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DUKE POWER COMPANY

OCONEE NUCLEAR STATION

UNIT 1

REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

MAY 1980

DUKE POWER COMPANY

Oconee Nuclear Station

Unit 1

Reactor Containment Building

Integrated Leak Rate Test

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TABLE OF CONTENTS

1.0 Introduction

The periodic Integrated Leak Rate Test (ILRT) of the Oconee Nuclear Station Unit 1 Containment Building was satisfactorily completed on February 11, 1980. The testing was conducted in accordance with the requirements of FSAR Section 5.6.2.1, Technical Specification 4.4, BN-TOP-1 (Bechtel Testing Criteria for ILRT), ANSI N45.4-1972 and 10CFR50, Appendix J, with two exceptions. 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 half the design basis accident pressure of ∿29.5 psig. A measured induced leakage was used to verify the results. Analysis of final test data shows the results to be well within the specified limits for this containment, which has a maximum allowable leak rate of 0.0775 wt.%/day. The leakage rate was measured at 0.0205 wt%/day, and the upper confidence limit (UCL) was determined to be 0.0222 wt%/day.

2.0 Summary and Conclusions

2.1 Synopsis

The Unit 1 Containment ILRT was performed in accordance with periodic test procedure PT/0/A/150/03 as approved for use on October 23, 1978. This procedure is similar to that used for the pre-operational ILRT.

Pressurization for the ILRT began at 1302 hrs. on January 25, 1980 with both air compressors. Pressurization was stopped at 10 psig containment pressure at 1900 hrs on 1/25/80. Two hours previously (1700 hrs. 1/25/80) USNRC inspectors raised objections to the test method; specifically, the procedure did not meet the requirements of 10CFR50 Appendix J, section III.A.1(d). This item remained unresolved until February 11, 1980.

At 0630 hrs. on January 26, 1980, the containment building was entered to inspect for indications of leakage. The only indication of leakage upon entry was through the pressure equalization valve on the inner door of the personnel hatch. At 0900 hrs., personnel exited the containment, and, at that time, the equalization valve was properly seated, and there were no further indications of leakage through it. At 1050 hrs., the compressors were restarted and the containment pressurization continued. At 2115 hrs., the compressors were secured with the containment pressure at approximately 30 psig, and the four hour stabilization period begun.

At 1220 hrs. on January 27, 1980, several leaks through fittings on the ILRT pressure measurement impulse lines were identified; a leak rate of 0.1076 wt.%/day was calculated at this time. After repairs were effected, the leakage rate was calculated to be 0.0653 wt.%/day. At 1400 hrs. on January 28, 1980, a leak was identified on the reference vessel manometer piping through a misaligned valve. The reference vessels are not used for the test, and this was providing a leakage path to the penetration room. It was verified that this valve was closed prior to the previous startup, and that this leakage path did not exist during power operation. This leak was stopped by correctly aligning the valve, and the test period was restarted. At 1500 hrs. on 1/29/80, NRC inspectors again objected to test method and data validity due to the unresolved question on Appendix J, section III.A.1(d). This time the specific objection was that since draining and venting was not done in accordance with III.A.1(d), there were five penetrations at higher pressure outside the building than the internal test pressure. This would allow a leakage into the building, thereby masking a leak out of the building. The five penetrations are #48, Breathing Air Header Penetration; #41, Instrument Air Header Penetration; #39 and #53, High Pressure Nitrogen

and Make-up to Core Flood Tank Penetration; and #49, Low Pressure Nitrogen Header Penetration.

At 1520 hrs. on 1/29/80, the breathing air system for the entire plant (all three units) was secured and depressurized. Monitoring leak rate over two hours subsequent to securing BA system showed no change in leak rate that would indicate in leakage through penetration #48. At 1900 hrs. on 1/29/80, the valves between the instrument air (IA) outside building isolation valve (IA-90) and the rotometer were opened. This would provide an open path to the atmosphere for any leakage through IA-90 or from the IA header that had been leaking into the building. The leak rate was monitored, but no change indicative of in-leakage was found. After an Health Physics sample was taken through this penetration at 2215 hrs. 1/19/80, IA-90 was again closed, pressure was monitored between IA-90 (penetration #41 outside isolation), IA-110 (test rig, rotometer, isolation), and IA-88 (IA header isolation) for one hour with a precision Heise gauge. No pressure buildup was observed.

At 0005 hrs. on 1/30/80, final data analysis was completed. The test period was fixed from 2200 hrs. on 1/28/80 through 2200 hrs. on 1/29/80. The calculated leak rate was 0.0205 wt.%/day and the upper confidence limit (UCL) was 0.0222 wt.%/day. An imposed leak rate of 3.1 SCFM was calculated for the verification leak rate test. This leak was imposed at 0045 hrs. on 1/30/80.

At 1500 hrs. on 1/30/80, the verification test was completed. The calculated leak rate was 0.0995 wt.%/day, and the UCL was 0.1131 wt.%/day.

At 1857 hrs. on 1/30/80, depressurization of the containment began. Depressurization was completed at 0940 hrs. on 1/31/80. An entry to the containment was made to inspect for damage from the ILRT; one light bulb was found to be broken.

On January 30, 1980, NRC Region II, Office of Inspection and Enforcement, informed the Duke Power Company that the test as run was not satisfactory and that the test and results would not be accepted by the commission as they stood.

On January 31, 1980, a method for resolving the issue was arrived at by NRC/RII and Duke Power, which consisted of supplemental leak rate tests to 10 penetrations. This testing was completed on February 11, 1980 and the ILRT accepted by the NRC. The supplemental testing is detailed in section 2.3.

2.2 Appendix J Exceptions

Exception I - Change of Data Analysis Method

In an internal NRC memorandum from V. Stello to K. V. Seyfrit dated 10/25/77, the Division of Operating Reactors (Office of Nuclear Reactor Regulation) took the position that in order to meet the intent of 10CFR50, Appendix J and for the test results to be considered acceptable, the test results will demonstrate that a calculated 95% upper confidence limit is less than or equal to 75% La (75% L_t for reduced pressure tests). The 95% UCL for Unit 1 ILRTs has never met this criteria, even on the initial tests which set the limit L_t. This is due to the very low leakage rate of the Unit 1 containment building. On July 17, 1980, the station requested that the Licensing Group pursue a change to station Technical Specifications to raise L_t for Unit 1 to 0.150 wt.%/day, this being the value of the initial tests' 95% UCL (This change was not submitted to ONRR). On 12/11/79, R. C. Lewis of the USNRC transmitted a letter to W. O. Parker, Jr., re-affirming the NRC's position on the 95% UCL and the test acceptance. This was the same as V. Stello's 10/25/77 memo. Discussions were then held with M. Fairtile, NRC/ONRR and H. Whitener, NRC/RII about the data analysis method used for the test, the total time method previously used at ONS, vs. the mass-plot method, proposed for Unit 1.

On January 16, 1980, the NRC approved the use of the mass plot method of data analysis with the following restraints:

1) Acceptance criteria of 0.75 La (L_{tm}/L_{pm}) which must be met, including 95% UCL.

2) Mass plot test methodology used on reduced pressure test.

3) Test duration of 24 hrs. is mandatory.

This change of data analysis required the approval of the commission per Appendix J, section III.A.3(a) "....The method chosen for the initial test shall normally be used for the periodic tests."

Exception 2 - Failure to Comply with Appendix J, Section III.A.i(d)

On November 30, 1976, a request for revisions to the Oconee Nuclear Station Technical Specifications concerning containment leakage testing in compliance with 10CFR50, Appendix J was submitted to the USNRC/ONRR. This letter requested exemptions from 10CFR50, Appendix J for each of the penetrations that were challenged by the NRC inspectors. These relief requests have not been acted upon to date by the NRC. The following table lists each penetration challenged, and where applicable, the reason it was not drained and vented. This failure to drain and vent is contrary to Appendix J section III.A.1(d).

TABLE 2.2-1

Penetration #1 Pressurizer Sample Line

The pressurizer was not drained low enough to expose RC-6 to containment atmosphere for volume control of RCS during ILRT. Pressurizer steam space was not vented to the containment atmosphere during the test, but the RCS was vented through high point vents. This will be corrected in the procedure.

Penetration #39 High Pressure Nitrogen Header to "B" CFT

This line was not isolated from the supply header during the ILRT. This could be accomplished by closing N-137, opening N-111 and gaging open the N_2 Heater relief valve. Core flood tanks (CFT) were vented but not drained. This will be corrected in the procedure.

Penetration #41 Instrument Air Header

This line is used during the test for H.P. samples of containment atmosphere and imposing the known leak for the verification test. Because of this, the inside isolation valve remains open during the test. This will be vented outside through the rotometer during the test.

Penetration #45 LRT Pressure Impulse Line

This line is used for pressure instrumentation during the ILRT. Test connections do not exist, and an exemption was requested from local leak testing. These valves must remain open during the test.

Penetration #46 Reactor Head Wash System

This line was not drained or vented for ILRT. It could be drained and vented, but this would isolate Unit 2 and 3 head wash systems, Unit 1&2 Spent Fuel Pool Decon Chamber, and the Unit 3 Spent Fuel Pool Decon Chamber. Since these systems are not often in use, this would have little impact on the unit's operation and no safety impact. This will be corrected in the procedure.

Penetration #47 RCP Seal Vents

This line was not drained and vented during the ILRT. This could be isolated by closing DW-152 and vented by opening DW-154. This will be corrected in the procedure.

Penetration #48 Breathing Air Header

This system is common in all three units, without the capability to isolate unit one or two from the header. This system must be in service for personnel safety during the operation of the other units and would need to be modified to comply with Appendix J, III.A.1(d). It was not depressurized during the test for this reason.

TABLE 2.2-1

Penetration #49 Low Pressure Nitrogen Supply

This line was not isolated from the supply header during the ILRT. This could be done by closing N-110, opening N-105 and gaging open th N_2 Heater Relief valve. This will be corrected in the procedure.

Penetration #53 High Pressure Nitrogen Header to "A" CFT

This line was not isolated from the header during the ILRT. It is joined to the "B" CFT supply downstream of the N_2 Heater, so the corrective action described for penetration #39 will also bring this penetration into compliance with Appendix J, section III.A.1(d).

Penetration #55 Demineralized Water Supply

This line was not drained and vented during the ILRT. There was no isolation valve between the header, common to all three units, and Unit 1 prior to the CILRT. Without an isolation valve, draining and venting this line would have isolated Units 2 and 3 as well as Unit 1. This would have prevented the other units from mixing caustic, lithium hydroxide, or boric acid. It would have also prevented the other units from transferring concentrated boric acid by removing the capability to flush the lines with demin water. This would have compromised the safe operation of Units 2 and 3, and is exempted, therefore, by section III.A.1(d) of 10CFR50, Appendix J. Since the modification to piping has now been installed, and already exists on Units 2 and 3, this deficiency has been corrected, and the valve lineup in the procedure will reflect it.

Penetration #56 Spent Fuel Transfer Canal Fill and Drain

This line was not drained and vented during the ILRT. Draining and venting this line would isolate the SFP demineralizer and filter, but the pool could still be cooled in the recirculation mode. This will be corrected in the procedure.

Penetration #59 Core Flood Tank Sample Line

This line was not drained and vented during the ILRT. Since the core flood tanks were not drained for the test, these lines were water filled to the inside isolation valves. The tanks will be drained on future tests, and the outside isolation valves will be vented to the atmosphere of the sample sink. This will be corrected in the procedure.

Penetrations #60 and 61 R. B. Radiation Monitor

These penetrations are for the purge sample RIA and were not vented during the ILRT. They were type "C" tested prior to the ILRT. This will be corrected in the procedure.

2.3 Supplement Type "C" Leak Rate Tests

Supplemental Type "C" Leak Rate Tests were performed on penetrations 39, 45, 46, 47, 48, 49, 53, 55, 56 and 59. Listed below, by penetration, is the test as performed and the additional leakage measured. Unless otherwise noted, the results were arrived at by a volumetric measurement of make-up flow at 60 psig to the penetration, in standard cubic centimeters per minute. The results reported are corrected to weight percent per day (wt.%/day) of the containment atmosphere post-accident mass. The addition of these leakages to the measured total does not exceed the acceptance criteria for either the ILRT or for the local leak test of mechanical containment penetrations.

Penetration #39

This was tested for in-leakage together with penetration #53, since they cannot be tested separately. In order to pressurize the penetration, the CFTs also had to be pressurized. After the in-leakage was measured, the penetration was depressurized and re-isolated. The resulting pressure buildup was used to determine the leakage through the inside isolation valves, CF-8 and CF-10. No credit was taken for the outside isolation valves in this test.

Penetration #45

This penetration was tested in the reverse direction since test taps do not exist to test in the proper direction. The ILRT pressure instrumentation was removed, and the test rig attached at that point.

Penetration #46

Penetration #46 was tested from inside the building between the isolation valves. Since these are diaphram valves, the measured leakage is as conservative measured in the reverse direction. The test tap isolation valve was leaking, and the volumetric test rig could not maintain 60 psig. This penetration was then tested by the pressure decay method, repaired and retested. Only the pressure decay leak rate was added to the CILRT leakage, however the post-maintenance leakage is also reported.

