F)					
1..10	65.482	65.652	71.285	71.634	73.844	73.528	588.73	73.814	73.872	73.863
11..20	65.694	65.102	65.649	70.175	69.25	70.528	73.652	73.788	74.386	74.455
21..24	72.932	73.04	74.297	74.445						

Reading # 67 - Dec 09 08:15:13

1.. 3	44.839	44.84	14.257		Pressures (PSIA)					
					Dew Points (°F)					
1.. 6	72.451	73.893	76.038	71.985	74.405	73.12				
					Temperatures (°F)					
1..10	65.473	65.61	71.243	71.615	73.802	73.528	588.81	73.781	73.849	73.877
11..20	65.666	65.079	65.621	70.166	69.227	70.486	73.643	73.741	74.377	74.428
21..24	72.904	73.007	74.255	74.403						

Reading # 68 - Dec 09 08:30:14

1.. 3	44.835	44.836	14.257		Pressures (PSIA)					
					Dew Points (°F)					
1.. 6	72.401	73.805	75.989	71.929	74.348	72.912				
					Temperatures (°F)					
1..10	65.44	65.601	71.197	71.583	73.761	73.472	588.29	73.749	73.816	73.798
11..20	65.634	65.069	65.598	70.133	69.194	70.472	73.634	73.713	74.363	74.395
21..24	72.881	72.965	74.232	74.37						

Reading # 69 - Dec 09 08:45:14

1.. 3	44.831	44.832	14.259		Pressures (PSIA)					
					Dew Points (°F)					
1.. 6	72.341	73.77	75.915	71.85	74.302	73.023				
					Temperatures (°F)					
1..10	65.417	65.555	71.155	71.55	73.747	73.444	589.13	73.726	73.784	73.765
11..20	65.597	65.046	65.566	70.101	69.171	70.454	73.634	73.676	74.312	74.391
21..24	72.853	72.938	74.195	74.324						

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Reading # 70 - Dec 09 09:00:15

1.. 3	44.827	44.828	14.264		Pressures (PSIA)				
1.. 6	72.295	73.699	75.869	71.79	Dew Points (°F)	74.223	72.984		
1..10	65.398	65.536	71.113	71.527	Temperatures (°F)	73.747	73.421	588.61	73.698
11..20	65.569	65.037	65.543	70.078		69.143	70.417	73.522	73.644
21..24	72.816	72.91	74.12	74.291				74.256	73.751
									73.724
									74.372

Reading # 71 - Dec 09 09:15:15

1.. 3	44.823	44.824	14.261		Pressures (PSIA)				
1.. 6	72.237	73.581	75.829	71.745	Dew Points (°F)	74.184	72.924		
1..10	65.385	65.495	71.067	71.495	Temperatures (°F)	73.728	73.365	588.66	73.675
11..20	65.522	65.004	65.51	70.059		69.13	70.398	73.499	73.616
21..24	72.769	72.854	74.102	74.259				74.224	73.719
									73.691
									74.354

Reading # 72 - Dec 09 09:30:16

1.. 3	44.819	44.821	14.259		Pressures (PSIA)				
1.. 6	72.158	73.555	75.765	71.673	Dew Points (°F)	74.126	72.873		
1..10	65.361	65.481	71.039	71.486	Temperatures (°F)	73.663	73.365	588.72	73.651
11..20	65.513	64.995	65.487	70.045		69.106	70.375	73.425	73.57
21..24	72.765	72.849	74.097	74.226				74.191	73.696
									73.682
									74.326

Reading # 73 - Dec 09 09:45:17

1.. 3	44.816	44.817	14.256		Pressures (PSIA)				
1.. 6	72.12	73.502	75.733	71.627	Dew Points (°F)	74.047	72.899		
1..10	65.343	65.472	71.016	71.439	Temperatures (°F)	73.64	73.323	588.41	73.628
11..20	65.49	64.963	65.468	70.027		69.097	70.356	73.448	73.546
21..24	72.732	72.822	74.074	74.213				74.159	73.654
									73.626
									74.303

