

BOSTON EDISON COMPANY

Pilgrim Nuclear Station

Unit 1

REACTOR CONTAINMENT BUILDING
INTEGRATED LEAKAGE RATE TEST
FINAL REPORT

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GENERAL PHYSICS CORPORATION

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I. INTRODUCTION

The Reactor Containment Building Integrated Leakage Rate "Type A" Test is performed to demonstrate that leakage through the primary reactor containment systems and components penetrating primary 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 Pilgrim Nuclear Power Station Integrated Leakage Rate Test (ILRT).

The section of this report entitled Test Synopsis "Section II" presents the highlights of activities and events which occurred prior to and during the ILRT.

Test Data Summary "Section III" contains data and results necessary to demonstrate containment atmosphere stabilization, acceptable 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 eight-hour test period and ending with the verification test.

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

Section V lists the documents referenced for the conduct of the ILRT.

The successful periodic Type A and verification tests were performed according to the requirements of the Pilgrim Nuclear Power Station, Technical Specifications and 10CFR50, Appendix J. The test method utilized is the Absolute Method described in ANSI/ANS 56.8-1987, "Containment System Leakage Testing Requirements". Leakage rate was calculated using formulas from BN-TOP-1, Revision 1, 1972, (Total Time Analysis technique) during the Type A and verification tests. Formulas from ANSI/ANS 56.8-1987 (Mass Point Analysis) were run concurrently for informational purposes only. Type A and verification test durations were conducted according to the criteria of Pilgrim Nuclear Power Station, Plant Technical Specifications.

The test results are reported in accordance with the requirements of 10CFR50, Appendix J, Section V.B.3.

II. TEST SYNOPSIS

Prior to containment pressurization on May 18, 1993, Pilgrim Nuclear Power Station site test and maintenance personnel were engaged in activities related to containment leakage. Containment leakage was identified through the Type B and C local leakage rate testing programs and reduced by repairs to those systems and containment components having excessive leakage.

The following discussion highlights some of the most significant activities encountered during test preparation and execution and presents these items in a chronological order.

A. Pre-pressurization Activities

Pre-pressurization activities included: Completing all Type B and Type C testing; Type A test procedure review; final ILRT instrumentation operability checks; final ILRT computer program modifications; containment subvolume weighing factor calculation checks and sensor failure analysis. A few of these items are discussed below to present pertinent information that impacted on Type A Test activities.

The Type A test procedure review was conducted to ensure that all references to Plant Technical Specifications; 10CFR50, Appendix J; BN-TOP-1, Rev. 1, 1972; ANSI/ANS 56.8-1987; and the FSAR were accurate and current.

A containment area temperature survey was conducted in 1987 to verify proper sensor placement for the proposed test ventilation as required by ANSI N45.4-1972 paragraph 7.4 and ANSI/ANS 56.8 paragraph 5.5.1. The results of this survey were used to validate the ILRT measurement system sensors.

Final ILRT instrumentation operability checks were performed to ensure that all instrumentation was operating correctly. An in-situ check, as specified in ANSI/ANS 56.8-1987, Section 4.2.3.1, was conducted to verify that all ILRT instrumentation was working correctly. Calibration records for all ILRT measurement system component calibrations, in-situ loop checks, and for all field standards used are retained at the plant.

Local leakage rate testing at Pilgrim Nuclear Power Station were completed prior to the start of the ILRT. The results of this program are summarized in Appendix G, "Local Leakage Test Summaries".

B. ILRT Test Summary Time-Line

<u>Phase</u>	<u>Time Frame</u>	<u>Duration</u>
Pressurization	From: 1506 on 5/18/93 To: 0213 on 5/19/93	11.12 hours
Stabilization	From: 0215 on 5/19/93 To: 0615 on 5/19/93	4.00 hours
Hold Test	From: 0615 on 5/19/93 To: 1415 on 5/19/93	8.00 hours
Leak Stab. Verif. Test	From: 1630 on 5/19/93 To: 1730 on 5/19/93	1.00 hour
Verification Test	From: 1730 on 5/19/93 To: 2230 on 5/19/93	5.00 hours
Depress (includes performance of drywell to torus vacuum breaker leak rate test)	From: 2245 on 5/19/93 To: 1700 on 5/20/93	18.25 hours

C. Containment Pressurization

Containment pressurization started at 1506, on May 18, 1993 using two compressors with a total rating of 2400 scfm. Pressurization proceeded at a rate which did not exceed the procedural limit of 8 psi/hr. Compressor discharge valves were manually throttled to maintain backpressure and flowrate. Aftercooler cooling water flow was manually throttled to maintain compressor air discharge temperature. No fans were running in the containment during the ILRT itself or verification test.

