DUKE POWER COMPANY

OCONEE NUCLEAR STATION

UNIT 1

REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST
SUPPLEMENTAL REPORT

JUNE 1987

DUKE POWER COMPANY

Oconee Nuclear Station

Unit 1

Reactor Containment Building

Integrated Leak Rate Test

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1.0 Introduction

The Periodic Integrated Leak Rate Test (ILRT) of the Oconee Nuclear Station Unit 1 containment building was satisfactorily completed on April 7, 1986.

The testing was conducted in accordance with the requirements of Technical Specification 4.4, BN-TOP-1 (Bechtel Testing Criteria for ILRT), ANSI ANS 56.8 - 1981 and 10CFR50, Appendix J. The absolute method of testing was employed with the containment temperatures measured at 24 locations and containment dewpoint temperatures at two locations. Leakage was measured at design basis accident pressure of ~ 59 PSIG. A measured induced leakage was used to verify the results.

A pressure shift of ~0.03 occurred between 2200 and 2205. According to the Standards Lab supervisor the RUSKA was found shifted by ~0.03. To cause this type of shift would require the instrument to have been bumped. Once this type of shift occurs it would remain constant until corrected or the instrument was bumped again. This belief agrees with the pressure curve drawn for the original report. The pressure for all data sets starting at 2205 (data set 134) were reduced by 0.03 and a new leak rate was calculated.

Analysis of final test data shows the results to be within the specified limits for this containment, which has a maximum allowable leak rate of 0.250 Wt%/day. The leakage rate was measured at 0.1708 Wt%/day, and the Upper Confidence Limit (UCL) was determined to be 0.1734 Wt%/day.

Analysis of the original verification test data shows the results to be within the specified range for this test, which has a maximum deviation of ± 25% L_a. The deviation as measured was 0.0362 Wt%/day or 14.48% L_a. The verification data was not recalculated.

2.0 Summary and Conclusions

2.1 Synopsis

The Unit 1 Containment ILRT was performed in accordance with the Periodic Test Procedure PT/1/A/0150/03A as approved for use on February 10, 1986.

Pressurization began at 0215 hours on April 5, 1986, using two permanent compressors and three (rental) temporary compressors. At 0037 hours, on April 6, the compressors were secured with the containment pressure at approximately 61.5 PSIG, and the stabilization period began.

At approximately 0100 hours on April 6, 1986, Operations adjusted LPI Flows. Over the next 4½ hours, the RCS Temperature decreased about 3°F.

At 0528, RTD Number 5 displayed erratic readings. At 0600, RTD 5 appeared to be stable.

At 0915, technicians went into penetration room to check nitrogen lines. At 1N-240 connection a leak was measured to be approximately 67 cubic feet per hour (CFH). A sample of the leaking gas was checked for oxygen content. The results indicated the leaking gas to be nitrogen. Operations went out to isolate the nitrogen header better by closing 1N-69, 1N-71 and 1N-72, which are located up stream toward the supply header. The high pressure header was checked at the location where PG-186 was removed to vent the penetration and a small leak was observed but was not enough to measure with a rotometer.

At 1115, the leak at 1N-240 was measured and found to have been reduced to 22 CFH which could not cause inleakage as it was vented to the atmosphere.

At 1225, Ruska #1 (SN OCPRF 28024) was observed fluctuating - The volume fractions were changed so Pressure #1 (Ruska #1 SN OCPRF 28024) Volume Fraction = Zero and Pressure #2 (Ruska #2 SN OCPRF 28025) Volume Fraction = 1.0. All data back to 1100 was recalculated with the new volume fractions.

At 1500 hours. RTDs 2 through 7 were observed with erradic readings. All these RTDs were on Board #1 which was changed out by 1540 hours. With the new board installed, the values of each RTD was compared to its counter part and a correction was made as follows for the time the RTDs were bad (from start of test Data Set 326 through Data Set 381):

Value for RTD 2 = Value of RTD 11 + 3.7°F

Value for RTD 3 = Value of RTD 14 + 1.5°F

Value for RTD 4 = Value of RTD 9 - 0.9°F

Value for RTD 5 = Value of RTD 21 - 3.0°F

Value for RTD 6 = Value of RTD 8 + 0.1°F

Value for RTD 7 = Value of RTD 20 + 0.6°F

The other choice would have been to change volume fractions such that there would be a direct replacement for this period of time. The difference in weighted average Reactor Building temperature would have been 0.008°F.

Calculations were run using data starting at 10:05 pm on April 6, 1986 (for 12 hours and 55 minutes) resulting in a leak rate of 0.1322 wt%/day and a UCL leak rate of 0.1580 wt%/day.

2.2 Test Results

Tabulated below are the leak rates measured for the test. All leak rates are reported in weight percent per day (Wt%/day) of containment mass at Post-Accident Conditions.

Test	Acceptance Criteria	Tech. Spec. Limit	Calculated Leak Rate	95% (UCL)
59 PSIG	0.1875	0.1875	0.1708	0.1734

The verification test consisted of imposing a known leak rate on the containment at the end of the CILRT. Results from this supplemental test is acceptable provided the difference between the Supplemental Test Data and the Type "A" Test Data is within 25% of L_a.

Test Leak Rate	0.1708 Wt%/day
Imposed Leak Rate	0.1530 Wt%/day
Total	0.3238 Wt%/day
Verification Leak Rate (Measured)	0.2876 Wt%/day
Difference	0.0362 Wt%/day
Percent of L_a	14.48% (Maximum Allowed ±25%)

For the 12 hour 55 minute test.

Test Leak Rate	0.1271 Wt%/day
Imposed Leak Rate	0.1530 Wt%/day
Total	0.2801 Wt%/day
Verification Leak Rate (Measured)	0.2876 Wt%/day
Difference	0.0075 Wt%/day
Percent of L_a	3.00% (Maximum Allowed ±25%)

This verification data demonstrates the accuracy of the CILRT Data and demonstrates the validity of the verification test.

2.4 Error Analysis

Three kinds of errors can be introduced into the leak rate test calculations. They are: 1) systematic measurement error due to instrumentation; 2) random measurement error due to instrumentation; and 3) inclusion of a bad data point into the calculation. Each of these types of errors is addressed below and is based on information in ANSI/ANS - 56.8 - 1981.

A) Systematic Measurement Errors

Systematic error is the error introduced by a difference between the measured parameter and the actual value of the parameter, produced by predictable or identifiable effects.

Instrument calibration traceable to the National Bureau of Standards is one method of holding this error to a minimum. However, since the mass-plot data analysis technique calculates the leakage based on a ratio of these measured parameters and not the actual value, the overall effect of these systematic instrumentation errors can be considered negligable, if the instrument drift over the test period is not significant.

The instrument calibration and instrument drift, can be determined to be acceptable at the end of the test period by the Verification Test. This test imposes a known leakage on the containment structure through an indenpendently calibrated instrument which causes a known change in the leak rate. If the instrumentation has not experienced a calibration shift, and no other system change has occurred, the verification test measured leak rate would compare well with the sum of the test leak rate and the imposed leak rate. Therefore, a successful Verification Test confirms that the leak rate test instrumentation systematic error is within acceptable limits.

During this test, certain points (discussed in paragraph 2.1) required substitution of corrected values due to temporary malfunctions. The substitution methods used were based on comparative analysis of data before, during and after the temporary malfunctions. Some error obviously exists due to the correction methods applied, but the analysis given in paragraph 2.1 shows that these errors were minimal and did not affect the results of this test.

B) Random Measurement Error

Random errors are those errors in the measured parameters whose sign and magnitude vary without pattern or discernable cause, such as instrument calibration.

For the leak rate test, the effect of random errors must be considered in the data analysis. This is accomplished by statistical techniques in which the deviation from a least square fit regression line of measured data is bounded such that a certain fraction of the data points lie within the bounds. These bounds define a region called the confidence interval. The probability that any measured data point will fall within the confidence interval is called the confidence level.

The confidence level set for this test is 95%, and from this, the limits or values of the confidence interval are calculated. The lower limit of this interval is of no significant consequence since the reported leak rate is higher. If the actual leakage is lower than the reported value, due to the inclusion of erroneously high values, then the reported value is of a conservative nature. If, on the other hand, random measurement errors has caused the inclusion of erroneously low values, then the actual leakage would be higher then the reported value. For this reason, the upper boundary (limit) to the 95% confidence interval is of significance to the test results and is included in the report.

C) <u>Inclusion of Bad Data Points in the Calculations</u>

Criteria exist in statistical analysis for the rejection of bad data points in the process of data analysis. This is not necessary in the mass-plot method for two reasons. First, since the mass-plot calculation is based on a regression fit of all the data points, a single erroneous value will have little effect on the calculated leak rate. Secondly, since the random error analysis clearly shows the need to calculate and report the upper limit of the 95% confidence interval, the inclusion of a bad data point in the calculation is already accounted for in the data analysis. However, where obvious bad data was identified it was corrected to minimize errors.

D) <u>Analysis Conclusions</u>

The information above, on each type of error, demonstrates that if the 95% upper confidence limit is less than 75% L_a and that the verification test results are acceptable, then the containment leakage rate accurately accounts for any instrument errors in the leak rate measurement system.

2.5 Test Organization

The Performance Section at the Oconee Nuclear Station has overall responsibility for the CILRT. The testing activities were supervised by the test coordinator. The organizational chart is presented in Figure 2.6.1. The test personnel were as follows:

A. Test Coordinator — K. G. Rohde
responsible for all ILRT activities

B.	Shift Coordinator (one per shift) responsible for testing activities on their assigned shifts	R. P. Todd M. J. Robinson
C.	Test Field Engineers (one per shift)	K. Chea L. S. Hawthorne
D.	Data Engineers (one per shift) responsible for Data Analysis	M. L. Baker B. A. Whitlock
E.	Support Engineer (technical, support-engineer from System Results Group, Duke Power)	W. M. Suslick
F.	Operators (normal shift)	
G.	Test Computer Support	R. P. Todd

OCONEE ILRT ORGANIZATION

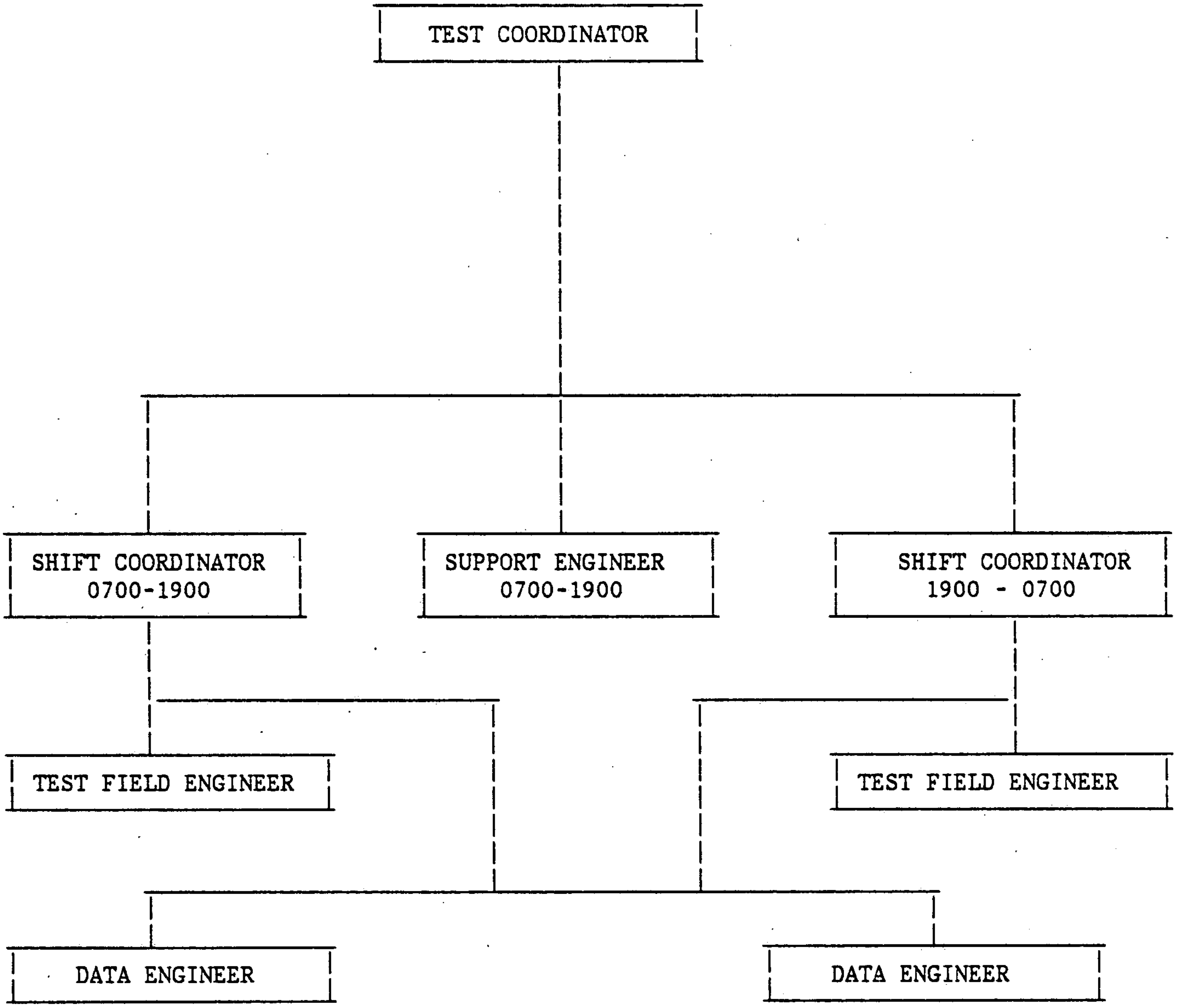


FIGURE 2.6-1

3.0 Design Information

3.1 Reactor Building

The Reactor Building is a reinforced and post-tensioned concrete structure designed to contain any accidental release of radioactivity from the reactor coolant system as defined in the Final Safety Analysis Report (Reference 1).

The structure consists of a post-tensioned reinforced concrete cylinder and dome connected to and supported by a massive reinforced concrete foundation slab as shown in Figure 3.1-1. The entire interior surface of the structure is lined with a ¼ inch thick welded ASTM A36 steel plate to assure a high degree of leak tightness. Numerous mechanical and electrical systems penetrate the Reactor Building wall through welded steel penetrations.

Principal dimensions are as follows:

Inside Diameter	116 ft.
Inside Height (including Dome)	208-1/2 ft.
Vertical Wall Thickness	3-3/4 ft.
Dome Thickness	3-1/4 ft.
Foundation Slab Thickness	8-1/2 ft.
Liner Plate Thickness	1/4 inch
Internal Free Volume	1,910,000 Cu. ft.

3.2 Measurement Systems

Instrumentation used for the Oconee Unit 1 ILRT is similar to that used on previous tests conducted by Bechtel. The leak rate test measurement system is shown schematically in Figure 3.2-1.

Reactor Building pressure was measured by a Ruska Instrument precision pressure gauge. The unit was calibrated before the test.

Reactor Building temperature was measured by twenty-four (24) calibrated RTDs and read on a Kaye RAMP digital recorder. Each RTD was assumed to be representative of a fraction of the total containment volume.

Reactor Building dewpoint temperature was measured by two (2) General Eastern Dewpoint Hygrometers.

The relative location of the humidity sensors is shown in Figure 3.4-1. A 0-10.45 SCFM Brooks rotometer was used in establishing a known leak rate.

3.2.2 Instrument List

Specifications for the instrumentation used for the Oconee Unit 1 ILRT are listed in Table 3.2-1.

3.2.2 Temperature Sensor Locations

The locations of temperature sensors within the Reactor Building are shown in Figures 3.2-2 through 3.3-6.

3.2.3 RTD and Dewpoint Volume Fractions

Volume fractions were used for calculating the average temperature and the average dewpoint temperature in the containment. These fractions were determined using an equivalent volume for each sensor. The free volume of the containment was divided into "cells" with a sensor center in each. Volume fractions are given in Table 3.2-2.

3.2.4 RTD Single Point Calibration

Conferring with Duke Power Standards Lab (calibration facility) to draw on their knowledge of RTDs and their understanding of industry documents such as NBS Monograph 126, and taking Health Physics' position for shipping potentially contaminated material to the Standards Lab into consideration, we decided to verify RTD integrity by an ice point check only. The RTDs were verified against the original data on the order of 0.01 OHMS and in light of NBS Monograph 126 should provide data as defined in the original test data. The instrument procedure IP/0/B/150/1K was written to perform this process and was approved after normal engineering review.

3.3 Pressurization System

Reactor Building pressurization was accomplished by two (2) electric motor driven and three (3) diesel driven air compressors operating in parallel. These compressors also include aftercoolers as integral equipment. The discharge from the compressors passes through a air dryer which reduces the moisture content in the air prior to its entry into the Reactor Building. The specifications for these components are as follows:

A. Two (2) electric driven Joy Turbo-Air (20V2) centrifugal type air compressors with a capacity of 2300 SCFM @ 80 PSIG. Three (3) diesel driven Atlas Compco Oil Free Air Compressors with a capacity of 1500 SCFM @ 102 PSIG.