Reading # 74 - Dec 09 10:00:17

1.. 3	44.812	44.814	14.251		Pressures (PSIA)				
1.. 6	72.066	73.463	75.674	71.574	Dew Points (°F)	73.982	72.86		
1..10	65.329	65.458	70.983	71.43	Temperatures (°F)	73.621	73.3	588.97	73.6
11..20	65.49	64.963	65.454	70.017		69.065	70.333	73.425	73.519
21..24	72.695	72.78	74.014	74.152				74.117	73.635
									73.617
									74.275

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Reading # 75 - Dec 09 10:15:17

1.. 3	44.809	44.811	14.257						
1.. 6	71.995	73.425	75.601	71.509					
1..10	65.329	65.448	70.941	71.421					
11..20	65.457	64.949	65.427	70.003					
21..24	72.672	72.747	74.004	74.11					

Pressures (PSIA)

Dew Points (°F)

Temperatures (°F)

73.575	73.277	589.21	73.577	73.621	73.552
69.055	70.319	73.369	73.495	74.103	74.256

Reading # 76 - Dec 09 10:30:18

1.. 3	44.806	44.807	14.258						
1.. 6	71.948	73.357	75.541	71.456					
1..10	65.32	65.416	70.918	71.398					
11..20	65.434	64.926	65.413	69.98					
21..24	72.649	72.743	73.944	74.092					

Pressures (PSIA)

Dew Points (°F)

Temperatures (°F)

73.888	72.748				
73.575	73.259	589.02	73.563	73.589	73.57
69.046	70.301	73.36	73.44	74.061	74.238

Reading # 77 - Dec 09 10:45:18

1.. 3	44.803	44.804	14.258						
1.. 6	71.915	73.325	75.509	71.423					
1..10	65.311	65.397	70.886	71.374					
11..20	65.425	64.926	65.39	69.971					
21..24	72.621	72.706	73.925	74.064					

Pressures (PSIA)

Dew Points (°F)

Temperatures (°F)

73.849	72.722				
73.542	73.235	588.94	73.531	73.58	73.543
69.032	70.291	73.318	73.407	74.038	74.187

Reading # 78 - Dec 09 11:00:19

1.. 3	44.8	44.801	14.259						
1.. 6	71.842	73.285	75.462	71.35					
1..10	65.311	65.397	70.863	71.356					
11..20	65.416	64.916	65.38	69.948					
21..24	72.626	72.668	73.902	74.041					

Pressures (PSIA)

Dew Points (°F)

Temperatures (°F)

73.796	72.65				
73.533	73.217	589.1	73.521	73.547	73.505
69.009	70.268	73.304	73.398	73.987	74.196

Reading # 79 - Dec 09 11:15:20

1.. 3	44.797	44.798	14.263						
1.. 6	71.801	73.211	75.414	71.317					
1..10	65.287	65.384	70.83	71.356					
11..20	65.383	64.916	65.371	69.938					
21..24	72.589	72.65	73.851	73.948					

Pressures (PSIA)

Dew Points (°F)

Temperatures (°F)

73.749	72.641				
73.487	73.18	588.92	73.503	73.524	73.487
69	70.259	73.239	73.352	73.95	74.159

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Reading # 80 - Dec 09 11:30:20

1.. 3 44.794 44.795 14.256

Pressures (PSIA)

1.. 6 71.758 73.207 75.351 71.266

Dew Points (°F)

73.699 72.761

Temperatures (°F)

1..10 65.287 65.374 70.807 71.333

11..20 65.374 64.898 65.357 69.915

21..24 72.575 72.631 73.851 73.934

73.51 73.138 588.68 73.48 73.501 73.454  
68.99 70.245 73.184 73.342 73.931 74.136

Reading # 81 - Dec 09 11:45:21

1.. 3 44.792 44.793 14.261

Pressures (PSIA)

1.. 6 71.724 73.135 75.285 71.213

Dew Points (°F)

73.673 72.564

Temperatures (°F)

1..10 65.278 65.351 70.788 71.31

11..20 65.351 64.884 65.348 69.906

21..24 72.561 72.603 73.814 73.953

73.445 73.105 588.34 73.456 73.491 73.422  
68.977 70.236 73.165 73.324 73.908 74.108

Reading # 82 - Dec 09 12:00:21

1.. 3 44.789 44.79 14.259

Pressures (PSIA)

1.. 6 71.68 73.077 75.28 71.182

Dew Points (°F)

73.627 72.67

Temperatures (°F)