At 1730 hours on May 18, 1993, a 15 psig containment walkdown was performed to identify any potential leaking penetrations. No significant leakage was discovered.

Containment test pressure of 61.2058 psia was reached at 0213 hours on May 19, 1993 and the compressors secured.

D. Containment Atmosphere Stabilization

Stabilization was commenced at 0215 hours on May 19, 1993.

By 0615 on May 19, 1993, the stabilization criteria of BN-TOP-1, Rev. 1, and ANSI 56.8-1987, section 5.3.1.6 were met and the contained air mass had stabilized.

E. ILRT Test Period

Subsequent to meeting the temperature stabilization criteria, leakage rate analysis began at 0615 on May 19, 1993.

By 1315 hours (seven hours into a planned eight hour BN-TOP-1 test), the measured total time and mass point leakage rates had stabilized at approximately 0.128% wt./day.

At approximately 1328 hours, the plant experienced a loss of offsite power. All ILRT instrumentation was connected to an uninterruptible power supply and continued to function. However, containment isolation valves AO-5035A and AO-5036A, which were open to provide communication between the drywell and torus, closed. In addition, the loss of offsite power caused a loss of shutdown cooling flow which created changes in reactor vessel level and temperature.

Minor fluctuations occurred in the ILRT data from 1330 hours until 1415 hours. At 1415 hours, after eight hours of ILRT data, the calculated total time leakage rate was 0.1289% wt./day and the mass point leakage rate was 0.1331% wt./day. As the plant was still recovering from the loss of offsite power, the verification test was not started and ILRT data collection continued. From 1415 hours until approximately 1600 hours, a significant increase in containment mass resulted from changes in reactor vessel level due to re-establishing shutdown cooling flow. By 1615 hours, containment mass data confirmed that the plant had recovered from the loss of offsite power and operations had stabilized reactor vessel level and temperature. (Refer to Mass Plot in Appendix B). During the stabilization and hold test periods, the instrumentation was continuously monitored.

Since the data from 1415 hours until 1615 hours was significantly disturbed by plant recovery operations, the ILRT was considered successfully completed at 1415 on May 19, 1993. This represents an eight (8) hour test and the containment leakage rate data met all the requirements of BN-TOP-1, Rev. 1 necessary to end the hold test in less than 24 hours. The maximum allowable leakage rate (L_a) for the primary containment is 1.0% wt./day of contained air mass at peak test pressure. The mass point and total time analysis were run concurrently on the General Physics ILRT Data Management Computer Program. The leakage rate results are as follow:

	Total Time Analysis (% wt./day)	Mass Point Analysis (% wt./day)
Calculated Leakage Rate From Regression Line	0.1289	0.1331
95% Upper Confidence Limit	0.2158*	0.1405*
20 Point Mean Leakage	0.1573	

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

F. Verification Test

A successful verification flow test was conducted following the ILRT. At 1630, a leakage of 7.54 scfm was imposed on the primary containment and allowed to stabilize for one hour. The verification test phase started at 1730 hours on May 19, 1993 and was completed at 2230 hours on the same day. The 7.54 scfm leak imposed (L_o) on the existing measured leakage was slightly larger than L_a (1.0 % wt./day) at 1.0106% wt./day. The results stabilized (as shown on the graph contained in Appendix C) within the $\pm 25\%$ L_a acceptance criteria and are summarized below:

	Total Time Analysis (% wt./day)	Mass Point Analysis (% wt./day)
Leakage Rate (L_{am})	0.1289	0.1331
Imposed Leak (L_o)	1.0106	1.0106
Lower limit: $L_o + L_{am} - 0.25 L_a$	0.8895	0.8937
Composite Leakage (L_c)	1.0934	1.0966
Upper limit: $L_o + L_{am} + 0.25 L_a$	1.3895	1.3937

III. TEST DATA SUMMARY

A. Plant Information

Owner	Boston Edison Company
Plant	Pilgrim Nuclear Station Unit 1
Location	Plymouth, Massachusetts
Containment Type	BWR Mark I
NSSS Supplier, Type	General Electric BWR 4
Date Test Completed	May 19, 1993

B. Technical Data

1. Containment Net Free Air Volume	263,520 cu. ft.
2. Design Pressure, P	56 psig
3. Design Temperature, T	281°F
4. Calculated Peak Accident Pressure, P _a	45 psig
5. Containment ILRT Avg. Temp. Limits	60-120°F
6. Calculated Peak Accident Temperature	281°F

