CLEVELAND ELECTRIC ILLUMINATING COMPANY

Perry Nuclear Power Plant

Unit 1

REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST REPORT

March 1, 1993

Table of Contents

TABLE OF CONTENTS

TABLE OF CONTENTS
CONT'D

APPENDICES

I. INTRODUCTION

The Reactor Building Integrated Leakage Rate "Type A" Test is performed to demonstrate that leakage through the primary reactor containment systems and components penetrating primary reactor containment do not exceed the allowable leakage rates specified in the Plant Technical Specifications.

The purpose of this report is to provide information pertinent to the activities related to the preparation, test performance, and reporting of the Perry Nuclear Power Plant Unit 1 Integrated Leakage Rate Test (ILRT).

Highlights of activities and events which occurred prior to and during the ILRT are presented in Section II, Test Synopsis.

Section III, Test Data Summary, contains data and results necessary to demonstrate containment atmosphere stabilization, acceptable "as-left" leakage rate, and successful verification test. In addition, plots provided in Appendices B and C supply a visual history of containment atmospheric conditions beginning with the 32 hour ILRT test period and ending with the 10 hour verification test.

Information in Section IV, Analysis and Interpretation, supplies the technical details associated with the ILRT computer program and its associated hardware as well as the instrumentation used during the ILRT.

Section V, References, lists the documents used for the conduct of the ILRT.

The successful "as-left" periodic Type A and verification test were performed according to the requirements of the Perry Nuclear Power Plant Unit 1 Technical Specifications and 10CFR50, Appendix J. The test method used was the Absolute Method, as required by Plant Technical Specifications and as described in "ANSI N45.4-1972, "Leakage-Rate Testing of Containment Structures for Nuclear Reactors".

Mass Point leak rates were calculated as described in ANSI/ANS-56.8-1981, "Containment System Leakage Testing Requirements". Leakage rates using the Total Time Analysis technique as described in BN-TOP-1, "Testing Criteria For Integrated Leakage Rate Testing Of Primary Containment Structures For Nuclear Power Plants" were run concurrently for informational purposes. The test results are reported in accordance with the requirements of 10CFR50, Appendix J, Section V.B.3.

As noted in Section IV.E, the Perry Nuclear Power Plant is treating the "as-found" ILRT as a failure due to an administrative discrepancy that failed to perform "as-found" LLRTs on two penetrations prior to adjustments being made to isolation valves in the penetrations. The Perry Nuclear Power Plant plans to perform an ILRT in RF04 that will demonstrate the leak tightness of containment barriers which are testable only by a Type A test. Given that prior test failures were attributed to penetrations testable through the LLRT process, the RF04 test will demonstrate that an accelerated test schedule is not necessary. Future correspondence will address scheduling of Post RF04 Type A test.

II. TEST SYNOPSIS

Prior to containment pressurization on 1349, February 26, 1993, site personnel were engaged in prerequisite activities for the conduct of the ILRT. The ILRT was conducted at the end of a midcycle maintenance outage. These activities included ILRT procedure review and finalization, ILRT computer program checkout and linkup to the Volumetrics Data Acquisition System, and ILRT instrumentation installation and operability checks.

The ILRT test procedure was reviewed against the requirements of the Plant Technical Specifications; 10CFR50, Appendix J; and ANSI/ANS-56.8-1981.

The ILRT instrumentation was calibrated prior to the ILRT as recommended by ANSI N45.4-1972, Sections 6.2 and 6.3. Final ILRT instrumentation operability checks and in-situ checks, as specified in ANSI/ANS-56.8-1987, Section 4.2.3.1, were performed to ensure that all instrumentation was operating correctly. Calibration records for the ILRT instrumentation system components are retained at the plant.

A. Edited Test Log

February 26, 1993

1349 Hr.	Pressurization of containment started.
1409 Hr.	DW Cooler 1A at max amps, shifting to DW Cooler 2B.
1419 Hr.	Two DW fans off; 3 running.
1448 Hr.	DW fan 1A is only fan running.
1449 Hr.	Pressurization rate is 3.3 psi/hr.
1516 Hr.	Reduced press. rate to 1 psi/hr.
1549 Hr.	Dew temp 8 locked up high.
1558 Hr.	Resumed press. rate of approx. 3.4 psi/hr.
1718 Hr.	Reduced press. rate to 2.5 psi/hr. Containment pressure at 9 psig.
1733 Hr.	Reduced press. rate to approx. 2psi/hr. Containment pressure at 9.9 psig.

February 26, 1993

1815 Hr.	Dropped another compressor. Press. rate at approx. 1 psi/hr. Containment pressure at 11.2 psig.
1839 Hr.	Set weight factor for Dew temp 8 to 0 and redistributed weight factors.
1930 Hr.	Pressurization stopped and valves closed. Containment pressure is 12.3 psig (27.059 psia).
1938 Hr.	Started stabilization.
2000 Hr.	All fans off and cooling water secured.
2035 Hr.	Dew temp 1 acting erratically (bouncing ± 13° F). Set weight factor to 0 and redistributed weight factor.

February 27, 1993

0115 Hr.	I&C adjusting chilled mirror servo loops to try to minimize dew temp fluctuations due to high humidity. Instruments were initially setup under low humidity conditions.
0230 Hr.	Found verification flow meter tubing had sprung apart. Tubing repaired.
0430 Hr.	I&C finished adjustments. All Dew temps seem OK. Returning Dew temp weighting factors to original values.
0500 Hr.	Dew temp 8 locked up high again. Set weight factor to 0 and redistributed weight factor.
0613 Hr.	Started ILRT.
0858 Hr.	Dew temps 10, 11, 12, & 13 went into auto balance cycle. Deleted data point.
0913 Hr.	Data transmission problem. Data string corrupt. Cannot use this point.
0928 Hr.	Data point OK.

February 28, 1993

1347 Hr.	Data still shows a lot of fluctuation due to Dew temps. Cannot do 8 hour BN-TOP-1 test.
2022 Hr.	Data collection continuing.
0330 Hr.	Dew temp 1 dropped 10° F in 15 minutes. Set weight factor to 0 and redistributed weight factor.
0813 Hr.	ILRT is now 26 hours. Plan to continue to see if leakage rate stabilizes.
1413 Hr.	Ended ILRT with 32 hours of data. Mass point leakage rate is 0.0954% wt./day. UCL leakage rate is 0.1007% wt./day.
1420 Hr.	Started verification flow of 3.532 scfm.
1428 Hr.	Started 1 hour stabilization period.
1528 Hr.	Start of verification test. Imposed flow is equal to 0.1973% wt./day.
2043 Hr.	RTD 6 failed. Set weight factor to 0 and redistributed weight factor.

March 1, 1993

0128 Hr.	Verification test completed satisfactorily.

B. Test Summary Time-Line

Phase	Time Frame	Duration
Pressurization	From: 1349 on 2/26/93 To: 1930 on 2/26/93	5.68 hours
Stabilization	From: 1938 on 2/26/93 To: 0558 on 2/27/93	10.33 hours

Phase	Time Frame	Duration
ILRT Test	From: 0613 on 2/27/93 To: 1413 on 2/28/93	32.00 hours
Verification Test	From: 1528 on 2/28/93 To: 0128 on 3/01/93	10.00 hours

C. ILRT Results Summary

	Mass Point % wt./day	Revised Mass Point % wt./day	Total Time % wt./day
Calculated Leakage Rate	0.0954*	0.0957*	0.0729*
95 % Upper Confidence Leakage rate	0.1007*	0.1010*	0.0934*

* Does not include penalties for nonstandard alignments and water level changes

The Region III NRC Inspector raised a concern that temperature elements TE-N001, TE-N002, TE-N003, and TE-N004 had unequal weighting factors yet were all located at the same elevation in the upper area of containment with no physical barriers separating the sensors. The revised Mass Point results are based on using equal weighting factors for those four temperature elements. Since this is a negligible change, the calculated Mass Point leakage rate of 0.0954 %wt. per day will be used in all future discussions.

D. Verification Test Results Summary

	Mass Point % wt./day	Total Time % wt./day
Leakage Rate (L_{am})	0.0954	0.0729
Imposed Leak (L_o)	0.1973	0.1973
Lower Limit: $L_o + L_{am} - 0.25\ L_a$	0.2427	0.2202
Composite Leakage (L_c)	0.2935	0.2793
Upper Limit: $L_o + L_{am} + 0.25\ L_a$	0.3427	0.3202

III. TEST DATA SUMMARY

A. Plant Information

Owner	Cleveland Electric Illuminating Company
Plant	Perry Nuclear Power Plant Unit 1
Location	Perry, Ohio
Containment Type	Pressure suppression type, steel containment with annulus space and concrete shield building
NSSS Supplier, Type	General Electric BWR
Date Test Completed	March 1, 1993

B. Technical Data

Containment Net Free Volume	1,441,900 cubic feet
Design Pressure	15.0 psig
Design Temperature	185° F
Calculated Peak Accident Pressure	11.31 psig
Calculated Peak Accident Temperature	185° F

C. Test Results - Type A

Test Method	Absolute
Test Pressure	12.34 psig

Integrated Leakage Rate Mass Point Analysis Test Results

Calculated Leakage Rate, L_{am}	0.0954 % wt./day
95 % Upper Confidence Limit Leakage Rate	0.1007 % wt./day

Integrated Leakage Rate Total Time Analysis Test Results (Presented for information only)

Calculated Leakage Rate, L_{am}	0.0729 % wt./day
95 % Upper Confidence Limit Leakage Rate	0.0934 % wt./day
Maximum Allowable Leakage Rate, L_a	0.2 % wt./day
ILRT Acceptance Criteria, 0.75 L_a	0.15 % wt./day
Verification Test Imposed Leakage Rate, L_o	3.532 scfm or 0.1973 % wt./day

Verification Test Mass Point Analysis Results and Limits

Upper Limit ($L_o + L_{am} + 0.25\ L_a$)	0.3427 % wt./day
Calculated Composite Leakage Rate, L_c	0.2935 % wt./day
Lower Limit ($L_o + L_{am} - 0.25\ L_a$)	0.2427 % wt./day

Verification Test Total Time Analysis Results and Limits (Presented for information only)

Upper Limit ($L_o + L_{am} + 0.25\ L_a$)	0.3202 % wt./day
Calculated Composite Leakage Rate, L_c	0.2793 % wt./day
Lower Limit ($L_o + L_{am} - 0.25\ L_a$)	0.2202 % wt./day

Report Printouts

The report printouts for the test stabilization, ILRT, and verification test calculations for the Total Time and Mass Point Analyses are provided in Appendices A, B, and C, respectively.

D. Test Results - Type B and C Tests

A summary of local leakage rate test results since the ILRT in 1989 is included in Appendix D.

E. Integrated Leakage Rate Measurement System

1. Absolute Pressure

Quantity	2
Manufacturer	Mensor
Type	Quartz Manometer
Range	0 - 100 psia
Accuracy	± 0.015% of reading plus ± 0.002% full scale
Repeatability	± 0.001% Full Scale ± 0.001 psi
Resolution	0.001 psi
Sensor Sensitivity Error	0.001% of full scale 0.001 psi

2. Drybulb Temperature

Quantity	32
Manufacturer	Rosemount
Type	3-wire 100 ohm platinum resistance temperature detectors (RTDs)

	Range	0 - 400° F
	Accuracy	± 0.25° F
	Sensor Sensitivity Error	0.01° F
3.	Relative Humidity	
	Quantity	11
	Manufacturer	EG&G
	Type	Chilled mirror Model 660-S2
	Range	32 - 120° F dewpoint
	Accuracy	± .54° F
	Sensor Sensitivity Error	0.1° F
4.	Verification Flow	
	Quantity	2 (1 primary, 1 backup)
	Manufacturer	Sierra
	Type	Thermal mass flow
	Range	0 - 10 scfm
	Accuracy	± 1% full scale
5.	Readout Device	
	Quantity	1
	Manufacturer	Volumetrics
	Type	Model A100

Repeatability	0.01° F
Resolution	
Drybulb Temp	0.01° F
Dewpoint Temp	0.01° F

The sensor locations and volume fractions as installed for the ILRT are shown in Appendix E.

F. Information Retained at Plant

The following information is available for review at the Perry Nuclear Power Plant site:

1. Access control procedure used to control access to the containment during testing.

2. A listing of all containment penetrations, including the total number, size, and function.

3. A listing of normal operating instrumentation used for the leakage test.

4. A system lineup (at time of test), showing required valve positions and status of piping systems.

5. A continuous, sequential log of events from the initial survey of containment to restoration of tested systems.

6. Documentation of instrumentation calibrations and standards, including a sensor failure analysis.

7. Data to verify temperature stabilization criteria as established by test procedure (Appendix A).

8. The working copy of the test procedure that includes signature sign-offs of procedural steps.

9. The procedure and data that verifies completion of penetration and valve testing, including as-found leak rates, corrective action, and final leak rates.

10. Computer printouts of ILRT data and automated data acquisition printouts along with a summary description of the computer program (Appendix F).

11. The Quality Assurance surveillance that was used to monitor the ILRT with proper signoffs.

12. A listing of test exceptions including changes in the containment system boundaries.

13. Description of sensor malfunctions, repairs, and methods used to redistribute volume weighting fractions to operating instrumentation.

14. A review of confidence limits of test results with accompanying computer printouts.

15. Description of the method of leakage rate verification.

16. ILRT data plots obtained during the test.

17. The P&IDs of pertinent systems.

IV. ANALYSIS AND INTERPRETATION

The upper 95% confidence limit (UCL) Mass Point and Total Time leakage rates calculated during the ILRT were less than the test acceptance criteria of 0.75 L_a (0.15 % wt./day). Additions to the calculated leakage rates must be made to account for penetration paths not exposed to the ILRT pressure, electrical penetration pressure changes, and for changes in the net free containment volume due to changes in containment water levels. These additions are discussed below.

A. Summary of Type B and C Penalties

Penetration paths not exposed to the ILRT pressure and the corresponding minimum pathway leakage rates are as follows:

Penetration Number	System	Penetration Test Data
		Minimum Pathway Local Leakage Rate (sccm)
131	Reactor Water Cleanup	67.7
204	Control Rod Drive	2.0
310	Nuclear Closed Cooling Water	27.58
311	Nuclear Closed Cooling Water	15.53
317	Containment Leak Rate	2.0
317	Containment Leak Rate	2.0
319	Containment Leak Rate	2.0
319	Containment Leak Rate	2.0
404	Chilled Water	2.0
405	Chilled Water	3.71
421	Residual Heat Removal	10.0
* ECCS	Division 1	981.82
109	Containment Leak Rate	2.0
119	Containment Leak Rate	2.0
120	Containment Leak Rate	2.0
	Sum Total (Σ)	1124.34

LLRT results based on the above equate to a Type B and C penalty addition of 0.0022 wt.-% per day.

B. Volume Change Corrections

The following volumes were monitored for liquid level changes which would affect the containment net free volume:

VOLUME MONITORED	LEVEL CHANGE	VOLUME CHANGE (ft^3)
Reactor Vessel	-10 inches/32 hours * +1 inch/32 hours	+200.85/24 hours * -20.09/24 hours
Containment Pool	0	0
Suppression Pool	0	0
Containment Equip.Floor Sump	+14.5 inches/32 hours	-15.12/24 hours
Containment Equip.Drain Sump	+12.5 inches/32 hours	-13.03/24 hours
Drywell Equip. Floor Sump	0	0
Drywell Equip. Drain Sump	+80 inches/32 hours	-83.4/24 hours

* Water was added to the reactor vessel during the ILRT.

The level decrease in the reactor vessel and corresponding increase in containment net free volume is conservatively neglected. Based on the volumes monitored, the containment net free volume decreased during the ILRT by 131.64 ft^3. This is equivalent to a leakage rate of 0.0092 wt% per day which will be added to the ILRT results.

C. Electrical Penetrations

The electrical penetrations remained pressurized during the ILRT at a pressure of approximately 20 - 28 psig. Since this pressure is greater than the ILRT pressure of 12.3 psig, the electrical penetration pressure was read prior to and after the ILRT. The pressure drop was conservatively calculated to be equivalent to a leakage rate of 0.00001% wt. per day. This would result in an insignificant change to the ILRT results.

D. "As Left" ILRT Results

The As Left ILRT leakage rate including the required additions is as follows:

	Mass Point Analysis (% wt./day)	Total Time Analysis (% wt./day)
95 % UCL Leakage Rate	0.1007	0.0934
Type B and C Penalties	0.0022	0.0022
Volume Change	0.0092	0.0092
As Left 95 % UCL Leakage Rate	0.1121	0.1048

The as left Total Time and Mass Point 95 % UCL leakage rates are less than the test acceptance criteria value of 0.75 L_a (0.15 % wt./day).

E. "As Found" ILRT Results

Prior to performance of the ILRT, adjustments were made to isolation valves in penetrations 418 and 423 without performing an "as-found" local leak rate test. Therefore, the leakage savings from these adjustments could not be determined. Due to the administrative discrepancy for these two piping pathways, the Perry Nuclear Power Plant is treating the "as-found" ILRT as a failure. This failure is due solely to the lack of data on the "as-found" Type C leak rates from these penetrations; it is not due to leakage pathways through containment which are testable only by performance of a Type A ILRT.

Similarly, the "as-found" test results from the ILRT performed during the first refueling outage exceeded 0.75 L_a because of excessive leakage through a Residual Heat Removal (RHR) relief valve flange. This particular pathway has since been modified such that it is Type C testable at every refueling outage, therefore evidence of the leak tightness of this penetration is available regardless of whether a Type A ILRT is performed. Local leak rate test results performed to date on this penetration have been successful.

Therefore, the RF01 and mid-cycle 4 test results have identified concerns only with pathways which are testable by local leak rate tests, and the results do not indicate the need for ILRT performance on an accelerated frequency as is conservatively required by Appendix J Section III.A.6(b). However, the Perry Nuclear Power Plant plans to conduct an ILRT during the next refueling outage with instrumentation that will not be susceptible to the difficulties described in Section II.A of this report, in order to again show that the containment barriers which are testable only by a Type A ILRT are not the contributors that lead to exceedance of the ILRT acceptance criteria. This RF04 demonstration will serve as the basis for scheduling of the subsequent ILRT during RF06. Future correspondence following performance of the RF04 test will address scheduling details and any necessary NRC reviews.

V. REFERENCES

A. Perry Unit 1 Surveillance Procedure, SVI-T23-T0394, "Integrated Leak Rate Test", Rev. 3.

B. Perry Nuclear Power Plant Unit 1 Technical Specifications.

C. Perry Nuclear Power Plant Unit 1 Updated Final Safety Analysis Report.

D. Code of Federal Regulations, Title 10, Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors".

E. ANSI N45.4-1972, "Leakage-Rate Testing of Containment Structures for Nuclear Reactors".

F. ANSI/ANS-56.8-1981, "Containment System Leakage Testing Requirements".

G. BN-TOP-1, Revision 1, "Testing Criteria For Integrated Leakage Rate Testing Of Primary Containment Structures For Nuclear Power Plants".

APPENDIX A

STABILIZATION PHASE DATA

STABLIZATION MODE
OPTIONS

TIME : 0558
MODE SUMMARY

1 - MANUAL DATA ENTRY
2 - PARAMATER GRAPHS
3 - SENSOR PLOTS
4 - SENSOR DIFFERENTIALS
5 - ANSI STABILIZATION CRITERIA
6 - BN-TOP-1 STAB.CRITERIA
7 - ANSI CRITERIA PRINTOUT
8 - BN-TOP-1 CRITERIA PRINTOUT
9 - REPRINT CURRENT DATA POINT
P - PASS WORD MENU
0 - FLASH OFF

# OF DATA POINTS =	54
MODE DURATION (IN HRS) =	10.33
TOT TIME MEASURED LEAK =	1.4578
TOT TIME CALCULATED LEAK =	0.7118
TOT TIME 95% UCL =	3.8297
MASS PT LEAK =	1.5289
MASS PT 95% UCL =	1.6710

ANSI TEMPERATURE STABLIZATION CRITERIA MET
BN-TOP TEMPERATURE STABLIZATION CRITERIA MET

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP:	72.388/ -0.005	AVG PRESS:	26.493/ -0.000
MASS:	193793.50/ -1.000	AVG DEW PRESS:	0.3248/-0.0001
		TOTAL PRESS:	26.818/ -0.001

STABLE MODE
Perry Nuclear Power Plant UNIT 1 Page 1

TEMPERATURE STABILIZATION UNIT 1						
		ANSI 56.8			BN-TOP-1	
TIME	TEMP	1 HR	4 HR	4 HR-1HR	BN1	BN2
0.00	74.217	0.0000	0.0000	0.0000	0.0000	0.0000
0.17	73.989	0.0000	0.0000	0.0000	0.0000	0.0000
0.33	73.855	0.0000	0.0000	0.0000	0.0000	0.0000
0.50	73.779	0.0000	0.0000	0.0000	0.0000	0.0000
0.67	73.723	0.0000	0.0000	0.0000	0.0000	0.0000
0.83	73.633	0.0000	0.0000	0.0000	0.0000	0.0000
1.00	73.524	0.6931	0.0000	-0.6931	0.0000	0.0000
1.17	73.433	0.5553	0.0000	-0.5553	0.0000	0.0000
1.33	73.357	0.4979	0.0000	-0.4979	0.0000	0.0000
1.50	73.306	0.4724	0.0000	-0.4724	0.0000	0.0000
1.67	73.269	0.4534	0.0000	-0.4534	0.0000	0.0000
1.83	73.235	0.3971	0.0000	-0.3971	0.0000	0.0000
2.00	73.195	0.3289	0.0000	-0.3289	-0.3965	0.3327
2.17	73.163	0.2701	0.0000	-0.2701	-0.3693	0.1627
2.33	73.127	0.2301	0.0000	-0.2301	-0.3572	0.0726
2.50	73.075	0.2316	0.0000	-0.2316	-0.3346	0.1356
2.67	73.045	0.2240	0.0000	-0.2240	-0.2869	0.2864
2.83	73.000	0.2359	0.0000	-0.2359	-0.2603	0.1597
3.00	72.970	0.2250	0.0000	-0.2250	-0.2327	0.1655
3.17	72.949	0.2137	0.0000	-0.2137	-0.2141	0.1115
3.33	72.924	0.2034	0.0000	-0.2034	-0.2072	0.0416
3.50	72.910	0.1643	0.0000	-0.1643	-0.1949	0.0735
3.67	72.882	0.1630	0.0000	-0.1630	-0.1873	0.0457
3.83	72.857	0.1424	0.0000	-0.1424	-0.1837	0.0221
4.00	72.841	0.1284	0.2204	0.0920	-0.1717	0.0716
4.17	72.823	0.1267	0.2024	0.0757	-0.1512	0.1232
4.33	72.807	0.1170	0.1791	0.0622	-0.1430	0.0492
4.50	72.785	0.1251	0.1620	0.0369	-0.1285	0.0871
4.67	72.763	0.1193	0.1486	0.0293	-0.1239	0.0273
4.83	72.738	0.1187	0.1420	0.0233	-0.1266	-0.0163
5.00	72.719	0.1219	0.1375	0.0156	-0.1228	0.0229
5.17	72.696	0.1263	0.1347	0.0084	-0.1284	-0.0335
5.33	72.689	0.1182	0.1264	0.0082	-0.1161	0.0737
5.50	72.679	0.1060	0.1210	0.0149	-0.1066	0.0568
5.67	72.668	0.0953	0.1149	0.0196	-0.1041	0.0156
5.87	72.642	0.0921	0.1082	0.0161	-0.1063	-0.0106
6.05	72.629	0.0845	0.1040	0.0195	-0.1035	0.0146
6.30	72.601	0.0805	0.0996	0.0191	-0.1023	0.0095
6.55	72.585	0.0888	0.0961	0.0073	-0.0944	0.0373
6.80	72.555	0.0992	0.0987	-0.0005	-0.0934	0.0133