Penetration #47

This penetration was tested from inside the building. Since both valves are check valves, and there is not a test tap between them, this penetration was tested as a unit.

Penetration #48

This penetration was tested from inside the building, with each valve being tested individually. Since the breathing air system

was depressurized and vented during part of the ILRT and the leak rate showed no indication of in-leakage through it, it was not tested in the reverse direction for in-leakage.

Penetration #49

This penetration was tested from inside the building between the isolation valves. It was also tested, by pressure decay method, from outside the building in the reverse direction for in-leakage.

Penetration #53

See testing of penetration #39; these two penetrations were tested together.

Penetration #55

This penetration was tested from inside the building with each valve tested individually.

Penetration #56

This penetration was tested from inside the building between the isolation valves.

Penetration #59

This penetration was hydrostatically tested per the agreement between NRC/RII and Duke Power. Since these valves are subjected to ten times the test pressure under normal operating conditions, and no leakage is normally seen, no leakage was expected; none was seen.

Leakage Summation and Total

Penetrations #39 and 53 (In-leakage)	6.04×10^{-4} wt.%/day
Penetration #39 (out-leakage)	1.0346×10^{-2} wt.%/day
Penetration #53 (out-leakage)	6.754×10^{-3} wt.%/day
Penetration #45 (LRT-25)	6.77×10^{-4} wt.%/day
Penetration #45 (LRT-24)	6.59×10^{-4} wt.%/day
Penetration #46 (both valves, prior to repair)	6.147×10^{-3} wt.%/day
Penetration #47 (both valves)	1.96×10^{-4} wt.%/day
Penetration #48 (BA-5)	8.85×10^{-5} wt.%/day
Penetration #48 (BA-33)	3.892×10^{-4} wt.%/day
Penetration #49 (N-119)	6.168×10^{-4} wt.%/day
Penetration #49 (N-106, N-107)	2.60×10^{-4} wt.%/day
Penetration #49 (In-leakage)	1.667×10^{-3} wt.%/day
Penetration #53 (DW-60)	4.514×10^{-4} wt.%/day
Penetration #53 (DW-59)	6.002×10^{-4} wt.%/day
Penetration #56 (both valves)	5.116×10^{-4} wt.%/day
Penetration #59 (hydro)	0 wt.%/day
Total	0.029967 wt.%/day

Penetration #46 (post-maintenance)........... 7.12×10^{-4} wt.%/day

Note on test conservatism

Each of these local penetration tests was performed at ~60 psig, twice the ILRT test pressure. This would tend to show more leakage than had they been tested at P_t or in conjunction with the ILRT. Further, with the exception of penetration #47, each penetration's isolation valves were tested individually (or together, such that the leakage through both valves is measured) and the measured leakage through both valves is added into the total. Had these valves been tested in conjunction with the ILRT only the lower of these two leakages could possibly be seen. Also, in keeping with this conservatism, on penetrations 39 and 53, since no practical method existed to test out-leakage through the outside isolation valves, no credit was taken for them, and the leakage through the inside isolation (check) valves was reported as the total penetration out-leakage, which also would not be the case had these penetrations been tested in conjunction with the ILRT.

On penetrations 39, 49 and 53, both in and out-leakage was measured and added to the total. This is reasonable to expect since any in-leakage during the test would mask or nullify an equal amount of out-leakage. However, it should be noted that during the ILRT the building atmosphere was at 30 psig, and during the supplemental type "C" tests, it was at 0 psig. This difference in ΔP across the valve is in keeping with the conservatism of the supplemental tests.

2.4 Test Results

Tabulated below are the leak rates measured for the test and the total leak rate when the supplemental type "C" results are added to the CILRT leak rate. As can be seen, the acceptance criteria was met in both cases. 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
29.5 psig	.0581	.0775	.0205	.0222

Test 95% UCL 0.0222
Supplemental Type "C" Tests...................0.029967
Pen. 1, 60, 61...................................0.000000162
Total Leakage 0.052167162

The verification test consisted of imposing a known leak rate on the containment at the end of the CILRT. Results from this supplemental test are acceptable provided the difference between the supplemental test data and the type test data is within 25% of L_t.

Test leak rate 0.0205
Imposed leak rate..............................0.0775

Total 0.0980
Verification leak rate (measured)............0.0995

Difference 0.0015
percent of L_t 1.93%

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

2.5 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 ANS-N274, work group 56.8, revision 3, Nov., 1978.

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 sytematic 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 independently 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. Any other error associated with the measurement is due to random error.

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 than the reported value. For this reason, the upper boundry (limit) to the 95% confidence interval is of significance to the test results and is included in the report.

C) Inclusion of Bad Data Points in the Calculations

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.

D) Analysis Conclusions

The information above, on each type of error, demonstrates that if the 95% upper confidence limit is less than 75% L_t 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.

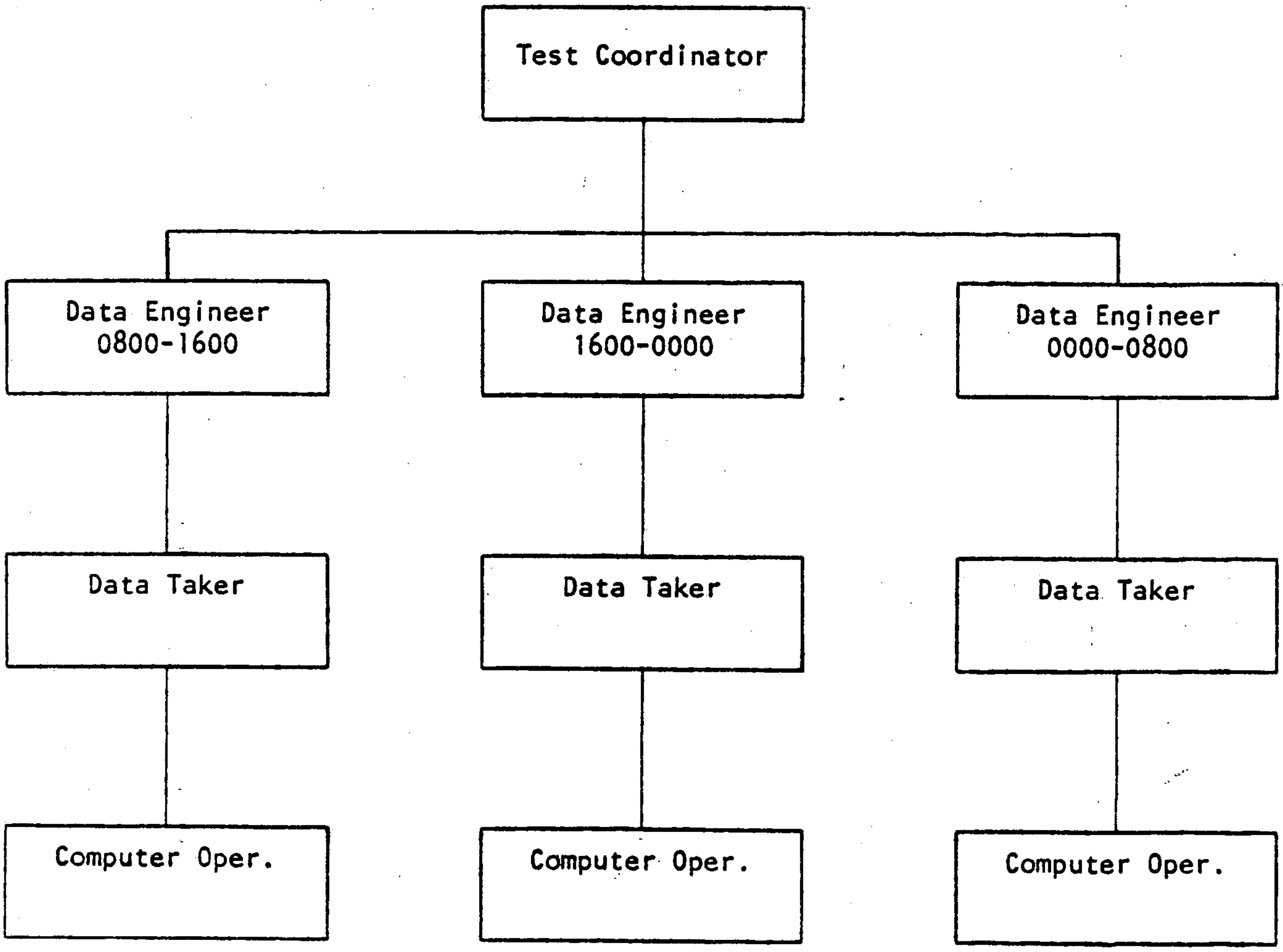
2.6 Test Organization

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

A.	Test Co-ordinator responsible for all ILRT activities -	B. G. Davenport
B.	Data Engineers (one per shift) responsible for testing activities on their assigned shifts -	W. G. Neuman R. P. Todd J. W. Collier
C.	Data Takers (one per shirt) responsible for reading and recording data -	M. A. Pruitt M. G. Beck T. W. Pellisero
D.	Computer Operators (one per shift) -	H. C. Thompson L. J. Stoddard L. M. Rehwalt
E.	Support Engineer (technical support-engineer from System Results Group, Duke Power)	J. E. Snyder
F.	Operators (normal shift)	

Figure 2.6-1

OCONEE ILRT ORGANIZATION



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 conrete 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 1/4 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 Texas 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 Leeds and Northrup Numatron digital readout device. Each RTD was assumed to be representative of a fraction of the total containment volume.

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

Air sampes for the two (2) dewpoint sensors came from two (2) of the auxiliary fans which continually circulated air in the Reactor Building during the leak rate test. 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.

3.2.1 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 3.2-6.

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.

3.3 Pressurization System

Reactor Building pressurization was accomplished by two (2) electric motor driven air compressors operating in parallel. These compressors, purchased for pressurization of the Oconee Reactor Building, also include aftercoolers as integral equipment. The discharge from the compressors passes through a single 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.

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.

C. One (1) Hankison (Model H-15) refreigerator type air dryer with inertial impingement separator, and a capacity of 3750 SCFM (100^{o}F Sat. inlet) @ 100 psig.

Three valves, 1LRT-15, 1LRT-16, and 1LRT-17 are used to control pressurization and depressurization 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.

3.4 Recirculation System

The Reactor Building Air Recirculation System consists of four (4) auxiliary fans and three (3) Reactor Building cooling fans. The auxiliary fans take suction through ducts in the upper region of the Reactor Building and circulate it downward. The Reactor Building cooling fans take air from midheight in the Reactor Building and exhaust it through duct work down to the lower levels of the Reactor Building.

3.5 Computer Programs

The containment integrated leak rate test specified that the test would utilize the plant computer program in data analysis. However, that program calculates the point-to-point and total time method leak rates and not the mass-plot leak rate. For that reason, a temporary change was made to the procedure to use off-line computer programs instead of the plant computer program.

The off-line programs were written for and run on the G. E. Terminet time sharing system. Two programs 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 ONSILRT 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 ^{o}F

b) 2 Dewpoint temperature in ^{o}F

c) absolute pressure in psia

3.5.1.3 Calculations

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

a) Corrected 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, loaded as part of the program.

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) Average the two values.

c) From the dewpoint temperature (Saturation Temperature), the vapor pressure (Saturation Pressure) is determined from the steam tables. The tables are available from the Terminet as a library program.