B. Two (2) Basco size 22048 aftercoolers (Integral to Compressors), type "ES" Fixed Tubesheet, with a capacity of 2100 SCFM @ 14.4 PSIA and with a design pressure of 150 PSIG. One (1) RP Adams Aftercoolers with a capacity of 5500 SCFM @ 80 PSIA and a design pressure of 150 PSIG.

C. One (1) Hankison (Model H-15) refrigerator type air dryer with inertial impingement separator, and a capacity of 3750 SCFM (100°F Sat. inlet) @ 100 PSIG. One (1) Arrow Air Refrigerator Type Dryer with a capacity of 6250 SCFM @ 100 PSIG.

These valves, 1LRT-15, 1LRT-16 and 1LRT-17 are used to control pressurization of the Reactor Building. The controls for these valves are located in the test panel. The pressurization system is shown schematically in Figure 3.3-1. The valves used to control depressurization are as follows: 1LRT-15, 1LRT-16 and 1LRT-17 for minimum release, 2LRT-15, 2LRT-16, 3LRT-15 and 3LRT-16 for increased release, finally remove rental equipment, leaving flange open, remove flange to Unit 3 and open LRT-13, and LRT-10 for unlimited release rate.

3.4 Recirculation System

One Reactor Building Cooling Fan was on low speed for this test.

3.5 Computer Programs

The containment integrated leak rate test procedure specified that the test would utilize the IBM-XT Program or the plant computer program in data analysis. Both programs calculate the mass-plot leak rate.

The off-line programs were written for and run on the IBM-XT system. Two main subroutines were used, one to calculate the corrected values of building pressure and temperature, the second to calculate the leak rate. Tables of corrected temperature and pressure were stored in separate permanent files.

3.5.1 ILRT Program

3.5.1.1 Purpose

This program is used to process the raw data for use in leak rate calculations and print out these values.

3.5.1.2 Program Inputs

a) 24 RTD temperatures in °F

b) 2 Dewpoint temperatures in °F

c) Absolute pressure in PSIA

3.5.1.3 Calculations

Three calculations are performed with the input data. They are:

a) Volume-weighted average building temperature

b) Vapor pressure of water from dewpoint temperatures

c) Corrected building pressure

3.5.1.4 Temperature

a) Apply the instrument calibration correction factors for each RTD, (performed by Kaye-Ramp processor)

b) Multiply each temperature by the volume fraction associated with each RTD.

c) Sum the volume weighted temperatures for building average.

3.5.1.5 Dewpoint Temperature

a) The values entered into this program have already been corrected for instrument calibration.

b) Volume weighted average of the two values.

c) From the dewpoint temperature (Saturation Temperature), the vapor pressure (Saturation Pressure) is determined from the steam tables. The program uses the ASME "K Function" for the saturation line and has been verified to be accurate to the least significant digit given in the 1967 ASME Steam Tables.

3.5.1.6 Pressure

a) Subtract vapor pressure from input absolute pressure.

3.5.1.7 Program Summary

This program will calculate the leak rate and 95% UCL from the input data, corrected pressure and temperature, based on the mass-plot method. The calculations are based on the formulas in Appendix B to ANS 56.8, 1981. As this work is readily available, it is not duplicated here.

TABLE 3.2-1

INSTRUMENT SPECIFICATIONS

<u>Absolute Pressure Gauge</u>

Mfg.	Ruska
Model	6000-151-100
Range	0-100 PSIA
Resolution	0.01%
Accuracy	0.006% + 0.024 PSI
Oconee I.D.	28024 and 28025

<u>Pressure Gauge</u>

Mfg.	Heise
Range	0-100 psig
Accuracy	0.1 psi
Repeatability	0.1 psi

<u>Temperature Elements</u>

Mfg.	Leeds & Northrup
Model	8197
Type	RTD, Copper, 100 ohms
Range	0-150°F
Repeatability and hysterisis	±.02°F
Accuracy	±.0.12°F

<u>Temperature, Pressure and Dewpoint Indication for Sensors</u>

Mfg.	Kaye Instrument
Model	64RR
Type	Ramp Relay Scanner DVM
Range	40,000 mV, 400.00 mV 4.0000 V, 10.000 V
Oconee I.D.	OCPRF-28121
Accuracy	±0.01% + 2 Counts + 4 μV

<u>Dewpoint Temperature</u>

Mfg.	General Eastern
Model	1200 AP
Range	120°F
Accuracy	±0.4°F
Sensitivity	±0.05°F
Standard Lab I.D.	SYIAC 11111 and SYIAC 11174

TABLE 3.2-1 (Cont'd)

Flow Indicator

Mfg.	Brooks
Type	Rotometer
Model	1110-24
Range	0 to 10.45 SCFM
Accuracy	± 1% of instantaneous reading
Repeatability	Better than 1/4% of instrument reading
Serial No.	7004-39848

TABLE 3.2-2

VOLUME FRACTIONS

Volume Fractions for RTDS

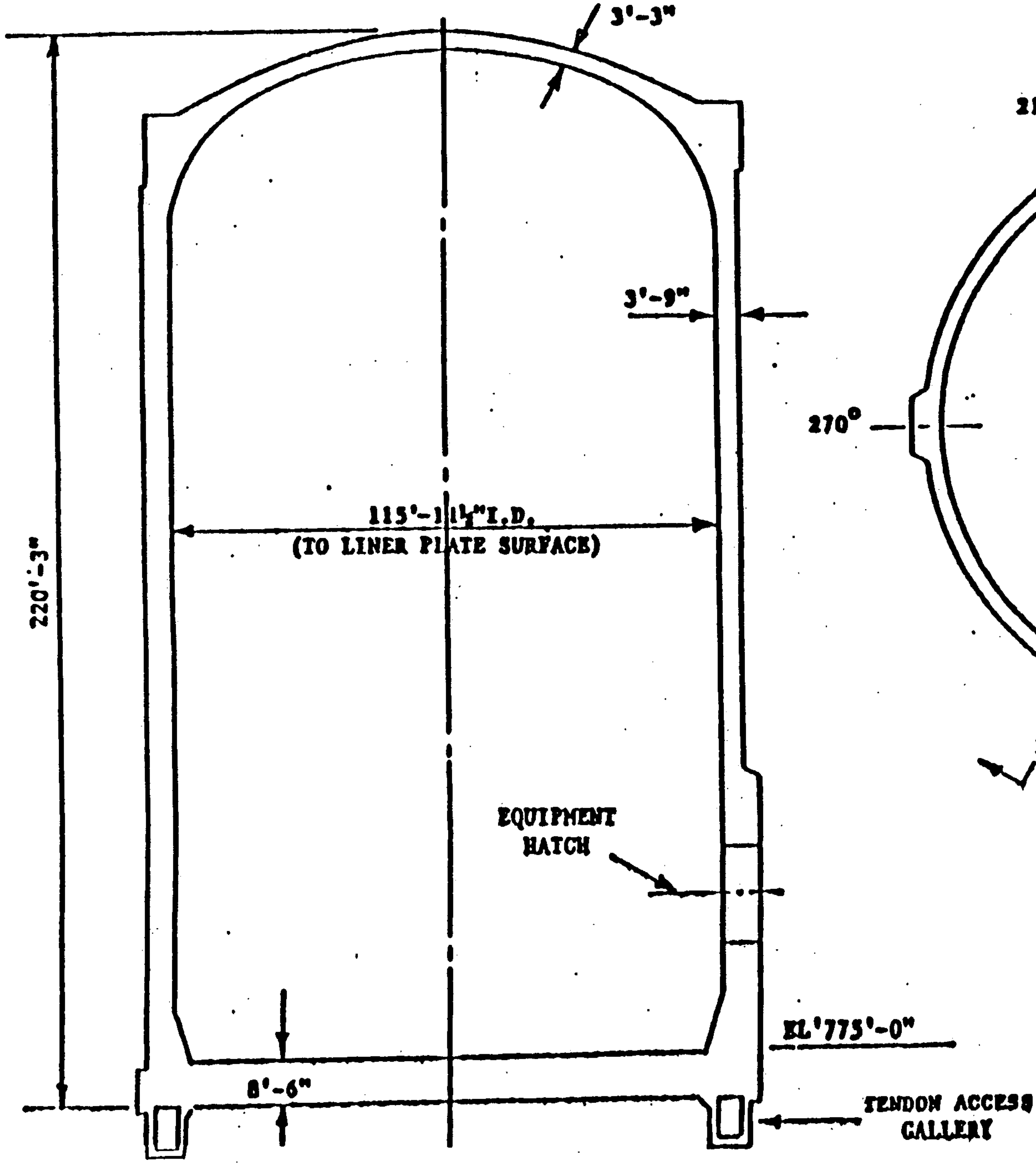
RTD #	Volume Fraction Normal	Volume Fraction Reassigned*
1	0.03	0.03
2	0.02	0.00
3	0.02	0.00
4	0.05	0.00
5	0.02	0.00
6	0.03	0.00
7	0.01	0.00
8	0.08	0.11
9	0.05	0.10
10	0.05	0.05
11	0.02	0.04
12	0.02	0.02
13	0.01	0.01
14	0.02	0.04
15	0.02	0.02
16	0.01	0.01
17	0.05	0.05
18	0.09	0.09
19	0.11	0.11
20	0.01	0.02
21	0.01	0.03
22	0.09	0.09
23	0.11	0.11
24	0.07	0.07
Total	1.00	1.00

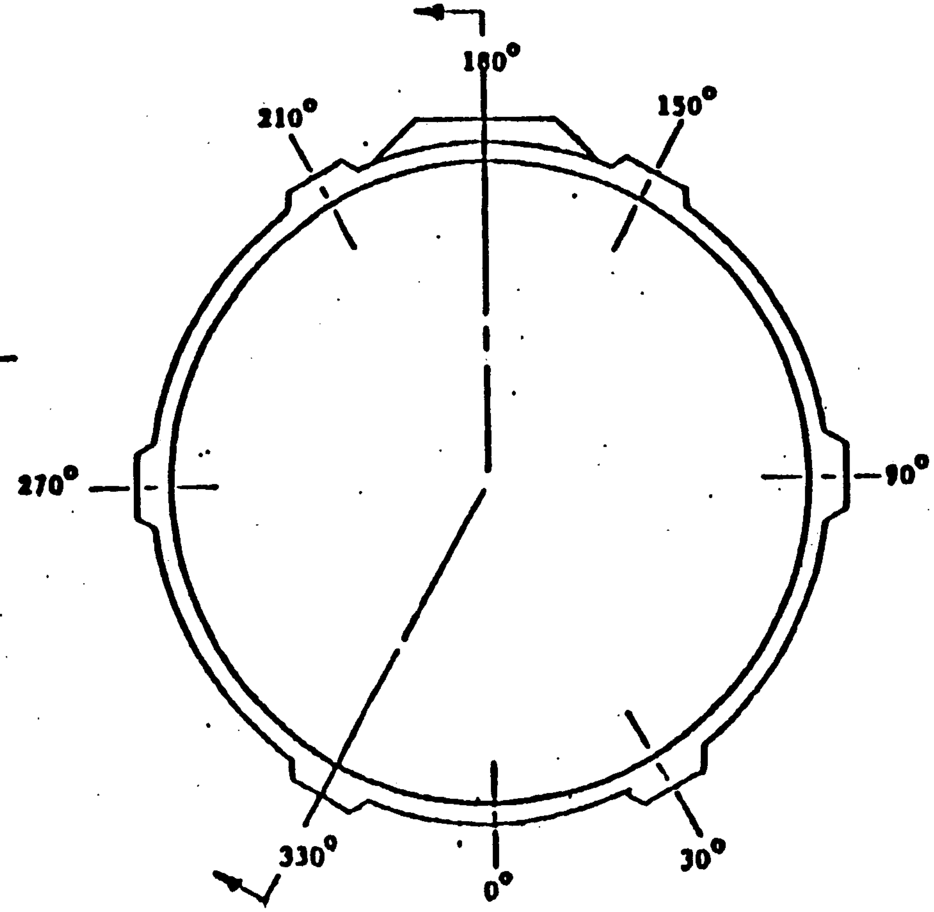
Dewpoint Sensors Volume Fraction

Dewpoint Sensor #	Volume Fraction
1 (Azimuth 100° Elevation 850')	0.4
2 (Aximuth 260° Elevation 850')	0.6
Total	1.0

*See Discussion on Page 2-2

REACTOR BUILDING





HORIZONTAL SECTION THROUGH
REACTOR BUILDING

LEAK RATE MEASUREMENT SYSTEM

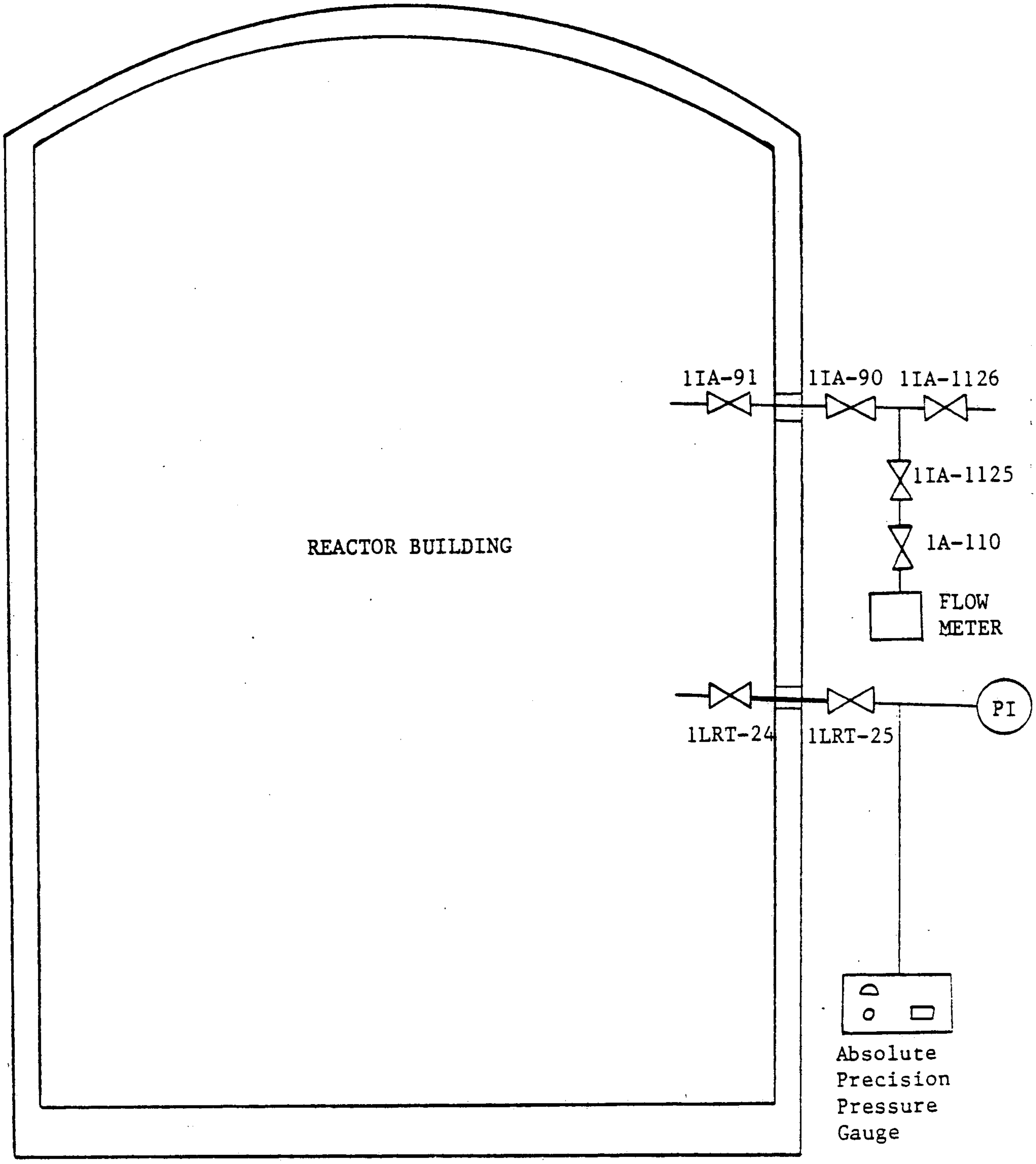


FIGURE 3.2-1 Test Measurement System Schematic.