1..10 65.264 65.351 70.774 71.3

11..20 65.351 64.884 65.339 69.906

21..24 72.533 72.576 73.786 73.902

73.436 73.129 588.6 73.447 73.459 73.385  
68.967 70.222 73.165 73.301 73.899 74.113

Reading # 83 - Dec 09 12:15:22

1.. 3 44.786 44.788 14.257

Pressures (PSIA)

1.. 6 71.621 73.057 75.235 71.123

Dew Points (°F)

73.562 72.545

Temperatures (°F)

1..10 65.255 65.333 70.742 71.3

11..20 65.328 64.875 65.339 69.883

21..24 72.524 72.543 73.777 73.892

73.422 73.105 588.59 73.415 73.45 73.375  
68.967 70.213 73.165 73.254 73.908 74.08

Reading # 84 - Dec 09 12:30:22

1.. 3 44.784 44.785 14.255

Pressures (PSIA)

1.. 6 71.606 73.016 75.214 71.069

Dew Points (°F)

73.508 72.544

Temperatures (°F)

1..10 65.246 65.333 70.733 71.291

11..20 65.328 64.875 65.329 69.883

21..24 72.524 72.534 73.786 73.869

73.413 73.082 588.42 73.433 73.427 73.408  
68.949 70.194 73.1 73.245 73.834 74.062



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Reading # 85 - Dec 09 12:45:22

					Pressures (PSIA)					
1.. 3	44.782	44.783	14.255							
					Dew Points (°F)					
1.. 6	71.542	72.951	75.155	71.036	73.496	72.591				
					Temperatures (°F)					
1..10	65.246	65.319	70.709	71.268	73.403	73.073	588.7	73.391	73.417	73.343
11..20	65.328	64.875	65.315	69.864	68.949	70.18	73.133	73.222	73.834	74.048
21..24	72.5	72.497	73.73	73.869						

Reading # 86 - Dec 09 12:59:08

					Pressures (PSIA)					
1.. 3	44.779	44.781	14.254							
					Dew Points (°F)					
1.. 6	71.535	72.917	75.108	70.996	73.456	72.466				
					Temperatures (°F)					
1..10	65.246	65.31	70.7	71.268	73.38	73.054	588.7	73.382	73.417	73.324
11..20	65.304	64.875	65.306	69.864	68.935	70.194	73.086	73.203	73.811	74.039
21..24	72.477	72.487	73.744	73.827						

Reading # 87 - Dec 09 13:14:13

					Pressures (PSIA)					
1.. 3	44.777	44.779	14.249							
					Dew Points (°F)					
1.. 6	71.475	72.891	75.063	70.958	73.41	72.557				
					Temperatures (°F)					
1..10	65.246	65.296	70.686	71.245	73.357	73.031	588.47	73.368	73.385	73.311
11..20	65.295	64.865	65.292	69.85	68.935	70.18	73.012	73.189	73.788	74.015
21..24	72.459	72.464	73.702	73.804						

Reading # 88 - Dec 09 13:29:14

					Pressures (PSIA)					
1.. 3	44.775	44.776	14.245							
					Dew Points (°F)					
1.. 6	71.443	72.853	75.023	70.918	73.364	72.407				
					Temperatures (°F)					
1..10	65.246	65.296	70.668	71.235	73.348	73.017	588.81	73.345	73.371	73.301
11..20	65.295	64.865	65.292	69.841	68.926	70.18	73.058	73.166	73.755	74.011
21..24	72.44	72.46	73.716	73.767						

Reading # 89 - Dec 09 13:44:14

					Pressures (PSIA)					
1.. 3	44.773	44.774	14.242							
					Dew Points (°F)					
1.. 6	71.391	72.787	74.99	70.892	73.331	72.432				
					Temperatures (°F)					
1..10	65.232	65.286	70.644	71.226	73.338	72.985	588.46	73.326	73.343	73.246
11..20	65.286	64.852	65.283	69.832	68.912	70.162	73.026	73.148	73.746	73.983
21..24	72.417	72.436	73.633	73.73						

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Reading # 90 - Dec 09 13:59:15