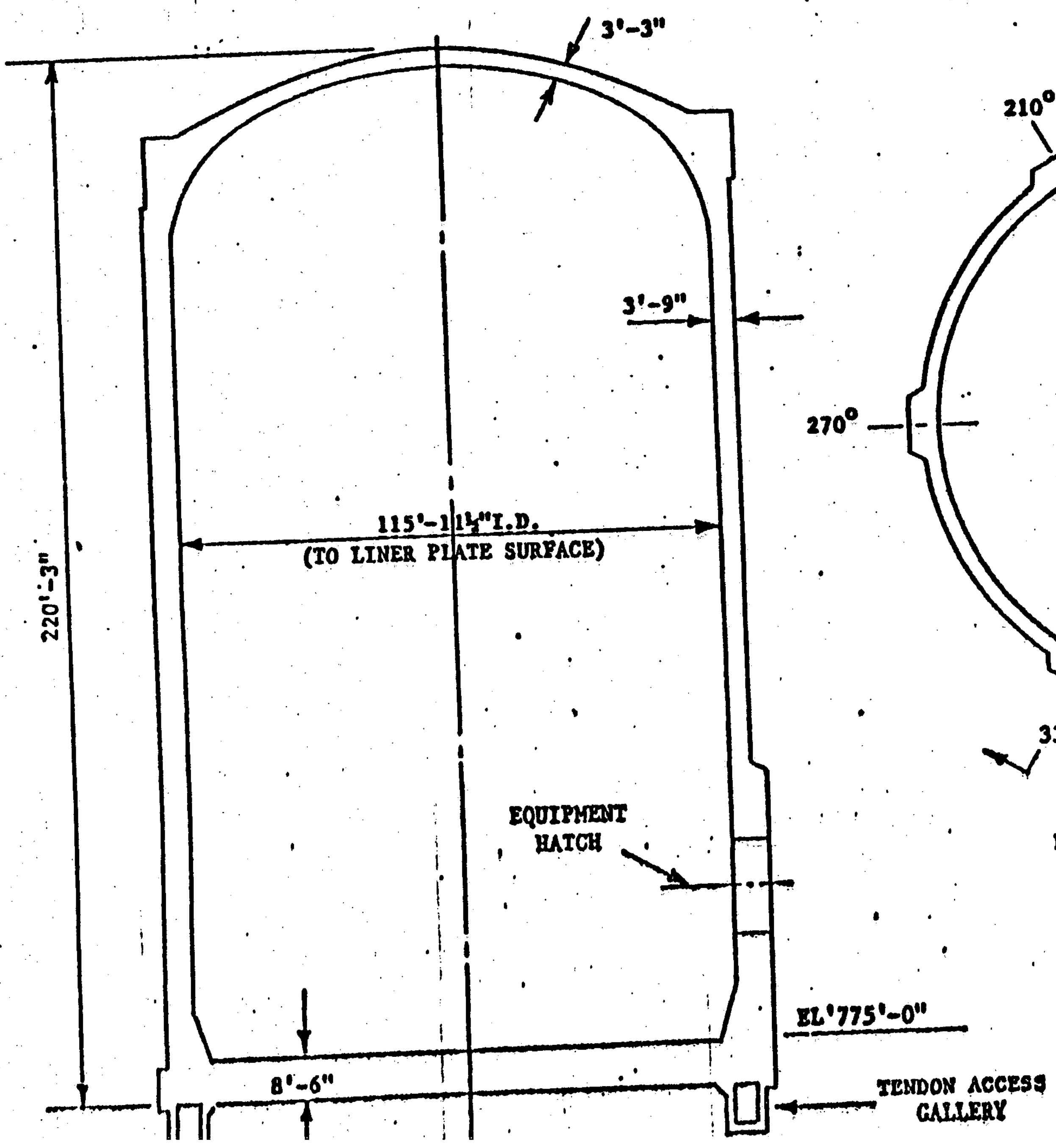
3.5.1.6 Pressure

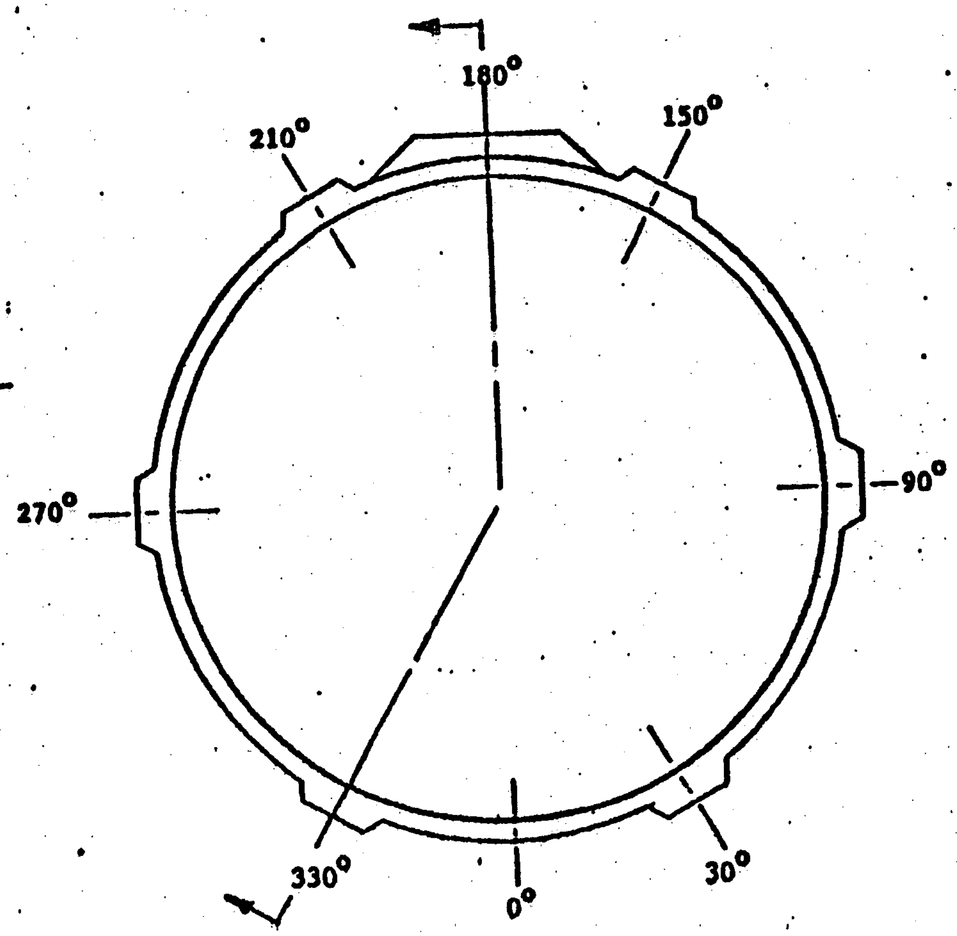
a) Subtract vapor pressure from input absolute pressure.

3.5.2 CILRT Program

This program will calculate the leak rate and 95% UCL from the input data, corrected pressure and temperature, based on the mass-plot method. It includes two output options, either the leak rate calculated from the designated start/stop points or a table of the leak rate and 95% UCL for each data point. The calculations are based on the formulas in Appendix B to ANS N274, work group 56.8, revision 3 - Nov. 15, 1978. As this work is readily available, it is not duplicated here.

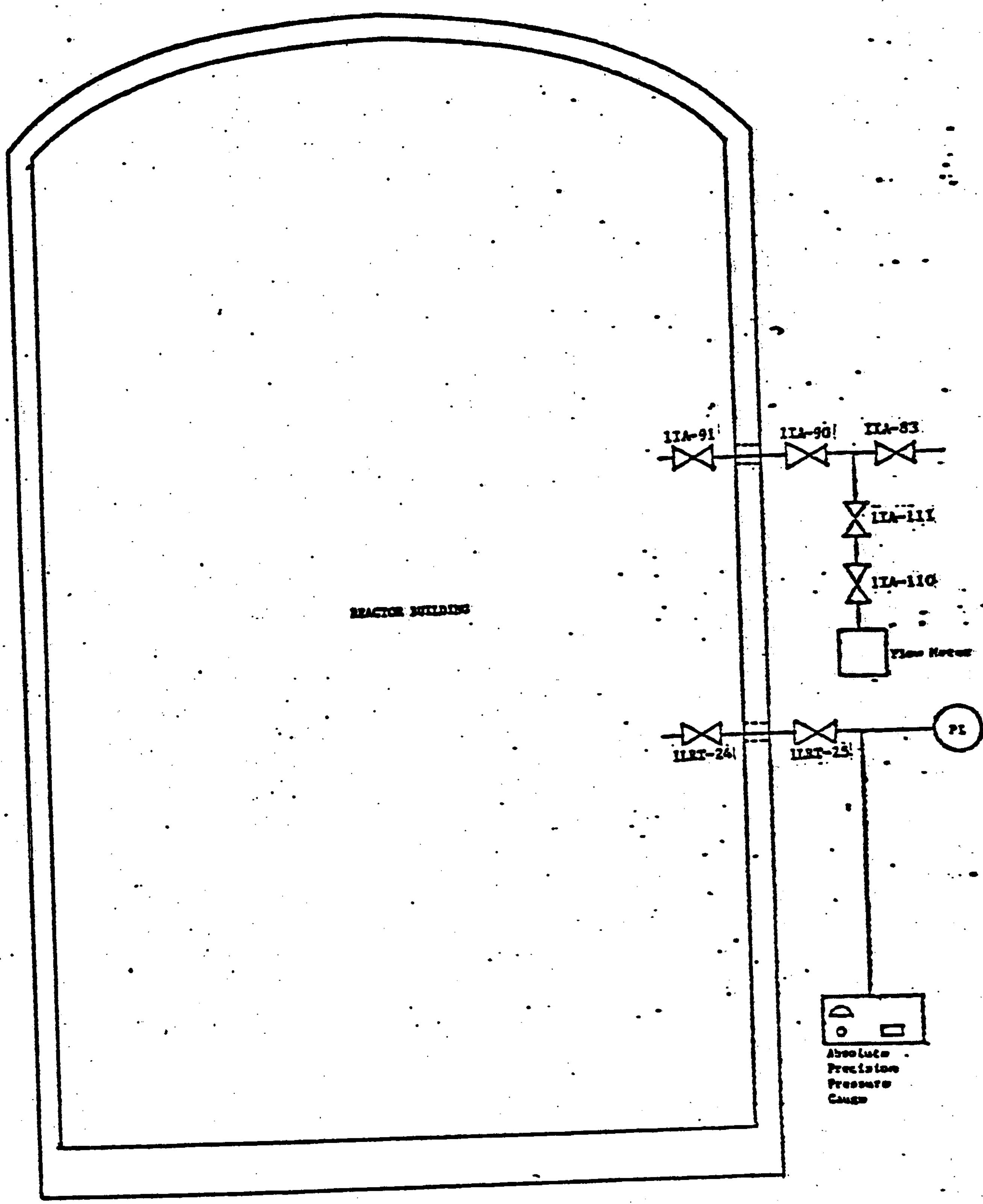
REACTOR BUILDING



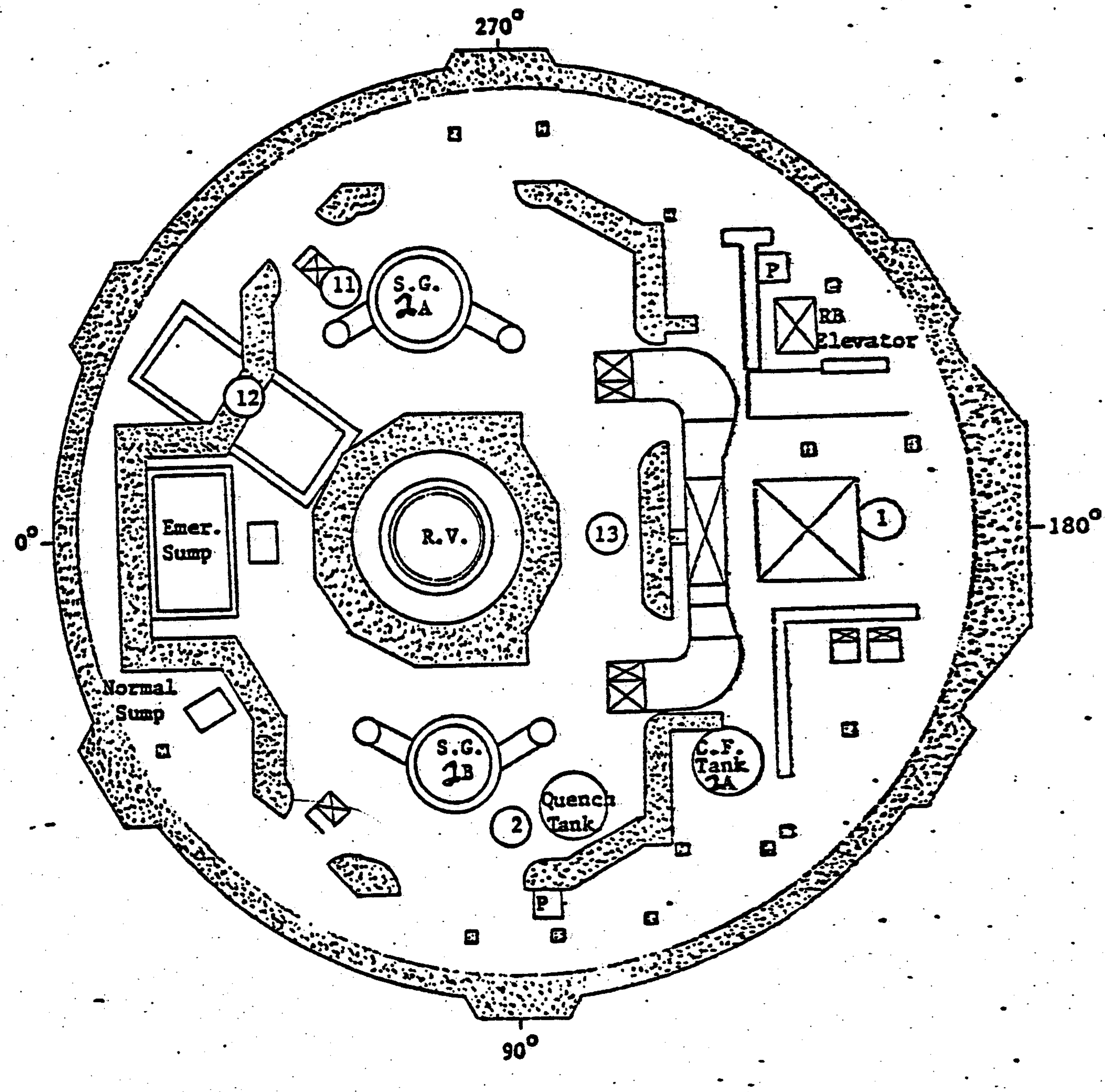


HORIZONTAL SECTION THROUGH REACTOR BUILDING

LEAK RATE MEASUREMENT SYSTEM



REACTOR BUILDING
BASEMENT FLOOR
ELEVATION 787'