TEMPERATURE STABILIZATION UNIT 1						
		ANSI 56.8			BN-TOP-1	
TIME	TEMP	1 HR	4 HR	4 HR-1HR	BN1	BN2
6.98	72.556	0.0718	0.0919	0.0201	-0.0821	0.0622
7.22	72.545	0.0678	0.0914	0.0236	-0.0739	0.0427
7.55	72.529	0.0525	0.0883	0.0359	-0.0733	0.0045
7.80	72.506	0.0451	0.0878	0.0427	-0.0758	-0.0104
8.05	72.504	0.0492	0.0843	0.0351	-0.0626	0.0308
8.30	72.487	0.0543	0.0840	0.0297	-0.0573	0.0214
8.55	72.477	0.0525	0.0772	0.0247	-0.0543	0.0118
8.83	72.456	0.0475	0.0706	0.0231	-0.0485	0.0245
9.08	72.450	0.0520	0.0674	0.0154	-0.0508	-0.0164
9.33	72.424	0.0597	0.0661	0.0063	-0.0569	-0.0243
9.58	72.421	0.0533	0.0646	0.0113	-0.0532	0.0161
9.83	72.416	0.0399	0.0629	0.0230	-0.0441	0.0365
10.08	72.394	0.0559	0.0589	0.0030	-0.0542	-0.0405
10.33	72.388	0.0361	0.0532	0.0171	-0.0483	0.0238

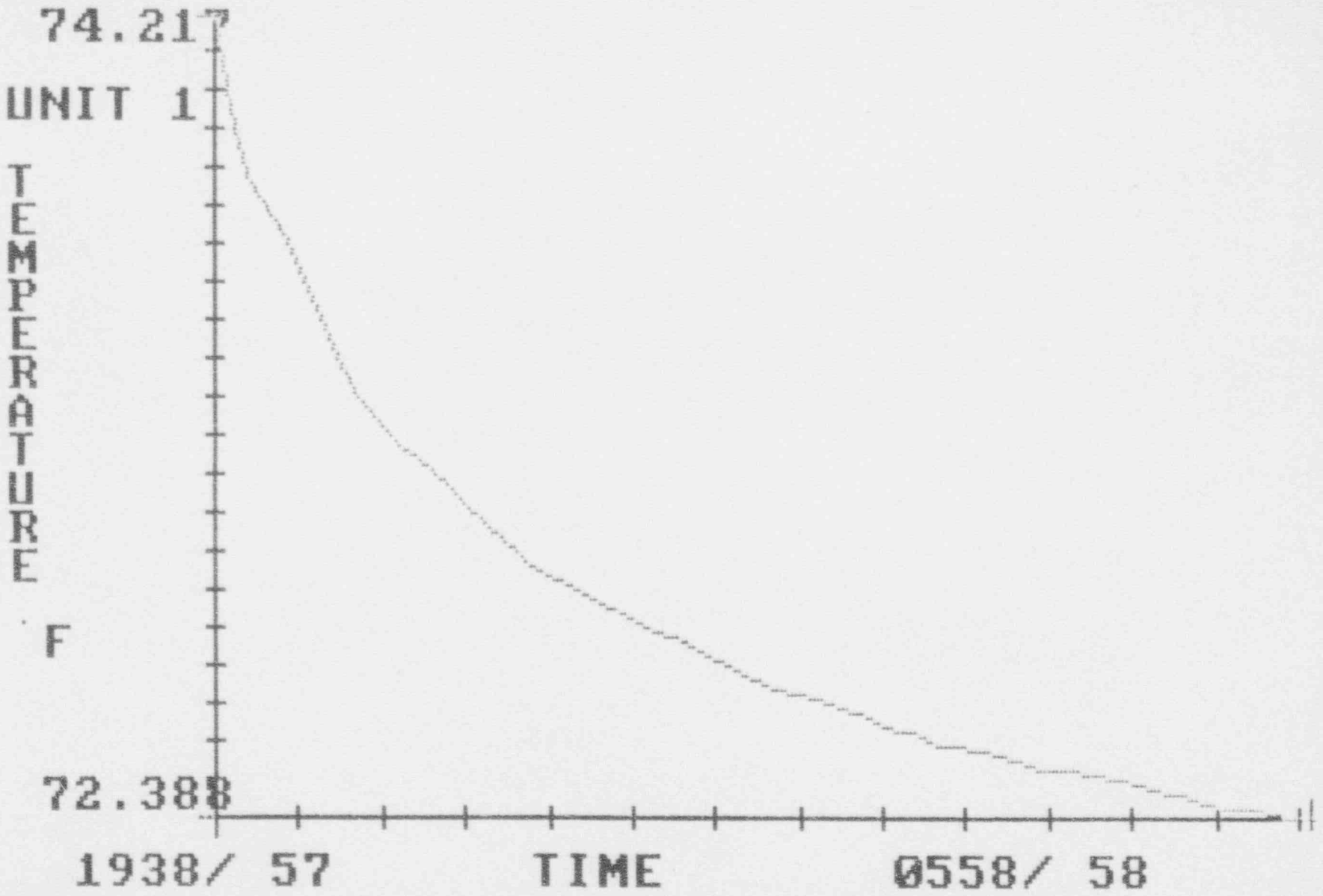
STABLE MODE
Page 1

AVERAGE DATA VALUES

DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
57	0.00	74.217	67.816	0.337	26.709	194703.92
57	0.17	73.989	68.387	0.343	26.687	194628.63
57	0.33	73.855	68.146	0.341	26.681	194628.38
57	0.50	73.779	68.222	0.341	26.672	194594.75
57	0.67	73.723	68.100	0.340	26.668	194581.70
57	0.83	73.633	68.701	0.347	26.654	194515.31
57	1.00	73.524	68.732	0.348	26.647	194501.03
57	1.17	73.433	68.100	0.340	26.647	194533.47
57	1.33	73.357	68.059	0.340	26.641	194520.75
57	1.50	73.306	68.051	0.339	26.636	194499.72
57	1.67	73.269	68.156	0.341	26.629	194463.92
57	1.83	73.235	67.591	0.334	26.630	194487.58
57	2.00	73.195	68.316	0.343	26.618	194407.78
57	2.17	73.163	68.514	0.345	26.610	194361.88
57	2.33	73.127	67.877	0.337	26.612	194389.19
57	2.50	73.075	68.112	0.340	26.603	194344.34
57	2.67	73.045	67.787	0.336	26.602	194346.06
57	2.83	73.000	67.885	0.338	26.596	194321.41
57	3.00	72.970	67.935	0.338	26.590	194291.39
57	3.17	72.949	68.025	0.339	26.584	194254.45
57	3.33	72.924	67.821	0.337	26.583	194251.77
57	3.50	72.910	68.350	0.343	26.571	194171.17
57	3.67	72.882	68.258	0.342	26.568	194160.03
57	3.83	72.857	67.616	0.334	26.571	194190.78
57	4.00	72.841	68.290	0.342	26.559	194106.22
57	4.17	72.823	68.092	0.340	26.556	194093.22
57	4.33	72.807	67.711	0.336	26.556	194101.94
58	4.50	72.785	67.698	0.335	26.552	194077.92
58	4.67	72.763	67.817	0.337	26.547	194050.33
58	4.83	72.738	68.531	0.345	26.534	193961.44
58	5.00	72.719	67.600	0.334	26.541	194022.27
58	5.17	72.696	68.178	0.341	26.530	193952.08
58	5.33	72.689	68.074	0.340	26.527	193934.34
58	5.50	72.679	67.809	0.337	26.527	193931.00
58	5.67	72.668	66.895	0.326	26.533	193982.28
58	5.87	72.642	66.972	0.327	26.527	193948.59
58	6.05	72.629	66.852	0.326	26.523	193926.42
58	6.30	72.601	67.090	0.328	26.515	193872.92
58	6.55	72.585	67.133	0.329	26.509	193834.81
58	6.80	72.555	66.964	0.327	26.505	193815.86

AVERAGE DATA VALUES

DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
58	6.98	72.556	67.032	0.328	26.502	193798.64
58	7.22	72.545	66.896	0.326	26.503	193810.38
58	7.55	72.529	66.956	0.327	26.501	193796.52
58	7.80	72.506	67.021	0.328	26.499	193792.22
58	8.05	72.504	67.028	0.328	26.498	193788.67
58	8.30	72.487	66.800	0.325	26.500	193806.48
58	8.55	72.477	66.881	0.326	26.499	193799.86
58	8.83	72.456	66.711	0.324	26.500	193817.59
58	9.08	72.450	66.929	0.327	26.496	193794.64
58	9.33	72.424	66.865	0.326	26.496	193801.77
58	9.58	72.421	67.071	0.328	26.493	193778.77
58	9.83	72.416	67.042	0.328	26.492	193775.42
58	10.08	72.394	67.069	0.328	26.490	193770.44
58	10.33	72.388	67.078	0.328	26.490	193767.95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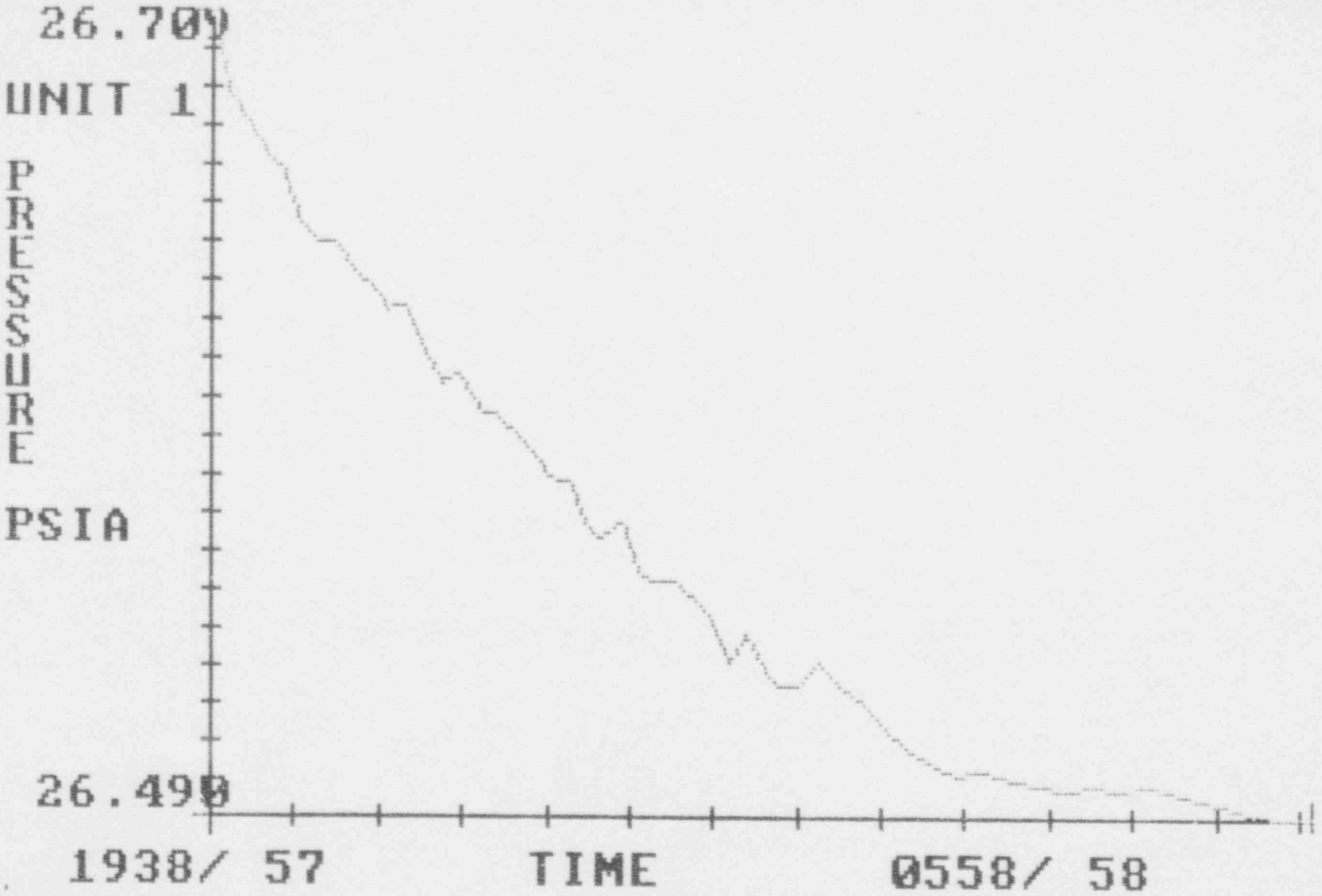
UNIT 1
TEMPERATURE F
72.388
1938/ 57
TIME
0558/ 58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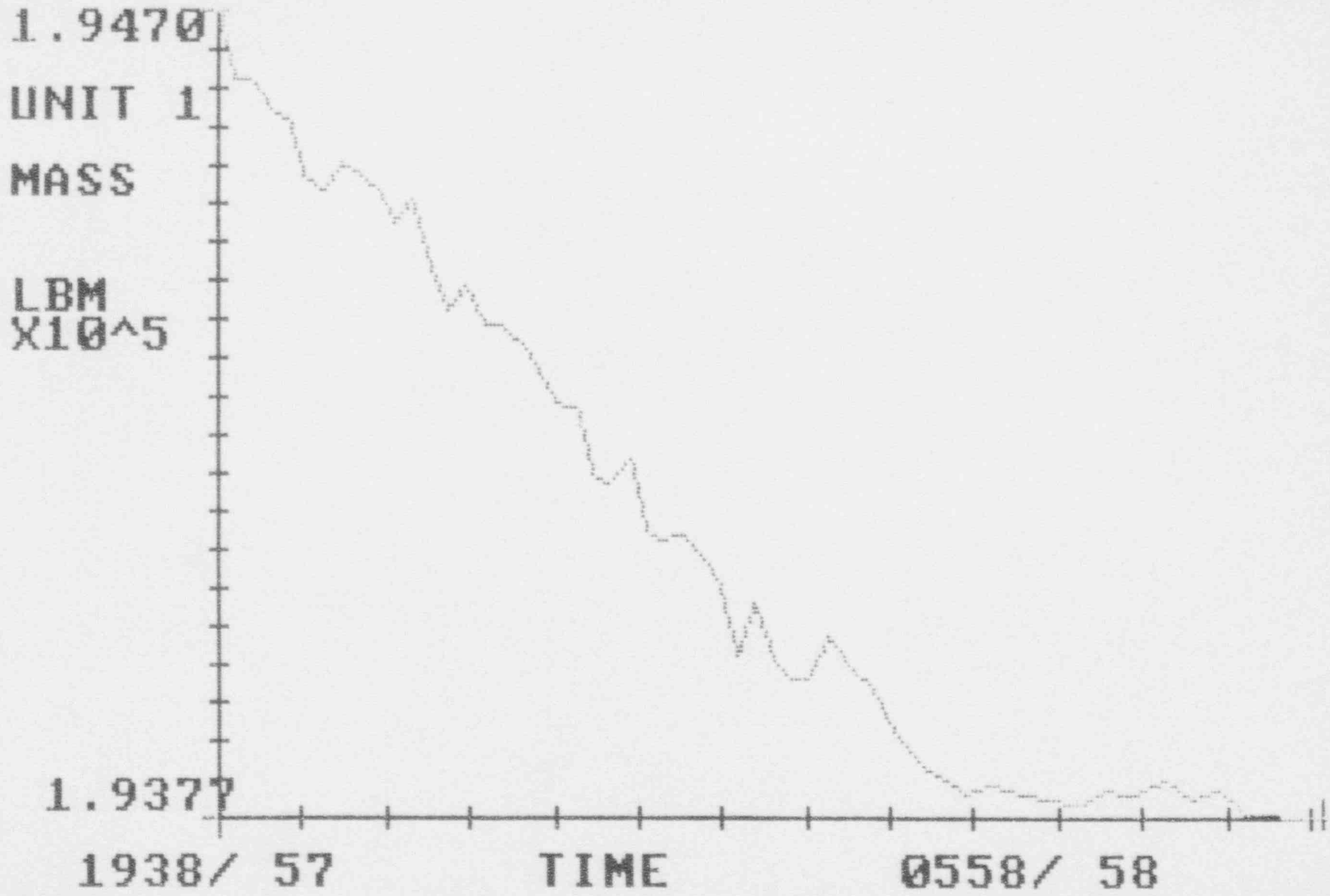
UNIT 1
PRESSURE
PSIA
26.490
1938/ 57
TIME
0558/ 58


1.9470
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MASS
LBM
X10^5
1.9377
1938/ 57
TIME
0558/ 58

APPENDIX B

ILRT TEST DATA AND PLOTS

TEST MODE

PLEASE SELECT THE OPTION
YOU WISH TO USE:

1 - MANUAL DATA ENTRY
2 - PARAMETER GRAPHS
3 - SENSOR PLOTS
4 - TREND ANALYSIS
5 - REPRINT CURRENT DATA PT
6 - SENSOR DIFFERENTIALS

P - PASS WORD MENU

SELECTED OPTION=

TEST DATA 1413

# OF DATA POINTS	= 125
MODE DURATION (IN HOURS)	= 32.00
TOT TIME MEASURED LEAK	= 0.0840
TOT TIME CALCULATED LEAK	= 0.0729
TOT TIME 95% UCL	= 0.0934
MASS POINT LEAK	= 0.0954
MASS POINT 95% UCL	= 0.1007
75% La	= .15
MASS	= 193557.20

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP:	71.939 / +0.030	AVG PRESS:	26.439 / +0.000
MASS:	193557.20 / -8.891	AVG DEW PRESS:	0.3292 / -0.0008
		TOTAL PRESS:	26.768 / -0.001

TEST MODE
Page 1

AVERAGE DATA VALUES

DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
58	0.00	72.366	67.098	0.329	26.490	193774.41
58	0.25	72.368	67.109	0.329	26.487	193758.09
58	0.50	72.358	67.142	0.329	26.487	193759.09
58	0.75	72.342	67.073	0.328	26.486	193759.59
58	1.00	72.335	67.097	0.329	26.486	193756.30
58	1.25	72.328	67.160	0.329	26.484	193750.09
58	1.50	72.318	67.227	0.330	26.483	193744.30
58	1.75	72.302	67.217	0.330	26.482	193743.59
58	2.00	72.291	67.203	0.330	26.482	193749.00
58	2.25	72.292	67.279	0.331	26.481	193738.50
58	2.50	72.279	67.267	0.330	26.481	193740.70
58	3.25	72.260	67.243	0.330	26.479	193734.80
58	3.50	72.243	67.279	0.331	26.477	193730.59
58	3.75	72.232	67.138	0.329	26.478	193739.00
58	4.00	72.204	67.311	0.331	26.475	193727.41
58	4.38	72.208	67.135	0.329	26.476	193733.41
58	4.63	72.203	67.199	0.330	26.475	193726.20
58	4.90	72.200	67.199	0.330	26.474	193723.59
58	5.15	72.200	67.269	0.330	26.473	193714.00
58	5.40	72.197	67.236	0.330	26.473	193714.30
58	5.65	72.182	67.166	0.329	26.473	193718.20
58	5.90	72.183	67.265	0.330	26.471	193706.00
58	6.15	72.163	67.135	0.329	26.472	193720.30
58	6.40	72.167	67.128	0.329	26.472	193719.50
58	6.65	72.162	67.149	0.329	26.471	193712.30
58	6.90	72.163	67.149	0.329	26.471	193712.00
58	7.15	72.147	67.178	0.329	26.470	193711.80
58	7.40	72.142	67.141	0.329	26.470	193712.80
58	7.65	72.131	67.148	0.329	26.469	193708.80
58	7.90	72.128	67.065	0.328	26.470	193716.91
58	8.15	72.122	66.960	0.327	26.470	193720.70
58	8.40	72.106	67.027	0.328	26.469	193720.70
58	8.65	72.103	66.902	0.326	26.470	193724.70
58	8.90	72.111	67.031	0.328	26.468	193707.50
58	9.15	72.099	67.073	0.328	26.467	193708.50
58	9.40	72.089	66.978	0.327	26.468	193716.20
58	9.65	72.091	66.951	0.327	26.468	193713.91
58	9.90	72.078	67.037	0.328	26.467	193711.59
58	10.15	72.080	67.081	0.328	26.465	193700.09
58	10.40	72.088	66.999	0.327	26.466	193703.80

AVERAGE DATA VALUES

DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
58	10.65	72.070	66.642	0.323	26.469	193732.30
58	10.90	72.057	66.828	0.325	26.467	193722.00
58	11.15	72.057	66.900	0.326	26.465	193708.80
58	11.40	72.063	66.919	0.326	26.464	193701.09
58	11.65	72.061	66.956	0.327	26.464	193698.91
58	11.90	72.050	66.945	0.327	26.464	193700.20
58	12.15	72.046	66.979	0.327	26.463	193695.09
58	12.40	72.047	66.994	0.327	26.463	193693.41
58	12.65	72.044	67.010	0.328	26.462	193689.70
58	12.90	72.035	67.044	0.328	26.461	193686.50
58	13.15	72.043	67.024	0.328	26.461	193681.50
58	13.40	72.021	67.261	0.330	26.458	193666.00
58	13.65	72.020	67.315	0.331	26.457	193661.91
58	13.90	72.016	67.349	0.331	26.457	193660.50
58	14.15	72.015	67.299	0.331	26.457	193661.41
58	14.40	72.023	67.298	0.331	26.456	193655.00
58	14.65	72.011	67.190	0.330	26.457	193668.41
58	14.90	72.034	67.492	0.333	26.453	193631.00
58	15.15	72.016	67.454	0.333	26.453	193637.20
58	15.40	72.003	67.470	0.333	26.453	193640.59
58	15.65	72.006	67.542	0.334	26.452	193633.30
58	15.90	72.003	67.532	0.333	26.452	193631.59
58	16.15	72.001	67.556	0.334	26.452	193630.30
58	16.40	72.002	67.411	0.332	26.453	193638.41
58	16.65	72.001	67.616	0.334	26.450	193618.09
58	16.90	71.990	67.506	0.333	26.446	193594.09
58	17.15	71.996	67.490	0.333	26.446	193593.59
58	17.40	71.984	67.527	0.333	26.445	193591.09
58	17.50	71.981	67.598	0.334	26.444	193582.30
58	17.75	72.001	67.628	0.335	26.444	193572.80
59	18.00	71.995	67.702	0.335	26.443	193568.59
59	18.25	71.986	67.522	0.333	26.445	193583.30
59	18.50	71.982	67.526	0.333	26.444	193584.41
59	18.75	71.994	67.379	0.332	26.446	193589.00
59	19.00	71.976	67.403	0.332	26.445	193589.59
59	19.25	71.978	67.482	0.333	26.444	193582.30
59	19.50	71.988	67.563	0.334	26.442	193564.30
59	19.75	71.979	67.554	0.334	26.442	193568.50
59	20.00	71.981	67.499	0.333	26.443	193572.41
59	20.25	71.993	67.433	0.332	26.443	193569.91

AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
59	20.75	71.983	67.494	0.333	26.442	193568.59
59	21.00	71.990	67.493	0.333	26.442	193566.09
59	21.25	71.979	67.434	0.332	26.443	193571.09
59	21.50	71.990	67.445	0.332	26.442	193562.70
59	21.75	71.980	67.495	0.333	26.441	193562.20
59	22.00	71.969	67.566	0.334	26.440	193556.41
59	22.25	71.963	67.503	0.333	26.441	193563.91
59	22.50	71.973	67.567	0.334	26.440	193554.80
59	22.75	71.971	67.591	0.334	26.440	193553.70
59	23.00	71.972	67.437	0.332	26.441	193562.50
59	23.25	71.971	67.603	0.334	26.439	193545.09
59	23.75	71.966	67.547	0.334	26.439	193551.70
59	24.00	71.955	67.510	0.333	26.439	193555.00
59	24.25	71.957	67.502	0.333	26.439	193555.00
59	24.50	71.958	67.445	0.332	26.440	193559.41
59	24.75	71.960	67.603	0.334	26.438	193545.59
59	25.00	71.974	67.570	0.334	26.438	193539.80
59	25.25	71.958	67.760	0.336	26.436	193529.41
59	25.50	71.960	67.566	0.334	26.437	193541.20
59	25.75	71.966	67.614	0.334	26.437	193535.00
59	26.00	71.963	67.603	0.334	26.437	193537.20
59	26.25	71.945	67.526	0.333	26.437	193546.41
59	26.50	71.964	67.559	0.334	26.437	193533.09
59	26.75	71.932	67.438	0.332	26.438	193554.91
59	27.00	71.940	67.453	0.333	26.438	193550.80
59	27.25	71.918	67.465	0.333	26.438	193557.80
59	27.50	71.929	67.383	0.332	26.439	193560.41
59	27.75	71.916	67.518	0.333	26.437	193554.00
59	28.00	71.938	67.425	0.332	26.438	193553.80
59	28.25	71.902	67.254	0.330	26.440	193577.50
59	28.50	71.897	67.317	0.331	26.438	193570.41
59	28.75	71.888	67.277	0.331	26.439	193576.91
59	29.00	71.890	67.228	0.330	26.439	193576.50
59	29.25	71.894	67.249	0.330	26.439	193573.59
59	29.50	71.906	67.253	0.330	26.439	193568.80
59	29.75	71.893	67.165	0.329	26.440	193581.00
59	30.00	71.914	67.216	0.330	26.439	193568.91
59	30.25	71.916	67.262	0.330	26.438	193560.91
59	30.50	71.910	67.267	0.330	26.438	193562.50
59	30.75	71.906	67.087	0.328	26.440	193579.00
59	31.00	71.900	67.241	0.330	26.438	193568.30
59	31.25	71.910	67.259	0.330	26.438	193563.30
59	31.50	71.905	67.266	0.330	26.438	193564.59
59	31.75	71.909	67.227	0.330	26.438	193566.09
59	32.00	71.939	67.157	0.329	26.439	193557.20

LEAKAGE RATE SUMMARY UNIT 1

		TOTAL TIME			MASS/POINT	
DATE	TIME	TTLM	LMCALC	SL	LAM	L95
58	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
58	0.25	0.8062	0.0000	0.0000	0.0000	0.0000
58	0.50	0.3770	0.3770	0.0000	0.3767	2.4949
58	0.75	0.2439	0.1945	1.3659	0.2143	0.6415
58	1.00	0.2239	0.1307	0.8717	0.1714	0.3771
58	1.25	0.2408	0.1215	0.7509	0.1784	0.3006
58	1.50	0.2483	0.1268	0.6857	0.1926	0.2760
58	1.75	0.2176	0.1197	0.6128	0.1858	0.2463
58	2.00	0.1569	0.0930	0.5274	0.1519	0.2106
58	2.25	0.1973	0.0930	0.5012	0.1547	0.2008
58	2.50	0.1669	0.0845	0.4652	0.1448	0.1834
58	3.25	0.1509	0.0375	0.4267	0.1320	0.1629
58	3.50	0.1549	0.0565	0.4234	0.1286	0.1537
58	3.75	0.1166	0.0544	0.3982	0.1122	0.1381
58	4.00	0.1453	0.0595	0.3888	0.1127	0.1348
58	4.38	0.1157	0.0474	0.3647	0.1042	0.1250
58	4.63	0.1289	0.0501	0.3559	0.1027	0.1209
58	4.90	0.1284	0.0507	0.3470	0.1020	0.1181
58	5.15	0.1453	0.0553	0.3448	0.1066	0.1216
58	5.40	0.1379	0.0575	0.3399	0.1083	0.1220
58	5.65	0.1231	0.0567	0.3315	0.1065	0.1190
58	5.90	0.1434	0.0594	0.3291	0.1098	0.1217
58	6.15	0.1088	0.0563	0.3189	0.1051	0.1170
58	6.40	0.1062	0.0533	0.3096	0.1008	0.1127
58	6.65	0.1157	0.0522	0.3033	0.0996	0.1106
58	6.90	0.1119	0.0508	0.2971	0.0977	0.1081
58	7.15	0.1084	0.0492	0.2909	0.0958	0.1057
58	7.40	0.1031	0.0473	0.2845	0.0935	0.1030
58	7.65	0.1061	0.0460	0.2794	0.0922	0.1012
58	7.90	0.0901	0.0431	0.2723	0.0882	0.0975
58	8.15	0.0816	0.0396	0.2646	0.0835	0.0934
58	8.40	0.0791	0.0363	0.2574	0.0791	0.0895
58	8.65	0.0711	0.0325	0.2499	0.0741	0.0851
58	8.90	0.0931	0.0315	0.2463	0.0734	0.0838
58	9.15	0.0891	0.0303	0.2425	0.0722	0.0821
58	9.40	0.0766	0.0281	0.2374	0.0695	0.0793
58	9.65	0.0776	0.0262	0.2329	0.0672	0.0768
58	9.90	0.0786	0.0247	0.2289	0.0655	0.0747
58	10.15	0.0907	0.0245	0.2270	0.0657	0.0745
58	10.40	0.0841	0.0238	0.2244	0.0651	0.0735

LEAKAGE RATE SUMMARY UNIT 1

		TOTAL TIME			MASS/POINT	
DATE	TIME	TTLM	LMCALC	SL	LAM	L95
58	10.65	0.0489	0.0200	0.2179	0.0600	0.0696
58	10.90	0.0595	0.0176	0.2131	0.0569	0.0665
58	11.15	0.0729	0.0166	0.2103	0.0559	0.0651
58	11.40	0.0796	0.0162	0.2085	0.0558	0.0647
58	11.65	0.0802	0.0161	0.2070	0.0560	0.0644
58	11.90	0.0771	0.0157	0.2052	0.0557	0.0638
58	12.15	0.0808	0.0157	0.2041	0.0559	0.0637
58	12.40	0.0808	0.0158	0.2030	0.0562	0.0637
58	12.65	0.0829	0.0161	0.2022	0.0569	0.0641
58	12.90	0.0843	0.0165	0.2017	0.0576	0.0646
58	13.15	0.0874	0.0172	0.2015	0.0587	0.0655
58	13.40	0.1001	0.0188	0.2027	0.0611	0.0680
58	13.65	0.1020	0.0205	0.2041	0.0635	0.0706
58	13.90	0.1015	0.0221	0.2052	0.0656	0.0727
58	14.15	0.0989	0.0234	0.2060	0.0672	0.0744
58	14.40	0.1027	0.0250	0.2071	0.0692	0.0764
58	14.65	0.0895	0.0256	0.2068	0.0698	0.0768
58	14.90	0.1192	0.0282	0.2095	0.0732	0.0807
58	15.15	0.1121	0.0302	0.2112	0.0756	0.0833
58	15.40	0.1076	0.0318	0.2124	0.0776	0.0853
58	15.65	0.1117	0.0336	0.2138	0.0797	0.0875
58	15.90	0.1112	0.0354	0.2151	0.0817	0.0895
58	16.15	0.1105	0.0370	0.2162	0.0835	0.0912
58	16.40	0.1027	0.0381	0.2165	0.0844	0.0920
58	16.65	0.1162	0.0399	0.2180	0.0866	0.0941
58	16.90	0.1321	0.0426	0.2208	0.0900	0.0980
58	17.15	0.1305	0.0451	0.2232	0.0930	0.1013
58	17.40	0.1305	0.0475	0.2254	0.0957	0.1043
58	17.50	0.1359	0.0514	0.2291	0.0987	0.1075
58	17.75	0.1407	0.0540	0.2316	0.1019	0.1110
59	18.00	0.1416	0.0565	0.2341	0.1049	0.1142
59	18.25	0.1297	0.0583	0.2354	0.1067	0.1160
59	18.50	0.1272	0.0599	0.2365	0.1084	0.1176
59	18.75	0.1225	0.0612	0.2371	0.1095	0.1186
59	19.00	0.1204	0.0624	0.2376	0.1103	0.1192
59	19.25	0.1236	0.0637	0.2382	0.1114	0.1201
59	19.50	0.1334	0.0654	0.2394	0.1131	0.1217
59	19.75	0.1291	0.0669	0.2403	0.1144	0.1230
59	20.00	0.1251	0.0681	0.2409	0.1154	0.1238
59	20.25	0.1250	0.0693	0.2413	0.1163	0.1245

LEAKAGE RATE SUMMARY UNIT 1

		TOTAL TIME			MASS/POINT	
DATE	TIME	TTLM	LMCALC	SL	LAM	L95
59	20.75	0.1228	0.0690	0.2404	0.1171	0.1251
59	21.00	0.1228	0.0701	0.2409	0.1176	0.1255
59	21.25	0.1184	0.0710	0.2410	0.1179	0.1256
59	21.50	0.1219	0.0721	0.2413	0.1185	0.1260
59	21.75	0.1208	0.0730	0.2415	0.1189	0.1262
59	22.00	0.1227	0.0741	0.2418	0.1193	0.1265
59	22.25	0.1171	0.0748	0.2417	0.1195	0.1265
59	22.50	0.1209	0.0757	0.2419	0.1198	0.1266
59	22.75	0.1201	0.0765	0.2419	0.1201	0.1268
59	23.00	0.1141	0.0770	0.2416	0.1199	0.1265
59	23.25	0.1221	0.0778	0.2418	0.1204	0.1268
59	23.75	0.1161	0.0774	0.2406	0.1204	0.1266
59	24.00	0.1132	0.0779	0.1058	0.1201	0.1262
59	24.25	0.1120	0.0783	0.1059	0.1199	0.1259
59	24.50	0.1086	0.0786	0.1059	0.1194	0.1253
59	24.75	0.1145	0.0791	0.1061	0.1193	0.1251
59	25.00	0.1162	0.0797	0.1064	0.1193	0.1250
59	25.25	0.1202	0.0804	0.1069	0.1196	0.1251
59	25.50	0.1133	0.0809	0.1070	0.1195	0.1249
59	25.75	0.1151	0.0813	0.1073	0.1194	0.1248
59	26.00	0.1130	0.0817	0.1074	0.1192	0.1244
59	26.25	0.1076	0.0819	0.1073	0.1187	0.1239
59	26.50	0.1127	0.0822	0.1074	0.1186	0.1236
59	26.75	0.1016	0.0821	0.1070	0.1178	0.1228
59	27.00	0.1025	0.0821	0.1068	0.1170	0.1220
59	27.25	0.0984	0.0819	0.1063	0.1161	0.1211
59	27.50	0.0964	0.0816	0.1058	0.1151	0.1200
59	27.75	0.0984	0.0815	0.1054	0.1143	0.1192
59	28.00	0.0976	0.0813	0.1050	0.1134	0.1183
59	28.25	0.0863	0.0807	0.1041	0.1120	0.1170
59	28.50	0.0886	0.0802	0.1034	0.1107	0.1158
59	28.75	0.0851	0.0796	0.1026	0.1093	0.1144
59	29.00	0.0845	0.0790	0.1018	0.1079	0.1131
59	29.25	0.0850	0.0784	0.1010	0.1068	0.1120
59	29.50	0.0863	0.0779	0.1003	0.1057	0.1109
59	29.75	0.0805	0.0772	0.0994	0.1043	0.1096
59	30.00	0.0848	0.0767	0.0987	0.1032	0.1085
59	30.25	0.0874	0.0763	0.0981	0.1022	0.1075
59	30.50	0.0860	0.0759	0.0975	0.1013	0.1066
59	30.75	0.0787	0.0752	0.0967	0.1000	0.1053
59	31.00	0.0823	0.0747	0.0960	0.0990	0.1043
59	31.25	0.0837	0.0743	0.0953	0.0981	0.1034
59	31.50	0.0825	0.0738	0.0947	0.0971	0.1024
59	31.75	0.0813	0.0733	0.0940	0.0962	0.1015
59	32.00	0.0840	0.0729	0.0934	0.0954	0.1007

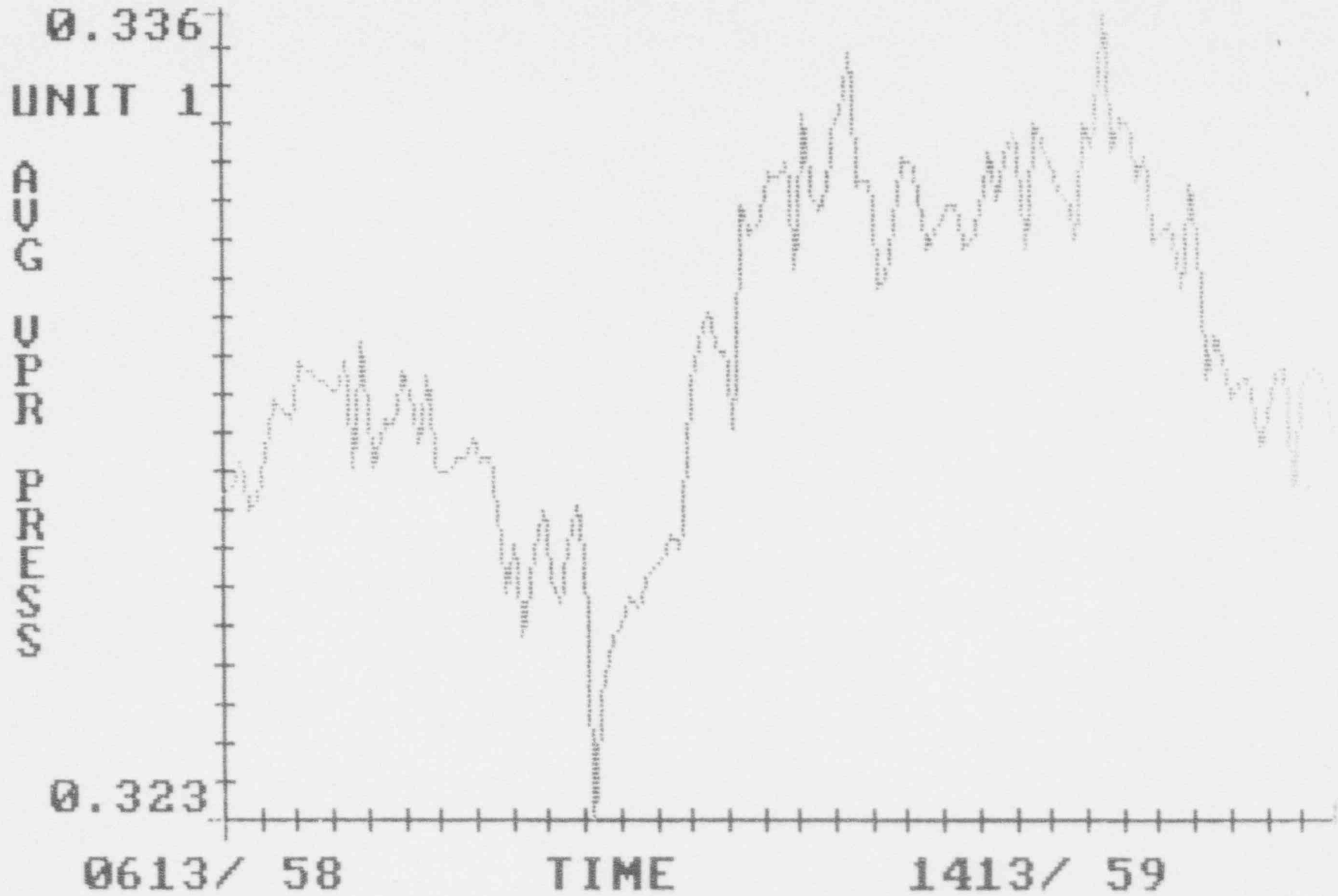
LEAKAGE RATE TREND UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
58	0.25	0.8062	0.0000	0.0000	0.0000	0.0000
58	0.50	0.3770	0.3770	0.3770	0.3767	0.3767
58	0.75	0.2439	0.1945	-0.1824	0.2143	-0.1625
58	1.00	0.2239	0.1307	-0.0638	0.1714	-0.0429
58	1.25	0.2408	0.1215	-0.0092	0.1784	0.0069
58	1.50	0.2483	0.1268	0.0053	0.1926	0.0143
58	1.75	0.2176	0.1197	-0.0071	0.1858	-0.0068
58	2.00	0.1569	0.0930	-0.0267	0.1519	-0.0339
58	2.25	0.1973	0.0930	0.0001	0.1547	0.0028
58	2.50	0.1669	0.0845	-0.0086	0.1448	-0.0099
58	3.25	0.1509	0.0375	-0.0469	0.1320	-0.0128
58	3.50	0.1549	0.0565	0.0190	0.1286	-0.0034
58	3.75	0.1166	0.0544	-0.0021	0.1122	-0.0165
58	4.00	0.1453	0.0595	0.0050	0.1127	0.0006
58	4.38	0.1157	0.0474	-0.0121	0.1042	-0.0085
58	4.63	0.1289	0.0501	0.0027	0.1027	-0.0015
58	4.90	0.1284	0.0507	0.0006	0.1020	-0.0007
58	5.15	0.1453	0.0553	0.0046	0.1066	0.0045
58	5.40	0.1379	0.0575	0.0022	0.1083	0.0018
58	5.65	0.1231	0.0567	-0.0008	0.1065	-0.0019
58	5.90	0.1434	0.0594	0.0027	0.1098	0.0033
58	6.15	0.1088	0.0563	-0.0031	0.1051	-0.0047
58	6.40	0.1062	0.0533	-0.0030	0.1008	-0.0042
58	6.65	0.1157	0.0522	-0.0011	0.0996	-0.0012
58	6.90	0.1119	0.0508	-0.0014	0.0977	-0.0019
58	7.15	0.1084	0.0492	-0.0016	0.0958	-0.0019
58	7.40	0.1031	0.0473	-0.0020	0.0935	-0.0023
58	7.65	0.1061	0.0460	-0.0012	0.0922	-0.0013
58	7.90	0.0901	0.0431	-0.0029	0.0882	-0.0041
58	8.15	0.0816	0.0396	-0.0035	0.0835	-0.0047
58	8.40	0.0791	0.0363	-0.0033	0.0791	-0.0044
58	8.65	0.0711	0.0325	-0.0038	0.0741	-0.0050
58	8.90	0.0931	0.0315	-0.0010	0.0734	-0.0007
58	9.15	0.0891	0.0303	-0.0012	0.0722	-0.0012
58	9.40	0.0766	0.0281	-0.0023	0.0695	-0.0027
58	9.65	0.0776	0.0262	-0.0019	0.0672	-0.0023
58	9.90	0.0786	0.0247	-0.0015	0.0655	-0.0017
58	10.15	0.0907	0.0245	-0.0002	0.0657	0.0002
58	10.40	0.0841	0.0238	-0.0007	0.0651	-0.0006

LEAKAGE RATE TREND UNIT 1

		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
58	10.65	0.0489	0.0200	-0.0038	0.0600	-0.0050
58	10.90	0.0595	0.0176	-0.0024	0.0569	-0.0032
58	11.15	0.0729	0.0166	-0.0010	0.0559	-0.0010
58	11.40	0.0796	0.0162	-0.0003	0.0558	-0.0001
58	11.65	0.0802	0.0161	-0.0002	0.0560	0.0001
58	11.90	0.0771	0.0157	-0.0004	0.0557	-0.0003
58	12.15	0.0808	0.0157	0.0000	0.0559	0.0003
58	12.40	0.0808	0.0158	0.0001	0.0562	0.0003
58	12.65	0.0829	0.0161	0.0003	0.0569	0.0006
58	12.90	0.0843	0.0165	0.0004	0.0576	0.0007
58	13.15	0.0874	0.0172	0.0007	0.0587	0.0011
58	13.40	0.1001	0.0188	0.0016	0.0611	0.0023
58	13.65	0.1020	0.0205	0.0017	0.0635	0.0024
58	13.90	0.1015	0.0221	0.0016	0.0656	0.0021
58	14.15	0.0989	0.0234	0.0013	0.0672	0.0017
58	14.40	0.1027	0.0250	0.0016	0.0692	0.0020
58	14.65	0.0895	0.0256	0.0006	0.0698	0.0006
58	14.90	0.1192	0.0282	0.0026	0.0732	0.0034
58	15.15	0.1121	0.0302	0.0020	0.0756	0.0024
58	15.40	0.1076	0.0318	0.0016	0.0776	0.0020
58	15.65	0.1117	0.0336	0.0018	0.0797	0.0021
58	15.90	0.1112	0.0354	0.0017	0.0817	0.0020
58	16.15	0.1105	0.0370	0.0016	0.0835	0.0018
58	16.40	0.1027	0.0381	0.0011	0.0844	0.0009
58	16.65	0.1162	0.0399	0.0019	0.0866	0.0021
58	16.90	0.1321	0.0426	0.0027	0.0900	0.0034
58	17.15	0.1305	0.0451	0.0025	0.0930	0.0030
58	17.40	0.1305	0.0475	0.0024	0.0957	0.0027
58	17.50	0.1359	0.0514	0.0039	0.0987	0.0030
58	17.75	0.1407	0.0540	0.0026	0.1019	0.0032
59	18.00	0.1416	0.0565	0.0025	0.1049	0.0030
59	18.25	0.1297	0.0583	0.0018	0.1067	0.0018
59	18.50	0.1272	0.0599	0.0016	0.1084	0.0017
59	18.75	0.1225	0.0612	0.0013	0.1095	0.0011
59	19.00	0.1204	0.0624	0.0012	0.1103	0.0008
59	19.25	0.1236	0.0637	0.0013	0.1114	0.0011
59	19.50	0.1334	0.0654	0.0017	0.1131	0.0017
59	19.75	0.1291	0.0669	0.0015	0.1144	0.0013
59	20.00	0.1251	0.0681	0.0012	0.1154	0.0010
59	20.25	0.1250	0.0693	0.0012	0.1163	0.0009