					Pressures (PSIA)					
1.. 3	44.771	44.772	14.24							
					Dew Points (°F)					
1.. 6	71.374	72.797	74.962	70.837	73.289	72.437				
					Temperatures (°F)					
1..10	65.232	65.277	70.635	71.212	73.324	72.976	588.85	73.303	73.343	73.259
11..20	65.277	64.852	65.274	69.818	68.912	70.148	73.012	73.124	73.713	73.978
21..24	72.431	72.432	73.619	73.735						

Reading # 91 - Dec 09 14:14:59

					Pressures (PSIA)					
1.. 3	44.769	44.77	14.238							
					Dew Points (°F)					
1.. 6	71.31	72.732	74.937	70.792	73.264	72.483				
					Temperatures (°F)					
1..10	65.232	65.277	70.626	71.203	73.292	72.957	588.83	73.285	73.306	73.246
11..20	65.286	64.852	65.274	69.818	68.902	70.148	73.012	73.115	73.681	73.969
21..24	72.412	72.418	73.61	73.693						

Reading # 92 - Dec 09 14:30:04

					Pressures (PSIA)					
1.. 3	44.767	44.768	14.233							
					Dew Points (°F)					
1.. 6	71.285	72.715	74.885	70.755	73.22	72.458				
					Temperatures (°F)					
1..10	65.232	65.263	70.603	71.194	73.283	72.943	588.67	73.285	73.297	73.213
11..20	65.253	64.852	65.26	69.808	68.893	70.138	73.003	73.083	73.69	73.946
21..24	72.389	72.376	73.61	73.693						

Reading # 93 - Dec 09 14:45:05

					Pressures (PSIA)					
1.. 3	44.765	44.766	14.232							
					Dew Points (°F)					
1.. 6	71.243	72.628	74.845	70.726	73.185	72.444				
					Temperatures (°F)					
1..10	65.223	65.245	70.589	71.18	73.269	72.92	588.94	73.248	73.287	73.181
11..20	65.24	64.842	65.26	69.799	68.879	70.125	73.026	73.069	73.639	73.937
21..24	72.375	72.362	73.577	73.651						

#### 4. Raw Instrument Data

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Reading # 65 - Dec 09 07:45:12

											Pressures (PSIA)	
1.. 3	44.848	44.849	14.253									
											Dew Points (amps)	
1.. 6	0.01401	0.014134	0.01433	0.013967	0.014181	0.014066						
											Temperatures (ohms)	
1..10	107.2	107.29	108.44	108.58	108.99	108.93	215.28	109.01	109.06	109.01		
11..20	107.25	107.1	107.23	108.19	108.01	108.33	108.97	109.05	109.13	109.24		
21..24	108.83	108.83	109.06	109.19								

Reading # 66 - Dec 09 08:00:13

											Pressures (PSIA)	
1.. 3	44.843	44.844	14.261									
											Dew Points (amps)	
1.. 6	0.014003	0.014129	0.014325	0.013961	0.014175	0.014063						
											Temperatures (ohms)	
1..10	107.19	107.28	108.43	108.57	108.98	108.91	215.31	109	109.05	109.01		
11..20	107.24	107.09	107.22	108.18	108	108.32	108.96	109.04	109.12	109.23		
21..24	108.82	108.82	109.05	109.17								

Reading # 67 - Dec 09 08:15:13

											Pressures (PSIA)	
1.. 3	44.839	44.84	14.257									
											Dew Points (amps)	
1.. 6	0.013996	0.014124	0.014315	0.013954	0.014169	0.014055						
											Temperatures (ohms)	
1..10	107.19	107.27	108.42	108.56	108.98	108.91	215.32	109	109.05	109.01		
11..20	107.23	107.08	107.21	108.18	108	108.31	108.96	109.03	109.12	109.23		
21..24	108.81	108.81	109.04	109.16								

Reading # 68 - Dec 09 08:30:14

											Pressures (PSIA)	
1.. 3	44.835	44.836	14.257									
											Dew Points (amps)	
1.. 6	0.013991	0.014116	0.01431	0.013949	0.014164	0.014037						
											Temperatures (ohms)	
1..10	107.18	107.27	108.41	108.56	108.97	108.9	215.22	108.99	109.04	108.99		
11..20	107.23	107.08	107.21	108.17	107.99	108.31	108.96	109.02	109.12	109.22		
21..24	108.81	108.8	109.03	109.16								