REACTOR BUILDING

INTERMEDIATE FLOOR

ELEVATION 830'

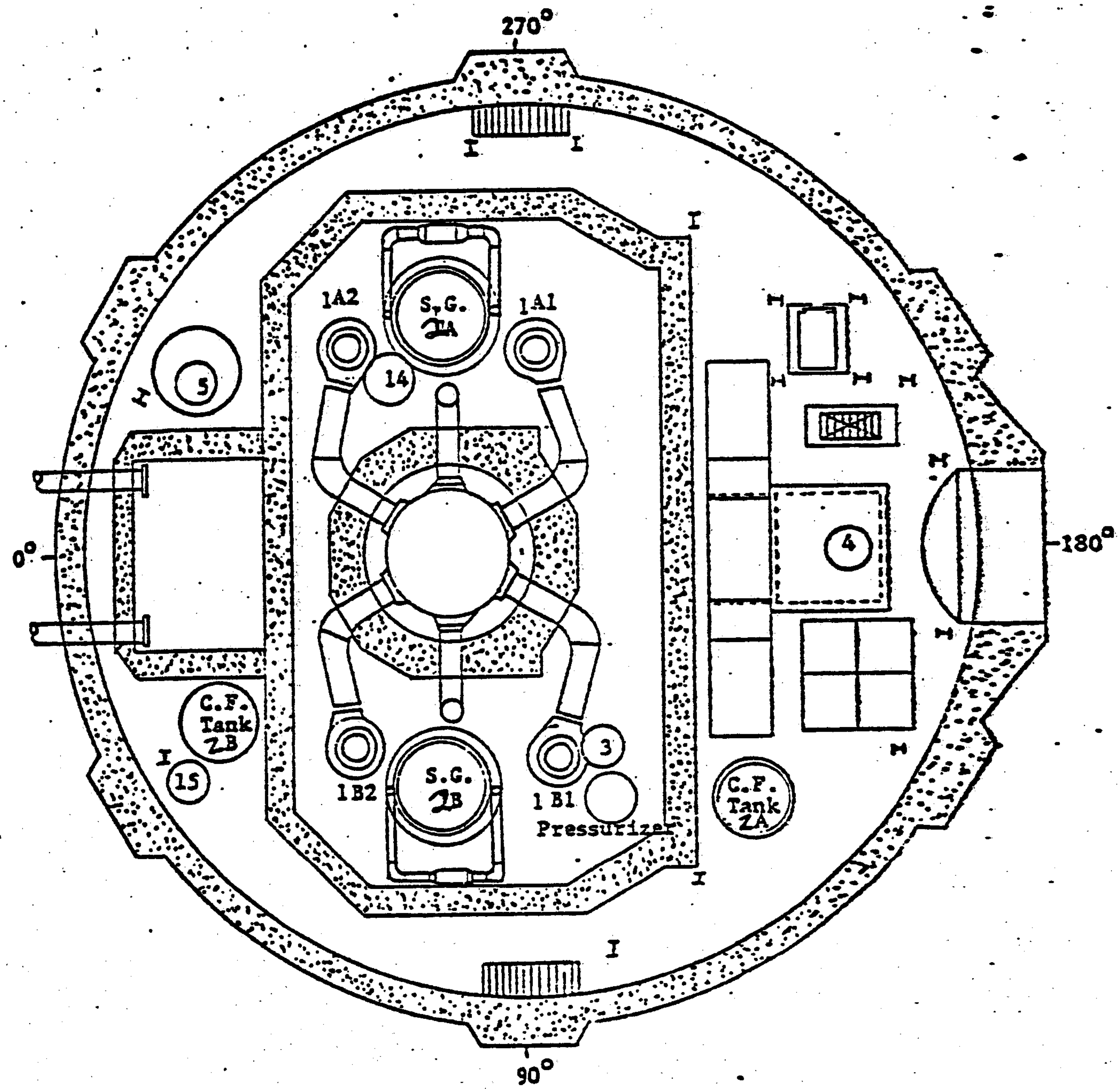


Figure 3.2-3

REACTOR BUILDING
OPERATING FLOOR
ELEVATION 850'

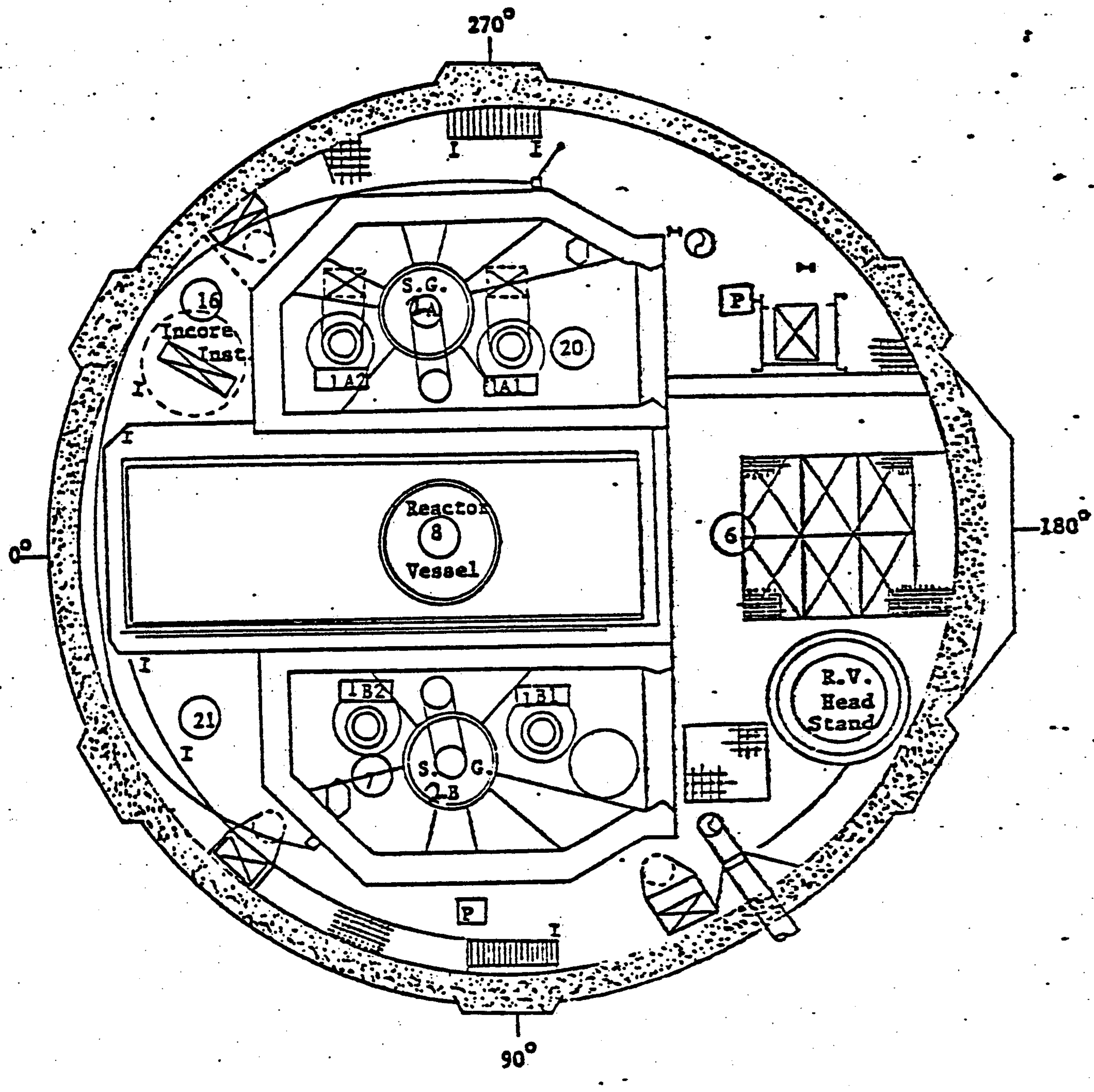


Figure 3.2-4

REACTOR BUILDING

SHIELDING FLOOR

ELEVATION 866'