REACTOR BUILDING

BASEMENT FLOOR

ELEVATION 787'

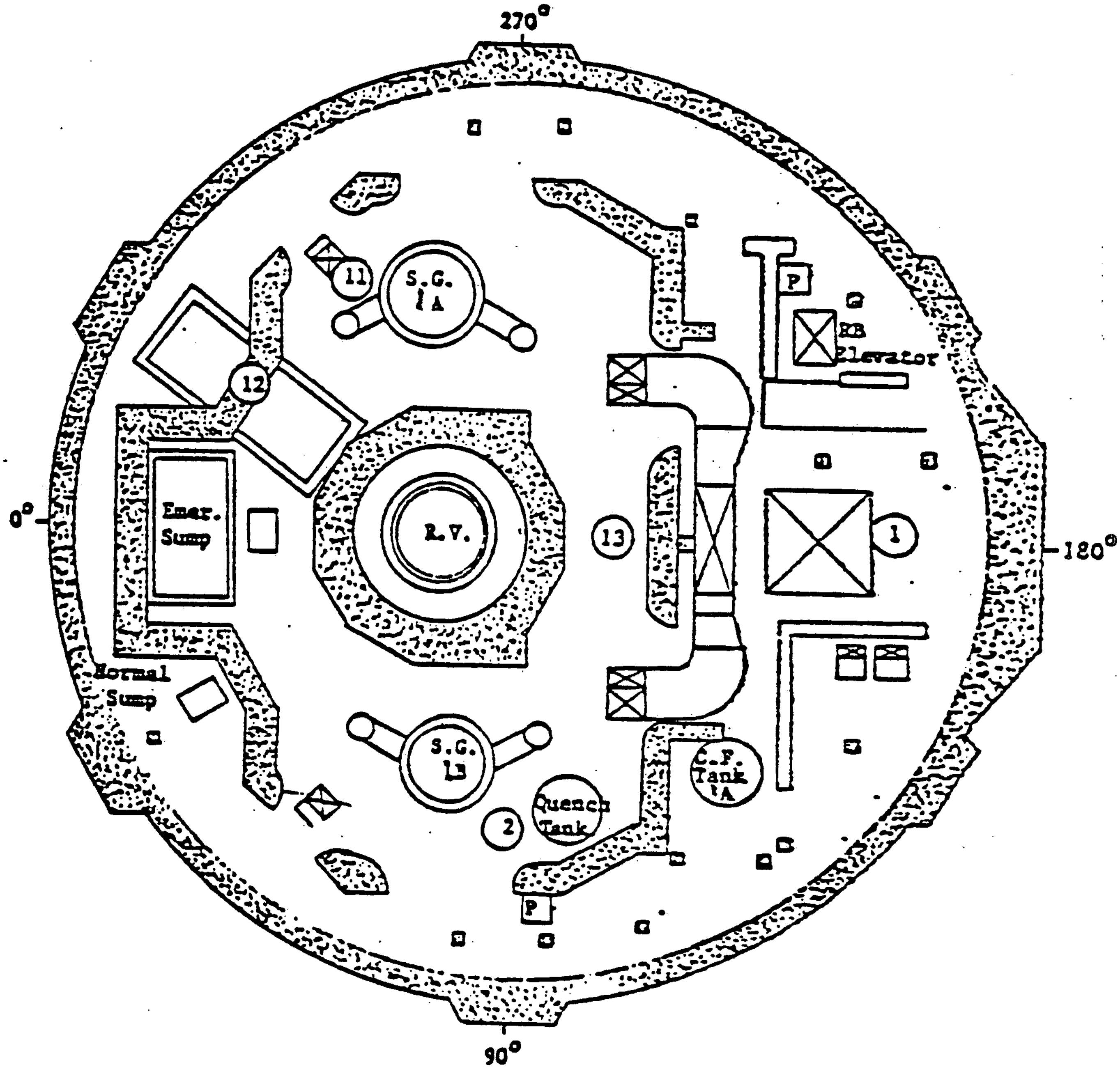


Figure 3.2-2

REACTOR BUILDING

INSTERMEDIATE FLOOR

ELEVATION 830'

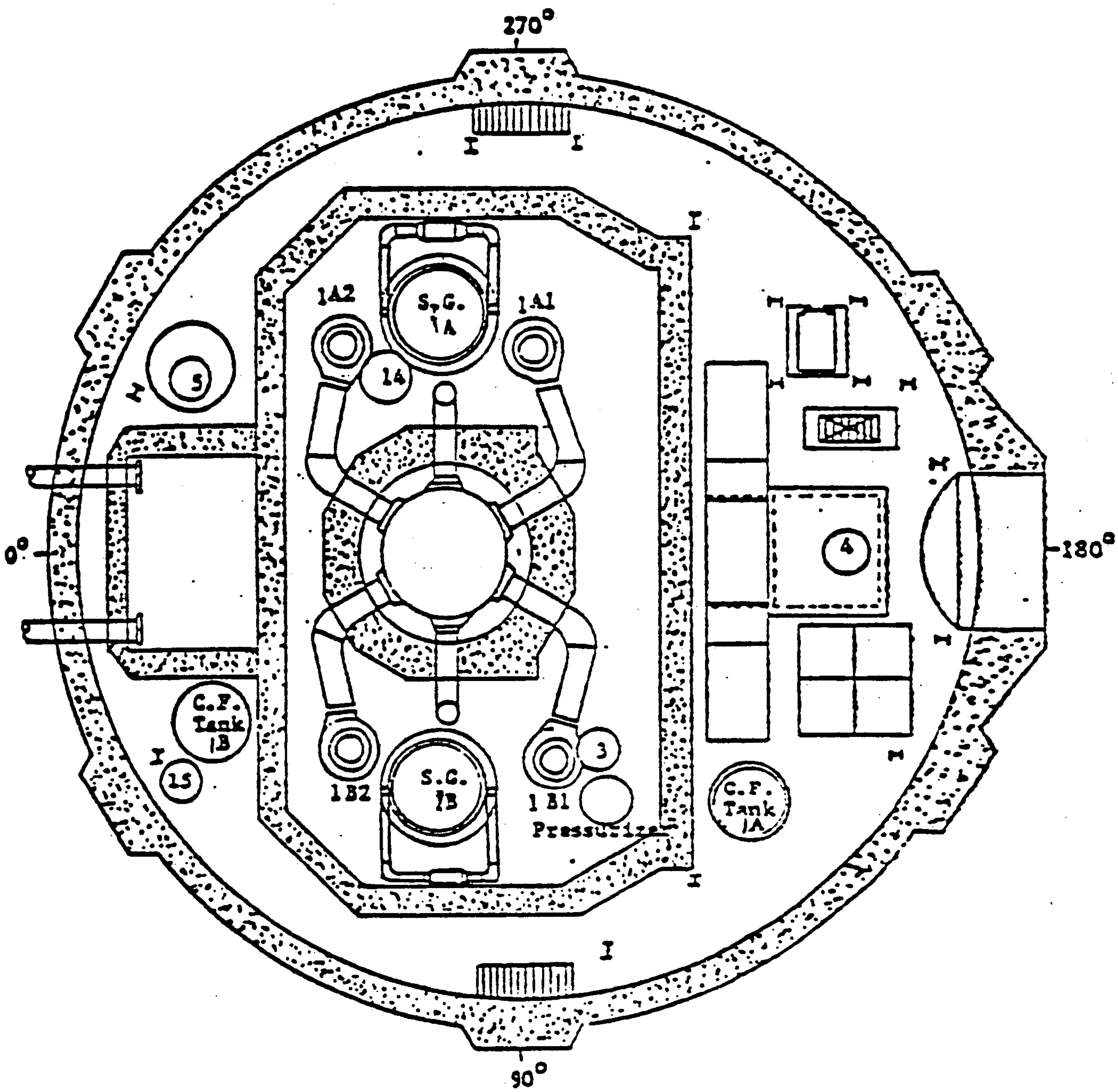


Figure 3.2-3

REACTOR BUILDING
OPERATING FLOOR
ELEVATION 850'

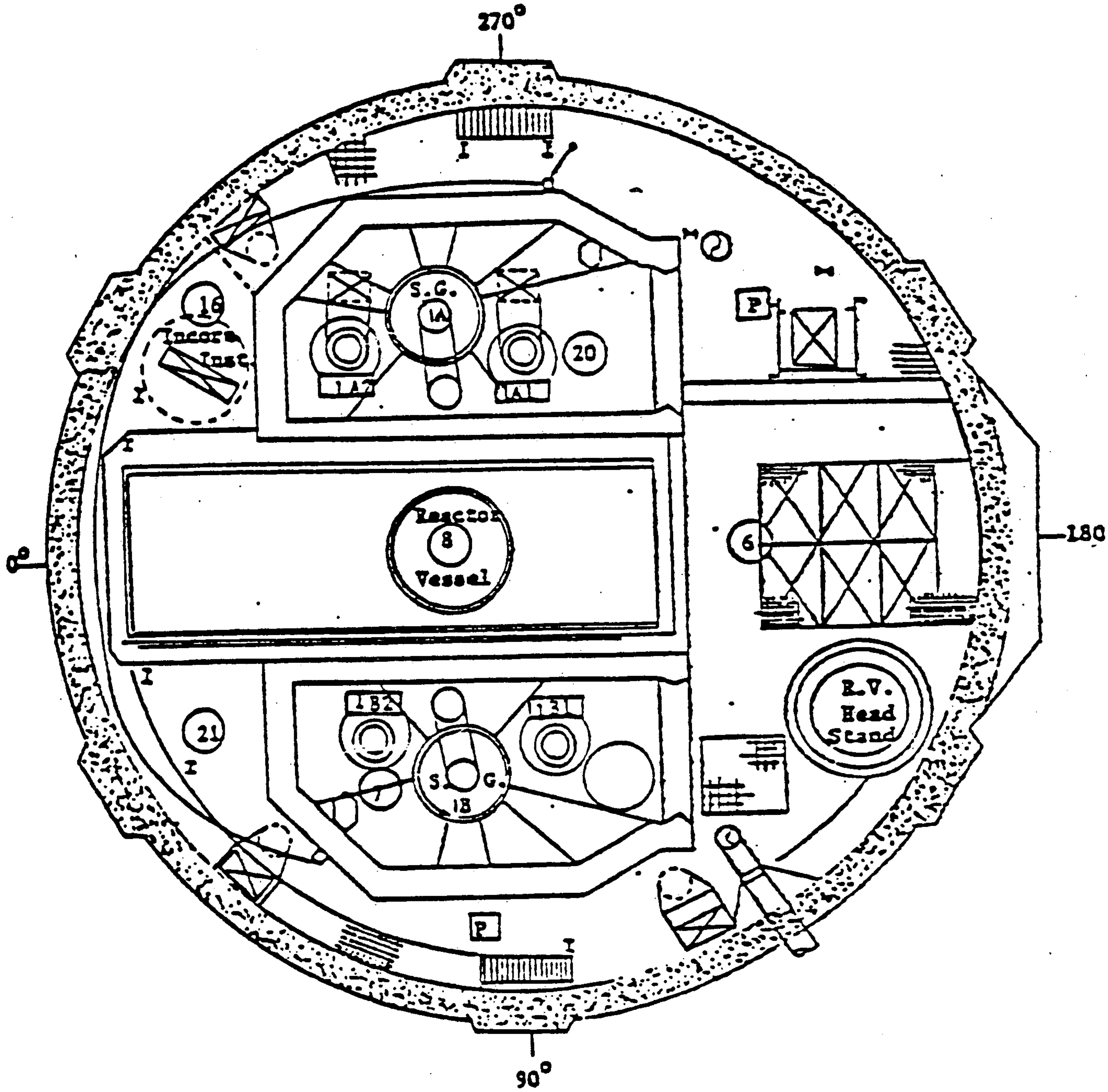


Figure 3.2-4

REACTOR BUILDING

SHIELDING FLOOR

ELEVATION 866'

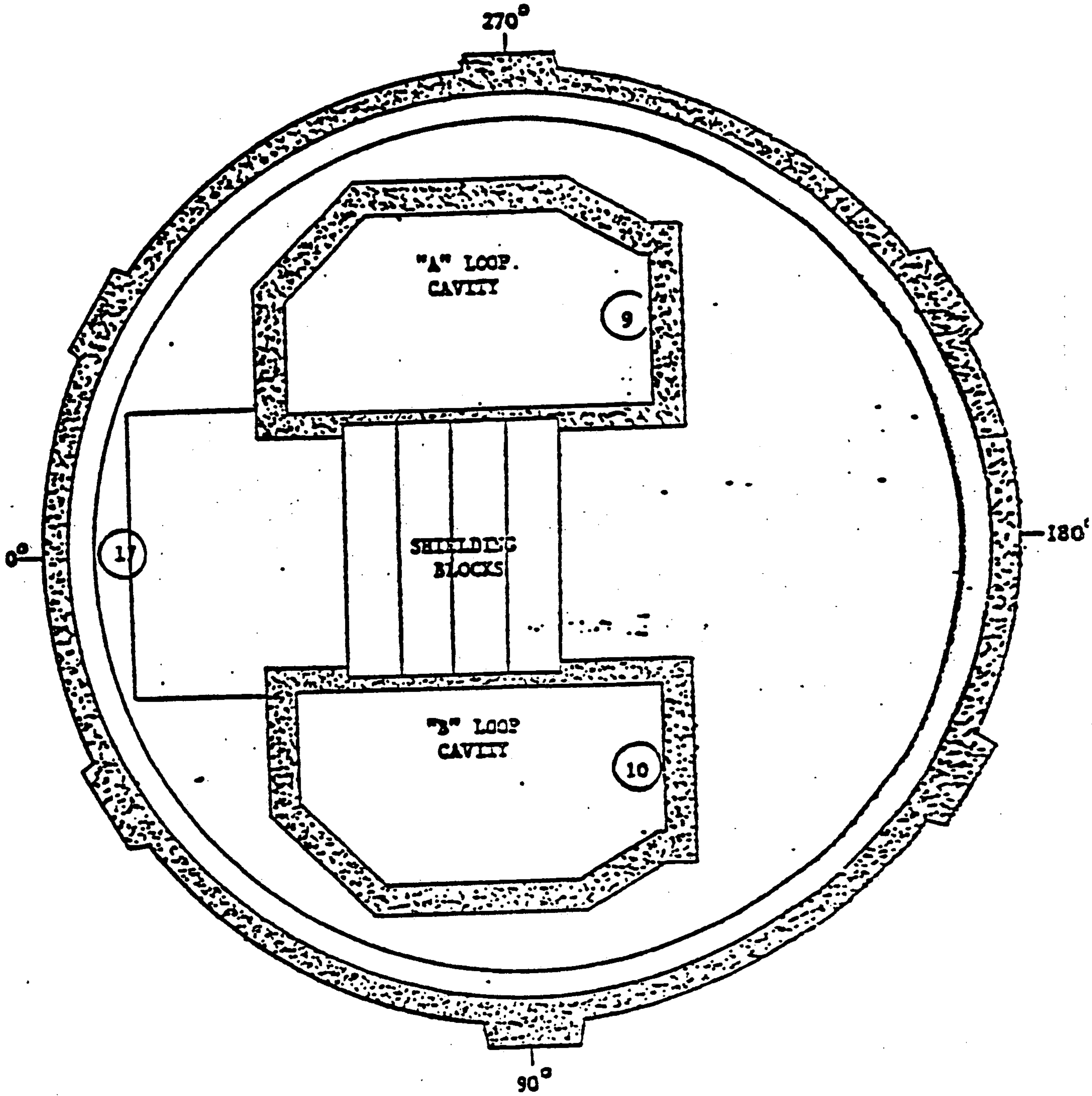
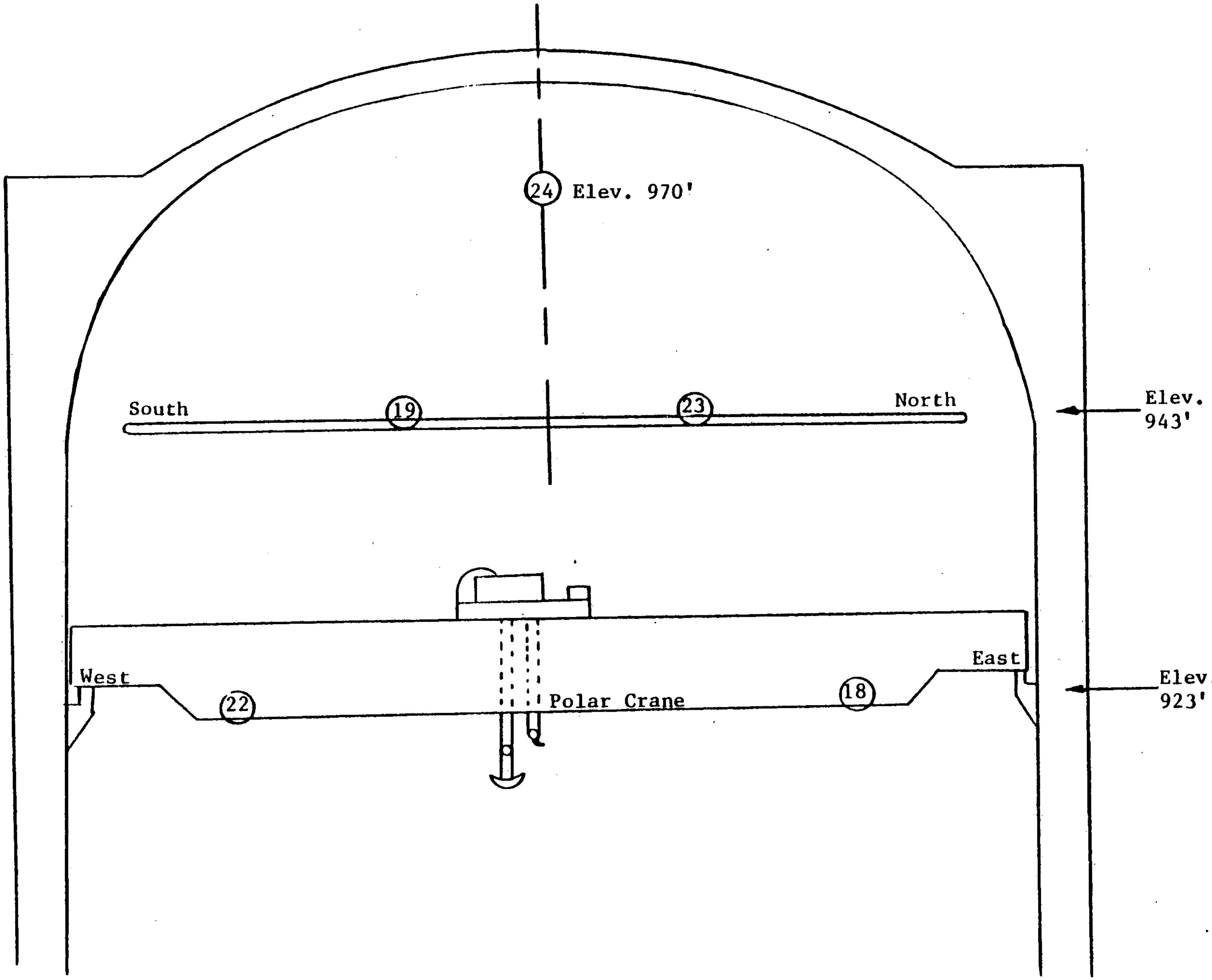