LEAKAGE RATE TREND UNIT 1

		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
59	20.75	0.1228	0.0690	-0.0004	0.1171	0.0008
59	21.00	0.1228	0.0701	0.0012	0.1176	0.0005
59	21.25	0.1184	0.0710	0.0009	0.1179	0.0003
59	21.50	0.1219	0.0721	0.0011	0.1185	0.0005
59	21.75	0.1208	0.0730	0.0010	0.1189	0.0004
59	22.00	0.1227	0.0741	0.0010	0.1193	0.0005
59	22.25	0.1171	0.0748	0.0007	0.1195	0.0001
59	22.50	0.1209	0.0757	0.0009	0.1198	0.0003
59	22.75	0.1201	0.0765	0.0008	0.1201	0.0003
59	23.00	0.1141	0.0770	0.0005	0.1199	-0.0002
59	23.25	0.1221	0.0778	0.0009	0.1204	0.0004
59	23.75	0.1161	0.0774	-0.0005	0.1204	0.0000
59	24.00	0.1132	0.0779	0.0005	0.1201	-0.0003
59	24.25	0.1120	0.0783	0.0004	0.1199	-0.0002
59	24.50	0.1086	0.0786	0.0003	0.1194	-0.0005
59	24.75	0.1145	0.0791	0.0005	0.1193	-0.0001
59	25.00	0.1162	0.0797	0.0006	0.1193	0.0000
59	25.25	0.1202	0.0804	0.0007	0.1196	0.0003
59	25.50	0.1133	0.0809	0.0004	0.1195	-0.0001
59	25.75	0.1151	0.0813	0.0005	0.1194	-0.0000
59	26.00	0.1130	0.0817	0.0004	0.1192	-0.0002
59	26.25	0.1076	0.0819	0.0002	0.1187	-0.0005
59	26.50	0.1127	0.0822	0.0004	0.1186	-0.0001
59	26.75	0.1016	0.0821	-0.0001	0.1178	-0.0008
59	27.00	0.1025	0.0821	-0.0000	0.1170	-0.0007
59	27.25	0.0984	0.0819	-0.0002	0.1161	-0.0009
59	27.50	0.0964	0.0816	-0.0003	0.1151	-0.0010
59	27.75	0.0984	0.0815	-0.0002	0.1143	-0.0008
59	28.00	0.0976	0.0813	-0.0002	0.1134	-0.0009
59	28.25	0.0863	0.0807	-0.0006	0.1120	-0.0014
59	28.50	0.0886	0.0802	-0.0005	0.1107	-0.0013
59	28.75	0.0851	0.0796	-0.0006	0.1093	-0.0014
59	29.00	0.0845	0.0790	-0.0006	0.1079	-0.0014
59	29.25	0.0850	0.0784	-0.0006	0.1068	-0.0012
59	29.50	0.0863	0.0779	-0.0005	0.1057	-0.0011
59	29.75	0.0805	0.0772	-0.0007	0.1043	-0.0014
59	30.00	0.0848	0.0767	-0.0005	0.1032	-0.0011
59	30.25	0.0874	0.0763	-0.0004	0.1022	-0.0010
59	30.50	0.0860	0.0759	-0.0004	0.1013	-0.0009
59	30.75	0.0787	0.0752	-0.0007	0.1000	-0.0013
59	31.00	0.0823	0.0747	-0.0005	0.0990	-0.0010
59	31.25	0.0837	0.0743	-0.0005	0.0981	-0.0009
59	31.50	0.0825	0.0738	-0.0005	0.0971	-0.0009
59	31.75	0.0813	0.0733	-0.0005	0.0962	-0.0010
59	32.00	0.0840	0.0729	-0.0004	0.0954	-0.0008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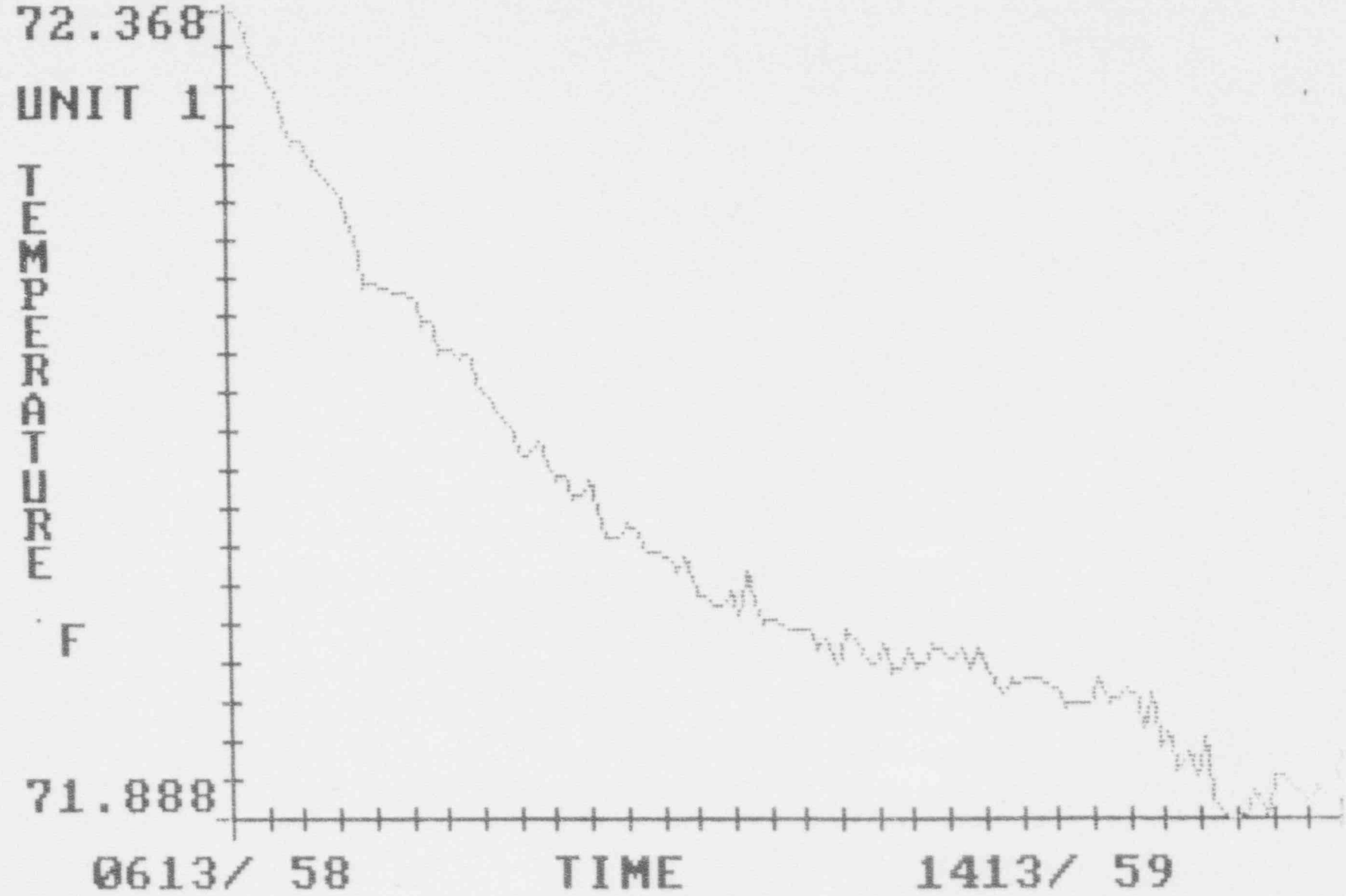
1413/ 59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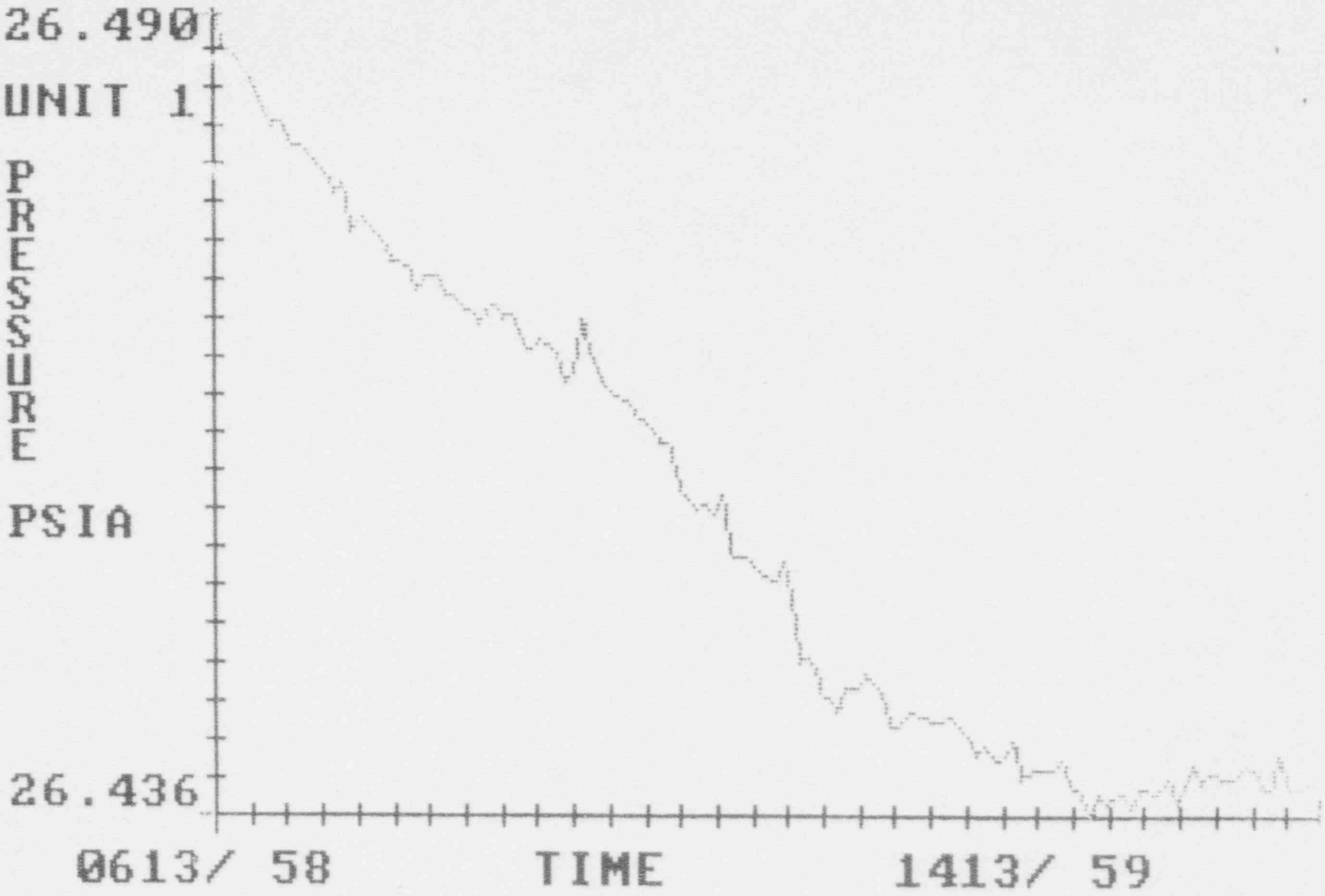
1413/ 59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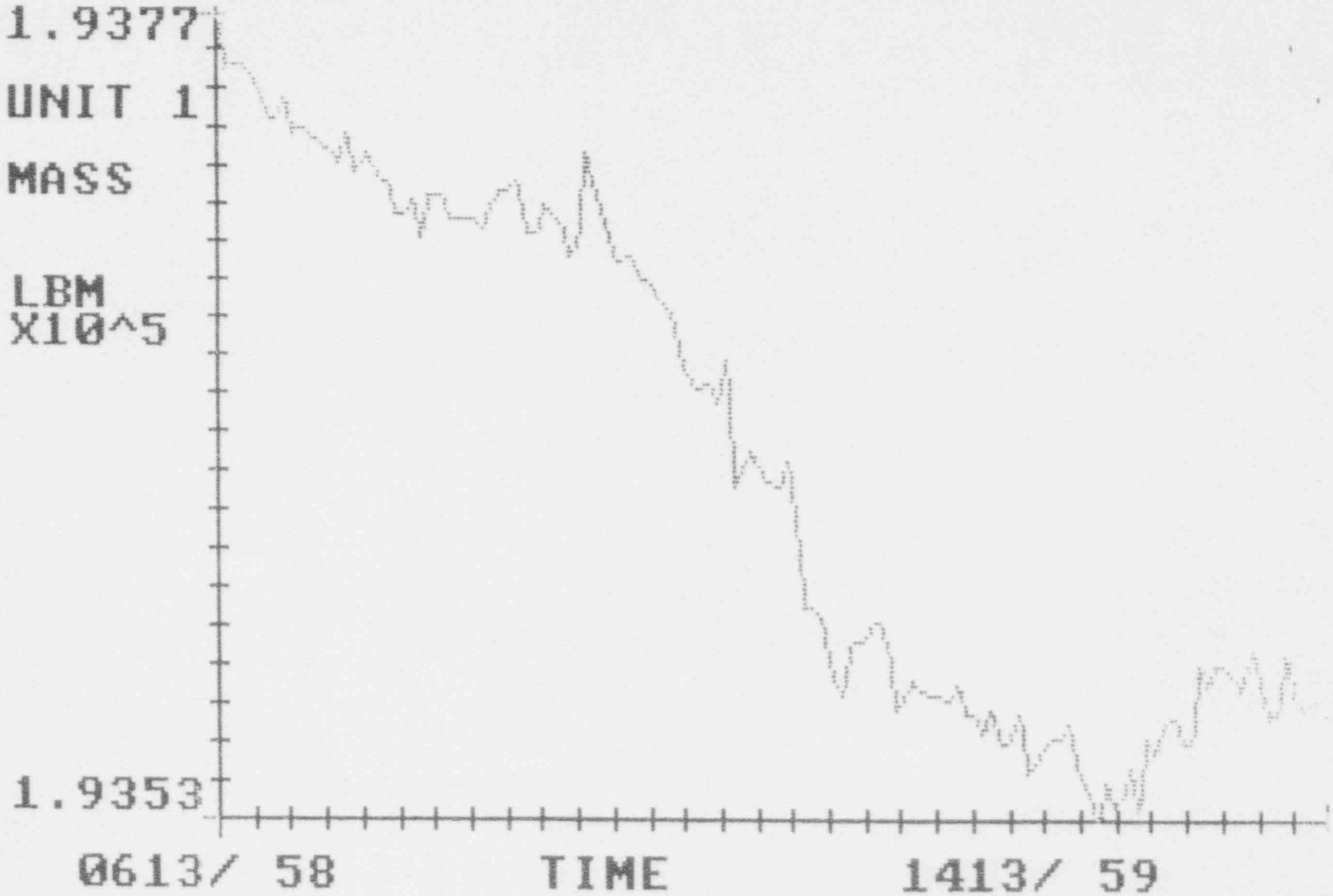
1413/ 59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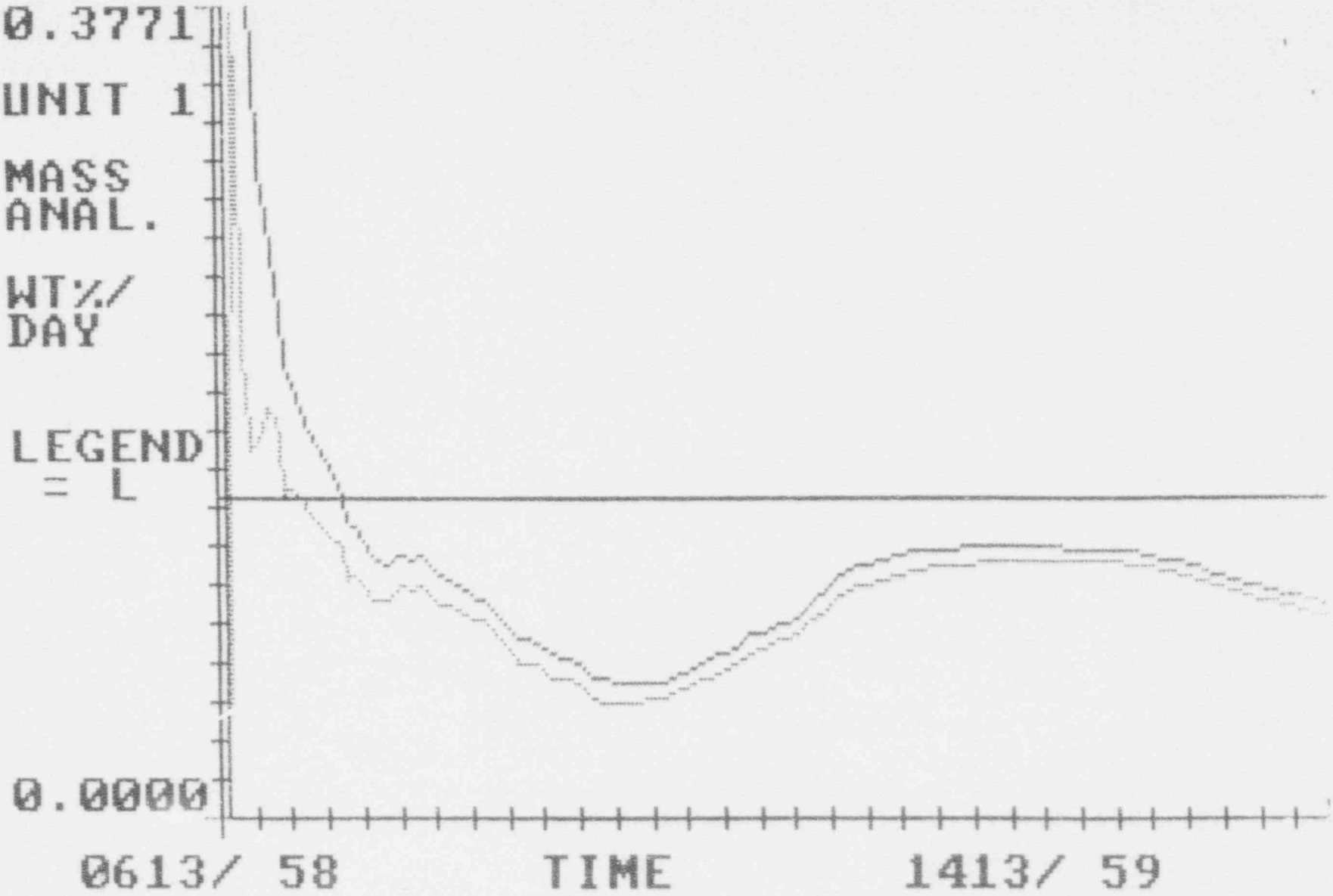
1413/ 59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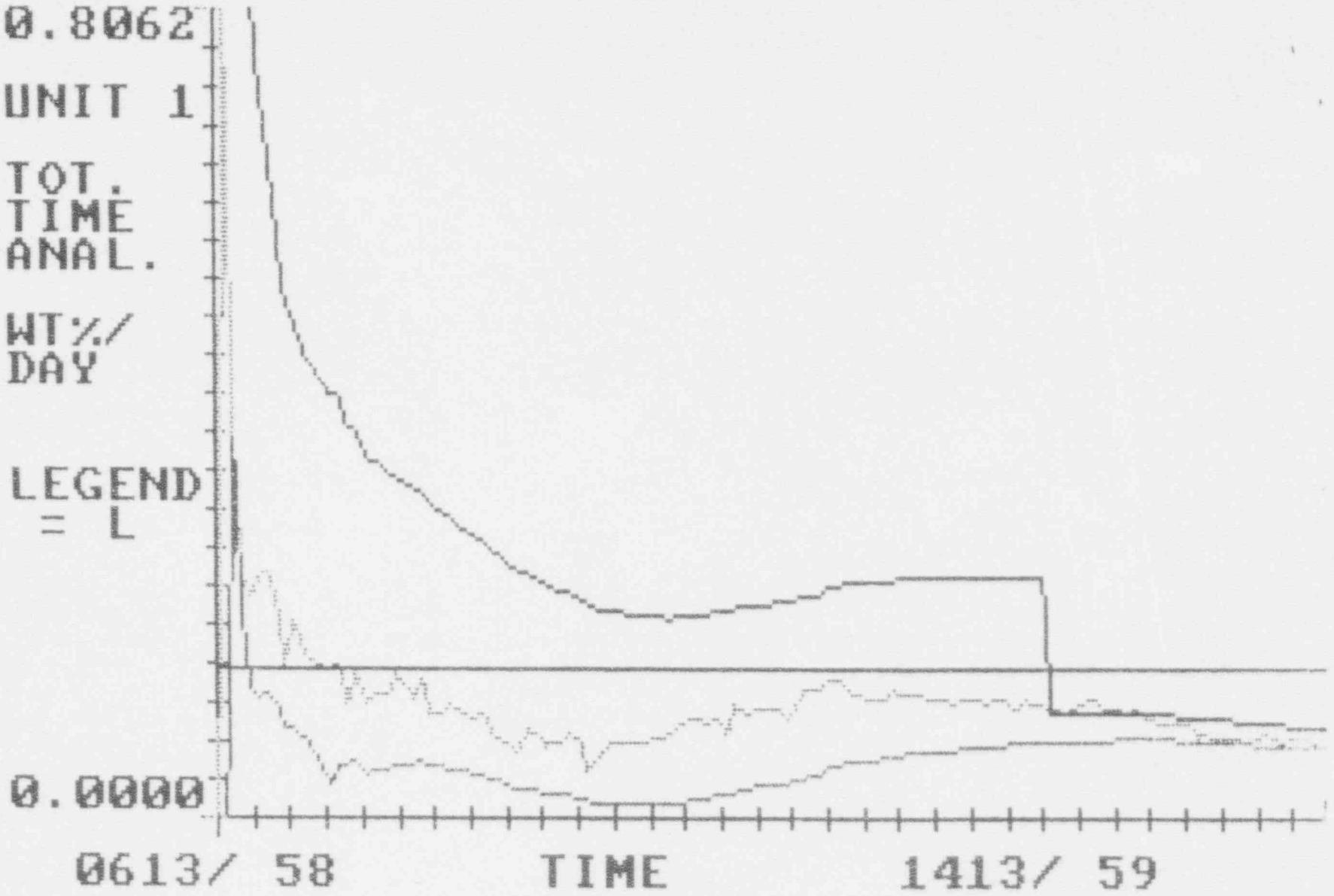
1413/ 59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0613/ 58
TIME
1413/ 59

APPENDIX C

VERIFICATION TEST DATA AND PLOTS

VERIFICATION MODE
OPTIONS:

TIME= 0128
TEST SUMMARY

1 - MANUAL DATA ENTRY
2 - PARAMETER GRAPHS
3 - SENSOR PLOTS
4 - TREND ANALYSIS
5 - REPRINT CURRENT DATA PT
6 - SENSOR DIFFERENTIALS

P - PASSWORD MENU

SELECTED OPTION =

# OF DATA POINTS	= 41
MODE DURATION (IN HOURS)	= 10.00
TOT TIME MEASURED LEAK	= 0.3617
TOT TIME CALCULATED LEAK	= 0.2793
MASS PT LEAK	= 0.2935
IMPOSED LEAK	= 0.1973
TOT TIME UPPER LIMIT	= 0.3202
TOT TIME LOWER LIMIT	= 0.2202
MASS PT UPPER LIMIT	= 0.3427
MASS PT LOWER LIMIT	= 0.2427

TOT TIME VERIFICATION CRITERIA HAS BEEN MET

MASS PT VERIFICATION CRITERIA HAS BEEN MET

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP:	71.925/ -0.020	AVG PRESS:	26.392 / +0.002
MASS:	193219.30/ +20.594	AVG DEW PRESS:	0.3363/ +0.0002
		TOTAL PRESS:	26.728 / +0.002

VERF MODE
Perry Nuclear Power Plant UNIT 1 Page 1

LEAKAGE RATE SUMMARY UNIT 1						
		TOTAL TIME			MASS/POINT	
DATE	TIME	TTLM	LMCALC	SL	LAM	L95
59	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
59	0.25	1.0866	0.0000	0.0000	0.0000	0.0000
59	0.50	0.7993	0.7993	0.0000	0.7989	2.2175
59	0.75	0.5856	0.5733	0.8647	0.5780	1.0127
59	1.00	0.5656	0.4928	0.9771	0.5189	0.7350
59	1.25	0.9089	0.6713	1.5655	0.7531	1.0694
59	1.50	0.8830	0.7541	1.4971	0.8378	1.0705
59	1.75	0.8906	0.8066	1.4348	0.8811	1.0553
59	2.00	0.8029	0.8030	1.3420	0.8547	0.9893
59	2.25	0.7279	0.7725	1.2525	0.8024	0.9221
59	2.50	2.1739	1.2512	2.4112	1.4272	2.0948
59	2.75	0.5930	1.0885	2.2710	1.1480	1.7701
59	3.00	2.5882	1.5558	3.0288	1.7493	2.5612
59	3.25	0.5706	1.3518	2.8904	1.4028	2.1796
59	3.50	0.5430	1.1857	2.7266	1.1463	1.8642
59	3.75	0.4720	1.0372	2.5592	0.9385	1.5978
59	4.00	0.4755	0.9192	2.4024	0.7877	1.3863
59	4.25	0.5140	0.8321	2.2657	0.6878	1.2271
59	4.50	0.5125	0.7606	2.1445	0.6134	1.0998
59	4.75	0.5065	0.7006	2.0368	0.5554	0.9955
59	5.00	0.3940	0.6299	1.9259	0.4834	0.8868
59	5.25	0.4398	0.5789	1.8337	0.4390	0.8075
59	5.50	0.4722	0.5415	1.7572	0.4135	0.7500
59	5.75	0.4929	0.5133	1.6926	0.3989	0.7070
59	6.00	0.4669	0.4854	1.6313	0.3827	0.6661
59	6.25	0.4818	0.4639	1.5790	0.3735	0.6348
59	6.50	0.4973	0.4478	1.5346	0.3707	0.6122
59	6.75	0.5036	0.4350	1.4957	0.3705	0.5944
59	7.00	0.4840	0.4214	1.4578	0.3677	0.5759
59	7.25	0.4754	0.4086	1.4223	0.3644	0.5585
59	7.50	0.4040	0.3886	1.3805	0.3495	0.5314
59	7.75	0.4230	0.3733	1.3451	0.3409	0.5114
59	8.00	0.4313	0.3610	1.3139	0.3357	0.4958
59	8.25	0.4136	0.3482	1.2833	0.3288	0.4795
59	8.50	0.3956	0.3349	1.2531	0.3204	0.4626
60	8.77	0.3793	0.3202	1.2226	0.3112	0.4457
60	9.02	0.3917	0.3097	1.1971	0.3056	0.4328
60	9.25	0.4012	0.3025	1.1757	0.3026	0.4230
60	9.50	0.4126	0.2961	1.1564	0.3022	0.4163
60	9.75	0.3973	0.2890	1.1368	0.2999	0.4083