C. Test Results - Type A Test

1. Test Method	Absolute
2. Test Pressure	46.3 psig

3. Integrated Leakage Rate Total Time Analysis (Calculated per BN-TOP-1)
Test Results:

- | | | |
|----|---|-----------------|
| a. | Calculated Leakage
Rate, from regression
line, L_{am} | 0.1289 wt.%/day |
| b. | Upper 95% Confidence
Limit | 0.2158 wt.%/day |

4. Integrated Leakage Rate Mass Point Analysis Test Results (Presented for
information only):

- | | | |
|----|---|-----------------|
| a. | Calculated Leakage
Rate, from regression
line, L_{am} | 0.1331 wt.%/day |
| b. | Upper 95% Confidence
Limit | 0.1405 wt.%/day |

5. Maximum Allowable
Leakage Rate, L_a

1.000 wt.%/day

6. ILRT Acceptance Criteria

0.750 wt.%/day (75% of L_a)

7. Verification Test Imposed
Leakage Rate (L_v)

7.54 scfm
(1.0106 wt.%/day)

8. Verification Test Total Time Analysis Results and Limits

- | | | |
|----|--|-----------------|
| a. | Upper Limit
($L_m + L_{am} + 0.25 L_a$) | 1.3895 wt.%/day |
| b. | Verification Test
Total Time Results | 1.0934 wt.%/day |
| c. | Lower Limit
($L_m + L_{am} - 0.25 L_a$) | 0.8895 wt.%/day |

9. Verification Test Mass Point Analysis Results and Limits (Presented for information only)

a.	Upper Limit ($L_m + L_{am} + 0.25 L_a$)	1.3937 wt.%/day
b.	Verification Test Mass Point Results	1.0966 wt.%/day
c.	Lower Limit ($L_m + L_{am} - 0.25 L_a$)	0.8937 wt.%/day

10. Report Printouts

The Report Printouts of the Type A and verification test calculations are provided for the Mass Point and Total Time Analysis (Appendices B and C). Stabilization data is also provided (Appendix A).

D. Test Results - Types B and C Tests

A summary of local leakage rate test results since the last ILRT in August 1991 are provided in Appendices G and H. A failure analysis team report for valve 2301-74 is provided in Appendix I.

E. Integrated Leakage Rate Measurement System

1. Absolute Pressure (2 Sensors)

Type	Paroscientific Precision Pressure
Range	0-100 psia
Accuracy	± 0.010 psia
Repeatability	± 0.010 psia
Sensitivity	± 0.0005 psi
Resolution	0.0001 psi
Calibration Date	4/29/93
Instrument Numbers:	CCGPC24210, CCGPC28778

2. Drybulb Temperature (18 Sensors)

Type	100 ohm platinum RTDs
Calibrated Range	60-110°F
Accuracy	$\pm 0.5^{\circ}\text{F}$
Repeatability	$\pm 0.1^{\circ}\text{F}$
Sensitivity	$\pm 0.001^{\circ}\text{F}$
Resolution	0.001°F
Calibration Date	4/18/93

3. Dewpoint Temperature (10 Sensors)

Type	Foxboro Lithium Chloride Dewcells
Calibrated Range	37.5-100°F
Accuracy	$\pm 1.5^{\circ}\text{F}$
Repeatability	$\pm 0.5^{\circ}\text{F}$
Sensitivity	$\pm 0.5^{\circ}\text{F}$
Resolution	0.001°F
Calibration Date	4/20/93

4. Verification Flow (1 Channel plus 1 Spare)

Flow Meter	Datametrics Thermal Mass Flowmeters
Range	0 to 15 scfm
Accuracy	$\pm 1\%$ FS
Sensitivity	$\pm .1\%$ FS
Repeatability	$\pm .01\%$ FS
Calibration Date	12/29/92

5. Data Acquisition System

Type Fluke Model 2285B

Drybulb Signal Conditioning/Readout

- 1) Repeatability: $\pm 0.001^{\circ}\text{F}$
- 2) Resolution: 0.001°F

Dewpoint Signal Conditioning/Readout

- 1) Repeatability: $\pm 0.001^{\circ}\text{F}$
- 2) Resolution: 0.001°F

Calibration Date 4/27/93

5. Overall Instrumentation Selection Guide (ISG) Value from ANSI/ANS-56.8-1987 based on ILRT instrumentation configuration at end of ILRT and an eight hour test = 0.0567% wt./day (see Appendix D for calculations).