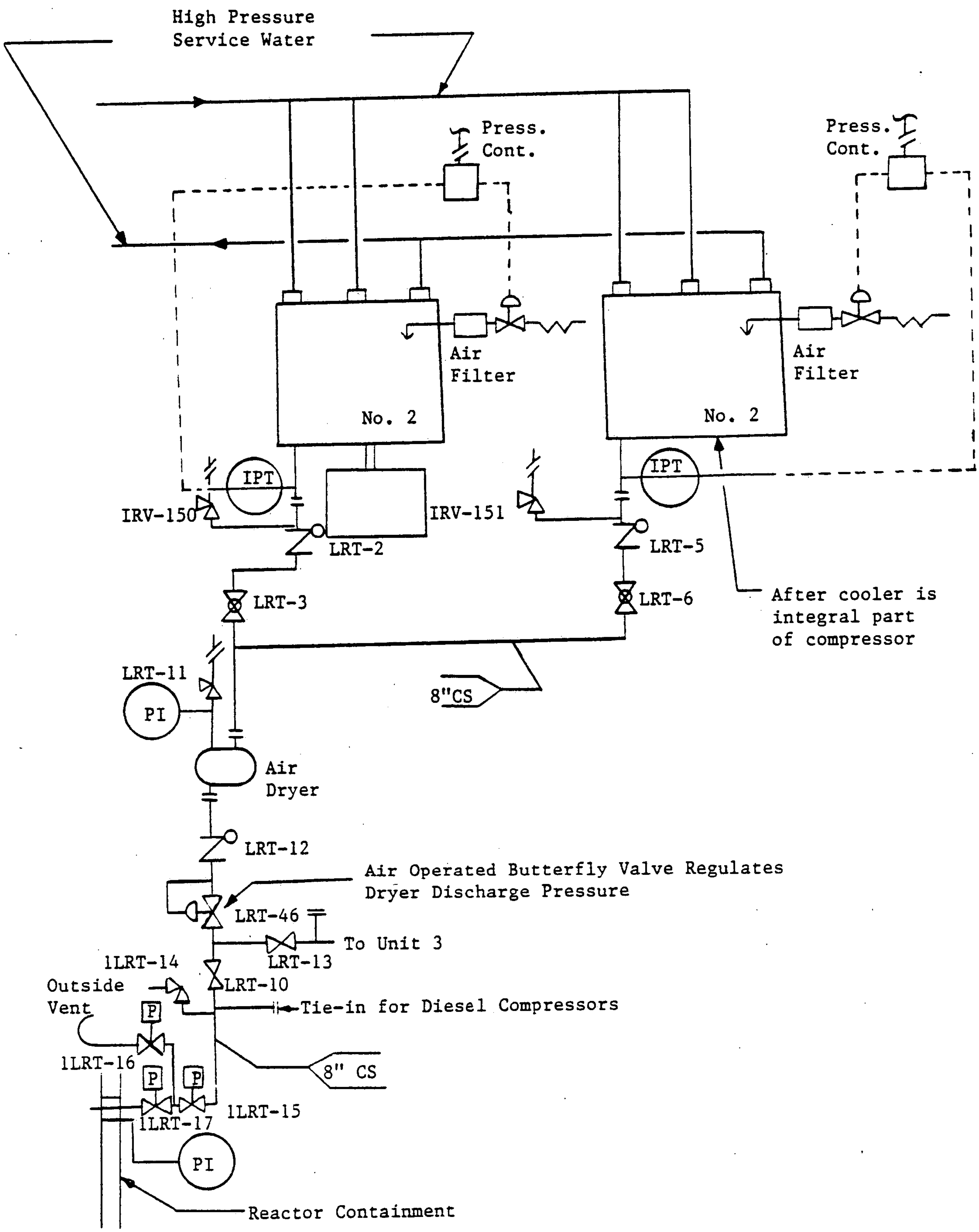
Figure 3.2-5

Figure 3.2-6



View of Spray Header Looking West
View of Polar Crane Looking North

REACTOR BUILDING PRESSURIZATION SYSTEM



REACTOR BUILDING AIR RECIRCULATION SYSTEM

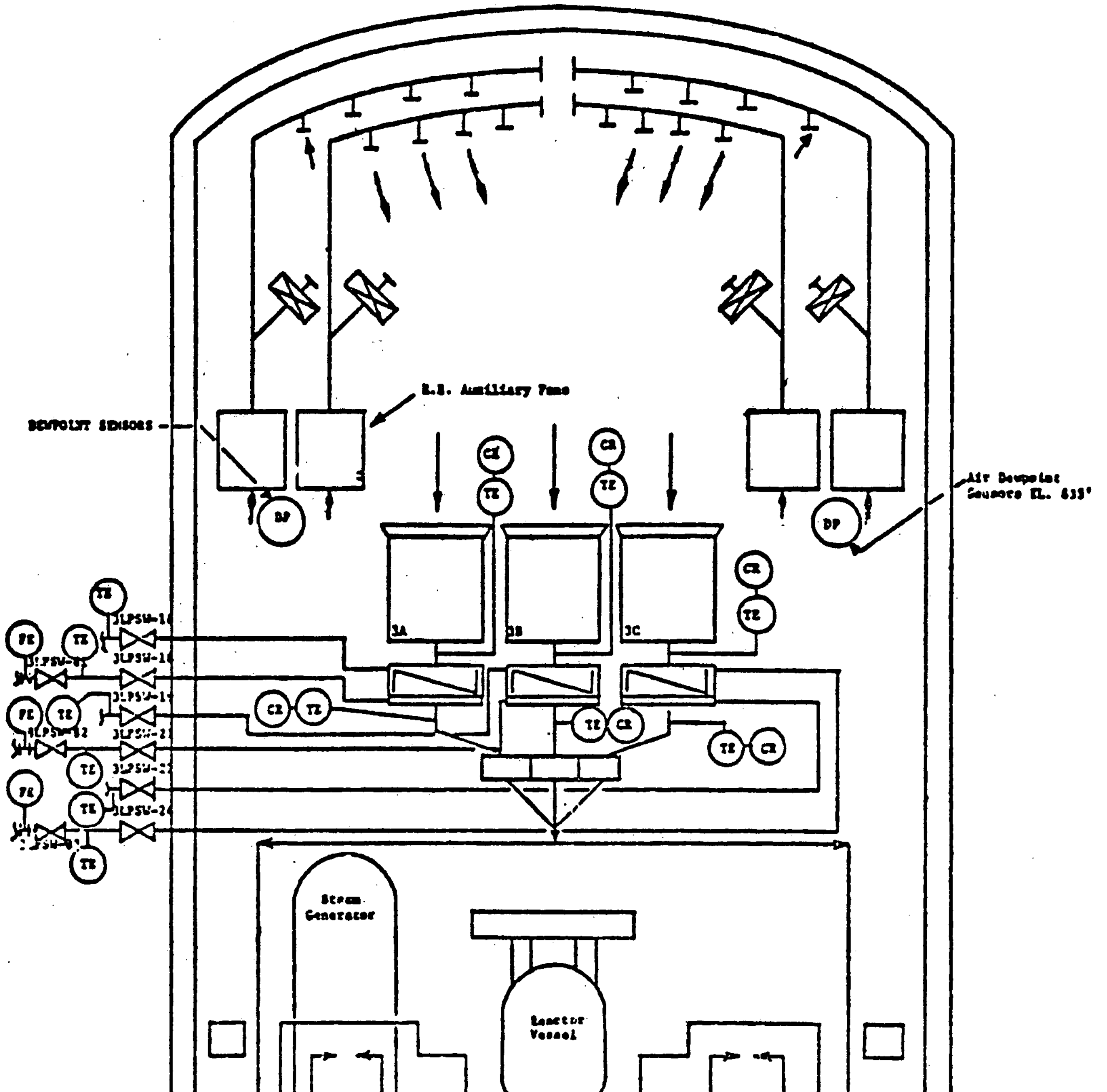


Figure 3.4-1

4.0 Conduct of Local Leak Tests

4.1 Local Leak Rate Test

The purpose of the Local Leak testing program was to systematically check the integrity of valves (seats and packing), flanges, pipe and electrical penetration welds, seals and compression fittings that are part of the boundaries of the containment system. These tests, specified by Section 4.4.1.2 of the Technical Specifications, have a combined Acceptance Criteria of less than or equal to 0.125% of the Reactor Building atmosphere per 24 hours. Final analysis of all penetration leakage rates show that the total penetration leakage rate was approximately 1.86 percent of the allowable.

4.1.1 Test Method

All electrical and mechanical penetration, including locks and hatches, were tested by pressurizing to ~ 59 PSIG. Two test methods are used. One is the mass make-up method using volumetric's test instruments. The other is mass difference method where the pressure, temperature and barometric pressure were recorded before and after the leak test (duration of test determined by penetration volume) and the leak rate determined.

4.1.2 Penetration Test Results

Per Technical Specification 4.4.1.2.3, the total leakage from all penetrations and isolation valves shall not exceed 0.125% of the Reactor Building atmosphere in 24 hours. The total measured leak rate from all penetrations prior to this test was 0.0170 Wt% per 24 hours. Results of all local penetration tests done since the last type A test are given in Tables 4.1-1 through 4.1-2.

4.2 Local Leak Test Failure Data

Per 10CFR50, Appendix J, V.B.3, a listing of all type "C" local leak tests that are failed to meet the acceptance criteria since the last ILRT are reported in Table 4.2.

TABLE 4.1-1

TYPE "B" TESTS

PENETRATION	DATE	WT%/DAY LEAKAGE
Electrical Penetrations	11/13/84	1.727×10^{-5}
	03/06/86	1.039×10^{-5}
Equipment Hatch	11/16/84	3.744×10^{-6}
Personnel Hatch	11/29/83	0.000
	02/13/84	0.000
	06/05/84	7.128×10^{-3}
	08/15/84	1.553×10^{-3}
	11/25/84	7.316×10^{-4}
	02/12/85	0.000
	07/11/85	0.000
	10/15/86	2.141×10^{-3}
	04/02/86	6.459×10^{-5}
Personnel Hatch O'Rings	10/13/83	1.474×10^{-5}
	01/31/84	4.212×10^{-5}
	02/06/84	3.276×10^{-6}
	02/16/84	3.276×10^{-6}
	03/03/84	9.361×10^{-6}
	04/27/84	9.361×10^{-6}
	05/10/84	4.072×10^{-5}
	07/16/84	0.000
	09/04/84	9.361×10^{-6}
	11/27/84	3.744×10^{-6}
	11/30/84	4.681×10^{-6}
	12/05/84	9.923×10^{-6}
	03/08/85	1.872×10^{-6}
	04/12/85	5.617×10^{-6}
	04/26/85	3.744×10^{-6}
	05/31/85	7.489×10^{-6}
	06/04/85	3.744×10^{-6}
	01/28/86	1.123×10^{-5}

TABLE 4.1-1 (Cont'd)

PENETRATION	DATE	WT%/DAY LEAKAGE
Emergency Hatch	09/28/83	0.000
	12/28/83	3.932×10^{-4}
	03/27/84	1.301×10^{-4}
	06/26/84	6.206×10^{-4}
	09/26/84	0.000
	11/15/84	5.252×10^{-4}
	02/15/85	2.574×10^{-4}
	10/14/85	3.763×10^{-4}
	03/18/86	0.000
	04/17/86	2.570×10^{-4}
Purge Valves	11/17/83	4.287×10^{-3}
	11/24/83	4.100×10^{-3}
	12/02/83	5.921×10^{-3}
	11/23/84	2.526×10^{-3}
	10/15/85	2.511×10^{-3}
	04/03/86	3.166×10^{-3}
	04/21/86	3.807×10^{-3}

TABLE 4.1-2

TYPE "C" TESTS

PENETRATION	DATE	WT%/DAY LEAKAGE
Mechanical Penetrations (total type "C" penetrations)	11/29/84	2.300×10^{-2}
	11/07/85	2.302×10^{-2}
	04/03/86	5.847×10^{-3}

TABLE 4.2

LOCAL TEST FAILURE DATA

ITEM	DATE	AS FOUND LEAK WT%/DAY	REASON FOR FAILURE	CORRECTIVE ACTION	AS LEFT LEAK WT%/DAY
DW-155	10/09/84	$9.91X10^{-5}$	LPS	Lapped Seat & Installed Disc & Spring	$3.223x10^{-7}$
FW-64	10/09/84	*$2.966x10^{-5}$	LPS	Replaced Diaphram & Adjusted Stem Travel	0
CC-24	10/11/84	$5.771x10^{-3}$	LPS	Adjusted Counter Weight	$7.716x10^{-4}$
DW-156	10/15/84	$6.758x10^{-3}$	LPS	Replaced Disc Spring & Gasket	0
CS-11	10/16/84	$1.017x10^{-2}$	LPS	Replaced Spring & Gasket	$1.281x10^{-5}$
CS-12	10/16/84	$6.067x10^{-3}$	LPS	Lapped Seat & Disc	$6.101x10^{-4}$
HP-283	10/17/84	$1.027x10^{-2}$	LPS	Replaced Valve	$4.421x10^{-3}$
FDW-124	10/20/84	$6.657x10^{-3}$	LPS	Lapped Seat & Replaced Disc	$9.101x10^{-5}$
FDW-123	10/20/84	$2.471x10^{-3}$	LPS	Replaced Disc & Lapped Seat	$9.101x10^{-5}$
FDW-122	10/20/84	$3.111x10^{-3}$	LPS	Repaired Seat Leak	$9.101x10^{-5}$
FDW-107	10/20/84	$1.338x10^{-3}$	LPS	Repaired Seat Leak	$2.427x10^{-5}$
FDW-108	10/20/84	$3.539x10^{-5}$	LPS	Repaired Seat Leak	$3.539x10^{-4}$
FDW-117	10/20/84	$1.854x10^{-3}$	LPS	Lapped Seat	$1.292x10^{-5}$
FDW-119	10/20/84	$1.854x10^{-3}$	LPS	Lapped Seat	$1.292x10^{-5}$
HP-209	10/30/84	$2.157x10^{-4}$	PL	Repacked Valve	$6.404x10^{-6}$
HP-36	11/08/84	$1.539x10^{-4}$	LPS	Repaired Seat Leak	$2.596x10^{-5}$
HP-37	11/08/84	$1.539x10^{-4}$	LPS	Repaired Seat Leak	$2.596x10^{-5}$
HP-38	11/08/84	$1.539x10^{-4}$	LPS	Repaired Seat Leak	$2.596x10^{-5}$
PR-27	11/22/84	$6.573x10^{-5}$	LPS	Replaced Valve Diaphram	$1.213x10^{-5}$
HP-286	02/17/86	$2.759x10^{-3}$	LPS	Replaced Valve	$7.521x10^{-7}$
HP-146	02/17/86	$2.759x10^{-3}$	LPS	Replaced Valve	$7.521x10^{-7}$

*Minimum Path Leakage

TABLE 4.2 (Cont'd)