LEAKAGE RATE SUMMARY UNIT 1						
		TOTAL TIME			MASS/POINT	
DATE	TIME	TTLM	LMCALC	SL	LAM	L95
60	10.00	0.3617	0.2793	1.1147	0.2935	0.3967

VERF MODE
Perry Nuclear Power Plant UNIT 1 Page 1

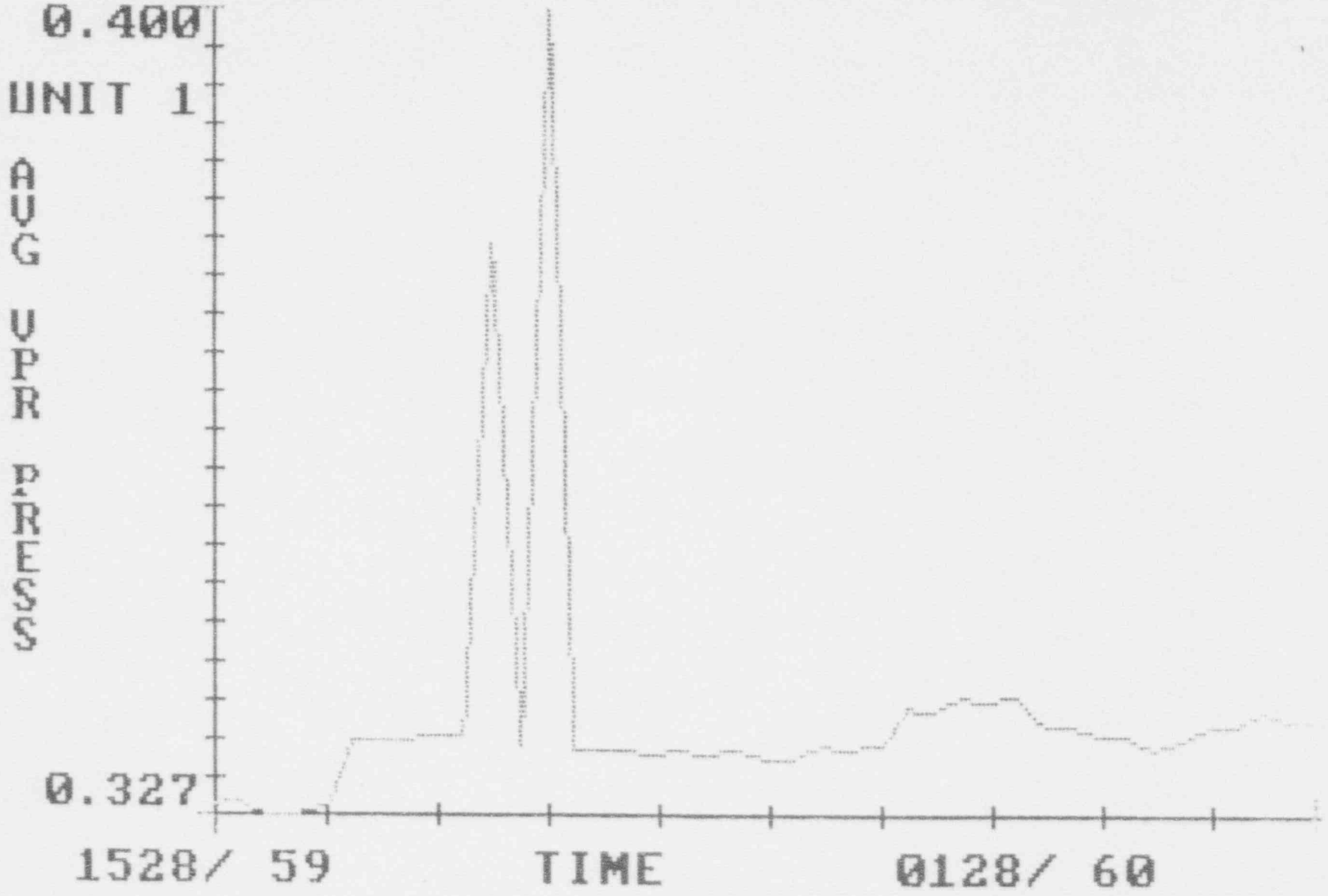
LEAKAGE RATE TREND UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
59	0.25	1.0868	0.0000	0.0000	0.0000	0.0000
59	0.50	0.7993	0.7993	0.7993	0.7989	0.7989
59	0.75	0.5856	0.5733	-0.2260	0.5780	-0.2210
59	1.00	0.5656	0.4928	-0.0806	0.5189	-0.0590
59	1.25	0.9089	0.6713	0.1786	0.7531	0.2342
59	1.50	0.8830	0.7541	0.0828	0.8378	0.0847
59	1.75	0.8906	0.8066	0.0525	0.8811	0.0434
59	2.00	0.8029	0.8030	-0.0036	0.8547	-0.0264
59	2.25	0.7279	0.7725	-0.0306	0.8024	-0.0523
59	2.50	2.1739	1.2512	0.4787	1.4272	0.6247
59	2.75	0.5930	1.0885	-0.1626	1.1480	-0.2792
59	3.00	2.5882	1.5558	0.4673	1.7493	0.6013
59	3.25	0.5706	1.3518	-0.2040	1.4028	-0.3465
59	3.50	0.5430	1.1857	-0.1661	1.1463	-0.2565
59	3.75	0.4720	1.0372	-0.1485	0.9385	-0.2078
59	4.00	0.4755	0.9192	-0.1180	0.7877	-0.1509
59	4.25	0.5140	0.8321	-0.0871	0.6878	-0.0998
59	4.50	0.5125	0.7606	-0.0715	0.6134	-0.0744
59	4.75	0.5065	0.7006	-0.0600	0.5554	-0.0580
59	5.00	0.3940	0.6299	-0.0707	0.4834	-0.0720
59	5.25	0.4398	0.5789	-0.0510	0.4390	-0.0443
59	5.50	0.4722	0.5415	-0.0374	0.4135	-0.0256
59	5.75	0.4929	0.5133	-0.0282	0.3989	-0.0146
59	6.00	0.4669	0.4854	-0.0279	0.3827	-0.0162
59	6.25	0.4818	0.4639	-0.0215	0.3735	-0.0092
59	6.50	0.4973	0.4478	-0.0161	0.3707	-0.0028
59	6.75	0.5036	0.4350	-0.0128	0.3705	-0.0002
59	7.00	0.4840	0.4214	-0.0136	0.3677	-0.0028
59	7.25	0.4754	0.4086	-0.0128	0.3644	-0.0033
59	7.50	0.4040	0.3886	-0.0201	0.3495	-0.0149
59	7.75	0.4230	0.3733	-0.0152	0.3409	-0.0087
59	8.00	0.4313	0.3610	-0.0123	0.3357	-0.0051
59	8.25	0.4136	0.3482	-0.0128	0.3288	-0.0070
59	8.50	0.3956	0.3349	-0.0133	0.3204	-0.0083
60	8.77	0.3793	0.3202	-0.0147	0.3112	-0.0092
60	9.02	0.3917	0.3097	-0.0105	0.3056	-0.0056
60	9.25	0.4012	0.3025	-0.0072	0.3026	-0.0030
60	9.50	0.4126	0.2961	-0.0064	0.3022	-0.0005
60	9.75	0.3973	0.2890	-0.0071	0.2999	-0.0023

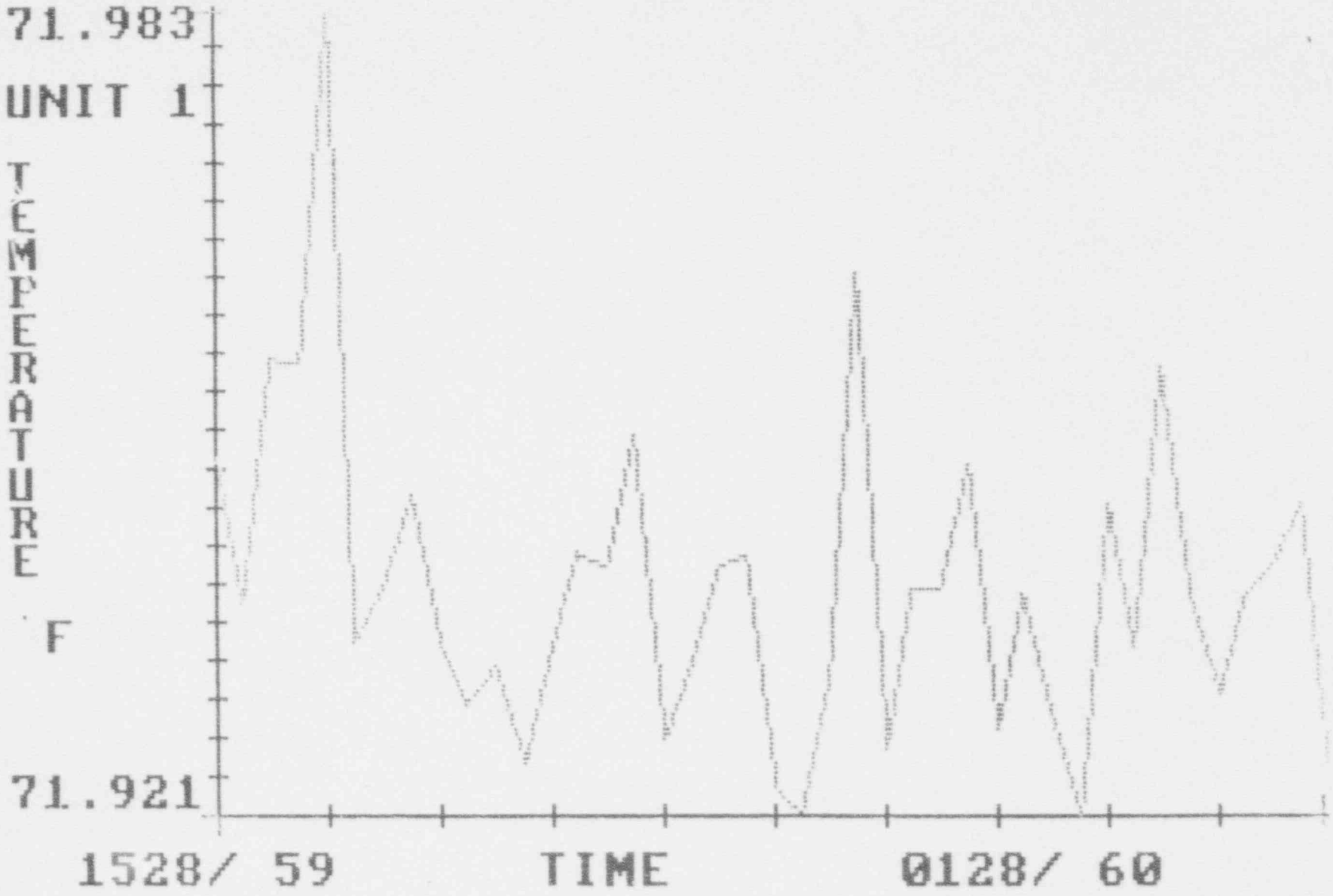
LEAKAGE RATE TREND UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
60	10.00	0.3617	0.2793	-0.0097	0.2935	-0.0064

VERF MODE
Page 1

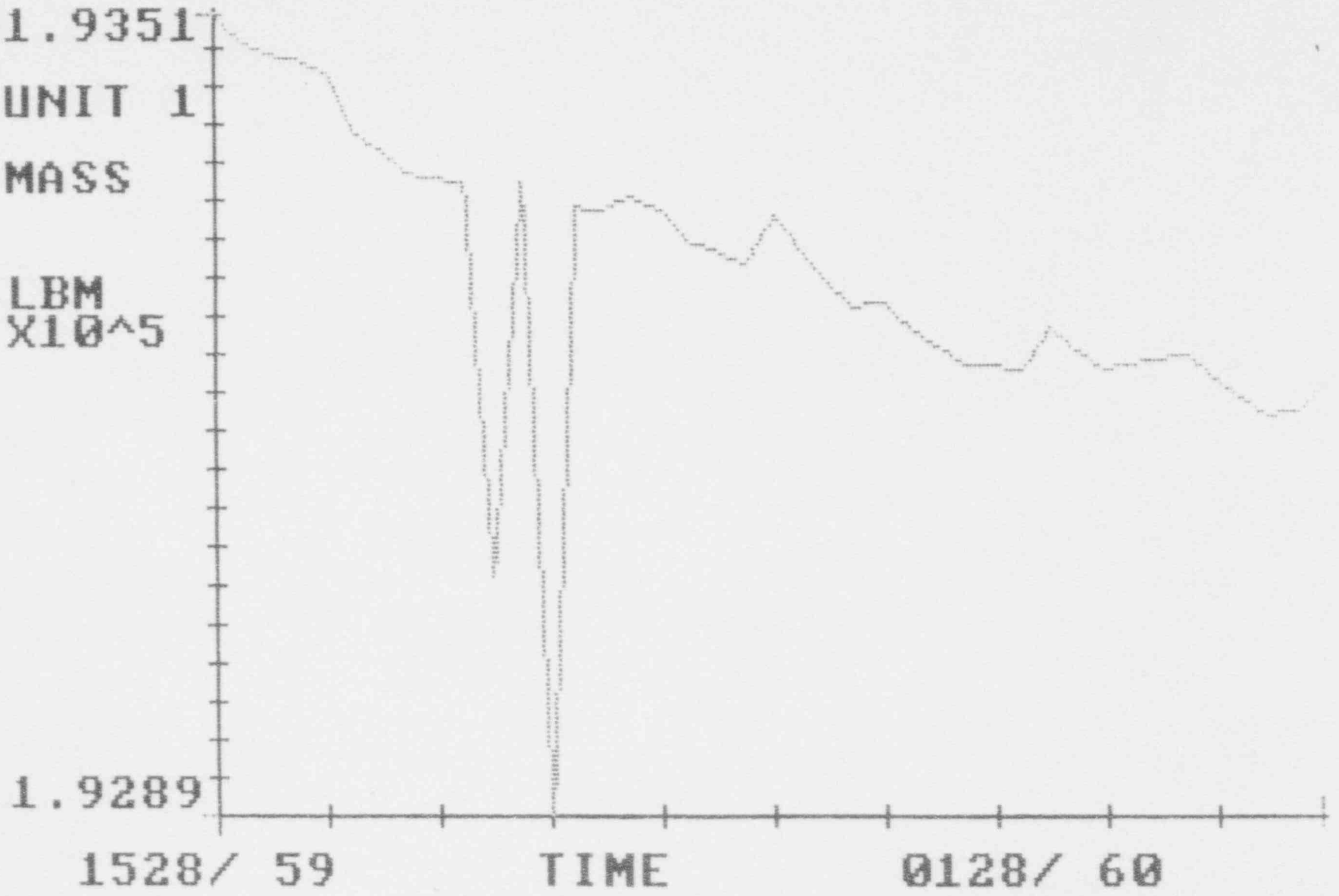
AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
59	0.00	71.948	67.097	0.329	26.433	193511.00
59	0.25	71.937	67.142	0.329	26.429	193489.09
59	0.50	71.956	67.005	0.327	26.429	193478.80
59	0.75	71.956	66.999	0.327	26.428	193475.59
59	1.00	71.983	67.093	0.328	26.428	193465.41
59	1.25	71.934	67.633	0.335	26.420	193419.41
59	1.50	71.939	67.617	0.334	26.418	193404.20
59	1.75	71.946	67.637	0.335	26.415	193385.41
59	2.00	71.934	67.644	0.335	26.414	193381.50
59	2.25	71.930	67.650	0.335	26.414	193379.00
59	2.50	71.932	71.239	0.379	26.372	193072.80
59	2.75	71.925	67.577	0.334	26.414	193379.50
59	3.00	71.934	72.836	0.400	26.347	192885.00
59	3.25	71.941	67.545	0.334	26.412	193361.50
59	3.50	71.940	67.549	0.334	26.411	193357.80
59	3.75	71.950	67.559	0.334	26.413	193368.30
59	4.00	71.927	67.522	0.333	26.411	193357.70
59	4.25	71.932	67.553	0.334	26.408	193334.91
59	4.50	71.940	67.503	0.333	26.407	193325.00
59	4.75	71.941	67.549	0.334	26.406	193317.00
59	5.00	71.923	67.474	0.333	26.410	193352.20
59	5.25	71.921	67.455	0.333	26.406	193324.80
59	5.50	71.932	67.599	0.334	26.403	193301.59
59	5.75	71.963	67.560	0.334	26.402	193282.50
59	6.00	71.926	67.601	0.334	26.401	193285.09
59	6.25	71.938	67.880	0.337	26.399	193268.20
59	6.50	71.938	67.828	0.337	26.397	193250.41
59	6.75	71.948	67.946	0.338	26.395	193236.91
59	7.00	71.928	67.935	0.338	26.394	193237.80
59	7.25	71.938	67.947	0.338	26.394	193233.09
59	7.50	71.929	67.723	0.336	26.398	193266.70
59	7.75	71.921	67.731	0.336	26.395	193246.70
59	8.00	71.945	67.659	0.335	26.395	193232.80
59	8.25	71.934	67.672	0.335	26.394	193235.91
59	8.50	71.955	67.532	0.333	26.396	193239.91
60	8.77	71.938	67.618	0.334	26.396	193242.91
60	9.02	71.930	67.716	0.336	26.393	193226.30
60	9.25	71.938	67.723	0.336	26.391	193211.80
60	9.50	71.940	67.824	0.337	26.389	193195.00
60	9.75	71.945	67.759	0.336	26.390	193198.70

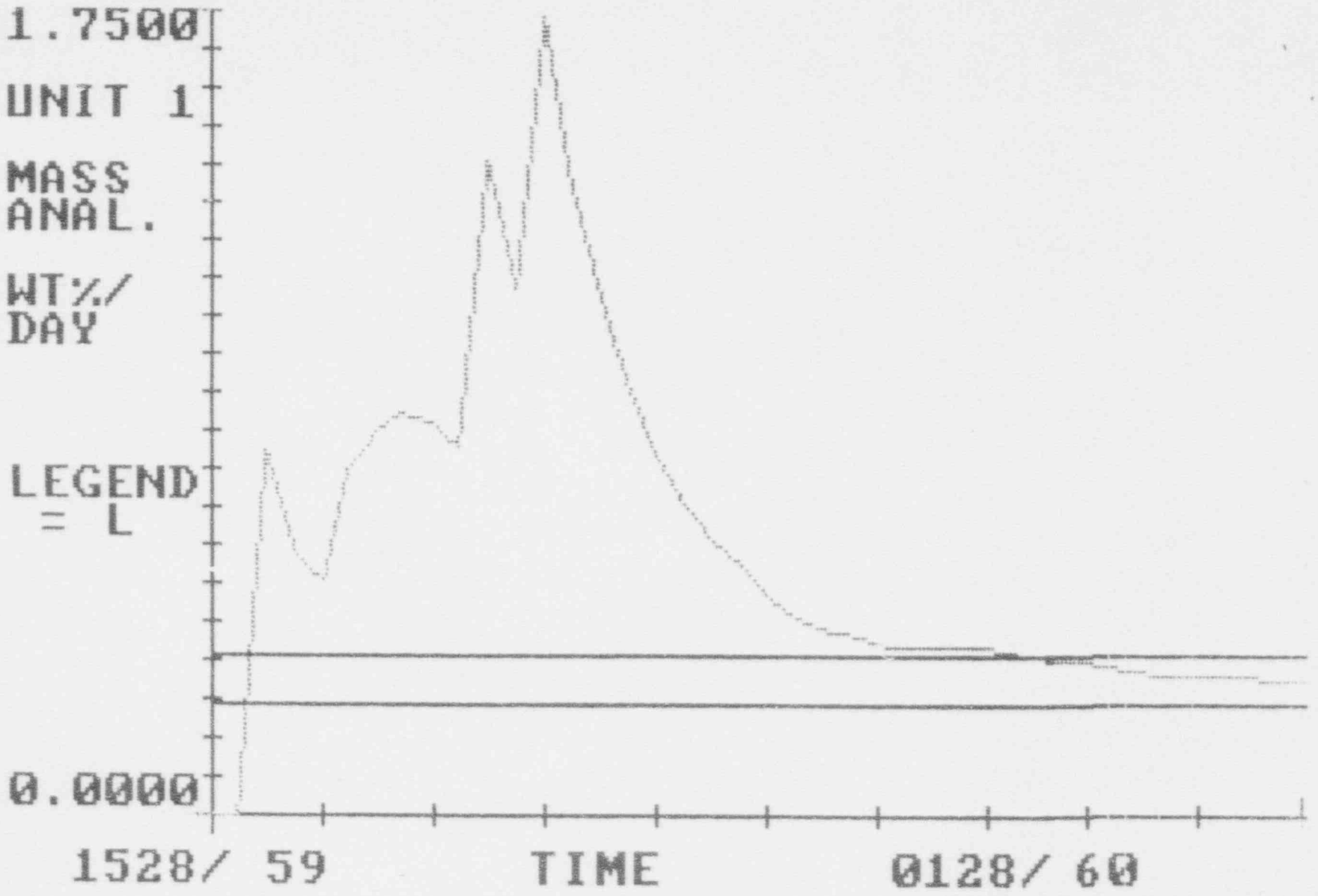
AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	DRY PRESS	MASS
60	10.00	71.925	67.777	0.336	26.392	193219.30


0.400
UNIT 1
AVG VPR PRESS
0.327
1528/ 59
TIME
0128/ 60


71.983
UNIT 1
TEMPERATURE
F
71.921
1528/ 59
TIME
0128/ 60

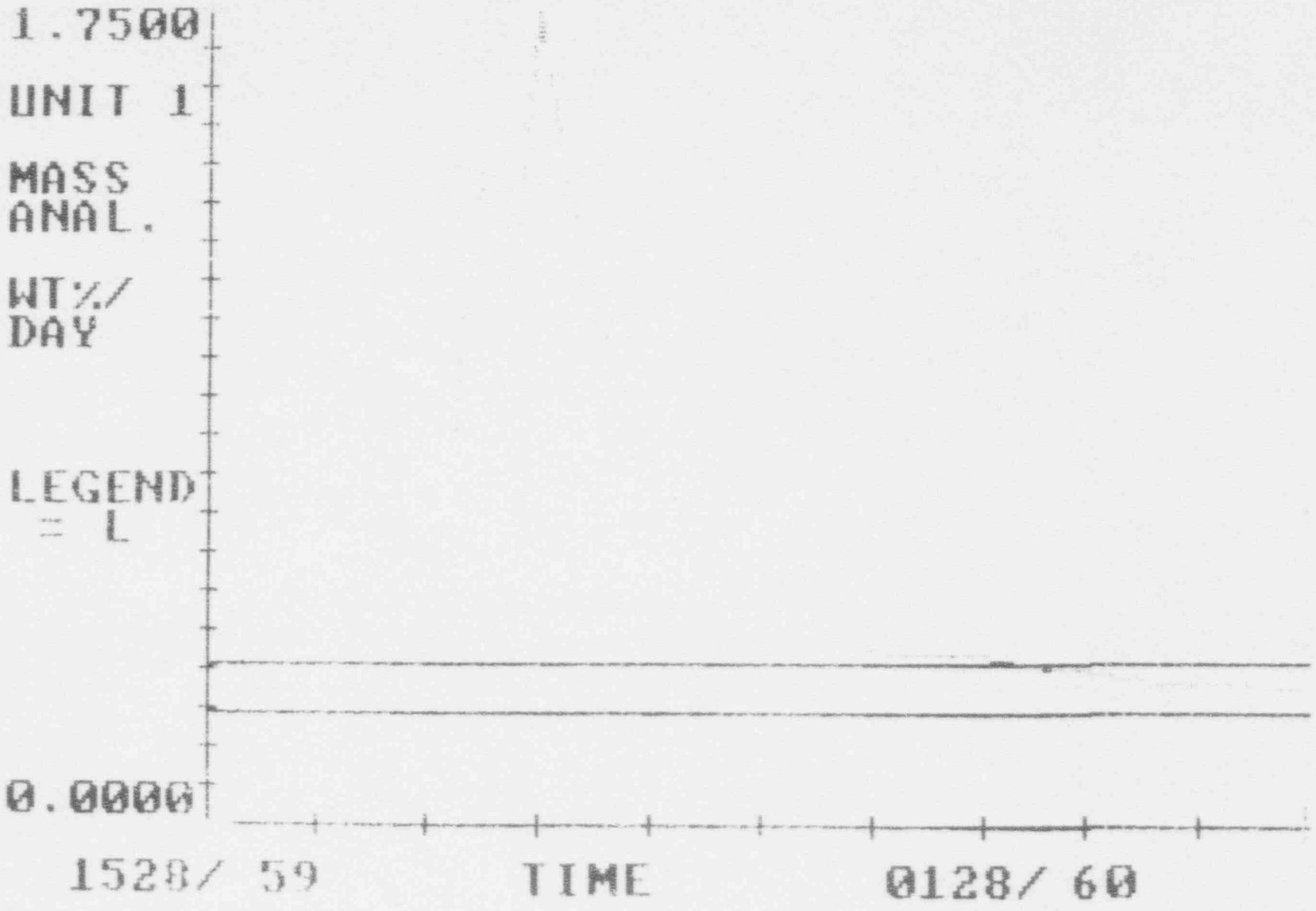
26.7611
UNIT 1
PRESSURE
PSIA
1528/ 59
1528/ 26.726
09 /28/ 60
0128/ 60
TIME