Reading # 69 - Dec 09 08:45:14

											Pressures (PSIA)	
1.. 3	44.831	44.832	14.259									
											Dew Points (amps)	
1.. 6	0.013986	0.014113	0.014304	0.013942	0.01416	0.014047						
											Temperatures (ohms)	
1..10	107.17	107.26	108.4	108.55	108.96	108.9	215.39	108.98	109.03	108.98		
11..20	107.22	107.08	107.2	108.16	107.99	108.31	108.96	109.01	109.1	109.22		
21..24	108.8	108.8	109.03	109.15								

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Reading # 70 - Dec 09 09:00:15

Pressures (PSIA)										
1.. 3	44.827	44.828	14.264							
Dew Points (amps)										
1.. 6	0.013982	0.014107	0.0143	0.013937	0.014153	0.014043				
Temperatures (ohms)										
1..10	107.17	107.26	108.39	108.55	108.96	108.89	215.28	108.98	109.02	108.98
11..20	107.21	107.08	107.19	108.16	107.98	108.3	108.93	109.01	109.09	109.22
21..24	108.8	108.79	109.01	109.14						

Reading # 71 - Dec 09 09:15:15

Pressures (PSIA)										
1.. 3	44.823	44.824	14.261							
Dew Points (amps)										
1.. 6	0.013977	0.014096	0.014296	0.013933	0.01415	0.014038				
Temperatures (ohms)										
1..10	107.17	107.25	108.38	108.54	108.96	108.88	215.29	108.97	109.02	108.97
11..20	107.2	107.07	107.19	108.16	107.98	108.3	108.93	109	109.09	109.21
21..24	108.79	108.78	109.01	109.13						

Reading # 72 - Dec 09 09:30:16

Pressures (PSIA)										
1.. 3	44.819	44.821	14.259							
Dew Points (amps)										
1.. 6	0.01397	0.014094	0.01429	0.013927	0.014145	0.014033				
Temperatures (ohms)										
1..10	107.16	107.24	108.38	108.54	108.95	108.88	215.31	108.97	109.01	108.97
11..20	107.2	107.07	107.18	108.15	107.97	108.29	108.91	108.99	109.08	109.21
21..24	108.78	108.78	109	109.13						

Reading # 73 - Dec 09 09:45:17

Pressures (PSIA)										
1.. 3	44.816	44.817	14.256							
Dew Points (amps)										
1.. 6	0.013966	0.014089	0.014287	0.013922	0.014138	0.014036				
Temperatures (ohms)										
1..10	107.16	107.24	108.37	108.53	108.94	108.87	215.24	108.96	109	108.95
11..20	107.19	107.06	107.18	108.15	107.97	108.29	108.92	108.98	109.07	109.2
21..24	108.78	108.77	109	109.12						

Reading # 74 - Dec 09 10:00:17

Pressures (PSIA)										
1.. 3	44.812	44.814	14.251							
Dew Points (amps)										
1.. 6	0.013961	0.014086	0.014282	0.013918	0.014132	0.014032				
Temperatures (ohms)										
1..10	107.15	107.24	108.36	108.52	108.94	108.87	215.35	108.96	109	108.95
11..20	107.19	107.06	107.18	108.15	107.96	108.28	108.91	108.98	109.06	109.19
21..24	108.77	108.76	108.99	109.11						

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Reading # 75 - Dec 09 10:15:17

Pressures (PSIA)

1.. 3 44.809 44.811 14.257

Dew Points (amps)

1.. 6 0.013955 0.014082 0.014276 0.013912 0.014129 0.014023

Temperatures (ohms)

1..10	107.15	107.24	108.35	108.52	108.93	108.86	215.4	108.95	109	108.94
11..20	107.19	107.06	107.17	108.14	107.96	108.28	108.9	108.97	109.06	109.19
21..24	108.76	108.76	108.98	109.1						

Reading # 76 - Dec 09 10:30:18

Pressures (PSIA)

1.. 3 44.806 44.807 14.258

Dew Points (amps)

1.. 6 0.013951 0.014076 0.01427 0.013907 0.014123 0.014022

Temperatures (ohms)

1..10	107.15	107.23	108.35	108.52	108.93	108.86	215.37	108.95	108.99	108.94
11..20	107.18	107.05	107.17	108.14	107.96	108.27	108.9	108.96	109.05	109.19
21..24	108.76	108.75	108.97	109.1						