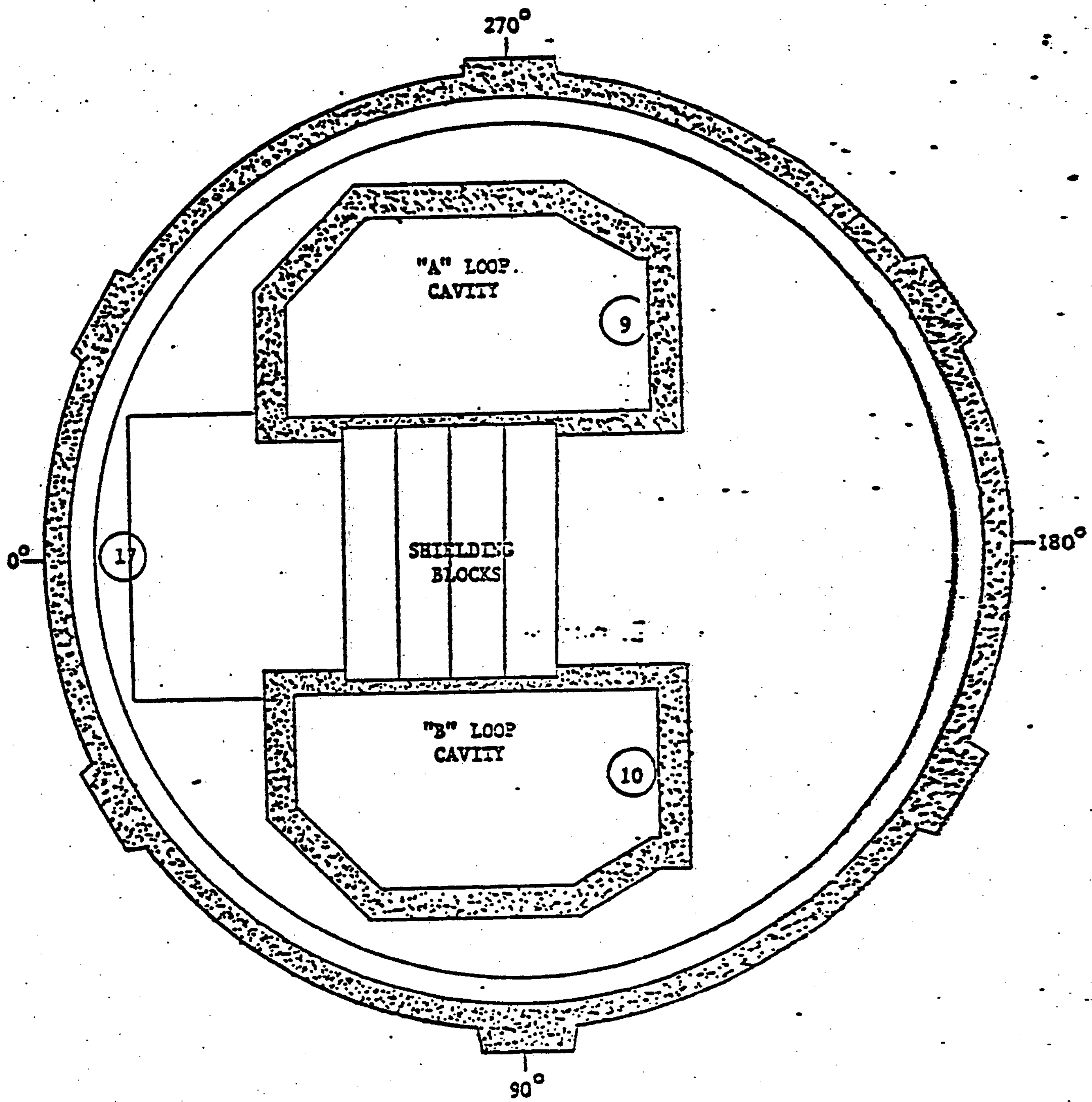


Figure 3.2-5

REACTOR BUILDING PRESSURIZATION SYSTEM

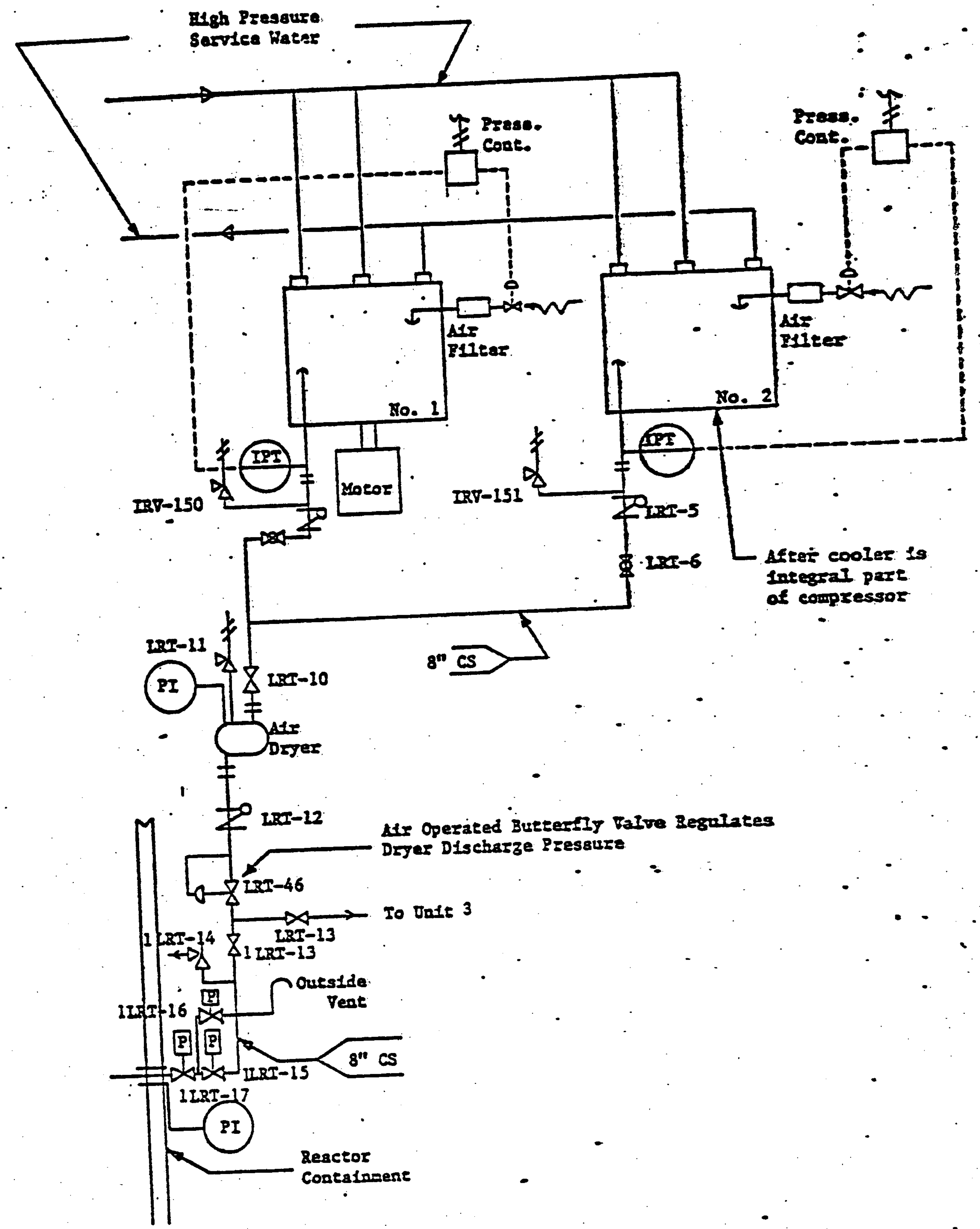


TABLE 3.2-1

INSTRUMENT SPECIFICATIONS

Pressure Digital Readout

Serial No.	10132 2646
Mfg.	Texas Instrument
Model	145
Type	Precision pressure gauge
Range	0-100 psia or 100,000 counts full scale
Stability	± .001 psi
Repeatability	± .0005 psi
Resolution	± .001 psi
Accuracy	± .015% of reading

Pressure Gauge

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

Temperature Elements

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

Temperature Indications for Temperature Elements

Mfg.	Leeds & Northrup
Model	245 Numatron
Range	0-150 ^{o}F
Reproductivity	± .07 ^{o}F from 60 ^{o}F to 120 ^{o}F
Accuracy	± .12 from 60 ^{o}F to 120 ^{o}F and ± .48 Below 60 ^{o}F

Dewpoint Temperature

Mfg.	Cambridge
Model	992-C1
Range	-100 ^{o}F to +200 ^{o}F
Accuracy	± 0.5 ^{o}F
Serial No.	332 and 333

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
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	1.00

Dewpoint Sensors Volume Fraction

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

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 shows that the total penetration leakage rate was approximately 14 percent of the allowable.

4.1.1 Test Method

All electrical and mechanical penetration, including locks and hatches, were tested by pressurizing ~59 psig. 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 by the mass difference method.

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 .125% of the Reactor Building atmosphere in 24 hours. The total measured leak rate from all penetrations prior to this test was .018% 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 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	09/21/78	2.593×10^{-6}
	11/21/78	3.026×10^{-6}
	01/24/80	5.111×10^{-6}
Equipment Hatch	12/09/77	6.08×10^{-7}
	05/17/78	7.96×10^{-7}
	10/13/78	1.577×10^{-7}
	11/15/78	1.577×10^{-7}
	01/24/80	2.536×10^{-6}
Personnel Hatch	01/19/78	0
	06/06/78	8.959×10^{-4}
	10/31/78	1.774×10^{-3}
	01/09/79	0
	05/08/79	1.042×10^{-3}
	09/28/79	2.859×10^{-4}
	01/24/80	2.859×10^{-4}
Emergency Hatch	07/28/77	1.101×10^{-3}
	10/02/77	1.101×10^{-3}
	12/09/77	5.562×10^{-3}
	03/22/78	7.685×10^{-4}
	07/20/78	7.540×10^{-6}
	03/15/79	4.775×10^{-4}
	07/13/79	9.537×10^{-4}
	11/14/79	7.531×10^{-4}
	1/24/80	1.209×10^{-3}

TABLE 4.1-2

TYPE "C" TESTS

PENETRATION	DATE	WT%/DAY LEAKAGE
Mechanical Penetrations	10/27/77	$1.013x10^{-2}$
	05/02/78	$1.035x10^{-2}$
	10/30/78	$1.446x10^{-2}$
	01/24/80	$1.661x10^{-2}$

TABLE 4.2

LOCAL TEST FAILURE DATA

ITEM	DATE	REASON FOR FAILURE	CORRECTIVE ACTION
PR-1	09/03/77	Leaking past seat	Adjusted seat
CC-8	08/30/77	Leaking past seat	Adjust stroke, changed valve seat
PR-1	10/06/78	Leaking past seat	Adjusted seat
PR-2	10/06/78	Leaking past seat	Adjusted seat
CC-8	09/19/78	Leaking past seat	Adjust stroke
LPSW-15	09/21/78	Leaking past seat	Lapped seat, installed new disk
HP-120	01/19/80	Leaking past seat and packing	Adjust packing, clean seat
PR-1	01/17/80	Leaking past seat	Install new seat and adjust it
LPSW-7	12/04/79	Leaking past seat	Lapped seat and gate
LPSW-11	12/04/79	Leaking past seat and drain valve	Lapped seat and gate adjust drain valve seat
LPSW-8	12/06/79	Leaking past seat	Cleaned gate, seat
LPSW-10	12/06/79	Leaking past seat	Cleaned gate, seat
LPSW-12	12/06/79	Leaking past seat	Cleaned gate, seat
LPSW-14	12/06/79	Leaking past seat	Cleaned gate, seat
LPSW-15	12/06/79	Leaking past seat	Ground seat, gate
CC-8	12/12/79	Leaking past seat	Milled gate

DATA SET	TIME HRS.	PRESSURE	TEMP.	BUILDING TOT.MASS	TEST NORM.MASS.	• TEST LK RATE	[illegible] RATE
29	0.	43.8854	64.557	431661.7	1.000000	0.	0.
30	0.25	43.8857	64.536	431681.9	1.000047	-0.4500	0.
31	0.50	43.8853	64.565	431654.1	0.999982	0.0844	0.0844
32	0.75	43.8854	64.566	431654.3	0.999983	0.1114	0.1114
33	1.00	43.8863	64.562	431666.4	1.000011	0.0406	0.1717
34	1.25	43.8855	64.559	431661.0	0.999998	0.0317	0.1087
35	1.50	43.8854	64.565	431655.1	0.999985	0.0392	0.0906
36	1.75	43.8854	64.576	431646.1	0.999964	0.0559	0.0944
37	2.00	43.8846	64.567	431645.6	0.999963	0.0606	0.0899
38	2.25	43.8847	64.576	431639.2	0.999948	0.0675	0.0909
39	2.50	43.8848	64.585	431632.7	0.999933	0.0747	0.0941
40	2.75	43.8845	64.595	431621.6	0.999907	0.0856	0.1030
41	3.00	43.8846	64.595	431622.6	0.999909	0.0885	0.1033
42	3.25	43.8846	64.593	431624.2	0.999913	0.0868	0.0995
43	3.50	43.8844	64.607	431610.7	0.999882	0.0911	0.1023
44	3.75	43.8843	64.612	431605.6	0.999870	0.0944	0.1045
45	4.00	43.8847	64.604	431616.1	0.999894	0.0903	0.0996
46	4.25	43.8849	64.599	431622.2	0.999908	0.0834	0.0927
47	4.50	43.8846	64.607	431612.7	0.999886	0.0805	0.0890
48	4.75	43.8844	64.595	431620.6	0.999905	0.0748	0.0832
49	5.00	43.8845	64.602	431615.8	0.999894	0.0709	0.0790
50	5.25	43.8845	64.606	431612.5	0.999886	0.0681	0.0756
51	5.50	43.8846	64.605	431614.3	0.999890	0.0647	0.0719
52	5.75	43.8847	64.601	431618.6	0.999900	0.0605	0.0677
53	6.00	43.8846	64.599	431619.3	0.999902	0.0566	0.0636
54	6.25	43.8836	64.594	431613.5	0.999888	0.0540	0.0608
55	6.50	43.8834	64.599	431607.5	0.999874	0.0527	0.0590
56	6.75	43.8836	64.606	431603.7	0.999866	0.0519	0.0578
57	7.00	43.8836	64.604	431605.3	0.999869	0.0506	0.0562
58	7.25	43.8837	64.602	431607.9	0.999875	0.0488	0.0542
59	7.50	43.8838	64.593	431616.3	0.999895	0.0460	0.0513
60	7.75	43.8838	64.600	431610.6	0.999882	0.0441	0.0492
61	8.00	43.8838	64.585	431622.9	0.999910	0.0408	0.0461
62	8.25	43.8837	64.602	431607.9	0.999875	0.0396	0.0446
63	8.50	43.8838	64.609	431603.2	0.999864	0.0388	0.0437
64	8.75	43.8838	64.618	431595.7	0.999847	0.0388	0.0434
65	9.00	43.8836	64.605	431604.5	0.999867	0.0377	0.0421
66	9.25	43.8826	64.622	431580.7	0.999812	0.0389	0.0431
67	9.50	43.8828	64.618	431585.9	0.999824	0.0392	0.0433
68	9.75	43.8828	64.604	431597.4	0.999851	0.0384	0.0423
69	10.00	43.8825	64.624	431578.0	0.999806	0.0391	0.0429
70	10.25	43.8825	64.632	431571.4	0.999791	0.0401	0.0437
71	10.50	43.8830	64.637	431572.2	0.999793	0.0407	0.0442
72	10.75	43.8829	64.632	431575.4	0.999800	0.0410	0.0443
73	11.00	43.8827	64.632	431573.4	0.999795	0.0412	0.0444
74	11.25	43.8830	64.621	431585.4	0.999823	0.0405	0.0436
75	11.50	43.8826	64.621	431581.5	0.999814	0.0400	0.0430
76	11.75	43.8821	64.622	431575.7	0.999801	0.0398	0.0427
77	12.00	43.8820	64.623	431573.9	0.999797	0.0397	0.0425
78	12.25	43.8827	64.623	431580.8	0.999813	0.0391	0.0418
79	12.50	43.8826	64.631	431573.2	0.999795	0.0388	0.0415
80	12.75	43.8825	64.631	431572.3	0.999793	0.0386	0.0411
81	13.00	43.8824	64.627	431574.6	0.999798	0.0382	0.0406
82	13.25	43.8823	64.638	431564.5	0.999775	0.0382	0.0406
83	13.50	43.8823	64.639	431563.7	0.999773	0.0382	0.0404
84	13.75	43.8826	64.648	431559.2	0.999763	0.0383	0.0405
85	14.00	43.8822	64.639	431562.7	0.999771	0.0381	0.0403
86	14.25	43.8823	64.646	431557.9	0.999760	0.0381	0.0402
87	14.50	43.8831	64.645	431566.6	0.999780	0.0377	0.0398
88	14.75	43.8839	64.648	431572.0	0.999792	0.0371	0.0391
89	15.00	43.8839	64.648	431572.0	0.999792	0.0365	0.0385
90	15.25	43.8832	64.645	431567.6	0.999782	0.0360	0.0380
91	15.50	43.8832	64.638	431573.4	0.999795	0.0354	0.0373
92	15.75	43.8831	64.647	431565.0	0.999776	0.0350	0.0369
93	16.00	43.8829	64.649	431561.4	0.999768	0.0347	0.0366
94	16.25	43.8839	64.641	431577.8	0.999806	0.0339	0.0358
95	16.50	43.8840	64.651	431570.5	0.999789	0.0333	0.0352
96	16.75	43.8837	64.649	431569.2	0.999786	0.0328	0.0347
97	17.00	43.8847	64.652	431576.6	0.999803	0.0321	0.0340
98	17.25	43.8846	64.650	431577.3	0.999804	0.0314	0.0333
99	17.50	43.8846	64.654	431574.0	0.999797	0.0308	0.0327
100	17.75	43.8847	64.661	431569.2	0.999786	0.0303	0.0322
101	18.00	43.8845	64.622	431599.3	0.999856	0.0291	0.0311
102	18.25	43.8856	64.667	431573.1	0.999795	0.0285	0.0306
103	18.50	43.8876	64.652	431605.1	0.999869	0.0273	0.0295
104	18.75	43.8864	64.662	431585.1	0.999823	0.0265	0.0287
105	19.00	43.8868	64.664	431587.4	0.999828	0.0258	0.0280
106	19.25	43.8875	64.671	431588.5	0.999830	0.0250	0.0273
107	19.50	43.8874	64.664	431593.3	0.999842	0.0242	0.0265
108	19.75	43.8877	64.677	431585.5	0.999824	0.0236	0.0258
109	20.00	43.8874	64.674	431585.1	0.999822	0.0230	0.0253
110	20.25	43.8875	64.677	431583.6	0.999819	0.0225	0.0247
111	20.50	43.8858	64.682	431562.7	0.999771	0.0224	0.0245
112	20.75	43.8875	64.680	431581.1	0.999813	0.0219	0.0240
113	21.00	43.8856	64.683	431559.9	0.999764	0.0218	0.0239
114	21.25	43.8875	64.691	431572.0	0.999792	0.0215	0.0236
115	21.50	43.8873	64.693	431568.4	0.999784	0.0213	0.0233
116	21.75	43.8882	64.694	431576.5	0.999803	0.0209	0.0229
117	22.00	43.8881	64.713	431559.8	0.999764	0.0208	0.0228
118	22.25	43.8877	64.722	431548.5	0.999738	0.0209	0.0228
119	22.50	43.8877	64.716	431553.4	0.999749	0.0209	0.0228
120	22.75	43.8879	64.719	431552.9	0.999748	0.0209	0.0227
121	23.00	43.8879	64.709	431561.2	0.999767	0.0207	0.0225
122	23.25	43.8879	64.719	431552.9	0.999748	0.0207	0.0225
123	23.50	43.8879	64.718	431553.8	0.999750	0.0206	0.0224
124	23.75	43.8879	64.718	431553.8	0.999750	0.0206	0.0223
125	24.00	43.8877	64.718	431551.8	0.999745	0.0205	0.0222