LOCAL TEST FAILURE DATA

ITEM	DATE	AS FOUND LEAK WT%/DAY	REASON FOR FAILURE	CORRECTIVE ACTION	AS LEFT LEAK WT%/DAY
HP-284	02/18/86	3.277×10^{-3}	LPS	Replaced Valve	1.612×10^{-7}
HP-283	02/18/86	9.944×10^{-3}	LPS	Replaced Valve	1.074×10^{-7}
HP-223	02/18/86	1.763×10^{-4}	LPS	Repaired Disc, Stem & Stem Nuts	0.0
CC-20	02/21/86	5.319×10^{-4}	LPS	Tightened Packing & Adjusted Arm	2.751×10^{-4}
CC-22	02/21/86	8.461×10^{-5}	LPS	Adjusted Packing & Repaired Seat	6.742×10^{-7}
CC-24	02/21/86	7.999×10^{-4}	LPS	Adjusted Packing & Adjusted Counterweight	2.929×10^{-4}
FW-64	02/24/86	6.312×10^{-4}	VNC	Adjusted Valve Stops	2.528×10^{-6}
FW-65	02/24/86	6.312×10^{-4}	VNC	Adjusted Valve Stops	2.528×10^{-6}
LPSW-15	02/26/86	*9.833×10^{-4}	LPS	Lapped Seat, Replaced Disc & Seat Rings, Replaced Motor Torque Switch	9.833×10^{-4}
CC-7	02/27/86	2.987×10^{-7}	SL	Repacked & Adjusted Limitorque	7.628×10^{-4}
CC-8	02/27/86	1.397×10^{-3}	LPS	Lapped Seat	7.628×10^{-4}
CC-55	02/27/86	5.238×10^{-4}	LPS	Replaced Valve	3.371×10^{-7}
FDW-108	03/05/86	5.225×10^{-3}	LPS	Replaced Disc & Lapped Seat	2.629×10^{-4}
FDW-107	03/10/86	2.66×10^{-4}	LPS	Replaced Disc & Bonnet Assembly	1.348×10^{-6}
RC-5	03/24/86	1.382×10^{-3}	LOA	Adjusted Limitorque	1.065×10^{-4}
LWD-27	03/28/86	2.987×10^{-7}	LPS	Replaced Valve	3.371×10^{-8}

*Minimum Path Leakage

Definitions:

LPS = Leaking Past the Seat
PL = Packing Leak
VNC = Valve Not Closing Completely
SL = Stem Leak
LOA = Limitorque Out of Adjustment

INTEGRATED LEAK RATE TEST CALCULATIONS

CASE A

24 HOUR TEST-CORRECTED DATA

DUKE POWER COMPANY

OCONEE NUCLEAR STATION UNIT 1

CONTAINMENT INTEGRATED LEAK RATE TEST 5- 26- 1987

DATA SET NO	CLOCK TIME	CORRECTED PRESSURE	CORRECTED TEMPERATURE	MASS	LEAK RATE	95%UCL LEAK RATE
1	1100	74.7705	80.067	714183.2	0.0000	0.0000
2	1105	74.7709	80.064	714191.1	-0.3176	0.0000
3	1110	74.7712	80.059	714200.1	-0.3402	-0.2468
4	1115	74.7708	80.061	714193.8	-0.1633	0.1334
5	1120	74.7712	80.045	714218.9	-0.2994	-0.0706
6	1125	74.7611	80.035	714135.9	0.1832	0.7932
7	1130	74.7609	80.025	714146.9	0.2907	0.7161
8	1135	74.7609	80.030	714140.6	0.3305	0.6398
9	1140	74.7612	80.016	714161.2	0.2702	0.5124
10	1145	74.7609	80.013	714162.7	0.2235	0.4200
11	1150	74.7613	80.033	714140.5	0.2268	0.3949
12	1155	74.7511	79.983	714108.6	0.2707	0.4084
13	1200	74.7621	79.982	714215.0	0.1473	0.3202
14	1205	74.7513	79.973	714123.6	0.1705	0.3194
15	1210	74.7510	79.951	714150.3	0.1535	0.2827
16	1215	74.7512	79.962	714137.9	0.1505	0.2629
17	1220	74.7514	79.941	714166.9	0.1231	0.2257
18	1225	74.7510	79.949	714153.3	0.1099	0.2018
19	1230	74.7411	79.936	714075.4	0.1485	0.2392
20	1235	74.7412	79.937	714073.0	0.1755	0.2611
21	1240	74.7414	79.927	714090.5	0.1839	0.2616
22	1245	74.7413	79.932	714082.6	0.1932	0.2641
23	1250	74.7411	79.905	714116.6	0.1826	0.2461
24	1255	74.7406	79.897	714122.5	0.1700	0.2311
25	1300	74.7412	79.895	714130.6	0.1558	0.2136
26	1305	74.7414	79.903	714121.8	0.1472	0.2013
27	1310	74.7309	79.907	714016.9	0.1712	0.2219
28	1315	74.7309	79.878	714055.1	0.1789	0.2310
29	1320	74.7307	79.853	714086.2	0.1744	0.2230
30	1325	74.7312	79.989	713911.1	0.2156	0.2764
31	1330	74.7306	79.854	714083.4	0.2067	0.2642
32	1335	74.7216	79.845	714009.8	0.2139	0.2643
33	1340	74.7212	79.839	714013.3	0.2192	0.2730
34	1345	74.7213	79.823	714035.9	0.2171	0.2632
35	1350	74.7211	79.822	714035.1	0.2153	0.2607
36	1355	74.7213	79.812	714050.0	0.2089	0.2522
37	1400	74.7214	79.813	714050.4	0.2033	0.2446
38	1405	74.7214	79.815	714047.3	0.1982	0.2377

39	1410	74.7215	79.816	714047.4	0.1929	0.2306
40	1415	74.7114	79.816	713950.1	0.2018	0.2387
41	1420	74.7113	79.784	713992.3	0.2029	0.2380
42	1425	74.7111	79.788	713985.0	0.2047	0.2381
43	1430	74.7112	79.783	713992.1	0.2043	0.2361
44	1435	74.7113	79.776	714002.6	0.2021	0.2326
45	1440	74.7111	79.777	713999.6	0.1997	0.2289
46	1445	74.7110	79.783	713990.6	0.1981	0.2260
47	1450	74.7111	79.772	714005.9	0.1950	0.2219
48	1455	74.7112	79.770	714009.1	0.1908	0.2169
49	1500	74.7115	79.808	713961.9	0.1912	0.2162
50	1505	74.7006	79.750	713935.1	0.1942	0.2180
51	1510	74.7009	79.753	713933.8	0.1962	0.2195
52	1515	74.7015	79.744	713951.2	0.1962	0.2186
53	1520	74.7014	79.723	713978.4	0.1936	0.2155
54	1525	74.7009	79.729	713965.1	0.1915	0.2125
55	1530	74.7006	79.731	713959.5	0.1899	0.2101
56	1535	74.6913	79.732	713869.9	0.1951	0.2152
57	1540	74.6906	79.715	713885.6	0.1982	0.2179
58	1545	74.6908	79.730	713867.4	0.2018	0.2211
59	1550	74.6913	79.725	713878.4	0.2041	0.2229
60	1555	74.6910	79.717	713886.8	0.2055	0.2236
61	1600	74.6908	79.714	713888.6	0.2062	0.2277
62	1605	74.6915	79.718	713890.5	0.2059	0.2229
63	1610	74.6811	79.716	713793.1	0.2115	0.2298
64	1615	74.6908	79.712	713891.3	0.2108	0.2276
65	1620	74.6909	79.699	713909.2	0.2087	0.2251
66	1625	74.6904	79.683	713926.1	0.2057	0.2219
67	1630	74.6813	79.685	713836.1	0.2072	0.2230
68	1635	74.6806	79.682	713833.1	0.2084	0.2232
69	1640	74.6811	79.683	713836.7	0.2092	0.2241
70	1645	74.6799	79.680	713829.4	0.2099	0.2245
71	1650	74.6806	79.670	713849.0	0.2094	0.2235
72	1655	74.6707	79.677	713745.0	0.2134	0.2278
73	1700	74.6810	79.630	713906.4	0.2102	0.2245
74	1705	74.6709	79.625	713815.9	0.2105	0.2144
75	1710	74.6708	79.636	713800.9	0.2113	0.2269
76	1715	74.6705	79.644	713787.1	0.2126	0.2258
77	1720	74.6708	79.641	713794.1	0.2132	0.2261
78	1725	74.6710	79.644	713791.8	0.2133	0.2259
79	1730	74.6712	79.646	713791.1	0.2137	0.2260
80	1735	74.6706	79.636	713798.9	0.2132	0.2222
81	1740	74.6707	79.624	713815.6	0.2122	0.2239
82	1745	74.6705	79.593	713854.6	0.2097	0.2219
83	1750	74.6708	79.596	713853.4	0.2071	0.2184
84	1755	74.6705	79.601	713844.4	0.2048	0.2164
85	1800	74.6604	79.596	713754.4	0.2087	0.2171
86	1805	74.6603	79.620	713721.1	0.2073	0.2165
87	1810	74.6608	79.600	713752.7	0.2076	0.2133
88	1815	74.6606	79.603	713746.8	0.2078	0.2189
89	1820	74.6612	79.594	713764.3	0.2074	0.2177
90	1825	74.6505	79.565	713700.8	0.2087	0.2190
91	1830	74.6501	79.568	713693.3	0.2101	0.2103
92	1835	74.6601	79.565	713792.7	0.2083	0.2194

93	1840	74.[illegible]506	79.561	713707.[illegible]	0.2089	0.2188
94	1845	74.6498	79.576	713679.8	0.2100	0.2197
95	1850	74.6498	79.564	713695.3	0.2106	0.2202
96	1855	74.6506	79.561	713706.5	0.2107	0.2200
97	1900	74.6502	79.556	713709.4	0.2106	0.2197
98	1905	74.6500	79.545	713722.0	0.2099	0.2198
99	1910	74.6500	79.541	713727.8	0.2091	0.2180
100	1915	74.6502	79.561	713703.3	0.2087	0.2174
101	1920	74.6504	79.557	713710.1	0.2081	0.2166
102	1925	74.6405	79.546	713630.0	0.2095	0.2179
103	1930	74.6401	79.517	713665.1	0.2097	0.2180
104	1935	74.6399	79.517	713662.9	0.2098	0.2179
105	1940	74.6401	79.512	713671.4	0.2097	0.2177
106	1945	74.6406	79.511	713677.0	0.2094	0.2172
107	1950	74.6396	79.507	713673.5	0.2087	0.2166
108	1955	74.6402	79.520	713661.5	0.2086	0.2163
109	2000	74.6404	79.505	713683.5	0.2080	0.2155
110	2005	74.6404	79.505	713683.7	0.2070	0.2144
111	2010	74.6300	79.482	713614.6	0.2075	0.2147
112	2015	74.6403	79.470	713728.9	0.2057	0.2130
113	2020	74.6298	79.480	713614.9	0.2060	0.2132
114	2025	74.6403	79.490	713701.9	0.2045	0.2117
115	2030	74.6302	79.480	713618.6	0.2047	0.2118
116	2035	74.6301	79.490	713604.6	0.2049	0.2119
117	2040	74.6302	79.460	713645.8	0.2044	0.2112
118	2045	74.6304	79.470	713634.4	0.2039	0.2106
119	2050	74.6299	79.460	713642.9	0.2031	0.2098
120	2055	74.6299	79.460	713642.3	0.2023	0.2088
121	2100	74.6300	79.460	713643.8	0.2014	0.2079
122	2105	74.6194	79.450	713555.3	0.2020	0.2084
123	2110	74.6303	79.440	713672.6	0.2006	0.2071
124	2115	74.6301	79.440	713670.8	0.1994	0.2058
125	2120	74.6194	79.450	713555.1	0.1996	0.2060
126	2125	74.6201	79.440	713575.7	0.1996	0.2059
127	2130	74.6202	79.450	713563.4	0.1998	0.2060
128	2135	74.6199	79.440	713573.2	0.1996	0.2057
129	2140	74.6199	79.440	713573.2	0.1994	0.2055
130	2145	74.6200	79.440	713575.0	0.1993	0.2052
131	2150	74.6202	79.450	713563.4	0.1991	0.2049
132	2155	74.6197	79.420	713597.6	0.1984	0.2042
133	2200	74.6191	79.400	713619.0	0.1974	0.2032
134	2205	74.6094	79.410	713512.8	0.1978	0.2035
135	2210	74.6096	79.440	713475.4	0.1986	0.2043
136	2215	74.6102	79.420	713506.9	0.1989	0.2045
137	2220	74.6095	79.430	713487.4	0.1994	0.2049
138	2225	74.6096	79.400	713528.0	0.1991	0.2044
139	2230	74.6093	79.394	713553.2	0.1989	0.2043
140	2235	74.5995	79.414	713412.8	0.2002	0.2057
141	2240	74.5994	79.400	713430.7	0.2011	0.2060
142	2245	74.5992	79.388	713443.9	0.2017	0.207[illegible]
143	2250	74.5990	79.380	713453.4	0.2021	0.207[illegible]
144	2255	74.6094	79.379	713553.3	0.2013	0.2[illegible]
145	2300	74.5993	79.387	713446.9	0.2016	0.2064
146	2305	74.5993	79.383	713451.4	0.2018	0.2[illegible]

147	2310	74.5998	79.374	713469.1	0.2017	0.2068
148	2315	74.5996	79.375	713465.4	0.2018	0.2068
149	2320	74.5989	79.391	713437.6	0.2020	0.2070
150	2325	74.5992	79.370	713467.7	0.2018	0.2067
151	2330	74.5997	79.382	713457.0	0.2017	0.2065
152	2335	74.5989	79.397	713429.9	0.2019	0.2066
153	2340	74.5987	79.366	713469.0	0.2016	0.2063
154	2345	74.5895	79.372	713372.9	0.2021	0.2068
155	2350	74.5892	79.360	713386.3	0.2025	0.2071
156	2355	74.5889	79.380	713356.3	0.2031	0.2073
157	0	74.5993	79.340	713508.9	0.2024	0.2070
158	5	74.5889	79.360	713383.0	0.2026	0.2071
159	10	74.5889	79.340	713409.7	0.2025	0.2071
160	15	74.5888	79.350	713395.1	0.2025	0.2070
161	20	74.5893	79.360	713386.4	0.2026	0.2071
162	25	74.5891	79.350	713398.3	0.2025	0.2069
163	30	74.5890	79.330	713423.5	0.2023	0.2066
164	35	74.5895	79.320	713441.2	0.2017	0.2060
165	40	74.5889	79.330	713422.9	0.2013	0.2056
166	45	74.5892	79.330	713425.4	0.2009	0.2057
167	50	74.5790	79.320	713341.3	0.2010	0.2052
168	55	74.5786	79.330	713323.9	0.2014	0.2055
169	100	74.5788	79.317	713342.8	0.2015	0.2057
170	105	74.5792	79.319	713344.6	0.2016	0.2057
171	110	74.5789	79.306	713358.8	0.2015	0.2055
172	115	74.5790	79.320	713341.3	0.2015	0.2055
173	120	74.5790	79.294	713375.4	0.2012	0.2053
174	125	74.5785	79.293	713372.3	0.2008	0.2047
175	130	74.5783	79.286	713379.6	0.2005	0.2043
176	135	74.5784	79.318	713337.9	0.2003	0.2042
177	140	74.5690	79.306	713264.5	0.2007	0.2045
178	145	74.5788	79.317	713343.6	0.2006	0.2044
179	150	74.5685	79.320	713240.5	0.2011	0.2043
180	155	74.5779	79.310	713343.7	0.2008	0.2040
181	200	74.5787	79.309	713352.4	0.2004	0.2042
182	205	74.5686	79.270	713307.7	0.2002	0.2037
183	210	74.5684	79.285	713285.9	0.2004	0.2040
184	215	74.5684	79.280	713292.9	0.2003	0.2039
185	220	74.5686	79.296	713273.1	0.2003	0.2036
186	225	74.5689	79.267	713314.9	0.2000	0.2035
187	230	74.5686	79.277	713298.2	0.1999	0.2033
188	235	74.5690	79.266	713316.6	0.1996	0.2030
189	240	74.5681	79.277	713293.7	0.1994	0.2028
190	245	74.5684	79.267	713310.2	0.1991	0.2025
191	250	74.5682	79.272	713301.3	0.1988	0.2021
192	255	74.5677	79.266	713304.2	0.1985	0.2019
193	300	74.5683	79.269	713306.8	0.1981	0.2015
194	305	74.5679	79.267	713304.7	0.1978	0.2011
195	310	74.5686	79.251	713332.6	0.1972	0.2006
196	315	74.5583	79.251	713234.7	0.1973	0.2002
197	320	74.5586	79.240	713252.2	0.1970	0.2003
198	325	74.5584	79.250	713236.4	0.1970	0.2001
199	330	74.5581	79.250	713233.8	0.1969	0.2002
200	335	74.5587	79.238	713255.1	0.1967	0.1999