Reading # 77 - Dec 09 10:45:18

Pressures (PSIA)

1.. 3 44.803 44.804 14.258

Dew Points (amps)

1.. 6 0.013948 0.014073 0.014268 0.013904 0.01412 0.01402

Temperatures (ohms)

1..10	107.15	107.23	108.34	108.51	108.92	108.85	215.35	108.94	108.99	108.94
11..20	107.18	107.05	107.16	108.14	107.96	108.27	108.89	108.95	109.05	109.18
21..24	108.75	108.75	108.97	109.09						

Reading # 78 - Dec 09 11:00:19

Pressures (PSIA)

1.. 3 44.8 44.801 14.259

Dew Points (amps)

1.. 6 0.013942 0.01407 0.014263 0.013898 0.014115 0.014013

Temperatures (ohms)

1..10	107.15	107.23	108.34	108.51	108.92	108.85	215.38	108.94	108.98	108.93
11..20	107.18	107.05	107.16	108.13	107.95	108.27	108.89	108.95	109.03	109.18
21..24	108.75	108.74	108.96	109.09						

Reading # 79 - Dec 09 11:15:20

Pressures (PSIA)

1.. 3 44.797 44.798 14.263

Dew Points (amps)

1.. 6 0.013938 0.014063 0.014259 0.013895 0.014111 0.014013

Temperatures (ohms)

1..10	107.15	107.22	108.33	108.51	108.91	108.84	215.34	108.94	108.98	108.92
11..20	107.17	107.05	107.16	108.13	107.95	108.27	108.87	108.94	109.03	109.17
21..24	108.75	108.73	108.95	109.07						

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Reading # 80 - Dec 09 11:30:20

											Pressures (PSIA)	
1.. 3	44.794	44.795	14.256									
											Dew Points (amps)	
1.. 6	0.013934	0.014063	0.014253	0.01389	0.014107	0.014023						
											Temperatures (ohms)	
1..10	107.15	107.22	108.33	108.5	108.91	108.83	215.3	108.93	108.97	108.92		
11..20	107.17	107.05	107.15	108.12	107.95	108.26	108.86	108.94	109.02	109.16		
21..24	108.74	108.73	108.95	109.06								

Reading # 81 - Dec 09 11:45:21

											Pressures (PSIA)	
1.. 3	44.792	44.793	14.261									
											Dew Points (amps)	
1.. 6	0.013931	0.014056	0.014248	0.013886	0.014104	0.014006						
											Temperatures (ohms)	
1..10	107.14	107.22	108.32	108.5	108.9	108.82	215.23	108.93	108.97	108.91		
11..20	107.16	107.04	107.15	108.12	107.94	108.26	108.86	108.94	109.02	109.16		
21..24	108.74	108.72	108.94	109.07								

Reading # 82 - Dec 09 12:00:21

											Pressures (PSIA)	
1.. 3	44.789	44.79	14.259									
											Dew Points (amps)	
1.. 6	0.013927	0.014051	0.014247	0.013883	0.0141	0.014015						
											Temperatures (ohms)	
1..10	107.14	107.22	108.32	108.5	108.9	108.83	215.28	108.92	108.96	108.9		
11..20	107.16	107.04	107.15	108.12	107.94	108.26	108.86	108.93	109.02	109.16		
21..24	108.73	108.72	108.94	109.06								

Reading # 83 - Dec 09 12:15:22

											Pressures (PSIA)	
1.. 3	44.786	44.788	14.257									
											Dew Points (amps)	
1.. 6	0.013922	0.01405	0.014243	0.013878	0.014094	0.014004						
											Temperatures (ohms)	
1..10	107.14	107.21	108.31	108.5	108.89	108.82	215.28	108.92	108.96	108.9		
11..20	107.16	107.04	107.15	108.12	107.94	108.26	108.86	108.92	109.02	109.15		
21..24	108.73	108.71	108.94	109.05								

Reading # 84 - Dec 09 12:30:22

											Pressures (PSIA)	
1.. 3	44.784	44.785	14.255									
											Dew Points (amps)	
1.. 6	0.013921	0.014046	0.014241	0.013873	0.01409	0.014004						
											Temperatures (ohms)	
1..10	107.14	107.21	108.31	108.49	108.89	108.82	215.25	108.92	108.95	108.91		
11..20	107.16	107.04	107.15	108.12	107.94	108.25	108.84	108.92	109	109.15		
21..24	108.73	108.71	108.94	109.05								