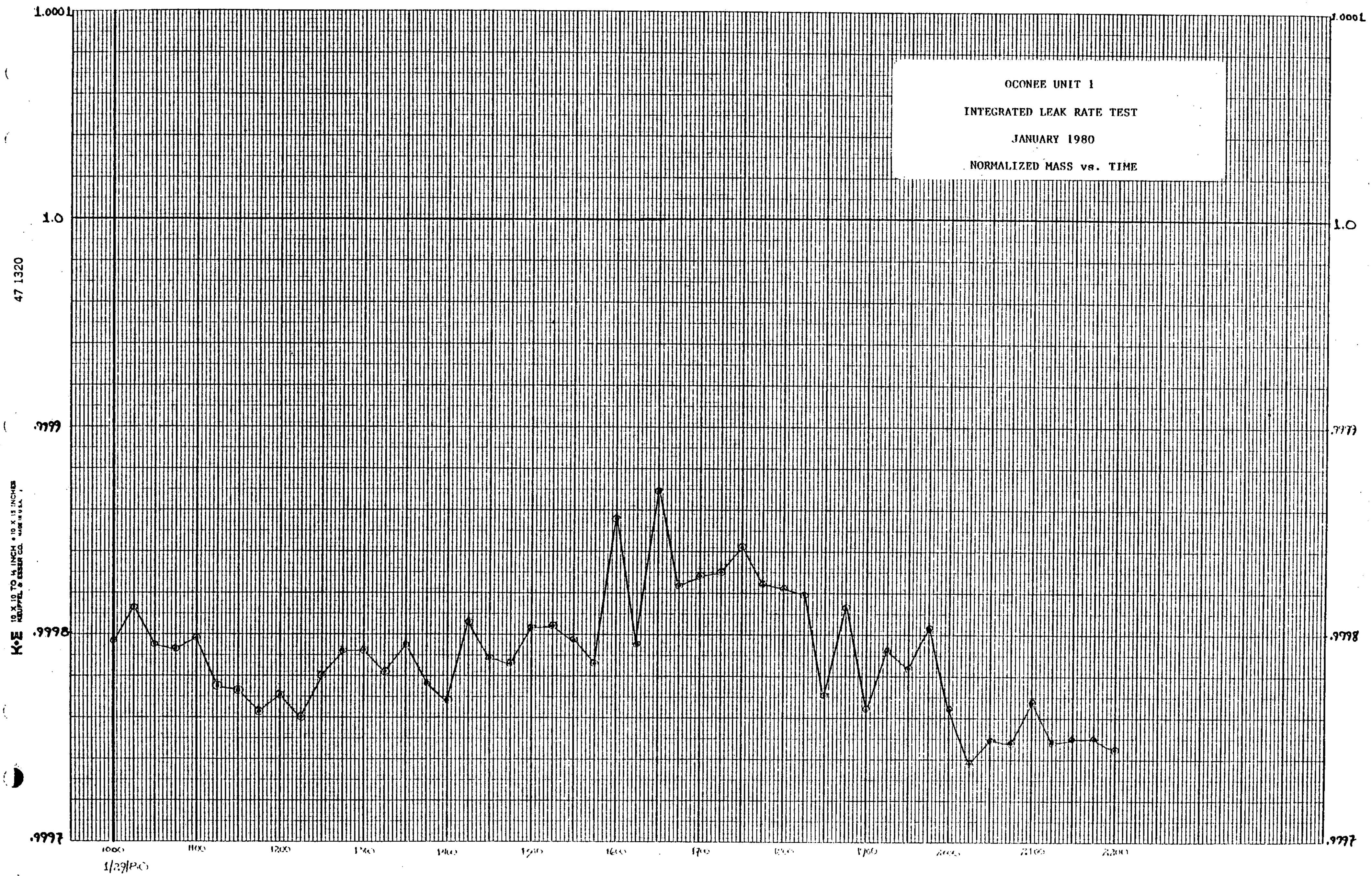
OCONEE UNIT 1 ILRT 1979

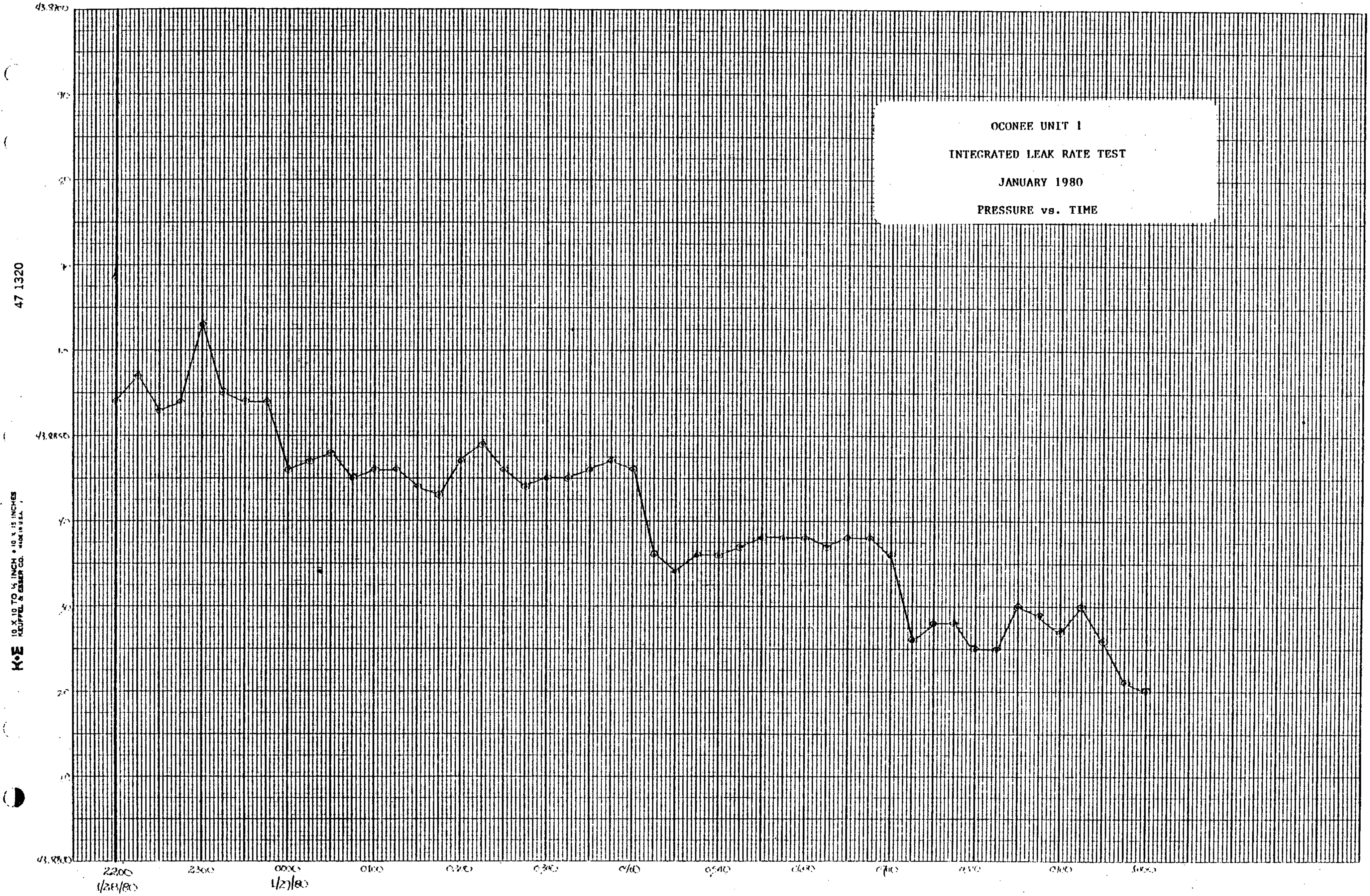
Verification Test

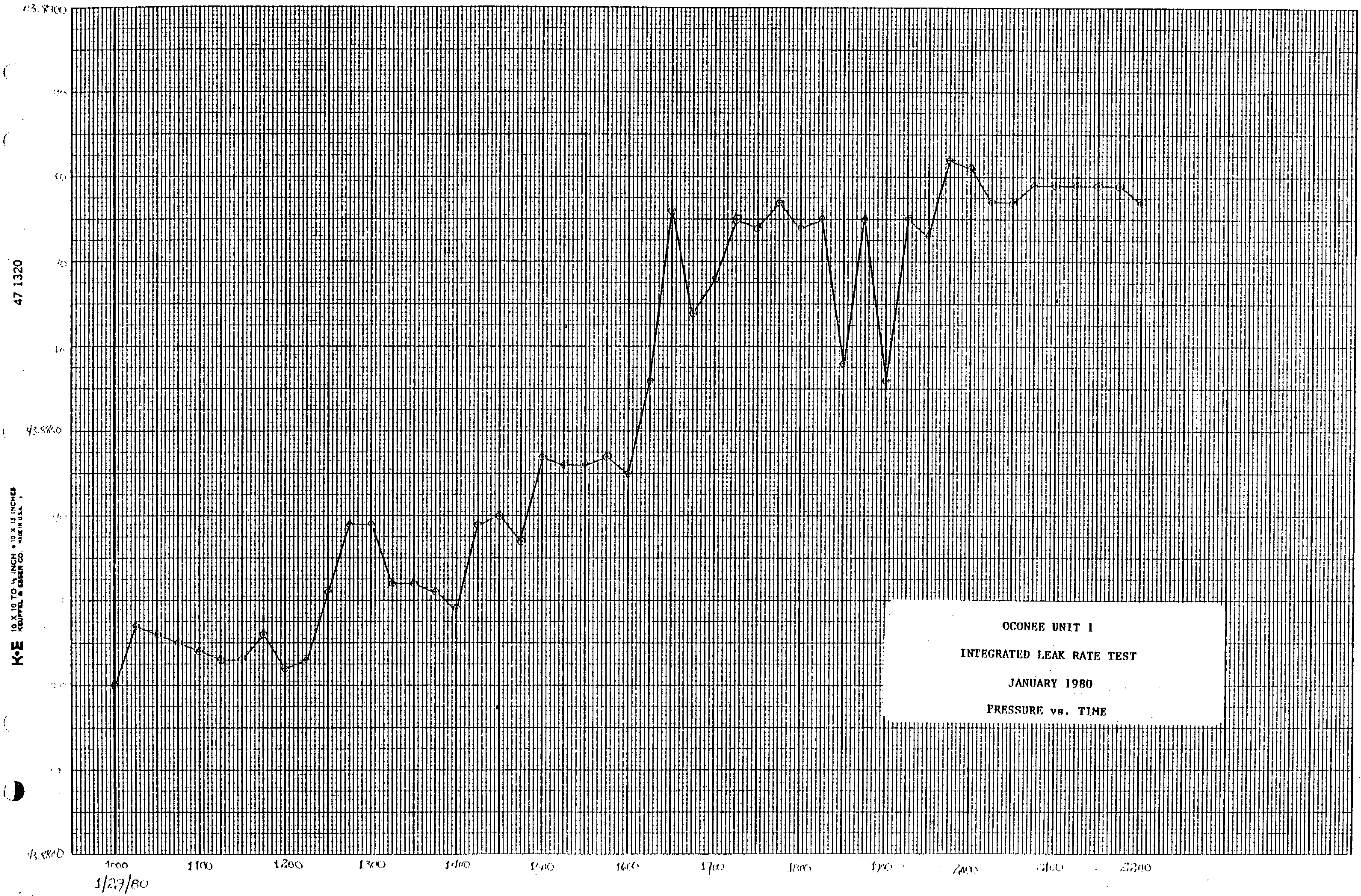
DATA SET	TIME HRS.	PRESSURE	TEMP.	BUILDING TOT.MASS	TEST NORM.MASS.	TEST LK RATE	UCL LK RATE
[illegible]	0.	43.8835	64.684	431538.5	1.000000	0.	0.
[illegible]	0.25	43.8838	64.694	431533.2	0.999988	0.1176	0.
5	0.50	43.8834	64.698	431526.0	0.999971	0.1392	0.1392
6	0.75	43.8835	64.690	431533.5	0.999989	0.0491	0.0491
7	1.00	43.8835	64.698	431527.0	0.999973	0.0507	0.1128
8	1.25	43.8834	64.699	431525.1	0.999969	0.0496	0.0864
9	1.50	43.8835	64.690	431533.5	0.999989	0.0238	0.0599
10	1.75	43.8836	64.693	431532.1	0.999985	0.0140	0.0418
11	2.00	43.8834	64.710	431516.1	0.999948	0.0320	0.0595
12	2.25	43.8830	64.709	431513.0	0.999941	0.0432	0.0674
13	2.50	43.8835	64.711	431516.3	0.999949	0.0441	0.0636
14	2.75	43.8829	64.703	431516.9	0.999950	0.0423	0.0585
15	3.00	43.8837	64.695	431531.4	0.999984	0.0292	0.0476
16	3.25	43.8849	64.696	431542.4	1.000009	0.0132	0.0349
17	3.50	43.8839	64.705	431525.1	0.999969	0.0121	0.0308
18	3.75	43.8841	64.701	431530.4	0.999981	0.0085	0.0252
19	4.00	43.8842	64.702	431530.5	0.999982	0.0057	0.0207
20	4.25	43.8840	64.696	431533.5	0.999989	0.0025	0.0161
21	4.50	43.8837	64.697	431529.7	0.999980	0.0016	0.0137
22	4.75	43.8837	64.692	431533.9	0.999989	-0.0005	0.0106
23	5.00	43.8839	64.694	431534.2	0.999990	-0.0021	0.0080
24	5.25	43.8839	64.700	431529.2	0.999979	-0.0020	0.0072
25	5.50	43.8839	64.701	431528.4	0.999977	-0.0017	0.0068
26	5.75	43.8740	64.709	431424.5	0.999736	0.0217	0.0447
27	6.00	43.8740	64.718	431417.1	0.999719	0.0412	0.0690
28	6.25	43.8740	64.723	431413.0	0.999709	0.0570	0.0865