201	340	74.5579	79.236	713250.3	0.1965	0.1996
202	345	74.5580	79.237	713250.0	0.1961	0.1993
203	350	74.5578	79.254	713225.5	0.1961	0.1992
204	355	74.5578	79.233	713253.8	0.1959	0.1990
205	400	74.5580	79.233	713255.3	0.1955	0.1986
206	405	74.5576	79.225	713262.1	0.1951	0.1982
207	410	74.5577	79.226	713262.1	0.1947	0.1978
208	415	74.5580	79.217	713276.4	0.1943	0.1974
209	420	74.5579	79.218	713274.1	0.1937	0.1968
210	425	74.5576	79.237	713246.1	0.1934	0.1964
211	430	74.5578	79.229	713258.6	0.1929	0.1960
212	435	74.5579	79.219	713273.3	0.1924	0.1955
213	440	74.5583	79.221	713273.9	0.1919	0.1950
214	445	74.5474	79.207	713188.8	0.1918	0.1949
215	450	74.5472	79.224	713164.2	0.1918	0.1947
216	455	74.5481	79.213	713186.8	0.1918	0.1948
217	500	74.5476	79.199	713201.4	0.1915	0.1945
218	505	74.5474	79.198	713200.7	0.1913	0.1943
219	510	74.5476	79.208	713188.9	0.1910	0.1939
220	515	74.5471	79.191	713206.9	0.1906	0.1936
221	520	74.5477	79.199	713202.3	0.1903	0.1932
222	525	74.5472	79.195	713202.4	0.1900	0.1929
223	530	74.5476	79.198	713202.1	0.1896	0.1925
224	535	74.5477	79.176	713232.3	0.1892	0.1921
225	540	74.5370	79.198	713101.3	0.1893	0.1922
226	545	74.5472	79.213	713178.6	0.1890	0.1919
227	550	74.5472	79.192	713206.4	0.1885	0.1915
228	555	74.5368	79.192	713106.5	0.1885	0.1914
229	600	74.5370	79.189	713112.4	0.1885	0.1914
230	605	74.5371	79.180	713126.1	0.1884	0.1912
231	610	74.5371	79.180	713125.5	0.1883	0.1911
232	615	74.5374	79.169	713143.1	0.1881	0.1909
233	620	74.5376	79.179	713132.2	0.1879	0.1907
234	625	74.5373	79.170	713141.0	0.1877	0.1905
235	630	74.5370	79.158	713154.3	0.1874	0.1901
236	635	74.5373	79.169	713142.4	0.1871	0.1898
237	640	74.5374	79.179	713129.7	0.1869	0.1896
238	645	74.5370	79.171	713136.5	0.1866	0.1893
239	650	74.5367	79.155	713155.2	0.1862	0.1890
240	655	74.5370	79.166	713143.1	0.1860	0.1887
241	700	74.5371	79.162	713149.6	0.1856	0.1883
242	705	74.5366	79.157	713151.3	0.1853	0.1880
243	710	74.5370	79.157	713155.6	0.1849	0.1876
244	715	74.5364	79.138	713174.8	0.1843	0.1871
245	720	74.5369	79.152	713160.6	0.1840	0.1867
246	725	74.5264	79.135	713082.9	0.1838	0.1865
247	730	74.5363	79.136	713176.3	0.1834	0.1861
248	735	74.5260	79.135	713078.8	0.1831	0.1858
249	740	74.5268	79.128	713095.5	0.1829	0.1855
250	745	74.5268	79.119	713108.2	0.1825	0.1852
251	750	74.5265	79.026	713228.3	0.1819	0.1846
252	755	74.5269	79.126	713099.2	0.1816	0.1844
253	800	74.5264	79.126	713094.4	0.1813	0.1840
254	805	74.5264	79.115	713109.0	0.1810	0.1837

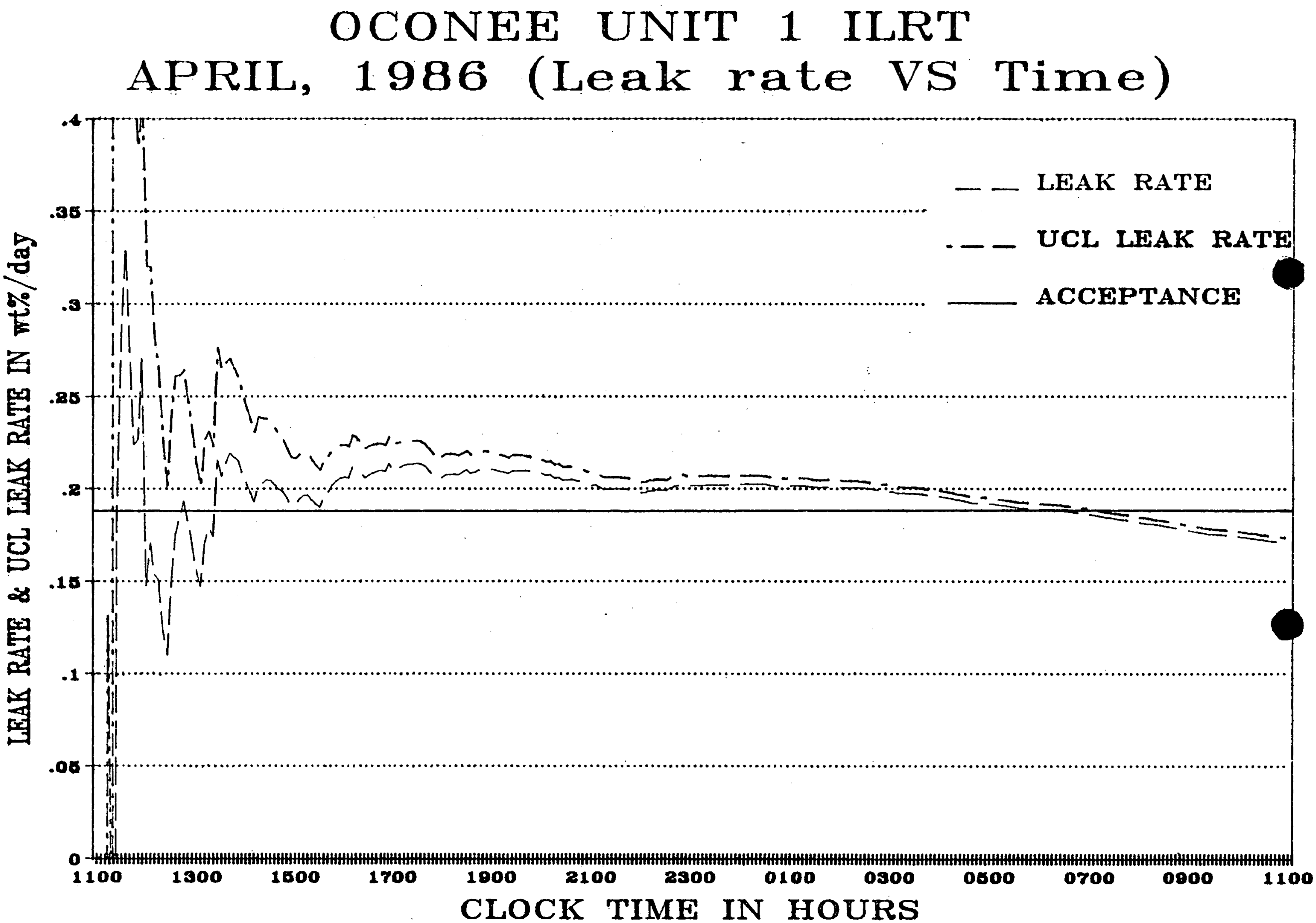
255	810	74.[illegible]261	79.126	713092.[illegible]	0.1806	0.1834
256	815	74.5261	79.124	713094.9	0.1804	0.1831
257	820	74.5264	79.129	713090.5	0.1801	0.1828
258	825	74.5262	79.125	713094.5	0.1798	0.1825
259	830	74.5262	79.126	713092.8	0.1794	0.1822
260	835	74.5264	79.124	713097.6	0.1791	0.1818
261	840	74.5269	79.129	713095.8	0.1787	0.1815
262	845	74.5259	79.113	713107.4	0.1783	0.1810
263	850	74.5269	79.115	713114.0	0.1780	0.1807
264	855	74.5259	79.114	713105.9	0.1775	0.1802
265	900	74.5264	79.111	713114.6	0.1771	0.1798
266	905	74.5258	79.121	713095.9	0.1767	0.1795
267	910	74.5264	79.115	713109.0	0.1763	0.1790
268	915	74.5260	79.108	713114.4	0.1759	0.1787
269	920	74.5257	79.117	713100.3	0.1755	0.1783
270	925	74.5258	79.109	713111.8	0.1751	0.1779
271	930	74.5161	79.114	713011.6	0.1750	0.1777
272	935	74.5159	79.093	713037.5	0.1747	0.1774
273	940	74.5161	79.106	713022.5	0.1746	0.1773
274	945	74.5164	79.111	713018.9	0.1745	0.1772
275	950	74.5160	79.107	713020.7	0.1743	0.1770
276	955	74.5161	79.086	713049.0	0.1740	0.1767
277	1000	74.5155	79.087	713041.9	0.1738	0.1765
278	1005	74.5159	79.096	713034.1	0.1735	0.1762
279	1010	74.5156	79.089	713039.9	0.1732	0.1759
280	1015	74.5156	79.083	713047.9	0.1728	0.1755
281	1020	74.5158	79.093	713037.3	0.1726	0.1753
282	1025	74.5156	79.073	713061.9	0.1722	0.1749
283	1030	74.5155	79.087	713042.2	0.1720	0.1746
284	1035	74.5159	79.100	713028.4	0.1716	0.1743
285	1040	74.5151	79.088	713037.1	0.1713	0.1740
286	1045	74.5055	79.089	712943.8	0.1713	0.1739
287	1050	74.5164	79.091	713044.9	0.1709	0.1735
288	1055	74.5151	79.092	713031.8	0.1705	0.1732
289	1100	74.4956	79.089	712849.1	0.1708	0.1734

DUKE POWER COMPANY

OCONEE NUCLEAR STATION UNIT 1

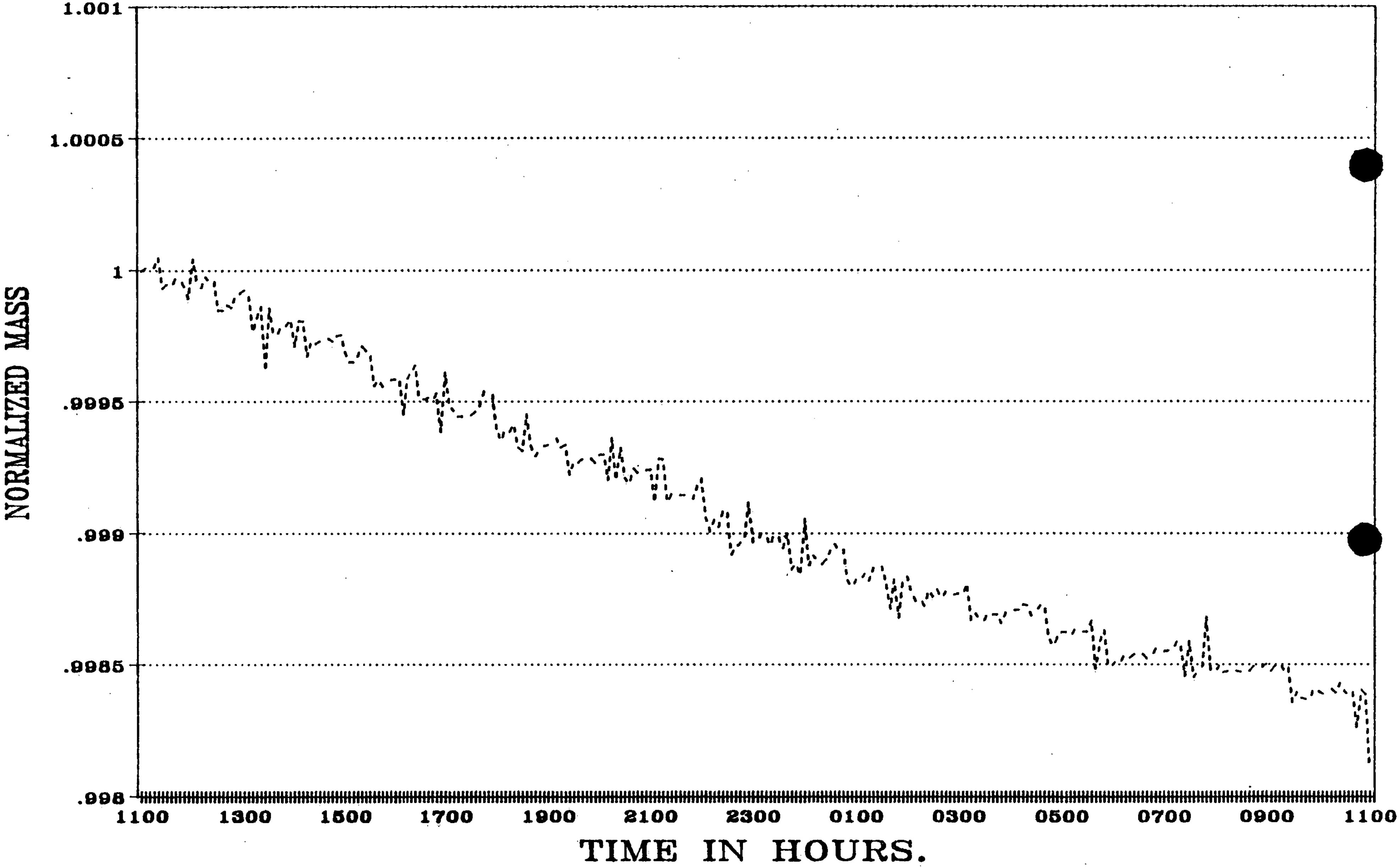
VERIFICATION 04-07-1986

DATA SET NO	CLOCK TIME	CORRECTED PRESSURE	CORRECTED TEMPERATURE	MASS	LEAK RATE	95%UCL LEAK RATE
304	1215	74.5048	79.058	712978.0	0.0000	0.0000
305	1220	74.5049	79.060	712975.9	0.0909	0.0000
306	1225	74.5048	79.071	712960.6	0.3484	1.3149
307	1230	74.5049	79.054	712984.2	-0.0136	0.6329
308	1235	74.5048	79.055	712981.8	-0.0654	0.2430
309	1240	74.5045	79.048	712988.8	-0.1073	0.0839
310	1245	74.5045	79.066	712964.5	-0.0074	0.1660
311	1250	74.4949	79.078	712856.4	0.3982	0.8709
312	1255	74.4947	79.073	712861.0	0.5480	0.9414
313	1300	74.4944	79.071	712861.2	0.5940	0.9061
314	1305	74.4948	79.090	712840.3	0.6309	0.8851
315	1310	74.4941	79.043	712895.3	0.5415	0.7701
316	1315	74.4943	79.043	712897.1	0.4671	0.6733
317	1320	74.4941	79.038	712902.4	0.4027	0.5906
318	1325	74.4944	79.059	712876.8	0.3746	0.5337
319	1330	74.4940	79.062	712869.7	0.3561	0.5002
320	1335	74.4840	79.063	712772.4	0.4118	0.5505
321	1340	74.4838	79.039	712801.8	0.4235	0.5469
322	1345	74.4841	79.054	712785.1	0.4356	0.5462
323	1350	74.4834	79.039	712798.1	0.4303	0.5296
324	1355	74.4844	79.059	712781.2	0.4295	0.5191
325	1400	74.4839	79.053	712785.1	0.4228	0.5043
326	1405	74.4839	79.035	712808.5	0.4028	0.4798
327	1410	74.4833	79.047	712786.8	0.3916	0.4628
328	1415	74.4839	79.040	712801.6	0.3737	0.4414
329	1420	74.4839	79.053	712785.1	0.3635	0.4268
330	1425	74.4838	79.057	712777.9	0.3541	0.4134
331	1430	74.4838	79.051	712786.3	0.3411	0.3976
332	1435	74.4835	79.033	712807.6	0.3225	0.3781
333	1440	74.4836	79.040	712798.8	0.3071	0.3610
334	1445	74.4833	79.039	712797.4	0.2930	0.3450
335	1450	74.4735	79.035	712708.8	0.3006	0.3499
336	1455	74.4736	79.034	712711.4	0.3049	0.3513
337	1500	74.4731	79.040	712698.3	0.3091	0.3529
338	1505	74.4727	79.028	712710.5	0.3091	0.3504
339	1510	74.4734	79.028	712716.9	0.3061	0.3452
340	1515	74.4733	79.030	712713.9	0.3029	0.34[illegible]
341	1520	74.4735	79.022	712725.6	0.2975	0.3[illegible]
342	1525	74.4730	79.024	712718.9	0.2923	0.3263
343	1530	74.4731	79.035	712705.3	0.2890	0.3214
344	1535	74.4736	79.019	712731.1	0.2820	0.3137
345	1540	74.4730	79.023	712720.3	0.2762	0.3069
346	1545	74.4627	79.025	712619.3	0.2827	0.3128
347	1550	74.4634	79.033	712614.6	0.2883	0.3175
348	1555	74.4629	79.040	712600.8	0.2940	0.3224
349	1600	74.4727	79.019	712722.9	0.2842	0.3129
350	1605	74.4627	79.018	712628.0	0.2858	0.3132
351	1610	74.4627	79.027	712616.3	0.2871	0.3134
352	1615	74.4627	79.029	712613.7	0.2876	0.3129