1.9351
UNIT 1
MASS
LBM
X10^5
1.9289
1528/ 59
TIME
0128/ 60


1.7500
UNIT 1
MASS
ANAL.
WT%/
DAY
LEGEND
= L
0.0000
1528/ 59
TIME
0128/ 60

APPENDIX D

TYPE B & C
LOCAL LEAKAGE RATE TEST SUMMARIES
(SINCE ILRT, JULY 1989)


1.7500
UNIT 1
MASS
ANAL.
WT%/
DAY
LEGEND
= L
0.0000
1528/ 59
TIME
0128/ 60

SUMMARY REPORT OF TYPE B & C TEST I RES SINCE RF01 ILRT (07/08/89)

PEN. NO.	VALVE NO.	AS-FOUND LLRT (SCCM)	DATE	PRE-REPAIR MIN PATH (SCCM)	AS-LEFT LLRT (SCCM)	DATE	POST-REPAIR MIN-PATH (SCCM)	SUMMARY/CORRECTIVE ACTION
P114	1M17-F010	Could not Pressurize	09/23/90	51.0 ± 6.0	18.6 ± 6.0	09/25/90	18.6 ± 6.0	In order to LLRT this penetration it is required to install a test shroud. Initial LLRT determined seal of flanged area of valve 1M17-F010 had been altered during installation of test shroud. Adjustments were made to ensure proper seal. LLRT was performed satisfactorily.
P204	1C11-F122	Could not Pressurize	11/15/90 04/21/92	53.70 ± 6.0 2.0 ± 0.6	56.15 ± 6.0 10.0 ± 6.0	11/23/90 04/30/92	53.7 ± 6.0 2.0 ± 0.60	On 11/19/90 installed new seal ring in 1C11-F122 swing check (also replaced bonnet, disc, clevis, and arm). Reperformed LLRT on 11/23/90 - sat. On 04/23/92 replaced check valve type from swing check to lift check. LLRT reperformed - sat. (See NOTE 1 for additional information)
P205	Fuel Transfer Tube	Could not Pressurize	11/29/90	N/A	2.86 ± 0.6	02/12/90	2.86 ± 0.6	Post LLRT after reinstallation of blank in Fuel Transfer Table determined excessive leakage at blind flange seal. Inspection on all 'o'-rings and seating surfaces was conducted with no deficiencies or abnormalities noted. Blind flange assembly was thoroughtly cleaned and reassembled. LLRT was reperformed - sat.
P208	1M17-F020	Could not Pressurize	09/22/90	10.0 ± 6.0	10.0 ± 6.0	09/24/90	10.0 ± 6.0	In order to LLRT this penetration it is required to install a test shroud. Initial LLRT determined seal of flanged area of valve 1M17-F020 had been altered during installation of test shroud. Adjustments were made to ensure proper seal. LLRT reperformed-sat.
P210	1P54-F1098	(See NOTE 4)	03/27/92	65.0 ± 6.0	159.78 ± 6.0	05/10/92	65.0 ± 6.0	1P54-F1098 (check valve) was binding, preventing the valve from closing. Valve was replaced with a different type valve. (See NOTE 3 for additional information)
P301	1G41-F140 1G41-F145	747.60 ± 60 439.50 ± 60	03/24/92 03/24/92	439.5 ± 60.0	94.10 ± 6.0 79.0 ± 6.0	05/06/92 05/06/92	79.0 ± 6.0	Motor operated butterfly valve 1G41-F140 needed adjustment of lower packing. Motor operated butterfly valve 1G41-F145 needed to have flanged area torqued to eliminate leakage.
P306	1P52-F550	3500 ± 600.0	03/26/92	203.83 ± 60.0	476.0 ± 60.0	03/30/92	203.83 ± 60.0	1P52-F550 check valve was disassembled. Valve internals were cleaned and body to bonnet gasket was replaced. LLRT reperformed - sat. (See NOTE 2 for additional information)

SUMMARY REPORT OF TYPE B & C TEST ... URES SINCE RF01 LLRT (07/08/89)

PEN. NO.	VALVE NO.	AS-FOUND LLRT (SCCM)	DATE	PRE-REPAIR MIN PATH (SCCM)	AS-LEFT LLRT (SCCM)	DATE	POST-REPAIR MIN-PATH (SCCM)	SUMMARY/CORRECTIVE ACTION
P308	1P51-F150	5,500±12,000	10/19/90	257 ± 60.0	137.53 ± 60.0	11/23/90	137.53 ± 6.0	Adjusted stroke and reset limit.
P311	1P43-F140	Could not pressurize	11/18/90	175.80 ± 60.0	117.50 ± 60.0	11/19/90	117.50 ± 60.0	Limit switch was adjusted to properly seat valve. LLRT reperformed - sat.
	1P43-F140	Could not pressurize	05/03/92	196.60 ± 6.0	2.0 ± 0.6	05/09/92	2.0 ± 0.6	Removed valve motor operator and valve from system to clean and rebuild valve. LLRT reperformed - sat.
	1P43-F140	22,370.43 ± 1019.40	10/27/92	N/A	20.0 ± 6.0	10/28/92	20.0 ± 6.0	During maintenance activity, limit switch was inadvertently repositioned. Limit switch was adjusted to properly seat valve.
P313	1M14-F045 1M14-F040 1M14-F190 (1M14-F195)	12,820.0 ± 600.0	11/22/90	11,750.0 ± 600.0	21.73 ± 6.0 16.6 ± 6.0		16.6 ± 6.0	Adjustment was made to 1M14-F040 travel stop. (Disc was going beyond seat).
	1M14-F045 1M14-F040 1M14-F190 (1M14-F195)	3130.0 ± 600.0	11/05/92	3130.00 ± 600.0	26.52 ± 6.0 23.47 ± 6.0	11/06/92	23.47 ± 6.0	Adjustments were made to seat ring of valve 1M14-F045. LLRT reperformed - sat.
	1M14-F045 1M14-F040 1M14-F190 (1M14-F195)	20,800 ± 6000.0	01/10/93	20,800 ± 6000.0	70.8 ± 6.0 55.4 ± 6.0	02/23/90	55.4 ± 6.0	Adjustments were made to travel stop and replaced seat ring on valve 1M14-F045. Cleaned seating surface of valve 1M14-F195.
P314	1M14-F090 1M14-F085 1M14-F200 (1M14-F205)	868.0 ± 60.0	03/20/92	868.0 ± 60.0	2.0 ± 0.6 2.0 ± 0.6	05/13/92	2.0 ± 0.6	Adjustments were made to 1M14-F090 actuator travel stops to allow valve seat to fully shut. Reperformed LLRT - sat.
P404	1P50-F539	10.0 ± 6.0 (See NOTE 4)	11/05/90	10.0 ± 6.0	470.5 ± 60.0 5.8 ± 0.6	11/13/90	5.8 ± 0.6	Replaced check valve with like valve due to excessive leakage past valve seat. Reperformed LLRT - sat.
P405	1P50-F140	610.67±60.0	11/05/90	21.6 ± 6.0	1.4 ± 0.6	11/09/90	1.4 ± 0.6	Adjusted packing gland nut to eliminate leakage. LLRT reperformed - sat.
P413	1P87-F049 1P87-F055	4735.0±600.0 5872.0±600.0	09/19/90	4735.0±600.0	10.0 ± 6.0	10/06/90	10.0 ± 6.0	During RF02 and RF03, removed old valves from system and welded new valves in place.

SUMMARY REPORT OF TYPE B & C TEST FAILURES SINCE RF01 LLRT (07/08/89)

PEN. NO.	VALVE NO.	AS-FOUND LLRT (SCCM)	DATE	PRE-REPAIR MIN PATH (SCCM)	AS-LEFT LLRT (SCCM)	DATE	POST-REPAIR MIN-PATH (SCCM)	SUMMARY/CORRECTIVE ACTION
P423	1B21-F016 1B21-F019	Could not pressurize	04/05/92	N/A	10.0 ± 6.0	04/14/92	10.0 ± 6.0	1B21-F019 would not close upon a 'close' signal from the control room during a RF03 leak rate test. The torque switch was defective. Containment integrity was maintained with the outboard containment isolation valve. The failure was caused by setpoint drift of the torque switch setpoint. The torque switch was replaced with an identical spare. LLRT reperformed - sat.
P428	1M17-F030 "O"-ring	Could not pressurize Could not pressurize pressurize	09/22/90 09/24/90	10.0 ± 6.0 10.0 + 6.0	18.3 ± 6.0 10.0 + 6.0	09/23/90 09/25/90	10.0 ± 6.0 10.0 + 6.0	In order to LLRT this penetration it is required to install a test shroud. Initial LLRT determined "o"ring seal of flanged area of valve 1M17-F030 had been pinched. Cleaned "o"-ring groove and installed new "o"-ring. LLRT reperformed - sat.

SUMMARY REPORT OF TYPE B & C TEST FAILURES SINCE RFO1 LLRT (07/08/89)

NOTE 1: (1C11-F122)	On 04/21/92, during the performance of Surveillance Instruction (SVI-C11-T9204), "Type C Local Leak Rate Test of 1C11 Penetration P204," leakage was determined to be in excess of 200 slm for the Inboard Containment Isolation Check Valve (1C11-F122). This resulted in the combined leakage rate as well as the Secondary Containment Bypass combined leakage rate as prescribed Technical Specifications to be exceeded. This valve was replaced with a differently designed spring loaded lift check valve. The valve was successfully tested in accordance with SVI-C11-T9204 on 04/30/92, with a leakage rate of 10 sccm. This 1C11-F122 check valve has an LLRT failure history dating back to 1986. Following each of the previous failures, the valve was disassembled and the immediate cause was diagnosed as misalignment between the check valve seating surfaces. The failures were attributed to the misapplication of the check valve which is susceptible to leakage at low pressures due to misalignment of valve internals. This design problem was previously identified and the valve was scheduled for replacement with a different type in the third refueling outage. The Inboard Containment Isolation Check Valve (1C11-F122) was replaced with a differently designed spring loaded lift check valve, manufactured by Edward Valves Inc., Model Number B36278(F316)FT2, which has softer seating material.
NOTE 2: (1P52-F550)	The leakage in valve 1P52-F550 was identified to be between the seat insert and the body of the valve. The seat insert is threaded into the valve body and torqued in accordance with the manufacturer's recommendations. However, leakage developed between the threaded areas of the two pieces. Check Valve 1P52-F550 was repaired by replacing its internals (springs, disc, and valve seat insert), carefully lapping the disc and valve seat insert, and using grafoil gasket tape as a sealant between the valve seat insert and the valve body. Engineering personnel have analyzed the acceptability of the valve for the application and are developing a design modification to allow the installation of a replacement valve more suited for the application or replacement of valve internals with replacement parts. This modification is scheduled for the fourth refueling outage following receipt of a replacement valve/component parts.
NOTE 3: (1P54-F1098)	Because of the unreliability of valve 1P54-F1098, it was replaced with a different type of valve per DCP 92078 (Anderson Greenwood & Co., Model No. CV1B-0430-5CV-N). The replacement valve was successfully leak tested.
NOTE 4: (1P54-F1098 & 1P50-F539)	Initial pressurization of check valve was unsatisfactory. Second application of air pressure evidently seated the check valve. A work order was initiated to check tolerances of valve internals per a General Maintenance Instruction.

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E301	01	90/09/08	1.00	0.60	PRIME READING
					1R72S026 O-RINGS
E301	01	92/03/23	0.00	0.00	SEE E308
					1R72S026 O-RINGS
E303	01	90/09/08	0.00	0.00	SEE E301
					1R72S017 O-RINGS
E303	01	92/03/23	0.00	0.00	SEE E312
					1R72S017 O-RINGS
E304	01	90/09/08	0.00	0.00	SEE E301
					1R72S028 O-RINGS
E304	01	92/03/23	0.00	0.00	SEE E308
					1R72S028 O-RINGS
E305	01	90/09/08	0.00	0.00	SEE E301
					1R72S019 O-RINGS
E305	01	92/03/23	0.00	0.00	SEE E308
					1R72S019 O-RINGS
E306	01	90/09/08	0.00	0.00	SEE E301
					1R72S016 O-RINGS
E306	01	92/03/23	0.00	0.00	SEE E312
					1R72S016 O-RINGS
E307	01	90/09/08	0.00	0.00	SEE E301
					1R72S030 O-RINGS
E307	01	92/03/23	0.00	0.00	SEE E312
					1R72S030 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E308	01	90/09/08	0.00	0.00	SEE E301
					1R72S018 O-RINGS
E308	01	92/03/23	2.00	0.60	
					1R72S018 O-RINGS
E309	01	90/09/08	0.00	0.00	SEE E301
					1R72S008 O-RINGS
E309	01	92/03/23	0.00	0.00	SEEE312
					1R72S008 O-RINGS
E310	01	90/09/08	0.00	0.00	SEE E315
					1R72S031 O-RINGS
E310	01	92/03/22	0.00	0.00	SEE E314
					1R72S031 O-RINGS
E311	01	90/09/08	0.00	0.00	SEE E315
					1R72S013 O-RINGS
E311	01	92/03/22	0.00	0.00	SEE E314
					1R72S013 O-RINGS
E312	01	90/09/08	0.00	0.00	SEE E301
					1R72S007 O-RINGS
E312	01	92/03/23	2.00	0.60	
					1R72S007 O-RINGS
E314	01	90/09/08	0.00	0.00	SEE E315
					1R72S012 O-RINGS
E314	01	92/03/22	2.00	0.60	
					1R72S012 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E315	01	90/09/08	1.00	0.60	PRI PENS
					1R72S003 O-RINGS
E315	01	92/03/23	0.00	0.00	SEE E318
					1R72S003 O-RINGS
E316	01	90/09/08	0.00	0.00	SEE E315
					1R72S029 O-RINGS
E316	01	92/03/23	0.00	0.00	SE E318
					1R72S029 O-RINGS
E317	01	90/09/08	0.00	0.00	SEE E315
					1R72S005 O-RINGS
E317	01	92/03/23	0.00	0.00	SEE E318
					1R72S005 O-RINGS
E318	01	90/09/08	0.00	0.00	SEE E315
					1R72S001 O-RINGS
E318	01	90/09/13	1.00	0.60	PRI PEN
					1R72S001 O-RINGS
E318	01	92/03/23	2.00	0.60	
					1R72S001 O-RINGS
E320	01	90/09/08	0.00	0.00	SEE E315
					1R72S002 O-RINGS
E320	01	90/09/13	0.00	0.00	SEE E318
					1R72S002 O-RINGS
E320	01	92/03/23	0.00	0.00	SEE E318
					1R72S002 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E322	01	90/09/08	0.00	0.00	SEEE328
					1R72S021 O-RINGS
E322	01	90/09/13	0.00	0.00	SEE E318
					1R72S021 O-RINGS
E322	01	92/03/23	0.00	0.00	SEE E328
					1R72S021 O-RINGS
E323	01	90/09/08	0.00	0.00	SEE E328
					1R72S035 O-RINGS
E323	01	92/03/23	0.00	0.00	SEE E328
					1R72S035 O-RINGS
E324	01	90/09/08	0.00	0.00	SEE E328
					1R72S023 O-RINGS
E324	01	92/03/23	0.00	0.00	SEE E328
					1R72S023 O-RINGS
E325	01	90/09/08	0.00	0.00	SEE E328
					1R72S024 O-RINGS
E325	01	92/03/23	0.00	0.00	SEE E328
					1R72S024 O-RINGS
E327	01	90/09/08	0.00	0.00	SEE E328
					1R72S022 O-RINGS
E327	01	92/03/23	0.00	0.00	SEE E328
					1R72S022 O-RINGS
E328	01	90/09/08	1.00	0.60	PRI PEN
					1R72S020 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E328	01	92/03/23	2.00	0.60	
					1R72S020 O-RINGS
E329	01	90/09/08	0.00	0.00	SEE E328
					1R72S033 O-RINGS
E329	01	92/03/22	0.00	0.00	SEE E314
					1R72S033 O-RINGS
E330	01	90/09/08	0.00	0.00	SEE E328
					1R72S036 O-RINGS
E330	01	92/03/23	0.00	0.00	SEE E332
					1R72S036 O-RINGS
E331	01	90/09/08	0.00	0.00	SEE E340
					1R72S015 O-RINGS
E331	01	92/03/23	0.00	0.00	SEE E332
					1R72S015 O-RINGS
E332	01	90/09/08	0.00	0.00	SEE E340
					1R72S010 O-RINGS
E332	01	92/03/23	2.00	0.60	
					1R72S010 O-RINGS
E333	01	90/09/08	0.00	0.00	SEE E328
					1R72S025 O-RINGS
E333	01	92/03/22	0.00	0.00	SEE E314
					1R72S025 O-RINGS
E334	01	90/09/08	0.00	0.00	SEE E328
					1R72S038 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E334	01	92/03/23	0.00	0.00	SEE E332
					1R72S038 O-RINGS
E335	01	90/09/08	0.00	0.00	SEE E340
					1R72S014 O-RINGS
E335	01	92/03/23	0.00	0.00	SEE E332
					1R72S014 O-RINGS
E336	01	90/09/08	0.00	0.00	SEE E340
					1R72S009 O-RINGS
E336	01	92/03/22	0.00	0.00	SEE E340
					1R72S009 O-RINGS
E337	01	90/09/08	0.00	0.00	SEE E315
					1R72S011 O-RINGS
E337	01	92/03/22	0.00	0.00	SEE E340
					1R72S011 O-RINGS
E338	01	90/09/08	0.00	0.00	SEE E315
					1R72S032 O-RINGS
E338	01	92/03/22	0.00	0.00	SEE E340
					1R72S032 O-RINGS
E339	01	90/09/08	0.00	0.00	SEE E340
					1R72S006 O-RINGS
E339	01	92/03/22	0.00	0.00	SEE E340
					1R72S006 O-RINGS
E340	01	90/09/08	1.00	0.60	PRI PEN
					1R72S004 O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
E340	01	92/03/22	2.00	0.60	
					1R72S004 O-RINGS
E341	01	90/09/08	0.00	0.00	SEE E301
					1R72S027 O-RINGS
E341	01	92/03/23	0.00	0.00	SEE E308
					1R72S027 O-RINGS
					1E12-F004A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P104	01	90/09/13	10.00	6.00	
					1E51-F019
P104	01	92/04/03	10.00	6.00	
					1E51-F019

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P106	01	90/09/25	10.00	6.00	
					1E51-F077 AND F068
P106	01	92/04/07	2.00	0.60	
					1E51-F077 AND F068
P106	01	93/02/10	2.00	0.60	PRE LLRT WO 92-5148
					1E51-F077 AND F068
P106	01	93/02/23	2.00	0.60	POST-LLRT PER W.O. 92-5148
					1E51-F077 AND F068
P106	03	92/04/14	15.80	0.85	COMBINED TWO TEST IN WO92-384
					1E51-F077, 1E51-F078, & 1E12-F102

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P107	01	90/11/05	10.00	6.00	
					1N27-F751 AND D027
P107	01	92/04/09	10.00	6.00	
					1N27-F751 AND D027
P107	02	90/11/04	397.50	60.00	
					1E12-F055A AND F025A AND 1E21-F018
P107	02	92/04/09	369.00	60.00	
					1E12-F055A AND F025A AND 1E21-F018
P107	02	92/04/12	519.00	60.00	POST LLRT
					1E12-F055A AND F025A AND 1E21-F018
P107	03	90/11/07	10.00	6.00	
					1E12-D015A
P107	03	92/03/03	2.00	0.60	PRE LLRT
					1E12-D015A
P107	03	92/04/12	2.00	0.60	POST LLRT
					1E12-D015A
P108	01	90/09/17	6.71	0.60	
					1P11-F545
P108	01	92/04/02	5.99	0.60	
					1P11-F545
P108	02	90/09/17	2.26	0.60	
					1P11-F060
P108	02	92/04/02	650.00	60.00	WROTE CR 92-069 & WO92-1291
					1P11-F060

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P109	01	89/07/12	1.00	0.60	AS LEFT
					1E61-D017, BLANK, AND 1E61-D003
P109	01	90/12/05	1.00	0.60	
					1E61-D017, BLANK, AND 1E61-D003
P109	01	92/03/18	2.00	0.60	PRE LLRT
					1E61-D017, BLANK, AND 1E61-D003
P109	01	92/05/17	7.90	0.60	POST DW TEST
					1E61-D017, BLANK, AND 1E61-D003
P109	01	93/01/07	2.00	0.60	PRE LLRT
					1E61-D017, BLANK, AND 1E61-D003
P109	01	93/03/02	2.00	0.60	
					1E61-D017, BLANK, AND 1E61-D003
P111	01	90/09/24	10.00	6.00	
					1P11-F090
P111	01	92/04/01	35.20	6.00	
					1P11-F090
P111	02	90/09/24	10.00	6.00	
					1P11-F080
P111	02	92/04/01	36.00	6.00	
					1P11-F080
P112	01	90/11/02	10.00	6.00	
					1E21-F006
P112	01	90/12/09	132.00	6.00	RETEST PER W.O. 90-5808 (1E21-F006)
					1E21-F006

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P112	01	90/12/14	4.13	0.60	RETEST PER W.O. 90-5808
					1E21-F006
P112	01	92/04/16	2.10	0.60	
					1E21-F006
P112	02	90/11/12	10.00	6.00	
					1E21-F005
P112	02	92/04/16	9.52	0.60	
					1E21-F005
P113	01	90/11/03	57.73	6.00	
					1E12-F028A
P113	01	92/04/07	605.00	60.00	
					1E12-F028A
P113	02	90/12/03	16.80	6.00	W.O. 89-6955 RETEST 1E12-F037A
					1E12-F037A
P113	02	92/04/07	4.00	0.60	
					1E12-F037A
P113	03	90/11/03	55.00	6.00	
					1E12-F042A
P113	03	92/04/06	33.30	6.00	
					1E12-F042A
P113	04	90/11/03	1,050.67	60.00	
					1E12-F027A
P113	04	92/04/06	505.60	60.00	
					1E12-F027A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P114	01	90/09/23	99,999.99	99,999.99	
					1M17-F010
P114	01	90/09/25	18.60	6.00	
					1M17-F010
P114	01	92/04/30	10.00	6.00	
					1M17-F010
P114	02	90/09/25	10.00	6.00	
					O-RINGS
P114	02	92/03/20	10.00	6.00	PRE LLRT
					O-RINGS
P114	02	92/05/06	10.00	6.00	POST-LLRT AFTER SHROUD REMOVAL
					O-RINGS
P114	03	90/09/23	51.00	6.00	
					1M17-F015
P114	03	92/04/30	10.00	6.00	
					1M17-F015
P114	03	92/05/05	22.00	6.00	RETEST PER W.O. 90-5976
					1M17-F015
P116	01	90/10/16	35.00	6.00	
					1P57-F524B
P116	01	92/04/19	40.23	6.00	
					1P57-F524B
P116	02	90/10/16	10.00	6.00	
					1P57-F015B