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Reading # 85 - Dec 09 12:45:22

Pressures (PSIA)										
1.. 3	44.782	44.783	14.255							
Dew Points (amps)										
1.. 6	0.013915	0.01404	0.014236	0.01387	0.014089	0.014008				
Temperatures (ohms)										
1..10	107.14	107.21	108.3	108.49	108.89	108.82	215.3	108.91	108.95	108.89
11..20	107.16	107.04	107.15	108.11	107.94	108.25	108.85	108.91	109	109.15
21..24	108.73	108.7	108.93	109.05						

Reading # 86 - Dec 09 12:59:08

Pressures (PSIA)										
1.. 3	44.779	44.781	14.254							
Dew Points (amps)										
1.. 6	0.013914	0.014037	0.014232	0.013866	0.014085	0.013997				
Temperatures (ohms)										
1..10	107.14	107.21	108.3	108.49	108.88	108.81	215.3	108.91	108.95	108.89
11..20	107.15	107.04	107.14	108.11	107.94	108.25	108.84	108.91	109	109.14
21..24	108.72	108.7	108.93	109.04						

Reading # 87 - Dec 09 13:14:13

Pressures (PSIA)										
1.. 3	44.777	44.779	14.249							
Dew Points (amps)										
1.. 6	0.013909	0.014035	0.014228	0.013863	0.014081	0.014005				
Temperatures (ohms)										
1..10	107.14	107.2	108.3	108.48	108.88	108.81	215.26	108.91	108.95	108.89
11..20	107.15	107.04	107.14	108.11	107.94	108.25	108.82	108.91	108.99	109.14
21..24	108.72	108.69	108.92	109.04						

Reading # 88 - Dec 09 13:29:14

Pressures (PSIA)										
1.. 3	44.775	44.776	14.245							
Dew Points (amps)										
1.. 6	0.013906	0.014031	0.014224	0.013859	0.014077	0.013992				
Temperatures (ohms)										
1..10	107.14	107.2	108.3	108.48	108.88	108.8	215.32	108.9	108.94	108.88
11..20	107.15	107.04	107.14	108.11	107.93	108.25	108.83	108.9	108.98	109.14
21..24	108.71	108.69	108.92	109.03						

Reading # 89 - Dec 09 13:44:14

Pressures (PSIA)										
1.. 3	44.773	44.774	14.242							
Dew Points (amps)										
1.. 6	0.013901	0.014026	0.014221	0.013857	0.014074	0.013994				
Temperatures (ohms)										
1..10	107.13	107.2	108.29	108.48	108.88	108.8	215.25	108.9	108.94	108.87
11..20	107.15	107.04	107.14	108.11	107.93	108.24	108.83	108.9	108.98	109.13
21..24	108.71	108.69	108.9	109.02						



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Reading # 90 - Dec 09 13:59:15

Pressures (PSIA)

1.. 3    44.771    44.772    14.24

Dew Points (amps)

1.. 6    0.0139    0.014026    0.014219    0.013852    0.01407    0.013994

Temperatures (ohms)

1..10	107.13	107.2	108.29	108.48	108.87	108.8	215.33	108.89	108.94	108.88
11..20	107.15	107.04	107.14	108.1	107.93	108.24	108.82	108.89	108.98	109.13
21..24	108.71	108.69	108.9	109.02						

Reading # 91 - Dec 09 14:14:59

Pressures (PSIA)

1.. 3    44.769    44.77    14.238

Dew Points (amps)

1.. 6    0.013894    0.014021    0.014217    0.013848    0.014068    0.013999

Temperatures (ohms)

1..10	107.13	107.2	108.29	108.48	108.87	108.79	215.33	108.89	108.93	108.87
11..20	107.15	107.04	107.14	108.1	107.93	108.24	108.82	108.89	108.97	109.13
21..24	108.71	108.68	108.9	109.01						

Reading # 92 - Dec 09 14:30:04

Pressures (PSIA)

1.. 3    44.767    44.768    14.233

Dew Points (amps)