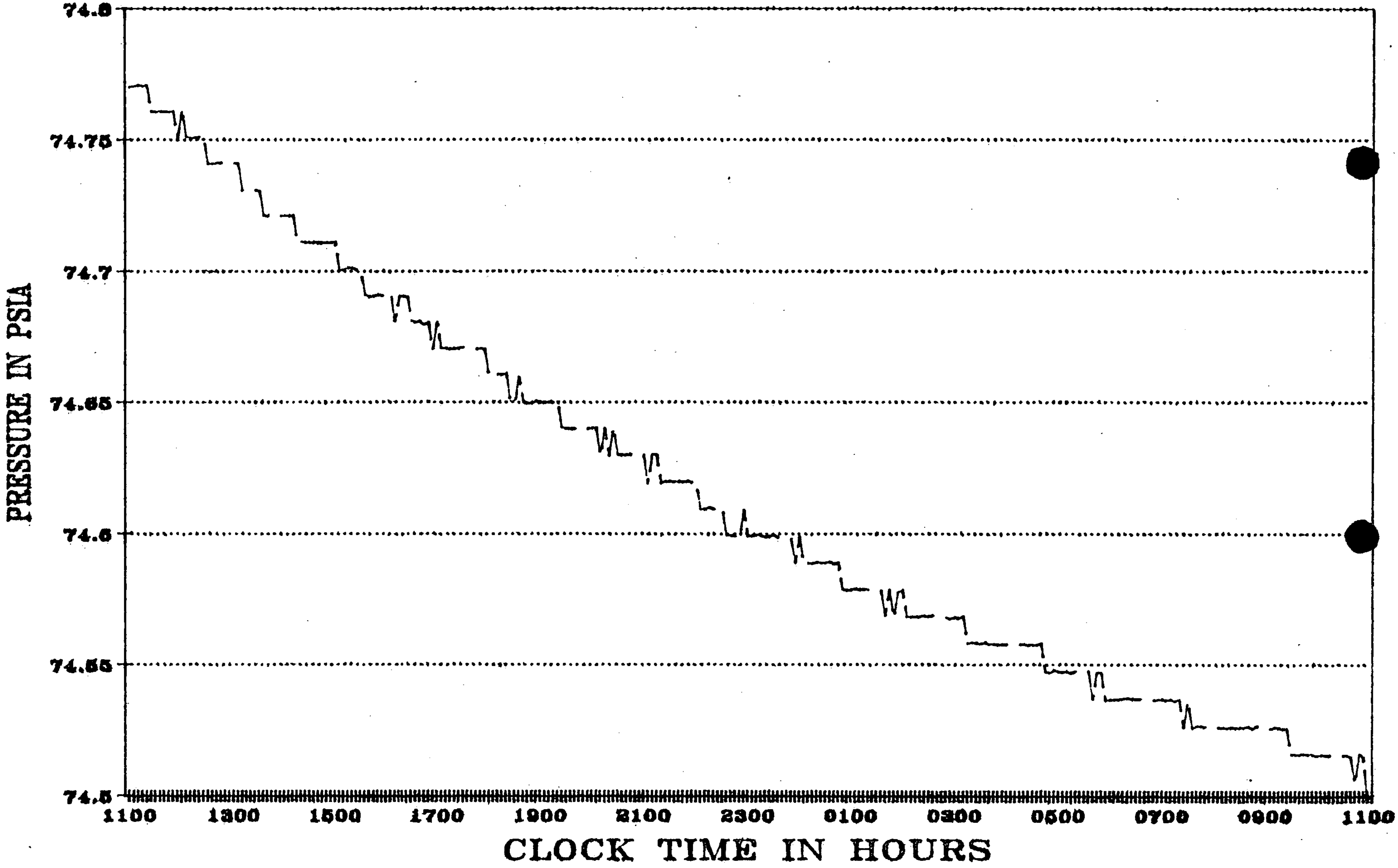


OCONEE UNIT 1 ILRT
APRIL, 1986 (Leak rate VS Time)
LEAK RATE
UCL LEAK RATE
ACCEPTANCE
LEAK RATE & UCL LEAK RATE IN wt%/day
.4
.35
.3
.25
.2
.15
.1
.05
0
1100
1300
1500
1700
1900
2100
2300
0100
0300
0500
0700
0900
1100
CLOCK TIME IN HOURS

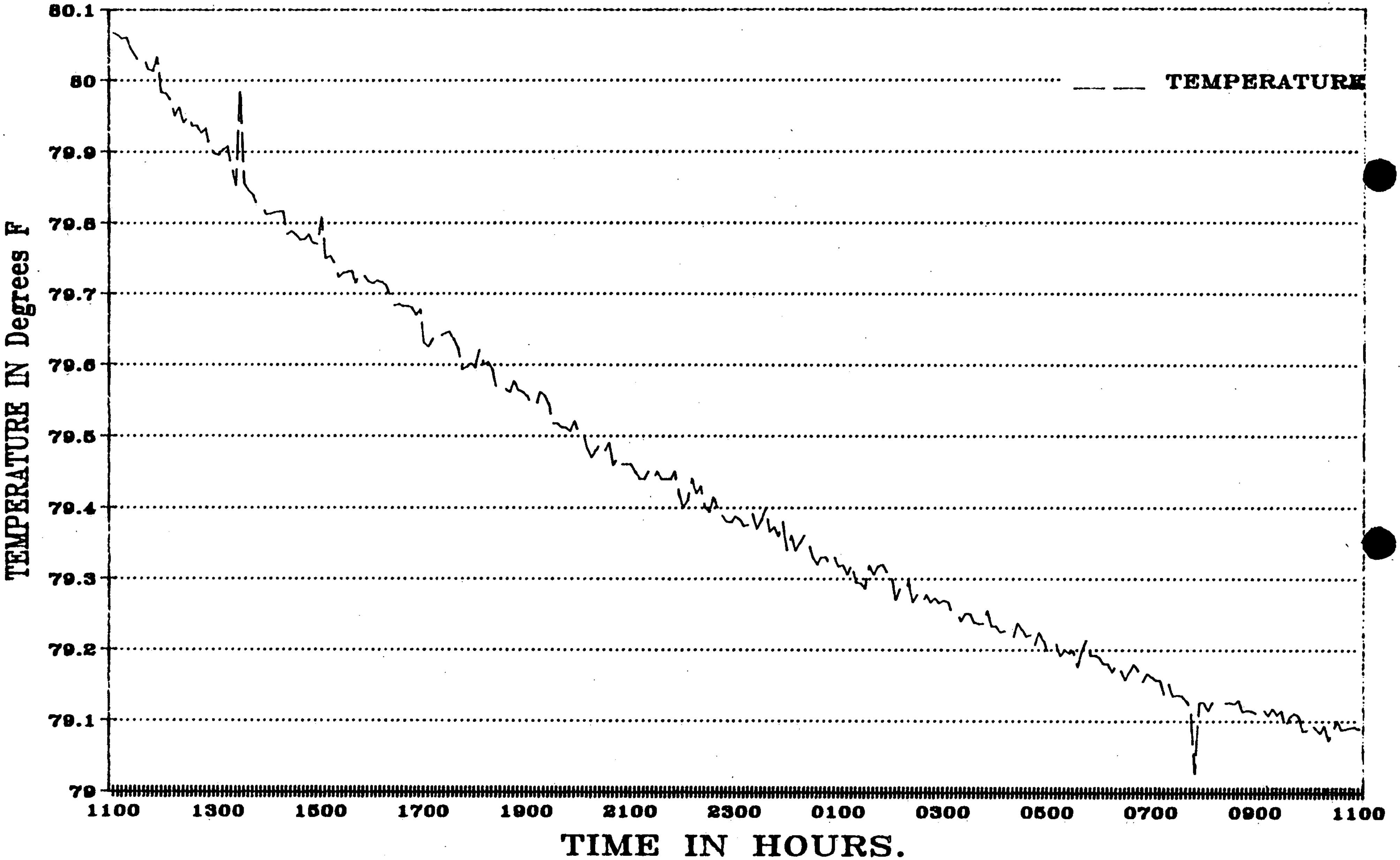
OCONEE UNIT 1 ILRT
APRIL, 1986 (Normalized Mass VS Time)



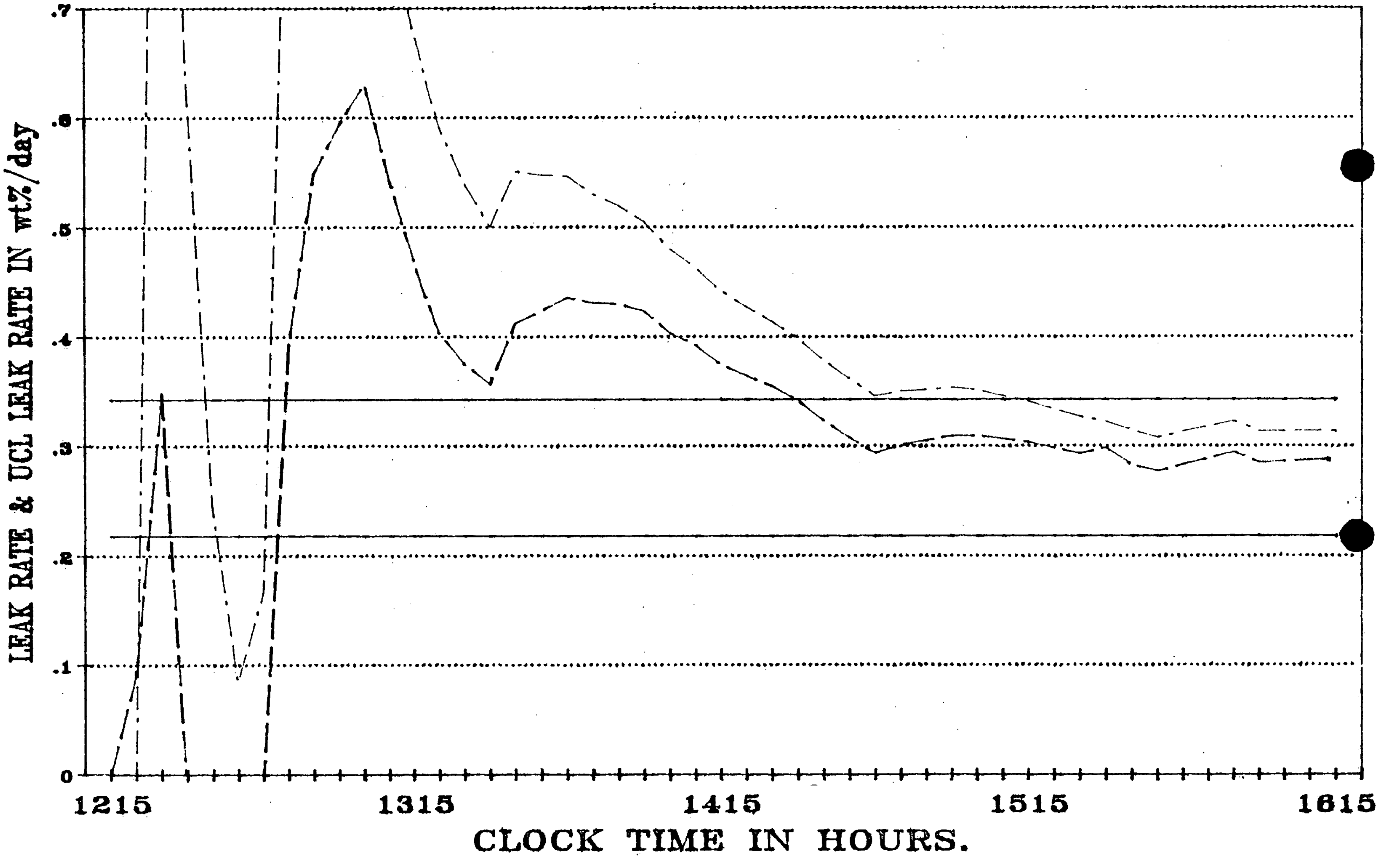
OCONEE UNIT 1 ILRT
APRIL, 1986 (Pressure VS Time)

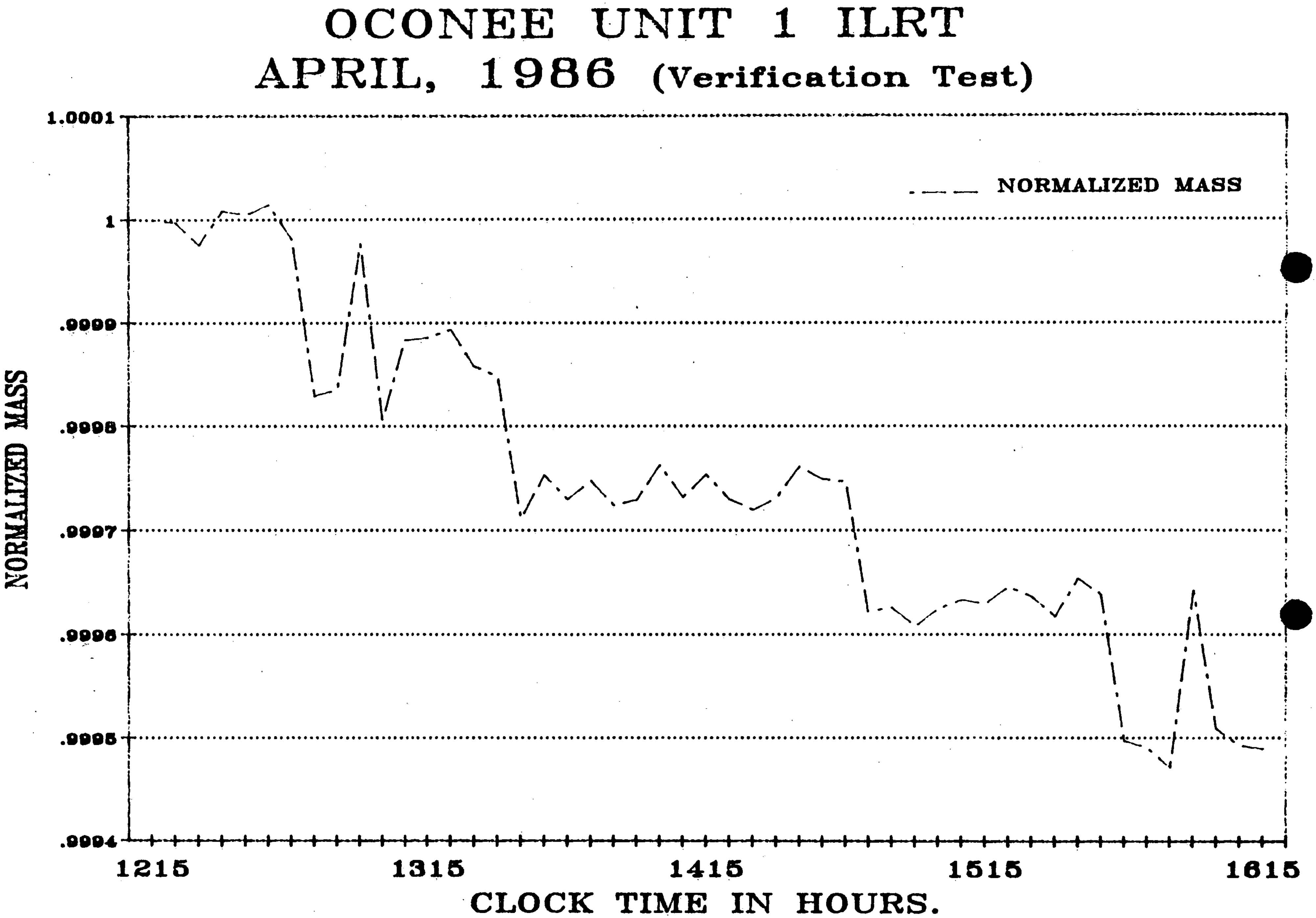


OCONEE UNIT 1 ILRT
APRIL, 1986 (Temperature VS Time)

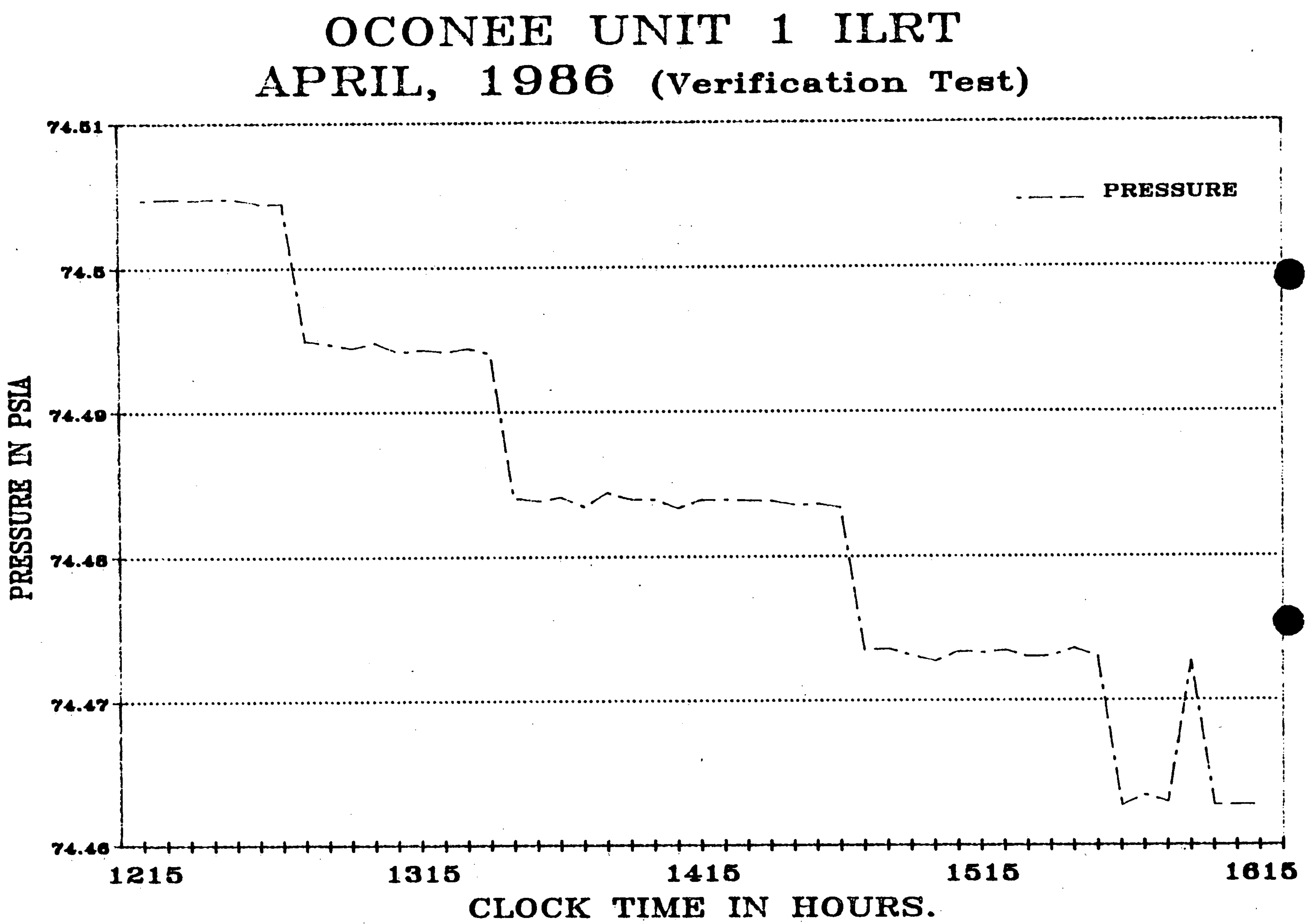


OCONEE UNIT 1 ILRT
APRIL, 1986 (Verification Test)