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P116	02	92/04/19	7.21	0.60	
					1P57-F015B
P116	02	92/04/22	38.21	6.00	
					1P57-F015B
P117	01	90/11/27	10.00	6.00	
					1P86-F528
P117	01	92/04/22	27.48	6.00	
					1P86-F528
P117	02	90/11/27	30.75	6.00	
					1P86-F002
P117	02	92/04/22	38.10	6.00	
					1P86-F002
P118	01	90/11/02	10.00	6.00	
					1E12-F558A
P118	01	92/04/10	2.00	0.60	
					1E12-F558A
P118	02	90/11/02	10.00	6.00	
					1E12-F0073A
P118	02	92/04/10	2.00	0.60	
					1E12-F0073A
P119	01	89/07/12	1.00	0.60	AS LEFT
					1E61-D015 AND D014
P119	01	90/12/05	1.00	0.60	
					1E61-D015 AND D014

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P119	01	92/03/18	2.00	0.60	PRE LLRT
					1E61-D015 AND D014
P119	01	92/05/17	2.00	0.60	POST DW TEST
					1E61-D015 AND D014
P119	01	93/01/06	2.00	0.60	PRE LLRT
					1E61-D015 AND D014
P119	01	93/03/02	2.00	0.60	
					1E61-D015 AND D014
P120	01	89/07/12	10.00	6.00	AS LEFT
					1E61-D016, BLANK, AND 1E61-D001
P120	01	90/12/05	1.00	0.60	
					1E61-D016, BLANK, AND 1E61-D001
P120	01	92/03/18	2.00	0.60	PRE LLRT
					1E61-D016, BLANK, AND 1E61-D001
P120	01	92/05/17	2.00	0.60	POST DW TEST
					1E61-D016, BLANK, AND 1E61-D001
P120	01	93/01/06	2.00	0.60	PRE LLRT
					1E61-D016, BLANK, AND 1E61-D001
P120	01	93/03/02	2.00	0.60	
					1E61-D016, BLANK, AND 1E61-D001
P121	01	90/10/29	0.00	0.00	
					1B21-F065A
P121	01	92/05/04	0.00	0.00	
					1B21-F065A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P121	04	90/07/03	54.10	6.00	PRI PEN
					EXPANSION BELLOWS
P121	04	90/12/05	74.32	6.00	
					EXPANSION BELLOWS
P121	04	92/05/17	34.95	6.00	
					EXPANSION BELLOWS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P122	02	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P122	02	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P123	01	90/10/13	44.20	6.00	
					1E51-F066
P123	01	91/04/11	360.00	60.00	
					1E51-F066
P123	01	91/04/12	366.00	60.00	
					1E51-F066
P123	01	92/04/04	330.00	60.00	
					1E51-F066
P123	02	90/11/02	1.05	0.60	
					1E51-F013 AND 1E12-F023
P123	02	92/04/16	28.21	6.00	
					1E51-F013 AND 1E12-F023
P123	03	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P123	03	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P124	02	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P124	02	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P131	01	90/09/27	1.00	0.60	
					1G33-F001
P131	01	92/04/29	10.00	6.00	
					1G33-F001
P131	01	93/02/12	20.00	6.00	RETEST TO WO 92-4266
					1G33-F001

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P131	02	90/09/27	16.19	0.60	
					1G33-F004
P131	02	92/04/29	132.80	6.00	
					1G33-F004
P131	02	93/02/12	67.70	6.00	
					1G33-F004
P131	03	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P131	03	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P132	01	90/10/15	317.80	60.00	
					1G33-F040
P132	01	92/04/09	3,230.00	600.00	EVALUATION BY ISI ENGINEER
					1G33-F040
P132	02	90/10/15	300.20	60.00	
					1G33-F039
P132	02	92/04/09	2,900.00	600.00	EVALUATION BY ISI ENGINEER
					1G33-F039
P201	01	90/09/30	1.00	0.60	
					1D17-F079B
P201	01	92/03/25	2.00	0.60	
					1D17-F079B
P201	02	90/09/30	1.00	0.60	
					1D17-F079A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P201	02	92/03/25	2.00	0.60	
					1D17-F079A
P201	03	90/09/30	1.00	0.60	
					1D17-F071B
P201	03	90/12/21	29.00	6.00	WO 90-6178
					1D17-F071B
P201	03	92/03/25	9.45	0.60	
					1D17-F071B
P201	04	89/12/22	10.00	6.00	REVERSE TEST PER W.O. 88-7052 DUE TO VALVE REPLACEMENT.
					1D17-F071A
P201	04	90/09/30	1.00	0.60	
					1D17-F071A
P201	04	91/06/10	10.00	6.00	PRE-LLRT PER W.O. 91-3251
					1D17-F071A
P201	04	91/06/11	10.00	6.00	POST-LLRT PER W.O. 91-3251
					1D17-F071A
P201	04	92/03/25	20.00	6.00	
					1D17-F071A
P202	01	90/09/24	10.00	6.00	PARTIAL
					EQUIPMENT HATCH DOUBLE O-RINGS
P202	01	90/12/05	11.00	6.00	
					EQUIPMENT HATCH DOUBLE O-RINGS
P202	01	92/03/22	3.28	0.60	PRE LLRT
					EQUIPMENT HATCH DOUBLE O-RINGS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P202	01	92/05/17	10.00	6.00	
					EQUIPMENT HATCH DOUBLE O-RINGS
P202	01	92/06/01	2.00	0.60	RETEST TO W.O. 92-2340
					EQUIPMENT HATCH DOUBLE O-RINGS
P202	01	93/01/08	2.00	0.60	PRE LLRT
					EQUIPMENT HATCH DOUBLE O-RINGS
P202	01	93/02/20	2.00	0.60	
					EQUIPMENT HATCH DOUBLE O-RINGS
P203	01	90/09/11	4.08	0.60	WO 89-5580
					1G41-F522
P203	01	92/03/23	2.00	0.60	
					1G41-F522
P203	02	90/09/11	1.00	0.60	
					1G41-F100
P203	02	92/03/23	31.80	6.00	
					1G41-F100
P204	01	90/11/15	99,999.99	12,000.00	
					1C11-F122
P204	01	90/11/23	56.15	6.00	
					1C11-F122
P204	01	92/04/21	99,999.99	99,999.99	WROTE CR 92-113 EXISTING WO 91-1336
					1C11-F122
P204	01	92/04/30	10.00	6.00	
					1C11-F122

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P204	02	90/11/15	53.70	6.00	
					1C11-F083
P204	02	92/04/21	2.00	0.60	
					1C11-F083
P204	02	93/01/13	6.12	0.60	WO 91 1887 PRE LLRT
					1C11-F083
P204	02	93/01/17	2.00	0.60	POST LLRT
					1C11-F083
P205	01	90/11/29	99,999.99	99,999.99	
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P205	01	90/12/02	2.86	0.60	
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P205	01	92/03/26	3.88	0.60	PRE LLRT
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P205	01	92/05/09	20.00	6.00	RETEST PER WO 91-1874
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P205	01	93/01/08	20.00	6.00	PRE-LLRT PRIOR TO BLANK REMOVAL
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P205	01	93/02/15	2.00	0.60	
					FLANGE SEAL & UPPER BELLOWS & LOWER BELLOWS & BEL
P208	01	90/09/22	99,999.99	99,999.99	
					1M1 - J20
P208	01	90/09/24	10.00	6.00	
					1M17-F020

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P208	01	92/05/01	10.00	6.00	
					1M17-F020
P208	02	90/09/24	10.00	6.00	
					O-RINGS
P208	02	92/03/20	2.00	0.60	PRE LLRT
					O-RINGS
P208	02	92/05/06	10.00	6.00	POST LLRT AFTER SHROUD REMOVAL
					O-RINGS
P208	03	90/09/22	10.00	6.00	
					1M17-F025
P208	03	92/05/01	10.00	6.00	PRE LLRT
					1M17-F025
P208	03	92/05/06	11.20	6.00	RETEST PER W.O. 90-5977
					1M17-F025
P210	01	90/11/19	10.00	6.00	
					1P54-F1098
P210	01	92/03/27	12.55	0.06	
					1P54-F1098
P210	01	92/05/10	159.78	6.00	RETEST PER WO 91-185
					1P54-F1098
P210	02	90/11/19	53.85	6.00	
					1P54-F340
P210	02	92/03/27	65.00	6.00	
					1P54-F340

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P301	01	90/09/10	120.06	6.00	
					1G41-F140
P301	01	92/03/24	747.67	60.00	INITIATED W.O. 92-1088
					1G41-F140
P301	01	92/05/06	94.10	6.00	RETEST PER W.O. 92-1088/1087
					1G41-F140
P3C1	02	90/09/10	112.83	6.00	
					1G41-F145
P301	02	92/03/24	439.50	60.00	INITIATED W.O. 92-1087
					1G41-F145
P301	02	92/05/06	79.00	6.00	RETEST PER W.O. 92-1088/1087
					1G41-F145
P302	01	90/11/01	371.80	60.00	
					1M51-F090
P302	01	92/03/27	59.85	6.00	
					1M51-F090
P302	02	90/11/01	497.00	60.00	
					1M51-F110
P302	02	92/03/27	96.05	6.00	
					1M51-F110
P304	01	90/10/26	64.67	6.00	
					1P57-F524A
P304	01	92/04/21	48.82	6.00	
					1P57-F524A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P304	02	90/10/26	12.50	6.00	
					1P57-F015A
P304	02	92/04/21	3.96	0.60	
					1P57-F015A
P305	01	90/11/07	10.00	6.00	
					1P53-F536 AND 1P53-F570
P305	01	92/04/28	2.00	0.60	
					1P53-F536 AND 1P53-F570
P305	02	90/11/06	10.00	6.00	
					1P53-F030 AND 1P53-F010
P305	02	92/04/28	2.00	0.60	
					1P53-F030 AND 1P53-F010
P305	03	90/11/07	10.00	6.00	
					1P53-F035 AND 1P53-F015
P305	03	92/04/28	2.00	0.60	
					1P53-F035 AND 1P53-F015
P305	04	90/11/06	10.00	6.00	
					1P53-F035 AND 1P53-F070
P305	04	92/04/28	2.00	0.60	
					1P53-F035 AND 1P53-F070
P305	05	90/11/07	10.00	6.00	
					1P52-F160
P305	05	92/04/28	2.00	0.60	
					1P52-F160

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P305	06	89/10/24	77.50	8.49	
					AIRLOCK BARREL
P305	06	90/04/23	413.00	60.30	
					AIRLOCK BARREL
P305	06	90/10/21	7.22	0.85	
					AIRLOCK BARREL
P305	06	91/04/19	90.90	8.49	
					AIRLOCK BARREL
P305	06	91/10/15	616.00	60.30	
					AIRLOCK BARREL
P305	06	92/03/17	746.34	60.00	PRE LLRT
					AIRLOCK BARREL
P305	06	92/09/02	4.00	0.85	
					AIRLOCK BARREL
P305	06	93/03/04	40.00	8.49	
					AIRLOCK BARREL
P306	01	90/11/23	185.50	6.00	
					1P52-F550
P306	01	92/03/26	3,500.00	600.00	WROTE CR 92-052 & WO 92-1143
					1P52-F550
P306	01	92/03/27	1,224.00	60.00	RETEST PER W.O. 92-1143...FAILED
					1P52-F550
P306	01	92/03/30	476.00	60.00	RETEST FOR WO 92-1143
					1P52-F550

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P306	02	90/11/23	209.83	60.00	
					1P52-F200
P306	02	92/03/26	203.83	60.00	
					1P52-F200
P308	01	90/10/19	257.00	60.00	
					1P51-F530
P308	01	90/11/11	4,700.00	600.00	INLEAKAGE FROM F545
					1P51-F530
P308	01	90/11/23	314.16	60.00	
					1P51-F530
P308	01	92/03/25	240.00	60.00	
					1P51-F530
P308	02	90/10/19	5,500.00	12,000.00	W.O. INITIATED
					1P51-F150
P308	02	90/11/23	137.53	6.00	
					1P51-F150
P308	02	92/03/25	286.67	60.00	
					1P51-F150
P309	01	90/11/05	24.83	6.00	
					1P22-F577
P309	01	90/11/06	24.83	6.00	
					1P22-F577
P309	01	92/04/30	44.50	6.00	
					1P22-F577

PEN NBR	TSO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P309	02	90/11/05	10.00	6.00	
					1P22-F010
P309	02	90/11/06	10.00	6.00	
					1P22-F010
P309	02	92/04/30	2.00	0.60	
					1P22-F010
P310	01	90/11/18	59.92	6.00	
					1P43-F721
P310	01	92/05/03	27.58	6.00	
					1P43-F721
P310	02	90/11/18	98.50	6.00	
					1P43-F055
P310	02	92/05/03	50.12	6.00	
					1P43-F055
P311	01	90/11/19	175.80	60.00	
					1P43-F215
P311	01	92/05/03	196.60	6.00	
					1P43-F215
P311	01	92/05/09	15.53	0.60	RETEST PER WO 92-1911
					1P43-F215
P311	02	90/11/18	99,999.99	99,999.99	COULD NOT PRESSURIZE 11/19/90
					1P43-F140
P311	02	90/11/19	117.50	60.00	AFTER AIR BLOW
					1P43-F140

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P311	02	92/05/03	99,999.99	99,999.99	WROTE WO
					1P43-F140
P311	02	92/05/09	2.00	0.60	RETEST PER WO 92-1778
					1P43-F140
P311	02	92/10/27	22,370.43	1,019.40	
					1P43-F140
P311	02	92/10/28	20.00	6.00	
					1P43-F140
P312	01	90/11/06	10.00	6.00	
					1P53-F541 AND 1P53-F571
P312	01	92/04/26	2.30	0.60	
					1P53-F541 AND 1P53-F571
P312	02	90/11/06	10.00	6.00	
					1P53-F075 AND F045
P312	02	92/04/26	2.00	0.60	
					1P53-F075 AND F045
P312	03	90/11/06	10.00	6.00	
					1P53-F040 AND F020
P312	03	92/04/26	2.00	0.60	
					1P53-F040 AND F020
P312	04	90/11/06	10.00	6.00	
					1P53-F025 AND F045
P312	04	92/04/26	2.00	0.60	
					1P53-F025 AND F045

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P312	05	90/11/06	11.42	6.00	
					1P52-F170
P312	05	92/04/26	3.20	0.60	
					1P52-F170
P312	06	89/10/18	844.00	60.30	
					AIRLOCK BARREL
P312	06	90/04/11	494.00	60.30	INCLUDES BARREL RELIEF VALVE 1P53-F596 LEAKAGE
					AIRLOCK BARREL
P312	06	90/10/11	486.50	60.30	
					AIRLOCK BARREL
P312	06	91/04/14	824.50	60.30	
					AIRLOCK BARREL
P312	06	91/10/03	657.33	60.30	
					AIRLOCK BARREL
P312	06	92/03/12	78.00	6.03	
					AIRLOCK BARREL
P312	06	92/08/19	738.00	60.00	
					AIRLOCK BARREL
P312	06	93/02/01	535.30	60.00	
					AIRLOCK BARREL
P313	01	89/08/24	1.00	0.60	
					1M14-F045, F040, AND F190
P313	01	89/11/13	10.00	6.00	
					1M14-F045, F040, AND F190

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P313	01	90/02/26	10.00	6.00	
					1M14-F045, F040, AND F190
P313	01	90/06/05	1.00	0.60	
					1M14-F045, F040, AND F190
P313	01	90/08/22	1.00	0.60	WO'S 90-3448&3449
					1M14-F045, F040, AND F190
P313	01	90/11/22	12,820.00	600.00	
					1M14-F045, F040, AND F190
P313	01	90/12/02	21.73	6.00	
					1M14-F045, F040, AND F190
P313	01	91/03/05	22.33	6.00	
					1M14-F045, F040, AND F190
P313	01	91/06/07	10.00	6.00	
					1M14-F045, F040, AND F190
P313	01	91/09/10	10.00	6.00	
					1M14-F045, F040, AND F190
P313	01	91/12/18	68.20	6.00	
					1M14-F045, F040, AND F190
P313	01	92/03/20	10.00	6.00	
					1M14-F045, F040, AND F190
P313	01	92/05/13	2.00	0.60	RETEST PER W.O. 90-379
					1M14-F045, F040, AND F190
P313	01	92/08/04	20.00	6.00	
					1M14-F045, F040, AND F190

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P313	01	92/11/05	3,130.00	600.00	
					1M14-F045, F040, AND F190
P313	01	92/11/06	26.52	6.00	
					1M14-F045, F040, AND F190
P313	01	93/01/10	20,800.00	6,000.00	PRE LLRT PER WO 92-4731
					1M14-F045, F040, AND F190
P313	01	93/02/04	39.42	6.00	POST LLRT WO'S 92-4731
					1M14-F045, F040, AND F190
P313	01	93/02/23	70.80	6.00	REF CR 93-07
					1M14-F045, F040, AND F190
P313	02	89/08/24	1.00	0.60	
					1M14-F045, F040 AND F195
P313	02	89/11/13	10.00	6.00	
					1M14-F045, F040 AND F195
P313	02	90/02/26	10.00	6.00	
					1M14-F045, F040 AND F195
P313	02	90/06/05	1.00	0.60	
					1M14-F045, F040 AND F195
P313	02	90/08/22	1.00	0.60	WO'S 90-3448&3449
					1M14-F045, F040 AND F195
P313	02	90/11/22	11,750.00	600.00	
					1M14-F045, F040 AND F195
P313	02	90/12/02	16.60	6.00	
					1M14-F045, F040 AND F195

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P313	02	91/03/05	26.33	6.00	
					1M14-F045, F040 AND F195
P313	02	91/06/07	25.70	6.00	
					1M14-F045, F040 AND F195
P313	02	91/09/10	10.00	6.00	
					1M14-F045, F040 AND F195
P313	02	91/12/18	44.60	6.00	
					1M14-F045, F040 AND F195
P313	02	92/03/20	16.00	6.00	
					1M14-F045, F040 AND F195
P313	02	92/05/13	2.00	0.60	RETEST PER W.O. 90-379
					1M14-F045, F040 AND F195
P313	02	92/08/04	21.60	6.00	
					1M14-F045, F040 AND F195
P313	02	92/11/05	3,130.00	600.00	
					1M14-F045, F040 AND F195
P313	02	92/11/06	23.47	6.00	
					1M14-F045, F040 AND F195
P313	02	93/01/10	22,000.00	6,000.00	PRE LLRT FOR WO 92-4731
					1M14-F045, F040 AND F195
P313	02	93/02/04	29.72	6.00	POST LLRT WO'S 92-4731 & 93-143
					1M14-F045, F040 AND F195
P313	02	93/02/23	55.40	6.00	CR 93-07
					1M14-F045, F040 AND F195

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P314	01	89/08/24	10.00	6.00	
					1M14-F090, F085, AND F200
P314	01	89/11/13	31.00	6.00	
					1M14-F090, F085, AND F200
P314	01	90/02/26	10.00	6.00	
					1M14-F090, F085, AND F200
P314	01	90/06/05	10.00	6.00	
					1M14-F090, F085, AND F200
P314	01	90/08/15	10.00	6.00	
					1M14-F090, F085, AND F200
P314	01	90/08/17	10.00	6.00	WO'S 90-3450&3451
					1M14-F090, F085, AND F200
P314	01	90/11/22	217.60	60.00	
					1M14-F090, F085, AND F200
P314	01	90/11/23	271.60	60.00	
					1M14-F090, F085, AND F200
P314	01	91/03/05	14.50	6.00	
					1M14-F090, F085, AND F200
P314	01	91/06/07	33.40	6.00	
					1M14-F090, F085, AND F200
P314	01	91/09/10	10.00	6.00	
					1M14-F090, F085, AND F209
P314	01	91/12/18	519.00	60.00	
					1M14-F090, F085, AND F200

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P314	01	92/03/20	868.00	60.00	
					1M14-F090, F085, AND F200
P314	01	92/05/13	2.00	0.60	RETEST PER W.O.91-5895
					1M14-F090, F085, AND F200
P314	01	92/08/04	6.86	0.60	
					1M14-F090, F085, AND F200
P314	01	92/11/05	33.80	6.00	
					1M14-F090, F085, AND F200
P314	01	93/02/04	43.02	6.00	
					1M14-F090, F085, AND F200
P314	02	89/08/24	10.00	6.00	
					1M14-F090, F085, AND F205
P314	02	89/11/13	13.20	6.00	
					1M14-F090, F085, AND F205
P314	02	90/02/26	10.00	6.00	
					1M14-F090, F085, AND F205
P314	02	90/06/05	10.00	6.00	
					1M14-F090, F085, AND F205
P314	02	90/08/15	10.00	6.00	
					1M14-F090, F085, AND F205
P314	02	90/08/17	10.00	6.00	WO'S 90-3450&3451
					1M14-F090, F085, AND F205
P314	02	90/11/23	292.17	60.00	
					1M14-F090, F085, AND F205

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P314	02	91/03/05	47.85	6.00	
					1M14-F090, F085, AND F205
P314	02	91/06/07	18.20	6.00	
					1M14-F090, F085, AND F205
P314	02	91/09/10	10.00	6.00	
					1M14-F090, F085, AND F205
P314	02	91/12/18	591.00	60.00	
					1M14-F090, F085, AND F205
P314	02	92/03/20	896.00	60.00	
					1M14-F090, F085, AND F205
P314	02	92/05/13	2.00	0.60	RETEST PER W.O. 90-372
					1M14-F090, FC85, AND F205
P314	02	92/08/04	6.61	0.60	
					1M14-F090, F085, AND F205
P314	02	92/11/05	254.00	60.00	
					1M14-F090, F085, AND F205
P314	02	93/02/04	43.65	6.00	
					1M14-F090, F085, AND F205
P315	01	90/09/16	2.95	0.60	
					1C41-F518
P315	01	92/03/29	10.00	6.00	
					1C41-F518
P315	02	90/09/14	37.50	6.00	
					1C41-F520

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P315	02	92/03/29	48.50	6.00	
					1C41-F520
P317	01	90/11/21	10.00	6.00	
					1D17-F089B
P317	01	92/03/05	2.00	0.60	
					1D17-F089B
P317	02	90/11/21	10.00	6.00	
					1D17-F089A
P317	02	92/03/05	2.00	0.60	
					1D17-F089A
P317	03	90/06/29	1.77	0.60	
					1D17-F081B
P317	03	90/11/21	10.00	6.00	
					1D17-F081B
P317	03	92/03/05	74.90	6.00	PRE LLRT FOR WO 92-881
					1D17-F081B
P317	03	92/03/18	6.00	0.60	RETEST WO 92-881
					1D17-F081B
P317	03	93/03/22	6.08	0.60	
					1D17-F081B
P317	04	90/11/21	10.00	6.00	
					1D17-F081A
P317	04	92/03/05	80.20	6.00	
					1D17-F081A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P317	04	93/03/22	6.19	0.60	
					1D17-F081A
P317	05	89/07/11	10.00	6.00	AS LEFT
					1E61-D007, F549 AND CAP
P317	05	90/11/13	3.21	0.60	
					1E61-D007, F549 AND CAP
P317	05	92/05/03	2.00	0.60	
					1E61-D007, F549 AND CAP
P317	05	93/01/26	2.00	0.60	PRE LLRT
					1E61-D007, F549 AND CAP
P317	05	93/03/02	2.00	0.60	
					1E61-D007, F549 AND CAP
P317	06	89/07/11	10.00	6.00	AS LEFT
					1E61-D006, F550 AND CAP
P317	06	90/11/13	6.05	0.60	
					1E61-D006, F550 AND CAP
P317	06	92/05/03	10.80	0.60	
					1E61-D006, F550 AND CAP
P317	06	93/01/26	2.00	0.60	PRE LLRT
					1E61-D006, F550 AND CAP
P317	06	93/03/02	20.00	6.00	
					1E61-D006, F550 AND CAP
P318	05	90/10/09	10.00	6.00	
					1M51-F210B AND 1P87-F074