1.. 6    0.013892    0.014019    0.014212    0.013845    0.014064    0.013996

Temperatures (ohms)

1..10	107.13	107.2	108.28	108.47	108.86	108.79	215.3	108.89	108.93	108.87
11..20	107.14	107.04	107.13	108.1	107.93	108.24	108.82	108.88	108.97	109.12
21..24	108.7	108.68	108.9	109.01						

Reading # 93 - Dec 09 14:45:05

Pressures (PSIA)

1.. 3    44.765    44.766    14.232

Dew Points (amps)

1.. 6    0.013888    0.014011    0.014208    0.013842    0.014061    0.013995

Temperatures (ohms)

1..10	107.13	107.19	108.28	108.47	108.86	108.78	215.35	108.88	108.92	108.86
11..20	107.14	107.03	107.13	108.1	107.92	108.24	108.83	108.88	108.96	109.12
21..24	108.7	108.67	108.89	109						

## **5. Mass Point Termination Criteria**

# Mass Point Termination Criteria

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RDG	TIME	Mass lbm	MP Leak	MP UCL %/day	Max Wind	Scatter	redicto %
65	0.00	419704.6882	0.0000	0.0000	0.0000	0.0000	-
66	15.02	419702.0939	0.0593	0.0000	0.2028	1.0000	-
67	30.02	419693.2294	0.1310	0.4854	0.2028	1.0116	-
68	45.03	419689.7767	0.1225	0.1789	0.1491	1.1267	-
69	60.03	419680.1827	0.1402	0.1756	0.1491	1.1216	-
70	75.05	419682.4739	0.1177	0.1525	0.1582	1.1574	-
71	90.05	419680.5624	0.1018	0.1315	0.1582	1.2175	-
72	105.07	419672.1338	0.1027	0.1241	0.1402	1.2629	-
73	120.08	419665.4424	0.1065	0.1232	0.1402	1.2718	-
74	135.08	419662.8707	0.1058	0.1189	0.1402	1.2961	-
75	150.08	419660.7423	0.1028	0.1138	0.1177	1.3253	-
76	165.10	419656.1933	0.1012	0.1104	0.1043	1.3469	-
77	180.10	419651.3849	0.1005	0.1082	0.1043	1.3608	-
78	195.12	419648.3717	0.0991	0.1058	0.1024	1.3767	-
79	210.13	419649.6234	0.0950	0.1022	0.1054	1.4041	-
80	225.13	419642.2540	0.0939	0.1002	0.1048	1.4192	-
81	240.15	419644.3079	0.0904	0.0970	0.1065	1.4467	34.2343
82	255.15	419635.5543	0.0899	0.0957	0.1065	1.4577	33.9077
83	270.17	419629.4603	0.0902	0.0955	0.1058	1.4584	35.2688
84	285.17	419622.8961	0.0914	0.0962	0.1028	1.4495	32.2111
85	300.17	419621.1347	0.0916	0.0959	0.1028	1.4506	30.0254
86	313.93	419616.9919	0.0918	0.0958	0.1028	1.4475	19.8917
87	329.02	419616.1835	0.0912	0.0949	0.1012	1.4557	16.1725
88	344.03	419609.5406	0.0914	0.0947	0.1012	1.4563	15.8223
89	359.03	419614.8349	0.0895	0.0931	0.1005	1.4719	16.0153
90	374.05	419608.0959	0.0886	0.0920	0.1005	1.4821	14.7754
91	389.78	419604.9498	0.0877	0.0910	0.0991	1.4935	13.3064
92	404.87	419599.5023	0.0873	0.0904	0.0991	1.4993	12.0793
93	419.88	419606.4812	0.0852	0.0887	0.0950	1.5163	11.9306

**6. BN-TOP-1 Temperature Stabilization Data**

**BN-TOP-1 Temperature Stabilization**  
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TIME	TEMP	AVE. DT OVER LAST 2 HOURS	RATE OF DT CHANGE OVER LAST 2 HOURS
t	T	$\frac{ T_t - T_{t-2} }{2}$	
HOURS	°F	°F/HR	°F/HR/HR
02:30	75.830		
03:30	74.169		
04:30	73.574	1.127	1.064
05:30	73.214	0.477	0.235
06:30	72.962	0.306	0.108
07:30	72.776	0.219	0.067