29	6.50	43.8739	64.720	431414.4	0.999713	0.0688	0.0983
30	6.75	43.8729	64.716	431407.9	0.999697	0.0788	0.1077
31	7.00	43.8729	64.722	431403.0	0.999686	0.0871	0.1151
32	7.25	43.8729	64.734	431393.1	0.999663	0.0947	0.1218
33	7.50	43.8731	64.712	431413.2	0.999710	0.0977	0.1231
34	7.75	43.8680	64.732	431346.6	0.999555	0.1080	0.1337
35	8.00	43.8668	64.656	431397.3	0.999673	0.1099	0.1341
36	8.25	43.8650	64.554	431463.5	0.999826	0.1035	0.1271
37	8.50	43.8618	64.504	431473.2	0.999849	0.0967	0.1198
38	8.75	43.8557	64.462	431447.8	0.999790	0.0930	0.1151
39	9.00	43.8434	64.447	431339.1	0.999538	0.0998	0.1216
40	9.25	43.8397	64.409	431334.0	0.999526	0.1056	0.1270
41	9.50	43.8378	64.382	431337.5	0.999534	0.1099	0.1306
42	9.75	43.8357	64.361	431334.1	0.999526	0.1135	0.1334
43	10.00	43.8356	64.323	431364.4	0.999597	0.1138	0.1327
44	10.25	43.8349	64.312	431366.6	0.999602	0.1135	0.1316
45	10.50	43.8317	64.286	431356.5	0.999578	0.1136	0.1309
46	10.75	43.8319	64.269	431372.5	0.999615	0.1123	0.1288
47	11.00	43.8320	64.260	431380.9	0.999635	0.1103	0.1262
48	11.25	43.8322	64.261	431382.0	0.999637	0.1082	0.1235
49	11.50	43.8312	64.249	431382.0	0.999637	0.1060	0.1208
50	11.75	43.8312	64.226	431401.0	0.999681	0.1028	0.1173
51	12.00	43.8290	64.209	431393.3	0.999664	0.1000	0.1142
52	12.25	43.8251	64.210	431354.1	0.999573	0.0995	0.1131

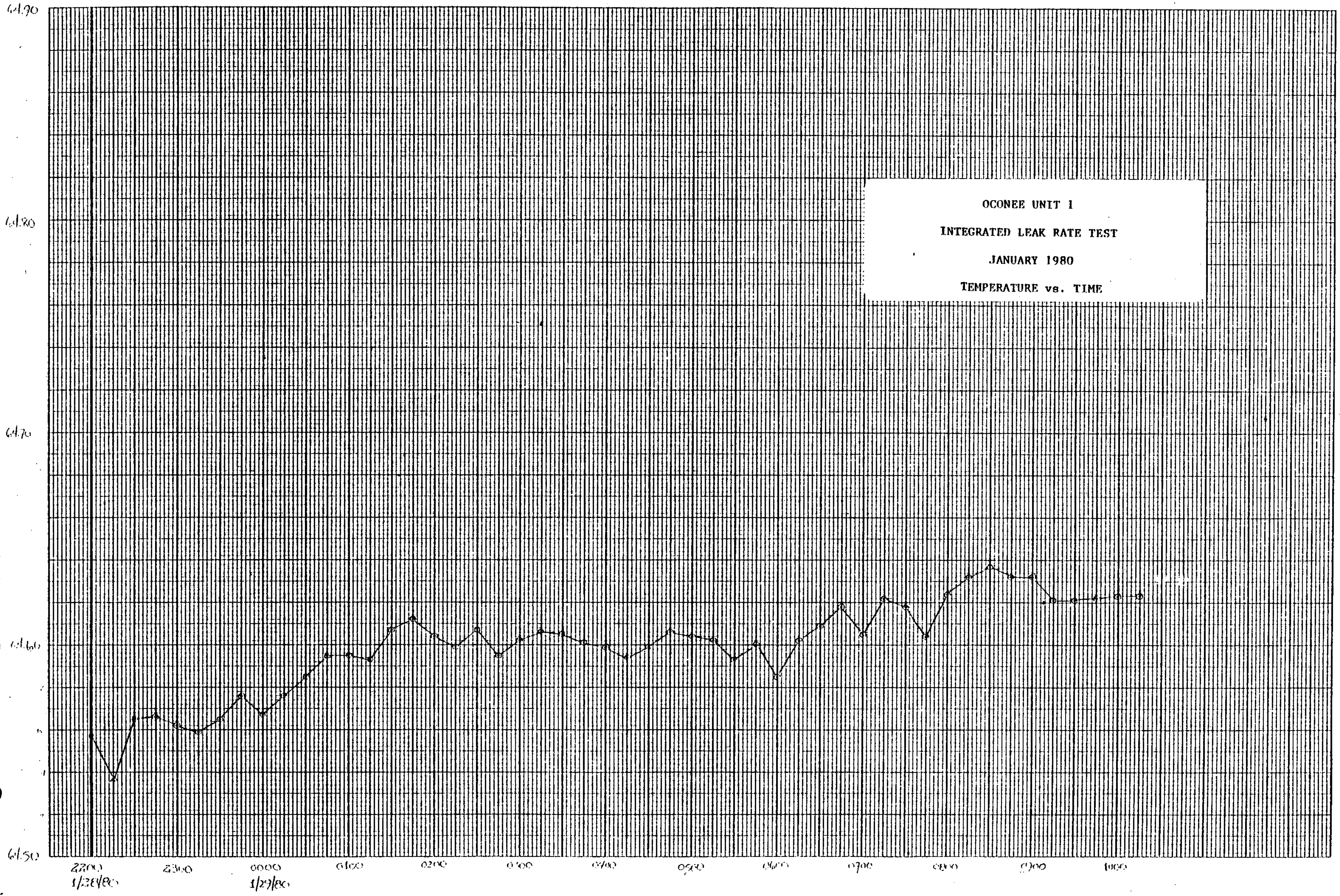
THE CALCULATED LEAK RATE IS- 0.0995 %/DAY
THE UCL LEAK RATE IS- 0.1131 %/DAY
ACCEPTANCE CRITERIA ON UCL LEAK RATE IS 0.0581%/DAY
ARE FURTHER DETAILS REQ'D- (1=YES,2=NO)?2

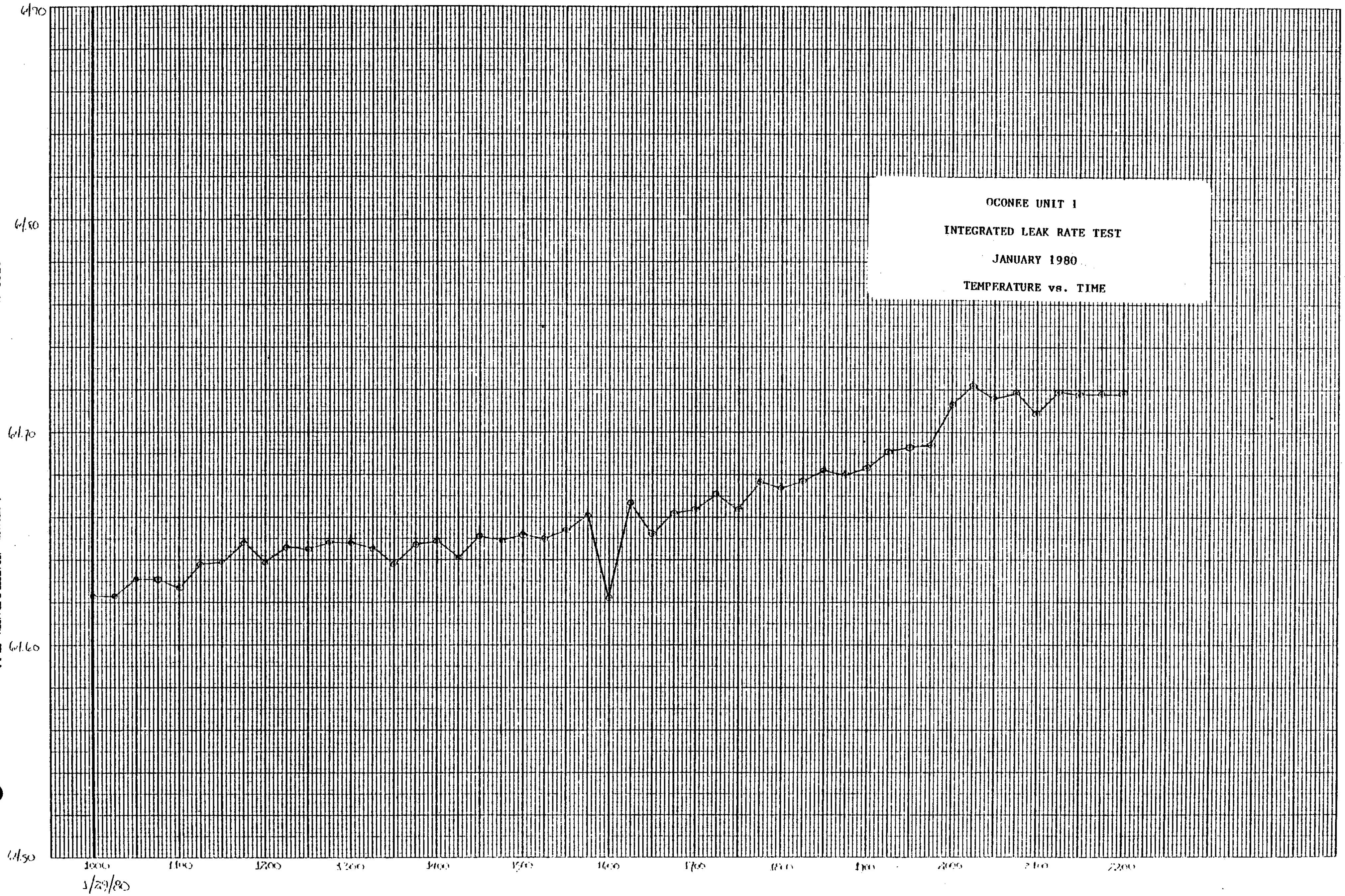

OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
NORMALIZED MASS vs. TIME
1.0001
1.0
.9999
.9998
.9997
2200
2300
0000
1/28/80
1/29/80