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P318	05	92/04/01	11.18	6.00	
					1M51-F210B AND 1P87-F074
P318	06	90/10/09	10.00	6.00	
					1M51-F220B
P318	06	92/04/01	10.00	6.00	
					1M51-F220B
P318	07	90/10/09	10.00	6.00	
					1M51-F230B AND 1P87-F077
P318	07	92/04/01	10.00	6.00	
					1M51-F230B AND 1P87-F077
P318	08	90/10/09	10.00	6.00	
					1M51-F240B AND 1P87-F071
P318	08	92/04/01	10.00	6.00	
					1M51-F240B AND 1P87-F071
P318	09	90/10/09	10.00	6.00	
					1M51-F250B AND 1P87-F065
P318	09	92/04/01	10.00	6.00	
					1M51-F250B AND 1P87-F065
P319	01	89/07/11	4.70	0.60	AS LEFT
					1E61-D005,F551,AND CAP
P319	01	90/11/13	3.01	0.60	
					1E61-D005,F551,AND CAP
P319	01	92/04/30	2.00	0.60	
					1E61-D005,F551,AND CAP

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P319	01	93/01/26	2.00	0.60	PRE LLRT
					1E61-D005,F551,AND CAP
P319	01	93/03/02	2.00	0.60	
					1E61-D005,F551,AND CAP
P319	02	89/07/11	4.70	0.60	AS LEFT
					1E61-D004, F552 AND CAP
P319	02	90/11/13	2.85	0.60	
					1E61-D004, F552 AND CAP
P319	02	92/04/30	2.00	0.60	
					1E61-D004, F552 AND CAP
P319	02	93/01/26	2.00	0.60	PRE LLRT
					1E61-D004, F552 AND CAP
P319	02	93/03/02	2.00	0.60	
					1E61-D004, F552 AND CAP

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P404	01	90/11/05	10.00	6.00	
					1P50-F539
P404	01	90/11/13	470.50	60.00	
					1P50-F539
P404	01	92/05/07	2.00	0.60	
					1P50-F539
P404	02	90/11/05	15.15	6.00	
					1P50-F060
P404	02	90/11/13	5.80	0.60	
					1P50-F060
P404	02	92/05/07	16.49	0.60	
					1P50-F060
P405	01	90/11/05	610.67	60.00	
					1P50-F140
P405	01	90/11/09	1.40	0.60	
					1P50-F140
P405	01	92/05/07	3.71	0.60	
					1P50-F140

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P405	02	90/11/05	21.60	6.00	
					1P50-F150
P405	02	92/05/07	11.58	0.60	
					1P50-F150
P406	01	89/07/14	8.08	0.60	AS LEFT
					1P54-F726
P406	01	90/09/14	10.00	6.00	
					1P54-F726
P406	01	92/03/24	2.00	0.60	
					1P54-F726
P406	02	89/07/14	1.00	0.60	AS LEFT
					1P54-F727
P406	02	90/09/14	10.00	6.00	
					1P54-F727
P406	02	92/03/24	6.00	0.60	
					1P54-F727
					1E12-F024B AND F011B

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P408	02	90/10/22	888.60	60.00	
					1E12-F021
P408	02	92/04/30	959.83	60.00	
					1E12-F021
P409	01	90/11/05	189.80	60.00	
					1E22-F023,F012,AND F035
P409	01	92/03/31	2.01	0.60	
					1E22-F023,F012,AND F035
P410	01	90/10/31	42.75	6.00	
					1E22-F005
P410	01	92/04/01	10.00	6.00	
					1E22-F005

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P410	02	90/10/31	10.00	6.00	
					1E22-F004
P410	02	92/04/01	10.00	6.00	
					1E22-F004
P411	01	90/10/24	10.00	6.00	
					1E12-F041C
P411	01	92/04/27	10.00	6.00	
					1E12-F041C
P411	02	90/10/24	7.21	0.60	
					1E12-F042C
P411	02	92/04/27	4.00	0.60	
					1E12-F042C
P412	01	90/10/23	128.60	6.00	
					1E12-F028B
P412	01	92/04/22	170.00	6.00	
					1E12-F028B
P412	02	90/10/23	104.70	6.00	
					1E12-F037B
P412	02	92/05/07	20.00	6.00	PER WO 91-2393
					1E12-F037B
P412	03	90/10/23	88.50	6.00	
					1E12-F042B
P412	03	92/04/22	6.00	0.60	
					1E12-F042B

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P412	04	90/10/23	1,810.50	60.00	
					1E12-F027B
P412	04	91/04/23	26.45	6.00	RETEST PER W.O. 90-245
					1E12-F027B
P412	04	92/04/22	33.00	6.00	PRE LLRT
					1E12-F027B
P413	01	90/09/19	4,735.00	600.00	FAILED BYPASS
					1P87-F049
P413	01	90/10/06	10.00	6.00	WO 90-1359
					1P87-F049
P413	01	92/05/06	52.05	6.00	
					1P87-F049
P413	02	90/09/19	5,872.00	600.00	FAILED BYPASS
					1P87-F055
P413	02	90/10/06	10.00	6.00	WO 90-1360
					1P87-F055
P413	02	92/05/06	20.00	6.00	
					1P87-F055
413	02	92/05/15	2.00	0.60	RETEST PER W.O. 91-4295
					1P87-F055
P413	03	90/09/19	10.00	6.00	
					1P87-F046
P413	03	92/05/06	20.00	6.00	
					1P87-F046

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P413	04	90/09/19	10.00	6.00	
					1P87-F052
P413	04	92/05/06	20.00	6.00	
					1P87-F052
P414	01	90/10/23	0.00	0.00	
					1B21-F065B
P414	01	92/05/17	0.00	0.00	
					1B21-F065B
P414	04	90/12/05	0.00	0.00	SEE V121 04
					EXPANSION BELLOWS
P414	04	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P415	02	90/11/05	0.00	0.00	SEE P121 04 EXPANSION BELLOWS
P415	02	90/12/05	0.00	0.00	SEE P121 04 EXPANSION BELLOWS
P415	02	92/05/17	0.00	0.00	SEE P121 04 EXPANSION BELLOWS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P416	02	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P416	02	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P417	01	90/11/12	10.00	6.00	
					1G61-F075
P417	01	92/04/14	10.00	6.00	
					1G61-F075
P417	02	90/11/12	10.00	6.00	
					1G61-F080
P417	02	92/04/14	10.00	6.00	
					1G61-F080
P418	01	90/10/31	10.00	6.00	
					1G61-F165
P418	01	92/04/08	10.00	6.00	
					1G61-F165
P418	01	93/01/25	20.00	6.00	
					1G61-F165

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P418	02	90/10/31	10.00	6.00	
					1G61-F170
P418	02	92/04/08	10.00	6.00	
					1G61-F170
P418	02	93/01/25	20.00	6.00	
					1G61-F17
P419	01	90/09/26	3.73	0.60	
					1G33-F053
P419	01	92/04/08	10.00	6.00	
					1G33-F053
P419	02	90/09/26	2.43	0.60	
					1G33-F054
P419	02	92/04/08	10.00	6.00	
					1G33-F054
P420	01	90/11/14	10.00	6.00	
					1G50-F272
P420	01	92/05/04	10.00	6.00	
					1G50-F272
P420	02	90/11/14	10.00	6.00	
					1G50-F277
P420	02	92/05/04	10.00	6.00	
					1G50-F277
P421	01	90/10/28	10.00	6.00	
					1E12-F009 AND F550

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P421	01	92/04/26	10.00	6.00	
					1E12-F009 AND F550
P421	02	90/10/28	10.00	6.00	
					1E12-F008
P421	02	92/04/26	10.00	6.00	
					1E12-F008
P421	03	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P421	03	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P422	01	89/07/13	1.00	0.60	AS LEFT
					1E51-F063, F076 AND F064
P422	01	90/12/14	34.80	6.00	
					1E51-F063, F076 AND F064
P422	01	92/04/28	68.00	6.00	
					1E51-F063, F076 AND F064
P422	01	92/05/21	134.00	6.00	RETEST PER W.O. 92-1134
					1E51-F063, F076 AND F064
P422	01	92/10/28	85.57	6.00	
					1E51-F063, F076 AND F064
P422	02	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P422	02	92/05/17	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P423	01	90/11/10	240.33	60.00	
					1B21-F019 AND 1B21-F016
P423	01	92/04/05	99,999.99	99,999.99	CR 92-073 & WO 92-1317
					1B21-F019 AND 1B21-F016
P423	01	92/04/14	10.00	6.00	RETEST PER W.O. 92-1317
					1B21-F019 AND 1B21-F016
P423	02	90/12/05	0.00	0.00	SEE P121 04
					EXPANSION BELLOWS
P423	02	92/05/17	0.00	0.00	SEE P212 04
					EXPANSION BELLOWS
P424	01	90/10/16	308.30	60.00	
					1G33-F028
P424	01	92/04/08	10.00	6.00	
					1G33-F028
P424	02	90/10/16	312.20	60.00	
					1G33-F034
P424	02	92/04/08	10.00	6.00	
					1G33-F034
P425	01	90/10/08	10.00	6.00	
					1M51-F210A
P425	01	92/04/20	20.00	6.00	
					1M51-F210A
P425	02	90/10/08	10.00	6.00	
					1M51-F220A

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P425	02	92/04/20	20.00	6.00	
					1M51-F220A
P425	03	90/10/08	85.50	6.00	
					1M51-F230A
P425	03	92/04/20	155.00	6.00	
					1M51-F230A
P425	04	90/10/08	10.00	6.00	
					1M51-F240A
P425	04	92/04/20	20.00	6.00	
					1M51-F240A
P425	05	90/10/08	10.00	6.00	
					1M51-F250A
P425	05	92/04/20	20.00	6.00	
					1M51-F250A
P428	01	90/09/22	99,999.99	99,999.99	COULD NOT PRESSURIZE
					1M17-F030
P428	01	90/09/23	18.30	6.00	RETEST WO 89-589
					1M17-F030
P428	01	92/02/25	13.20	6.00	
					1M17-F030
P428	02	90/09/24	99,999.99	99,999.99	COULD NOT PRESSURIZE
					O-RING
P428	02	90/09/25	10.00	6.00	
					O-RING

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P428	02	92/02/24	10.00	6.00	PRE LLRT FOR TEST SHROUD INSTALLATION
					O-RING
P428	02	92/03/02	10.00	6.00	AS LEFT
					O-RING
P428	03	90/09/22	10.00	6.00	
					1M17-F035
P428	03	92/02/25	18.30	6.00	PRE LLRT ON 1M17-F035
					1M17-F035
P428	03	92/02/26	26.70	6.00	RETEST TO WO 90-5978
					1M17-F035
P429	01	90/10/26	1.00	0.60	
					1P87-F083 AND F264
P429	01	92/04/24	10.00	6.00	
					1P87-F083 AND F264
P429	01	92/04/25	10.00	6.00	
					1P87-F083 AND F264
P429	02	90/10/26	116.21	6.00	
					1E12-F055B, F025B, F025C AND F005
P429	02	92/04/24	167.80	6.00	
					1E12-F055B, F025B, F025C AND F005
P429	03	90/10/28	2.32	0.60	
					1E12-D015B
P429	03	92/04/12	2.00	0.60	PRE LLRT
					1E12-D015B

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P429	03	92/04/25	2.00	0.60	
					1E12-D015B
P431	01	90/09/23	1.00	0.60	
					1E12-F558B
P431	01	92/04/22	2.63	0.60	
					1E12-F558B
P431	02	90/09/23	461.00	60.00	
					1E12-F073B
P431	02	92/04/22	669.33	60.00	
					1E12-F073B
P436	01	90/09/21	10.00	6.00	
					1M17-F040
P436	01	92/05/01	10.00	6.00	
					1M17-F040
P436	02	90/09/23	10.00	6.00	
					O-RING
P436	02	92/03/21	2.00	0.60	PRE LLRT
					O-RING
P436	02	92/05/06	10.00	6.00	POST-LLRT AFTER SHROUD REMOVAL
					O-RING
P436	03	90/09/21	10.00	6.00	
					1M17-F045
P436	03	92/05/01	10.00	6.00	PRE LLRT
					1M17-F045

PEN NBR	ISO BAR CODE	LEAKAGE READING DATE	LEAKAGE	STD	REMARKS BARRIER DESCRIPTIONS COMMENTS
P436	03	92/05/05	10.00	6.00	RETEST PER W.O. 90-5979
					1M17-F045

Total number found = 649

APPENDIX E

SENSOR LOCATIONS AND VOLUME FRACTIONS

APPENDIX E

SENSOR LOCATIONS AND VOLUME FRACTIONS

SENSOR NUMBER	ELEV. (FEET)	AZIMUTH (DEGREES)	ORIGINAL VOLUME WEIGHTING FACTOR	REVISED VOLUME WEIGHTING FACTOR
TE-N001	742	45	0.0393	0.0393
TE-N002	742	220	0.0524	0.0393
TE-N003	742	225	0.0393	0.0393
TE-N004	742	315	0.0262	0.0393
TE-N005	710	0	0.0739	0.0739
TE-N006	710	90	0.0739	* 0.0739
TE-N007	710	180	0.0739	0.0739
TE-N008	710	270	0.0739	0.0739
TE-N009	671	45	0.0202	0.0202
TE-N010	671	135	0.0202	0.0202
TE-N011	671	225	0.0272	0.0272
TE-N012	671	315	0.0272	0.0272
TE-N013	646	204	0.0315	0.0315
TE-N014	633	315	0.0153	0.0153
TE-N015	646	73	0.0315	0.0315
TE-N016	633	117	0.0153	0.0153
TE-N017	620	134	0.0216	0.0216
TE-N018	604	216	0.0515	0.0515
TE-N019	620	324	0.0216	0.0216
TE-N020	604	45	0.0515	0.0515
TE-N021	655	140	0.0121	0.0121
TE-N022	634	210	0.0272	0.0272
TE-N023	655	320	0.0121	0.0121
TE-N024	634	25	0.0272	0.0272
TE-N025	604	120	0.0256	0.0256
TE-N026	604	25	0.0256	0.0256

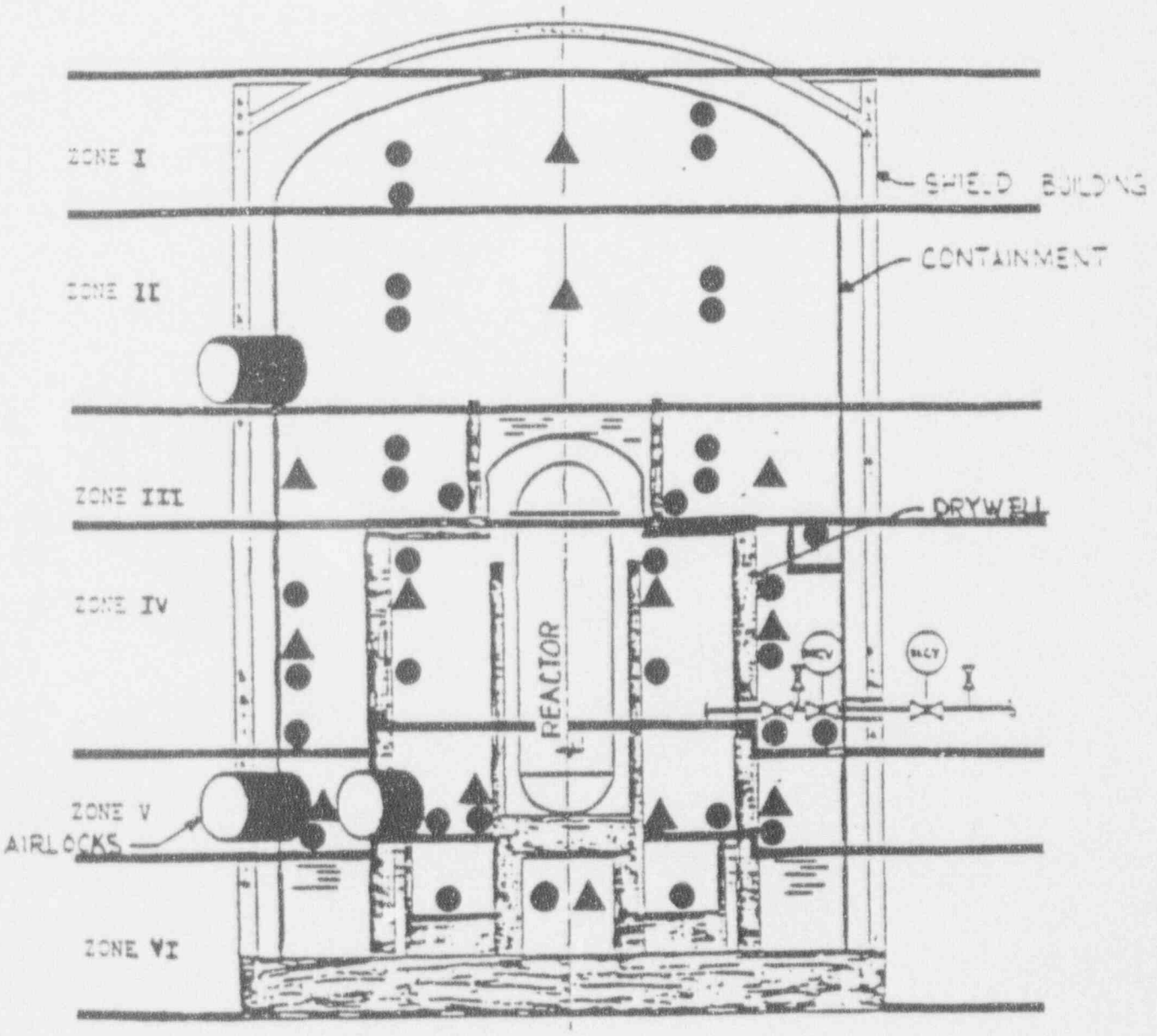
SENSOR NUMBER	ELEV. (FEET)	AZIMUTH (DEGREES)	ORIGINAL VOLUME WEIGHTING FACTOR	REVISED VOLUME WEIGHTING FACTOR
TE-N027	604	202	0.0256	0.0256
TE-N028	589	225	0.0048	0.0048
TE-N029	589	126	0.0158	0.0158
TE-N030	589	306	0.0158	0.0158
TE-N031	621	0	0.0096	0.0096
TE-N032	657	0	0.0112	0.0112
ME-N080	710	270	0.2956	0.0000
ME-N081	742	905	0.1573	0.4529
ME-N082	679	200	0.0531	0.0531
ME-N083	604	23	0.0515	0.0515
ME-N084	604	203	0.0515	0.0515
ME-N085	655	290	0.0393	0.0393
ME-N086	655	125	0.0393	0.0393
ME-N087	589	50	0.0363	0.0000
ME-N088	604	0	0.0384	0.0566
ME-N089	604	180	0.0384	0.0565
ME-N090	646	40	0.0731	0.0731
ME-N091	646	220	0.0731	0.0731
ME-N092	679	60	0.0531	0.0531

Sensor ME-N080 exhibited erratic readings with fluctuations of 10-15° F. Sensor ME-N087 locked up in the auto-balance mode and would not reset. Their weighting factors were re-distributed in accordance with a calculated single sensor failure analysis. All ILRT and verification test calculations were redone using the revised sensor weighting factors.

* This sensor failed during the verification test but its readings during the ILRT were consistent with other nearby sensors. For the verification test, sensor TE-N006 weighting factor was set to 0, sensor TE-N005 weighting factor was set to 0.0986, sensor TE-N007 weighting factor was set to 0.0985, and sensor TE-N008 weighting factor was set to 0.0985. All verification test calculations were redone with these revised weighting factors.

APPENDIX E

SENSOR LOCATIONS



APPENDIX F

GENERAL PHYSICS ILRT COMPUTER PROGRAM DESCRIPTION

DESCRIPTION OF GENERAL PHYSICS ILRT COMPUTER PROGRAM

The following paragraphs describe the various features and attributes of the General Physics ILRT Computer Program and the process used to certify it for each application.

REDUNDANCY

The General Physics ILRT team was equipped with two fully operational IBM compatible microcomputers during the ILRT and for on site data reduction and analysis. The computer software and hardware interfaced directly with the ILRT Measurement System Volumetrics Datalogger.

Two computers were brought on site for 100% redundancy, as each computer and its software is capable of independently performing the ILRT. The General Physics ILRT Computer Software is also capable of accepting manual input of raw sensor data and performing all required sensor data conversions if the data logger should cease to function. Each computer was equipped with back-up disks in the unlikely event of a disk "crash."

SECURITY

The General Physics ILRT Computer Program is written in IBM's BASICA. BASICA is a high level programming language which combines programming ease with user oriented command functions to create an easy to use and understand program. In order to increase speed of operation the program was then compiled into an executable command file. Compiling was accomplished using the IBM Basic Compiler. In addition to execution speed, this had the added benefit of making the program more secure as compiled programs cannot be edited or changed. The program requires a password to change modes of operation, start times, or enter the data editing routine to safeguard the integrity of the raw data files.

FEATURES

The program itself is designed to be a menu driven program consisting of five separate, menu driven operating modes. These are the:

1. Pressurization Mode
2. Stabilization Mode
3. Test Mode
4. Verification Mode
5. Depressurization Mode

These modes also correspond to the phases of the ILRT. Menu driven means that the user is presented with a list of options that the program can perform and from which the user can choose. It allows for interactive information exchange between the user and the computer and prevents invalid information or user mistakes from crashing the program. Program organization consists of a master menu which controls access to the seven operating modes chained to the individual menus which control these modes. The data processing, information display capabilities and function of each mode is as follows:

1. Pressurization Mode: All data reduction, graphic displays of average temperature, dewpoint, and corrected pressure.

2. Stabilization Mode: All data reduction, automatic comparison of data against ANSI 56.8 and BN-TOP-1 temperature stabilization criteria, notification when criteria is met, graphic displays of average temperature, dewpoint, and corrected pressure.

3. Test Mode: All data reduction, calculation of leakage rates using mass point, total time and point-to-point analysis techniques, display of trend report information required by BN-TOP-1, graphic display of average temperature, dewpoint, pressure and mass, as well as graphic display of mass point measured leakage, 95% UCL; total time measured and calculated leakage and the total time leakage rate at the 95% UCL (as calculated by BN-TOP-1), including a superimposed acceptance criteria line).

4. Verification Test Mode: With input of imposed leakage in SCFM automatically calculates and displays on graph and trend report the acceptance criteria band, plus all graphics displays available in test mode.

5. Depressurization Mode: All data and graphics capabilities of Pressurization Mode. In programs for BWR units, this mode also includes a Drywell to Suppression Chamber Bypass Test routine.

Other reduction and analysis capabilities of the General Physics ILRT computer program include:

1. Containment total pressure conversion from counts to psia (if required), and averaging.

2. Containment drybulb temperature weighted averaging and conversion to absolute units.

3. Containment dewpoint temperature weighted averaging (conversion from Foxboro dewcel element temperature to dewpoint temperature if required) and conversion to partial pressure of water vapor (psia).

4. Data storage of ILRT measurement system inputs for each data point.

5. Weight (mass) point calculations using the ideal gas law.

6. Automated Data Acquisition and/or Manual Data Entry.

7. Sensor performance and deviation information for sensor failure criteria, graphic display of individual sensor performance for selected operating mode.

8. Calculation of ISG formula at beginning of test; acceptance criteria based on number of sensors remaining and actual test duration.

9. Computer System Error Functions automatically checks for error in incoming data, printer or disk drive faults.

The computer program used by General Physics has been previously certified for six tests at the San Onofre Nuclear Generating Station and over a dozen other ILRTs. The initial certification required verification of the program through hand calculations and an independent review by Bechtel Power Corporation. After certification was completed, a calibration set of raw data was used to verify software of the program prior to usage. Additionally, once the computer was linked to the data acquisition system and a complete data stream was available, the input function of each mode of the program was verified by comparing the data acquisition system output to the computer printout data point summary.