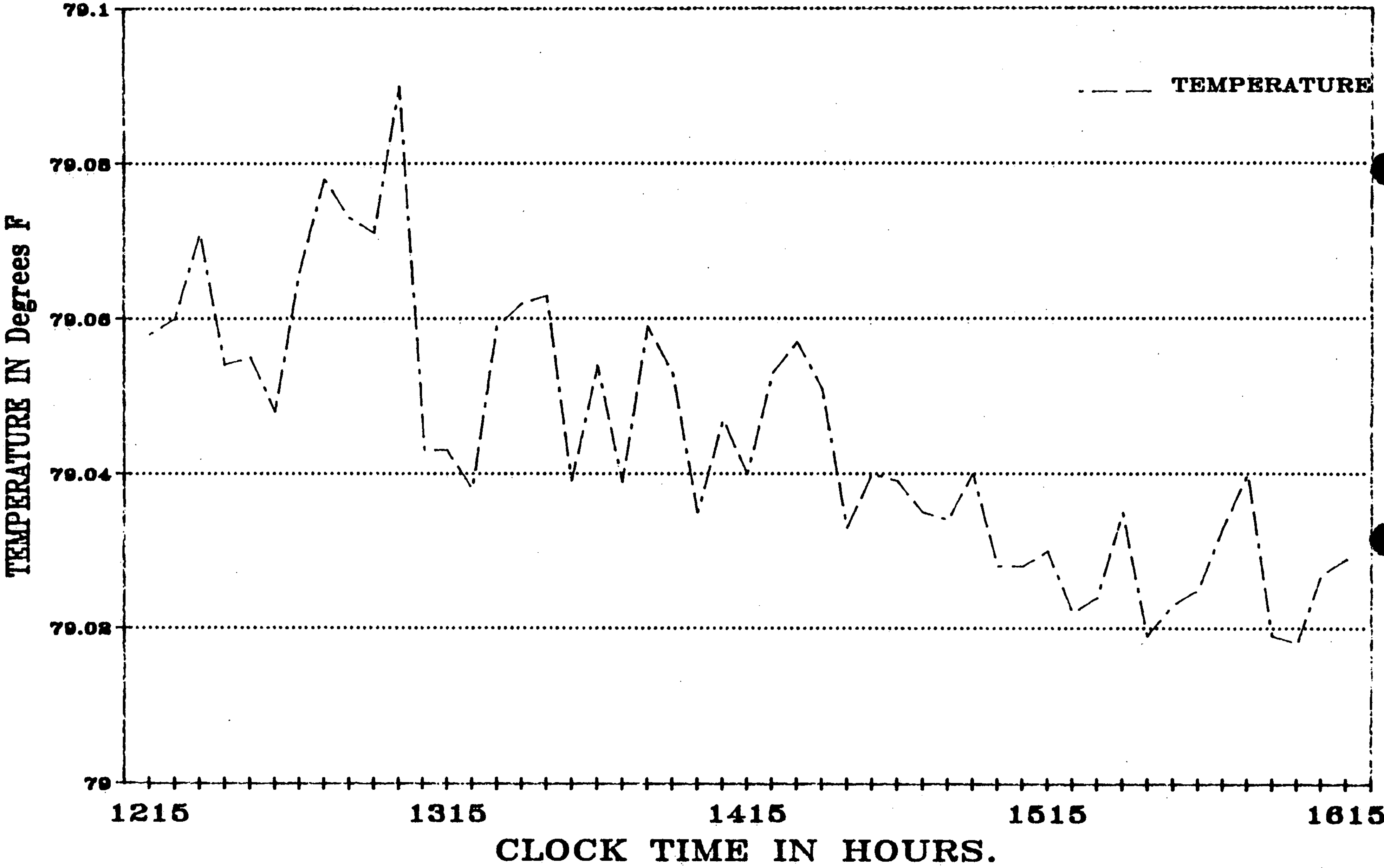




OCONEE UNIT 1 ILRT
APRIL, 1986 (Verification Test)
NORMALIZED MASS
1.0001
1
.9999
.9998
.9997
.9996
.9995
.9994
NORMALIZED MASS
1215
1315
1415
1515
1615
CLOCK TIME IN HOURS.


OCONEE UNIT 1 ILRT
APRIL, 1986 (Verification Test)
PRESSURE
74.51
74.5
74.49
74.48
74.47
74.46
PRESSURE IN PSIA
1215
1315
1415
1515
1615
CLOCK TIME IN HOURS.

OCONEE UNIT 1 ILRT
APRIL, 1986 (Verification Test)



DUKE POWER COMPANY

OCONEE NUCLEAR STATION UNIT 1

CONTAINMENT INTEGRATED LEAK RATE TEST 5- 26- 1987

DATA SET NO	CLOCK TIME	CORRECTED PRESSURE	CORRECTED TEMPERATURE	MASS	LEAK RATE	95%UCL LEAK RATE
134	2205	74.6094	79.410	713512.9	0.0000	0.0000
135	2210	74.6096	79.440	713475.4	1.5099	0.0000
136	2215	74.6102	79.420	713506.9	0.1211	5.1930
137	2220	74.6095	79.430	713487.4	0.1816	[illegible]
138	2225	74.6096	79.400	713528.0	-0.1689	0.5136
139	2230	74.6093	79.394	713533.2	-0.2768	[illegible]
140	2235	74.5995	79.414	713412.8	0.2354	0.3966
141	2240	74.5994	79.400	713430.7	0.3676	[illegible]
142	2245	74.5992	79.388	713443.9	0.3700	[illegible]
143	2250	74.5990	79.380	713453.4	0.3311	0.2789
144	2255	74.6094	79.379	713553.3	0.1105	0.4445
145	2300	74.5993	79.387	713446.9	0.1440	0.4212
146	2305	74.5993	79.383	713451.4	0.1548	[illegible]
147	2310	74.5998	79.374	713469.1	0.1360	[illegible]
148	2315	74.5996	79.375	713465.4	0.1232	0.2944
149	2320	74.5989	79.391	713437.6	0.1378	0.2874
150	2325	74.5992	79.370	713467.7	0.1215	0.2540
151	2330	74.5997	79.382	713457.0	0.1146	[illegible]
152	2335	74.5989	79.397	713429.9	0.1258	[illegible]
153	2340	74.5987	79.366	713469.0	0.1093	[illegible]
154	2345	74.5895	79.372	713372.9	0.1459	[illegible]
155	2350	74.5892	79.360	713386.3	0.1655	0.2326
156	2355	74.5889	79.380	713356.3	0.1913	[illegible]
157	0	74.5993	79.340	713508.9	0.1478	[illegible]
158	5	74.5889	79.360	713383.0	0.1588	0.2402
159	10	74.5889	79.340	713409.7	0.1584	[illegible]
160	15	74.5888	79.350	713395.1	0.1614	[illegible]
161	20	74.5893	79.360	713386.4	0.1641	[illegible]
162	25	74.5891	79.350	713398.3	0.1623	[illegible]
163	30	74.5890	79.330	713423.5	0.1531	[illegible]
164	35	74.5895	79.320	713441.2	0.1409	[illegible]
165	40	74.5889	79.330	713422.9	0.1357	[illegible]
166	45	74.5892	79.330	713425.4	0.1267	[illegible]
167	50	74.5790	79.320	713341.3	0.1375	[illegible]
168	55	74.5786	79.330	713323.9	0.1489	[illegible]
169	100	74.5788	79.317	713342.8	0.1539	[illegible]
170	105	74.5792	79.319	713344.6	0.1576	[illegible]
171	110	74.5789	79.306	713358.8	0.1583	[illegible]

172	115	74.5790	79.320	713341.5	0.1607	0.1977
173	120	74.5790	79.294	713375.4	0.1575	0.1928
174	125	74.5785	79.293	713372.3	0.1541	0.1878
175	130	74.5783	79.286	713379.6	0.1496	0.1820
176	135	74.5784	79.318	713337.9	0.1506	0.1814
177	140	74.5690	79.306	713264.5	0.1603	0.1911
178	145	74.5788	79.317	713343.6	0.1590	0.1883
179	150	74.5685	79.320	713240.5	0.1688	0.1986
180	155	74.5779	79.310	713343.7	0.1661	0.1947
181	200	74.5787	79.309	713352.4	0.1624	0.1900
182	205	74.5686	79.270	713307.7	0.1631	0.1896
183	210	74.5684	79.285	713285.9	0.1651	0.1906
184	215	74.5684	79.280	713292.9	0.1657	0.1902
185	220	74.5686	79.296	713273.1	0.1683	0.1920
186	225	74.5689	79.267	713314.9	0.1661	0.1890
187	230	74.5686	79.277	713298.2	0.1657	0.1877
188	235	74.5690	79.266	713316.6	0.1632	0.1846
189	240	74.5681	79.277	713293.7	0.1626	0.1831
190	245	74.5684	79.267	713310.2	0.1607	0.1807
191	250	74.5682	79.272	713301.3	0.1590	0.1783
192	255	74.5677	79.266	713304.2	0.1570	0.1757
193	300	74.5683	79.269	713306.8	0.1547	0.1729
194	305	74.5679	79.267	713304.7	0.1532	0.1709
195	310	74.5686	79.251	713332.6	0.1487	0.1662
196	315	74.5583	79.251	713234.7	0.1511	0.1682
197	320	74.5586	79.240	713252.2	0.1520	0.1686
198	325	74.5584	79.250	713236.4	0.1531	0.1692
199	330	74.5581	79.250	713233.8	0.1544	0.1701
200	335	74.5587	79.238	713255.1	0.1542	0.1694
201	340	74.5579	79.236	713250.3	0.1537	0.1685
202	345	74.5580	79.237	713250.0	0.1538	0.1682
203	350	74.5578	79.254	713225.5	0.1543	0.1683
204	355	74.5578	79.233	713253.8	0.1532	0.1668
205	400	74.5580	79.233	713255.3	0.1524	0.1656
206	405	74.5576	79.225	713262.1	0.1509	0.1639
207	410	74.5577	79.226	713262.1	0.1496	0.1623
208	415	74.5580	79.217	713276.4	0.1476	0.1601
209	420	74.5579	79.218	713274.1	0.1456	0.1579
210	425	74.5576	79.237	713246.1	0.1450	0.1571
211	430	74.5578	79.229	713258.6	0.1433	0.1551
212	435	74.5579	79.219	713273.3	0.1412	0.1529
213	440	74.5583	79.221	713273.9	0.1393	0.1509
214	445	74.5474	79.207	713188.8	0.1402	0.1515
215	450	74.5472	79.224	713164.2	0.1418	0.1530
216	455	74.5481	79.213	713186.8	0.1426	0.1535
217	500	74.5476	79.199	713201.4	0.1426	0.1532
218	505	74.5474	79.198	713200.7	0.1425	0.1529
219	510	74.5476	79.208	713188.9	0.1427	0.1528
220	515	74.5471	79.191	713206.9	0.1421	0.1521
221	520	74.5477	79.199	713202.3	0.1417	0.1515
222	525	74.5472	79.195	713202.4	0.1412	0.1507
223	530	74.5476	79.198	713202.1	0.1407	0.1500
224	535	74.5477	79.176	713232.3	0.1393	0.1485
225	540	74.5370	79.198	713101.3	0.1415	0.1507

226	545	74.5472	79.213	713178.6	0.1414	0.1505
227	550	74.5472	79.192	713206.4	0.1406	0.1495
228	555	74.5368	79.192	713106.5	0.1423	0.1512
229	600	74.5370	79.189	713112.4	0.1436	0.1524
230	605	74.5371	79.180	713126.1	0.1442	0.1528
231	610	74.5371	79.180	713125.5	0.1448	0.1533
232	615	74.5374	79.169	713143.1	0.1450	0.1533
233	620	74.5376	79.179	713132.2	0.1454	0.1533
234	625	74.5373	79.170	713141.0	0.1454	0.1533
235	630	74.5370	79.158	713154.3	0.1449	0.1527
236	635	74.5373	79.169	713142.4	0.1447	0.1524
237	640	74.5374	79.179	713129.7	0.1447	0.1522
238	645	74.5370	79.171	713136.5	0.1444	0.1518
239	650	74.5367	79.155	713155.2	0.1434	0.1507
240	655	74.5370	79.166	713143.1	0.1430	0.1502
241	700	74.5371	79.162	713149.6	0.1424	0.1495
242	705	74.5366	79.157	713151.3	0.1418	0.1488
243	710	74.5370	79.157	713155.6	0.1408	0.1476
244	715	74.5364	79.138	713174.8	0.1396	0.1465
245	720	74.5369	79.152	713160.6	0.1385	0.1453
246	725	74.5264	79.135	713082.9	0.1390	0.1457
247	730	74.5363	79.136	713176.3	0.1376	0.1443
248	735	74.5260	79.135	713078.8	0.1380	0.1446
249	740	74.5268	79.128	713095.5	0.1382	0.1447
250	745	74.5268	79.119	713108.2	0.1381	0.1445
251	750	74.5265	79.026	713228.3	0.1358	0.1424
252	755	74.5269	79.126	713099.2	0.1355	0.1421
253	800	74.5264	79.126	713094.4	0.1355	0.1420
254	805	74.5264	79.115	713109.0	0.1353	0.1416
255	810	74.5261	79.126	713092.2	0.1353	0.1415
256	815	74.5261	79.124	713094.9	0.1351	0.1413
257	820	74.5264	79.129	713090.5	0.1347	0.1408
258	825	74.5262	79.125	713094.5	0.1346	0.1405
259	830	74.5262	79.126	713092.8	0.1343	0.1402
260	835	74.5264	79.124	713097.6	0.1340	0.1398
261	840	74.5269	79.129	713095.8	0.1334	0.1392
262	845	74.5259	79.113	713107.4	0.1328	0.1385
263	850	74.5269	79.115	713114.0	0.1319	0.1375
264	855	74.5259	79.114	713105.9	0.1313	0.1367
265	900	74.5264	79.111	713114.6	0.1306	0.1361
266	905	74.5258	79.121	713095.9	0.1300	0.1355
267	910	74.5264	79.115	713109.0	0.1294	0.1348
268	915	74.5260	79.108	713114.4	0.1286	0.1340
269	920	74.5257	79.117	713100.3	0.1280	0.1333
270	925	74.5258	79.109	713111.8	0.1271	0.1324
271	930	74.5161	79.114	713011.6	0.1275	0.1320
272	935	74.5159	79.093	713037.5	0.1276	0.1323
273	940	74.5161	79.106	713022.5	0.1279	0.1320
274	945	74.5164	79.111	713018.9	0.1281	0.1332
275	950	74.5160	79.107	713020.7	0.1283	0.1333
276	955	74.5161	79.086	713049.0	0.1282	0.1331
277	1000	74.5155	79.087	713041.9	0.1280	0.1328
278	1005	74.5159	79.096	713034.1	0.1277	0.1325
279	1010	74.5156	79.089	713039.9	0.1275	0.1323

280	1015	74.5156	79.083	713047.9	0.1272	0.1319
281	1020	74.5158	79.093	713037.3	0.1270	0.1316
282	1025	74.5156	79.073	713061.9	0.1265	0.131[illegible]
283	1030	74.5155	79.087	713042.2	0.1263	0.1308
284	1035	74.5159	79.100	713028.4	0.1261	0.1305
285	1040	74.5151	79.088	713037.1	0.1258	0.1307
286	1045	74.5055	79.089	712943.8	0.1266	0.1310
287	1050	74.5164	79.091	713044.9	0.1260	0.1303
288	1055	74.5151	79.092	713031.8	0.1256	0.1299
289	1100	74.4956	79.089	712849.1	0.1271	0.1316