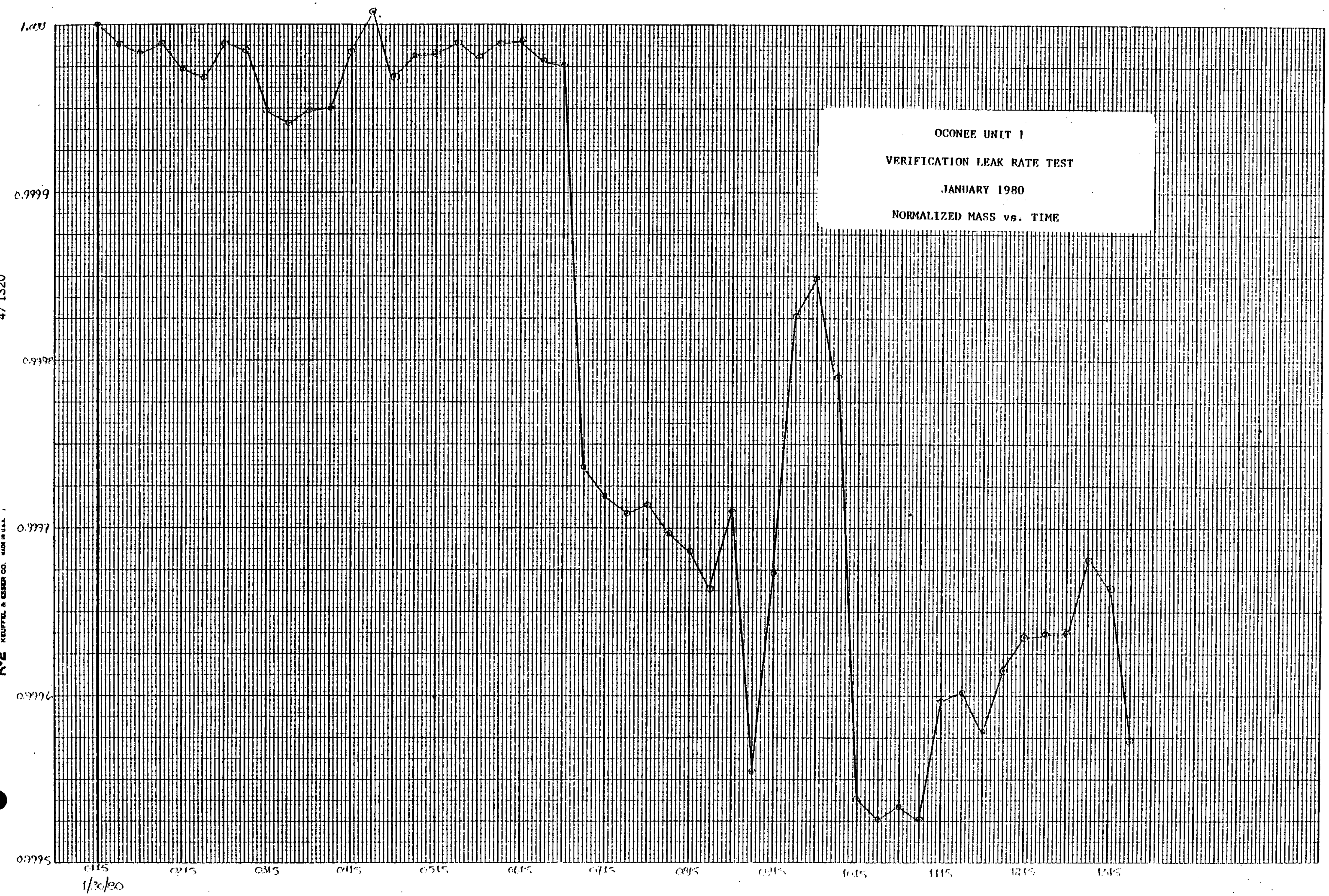

OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
NORMALIZED MASS vs. TIME
1.0001
1.0
.9999
.9998
.9997
1/29/80
K+E 10 X 10 TO ½ INCH • 10 X 15 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1320

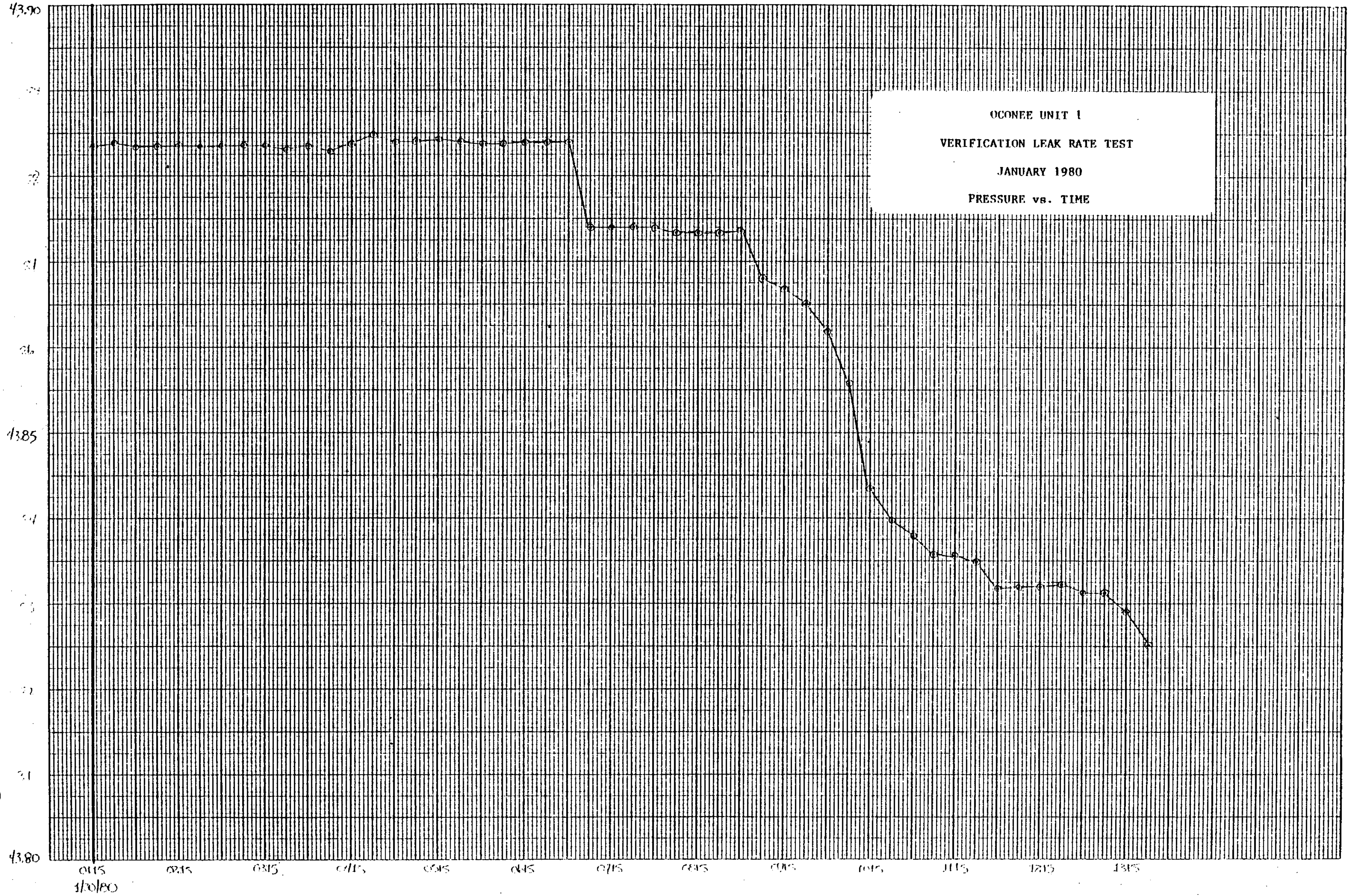

OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
PRESSURE vs. TIME
43.8850
2200
1/26/80
2300
1/27/80
47 1320
K+E 10 X 10 TO ½ INCH • 10 X 15 INCHES
KEUFFEL & ESSER CO.

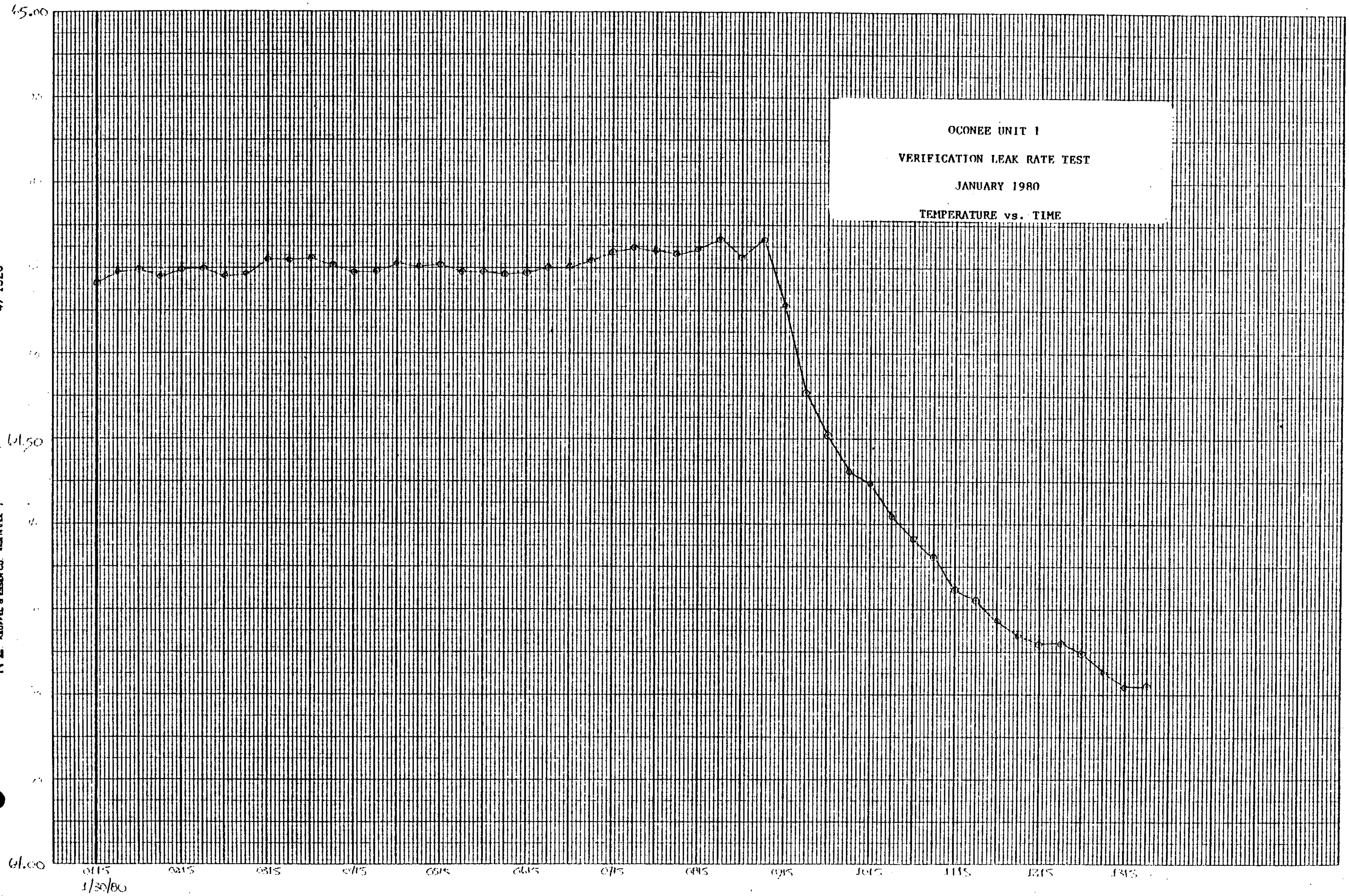

OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
PRESSURE vs. TIME
1/29/80
K-E 10 X 10 TO ½ INCH • 10 X 15 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
47 1320


OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
TEMPERATURE vs. TIME
61.90
61.80
61.70
61.60
61.50
2200
1/28/80
2300
0000
1/29/80
0100
0200
0300
0400
0500
0600
0700
0800
0900
1000


OCONEE UNIT 1
INTEGRATED LEAK RATE TEST
JANUARY 1980
TEMPERATURE vs. TIME
61.90
61.80
61.70
61.60
61.50
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
1/29/80


OCONEE UNIT 1
VERIFICATION LEAK RATE TEST
JANUARY 1980
NORMALIZED MASS vs. TIME
1.000
0.9999
0.9998
0.9997
0.9996
0.9995
0115
1/30/80
0215
0315
0415
0515
0615
0715
0815
0915
1015
1115
1215
1315


OCONEE UNIT 1
VERIFICATION LEAK RATE TEST
JANUARY 1980
PRESSURE vs. TIME
43.90
43.85
43.80
0115
1/30/80
0215
0315
0415
0515
0615
0715
0815
0915
1015
1115
1215
1315


OCONEE UNIT 1
VERIFICATION LEAK RATE TEST
JANUARY 1980
TEMPERATURE vs. TIME
65.00
64.50
64.00
0115
1/30/80
0215
0315
0415
0515
0615
0715
0815
0915
1015
1115
1215
1315