6. Sensor Locations and Volume Fractions

Appendix E, Sensor Locations contains descriptions of the sensor locations as installed for the 1993 ILRT.

F. Information Retained at Plant

The following information is available for review at the facility:

- 1. Access controls that were established to limit ingress to containment during testing.
- 2. A listing of all containment penetrations, including the total number of like penetrations, penetration size, and function.
- 3. A listing of normal operating instrumentation used for the leakage rate 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 initial survey of containment to restoration of all tested systems.

6. Documentation of instrumentation calibrations and standards.
7. Data to verify temperature stabilization criteria as established by test procedure (Appendix A).
8. The working copy of test procedure that includes signature sign-off of procedural steps.
9. The procedure and all data that verifies completion of penetrations and valve testing (B&C-type tests), including as-found leak rates, corrective action taken, and final leak rate.
10. Computer printouts of Integrated Leakage Rate Test Data and automated data accumulation along with summary description of computer program.
11. The Quality Assurance surveillance checklist that was used to monitor ILRT with proper sign-offs.
12. A listing of all test exceptions including changes in containment system boundaries instituted by licensee to conclude successful testing.
13. A review of confidence limits of test results with accompanying computer printouts where applicable.
14. Description of method of leakage rate verification of instrument measuring system (superimposed leakage), with calibration information of flowmeters along with calculations that were used to measure the verification leakage rate (Appendix C).
15. Plot presenting ILRT data obtained during the test (Appendix B).
16. The P&IDs of pertinent systems.

IV. ANALYSIS AND INTERPRETATION

The upper 95% confidence limit (UCL) Total Time and Mass Point leakage rates calculated during the ILRT were less than the test acceptance criteria of 0.75 L_s (0.750 % wt./day). Corrections for penetration paths not exposed to the ILRT pressure and for changes in the net free volume due to changes in containment water levels must be considered for addition to the calculated results of the ILRT.

A. Type B&C Penalties

The following corrections must be added for valves/penetrations which were not in their normal post-accident condition:

Penetration	Description	Leakage (SLM)
9A	Feedwater (including RCIC and RWCU)	0.005
9B	Feedwater (including HPCI)	0.025
12	Residual Heat Removal (Shutdown Cooling)	0.399
14	Reactor Water Clean-Up	0.387
23	Reactor Building Closed Cooling Water Supply	0.005
24	Reactor Building Closed Cooling Water Supply	0.004
40Aa	Jet Pump Sensing - Post Accident Sampling	0.006
40Dc	Jet Pump Sensing - Post Accident Sampling	0.006
41A	Recirc Sampling	0.005
46A	Reactor Recirc Seal	0.986
46B	Reactor Recirc Seal	3.818
47	ILRT Instrumentation	0.066
47	ILRT Instrumentation	0.066
223	HPCI Turbine Exhaust	0.014
223	HPCI Turbine Exhaust	0.095
228G	Post Accident Sampling	0.195
228H	Post Accident Sampling	0.004
Leakage Summation		6.086

The LLRT results based on the above equate to a Type B and C penalty addition of 0.0288 %wt./day.

B. Volume Change Corrections

The following corrections are made for any liquid level changes which resulted in an decrease in the net free volume of the containment:

Volume Monitored	Level Change	Containment Volume Change
Reactor Vessel	+ 6.799 inches/8 hours	- 204.52 cu. ft./day
Torus	+ 0.0160 inch/8 hours	- 37.63 cu. ft./day
Equipment Drain Sump	+697 gallons/66 hours	- 33.88 cu. ft./day
Floor Drain Sump	0	0
Total Volume Change		- 276.03 cu. ft./day

Based on the volumes monitored, the containment net free volume decreased during the ILRT by 276.03 ft³. This is equivalent to a leakage rate of 0.1047 %/day which will be added to the ILRT results.

C. Reported "As Left" ILRT Results

The results of the ILRT to be reported including all corrections are:

	Total Time Analysis (% wt./day)	Mass Point Analysis (% wt./day)
95% UCL Leakage Rate	0.2158	0.1405
Volume Correction	0.1047	0.1047
Type C Penalty Addition	0.0288	0.0288
"As Left" Leakage Rate	0.3493	0.2740

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 (0.750 % wt./day).

D. Leakage Savings

The following corrections must be added for valves/penetrations which were repaired and/or adjusted prior to the ILRT:

Pen. No.	Description	Min. Path As Found (SLM)	Min. Path As Left (SLM)	Leakage Savings (SLM)
	Drywell Head	0.059	0.010	0.049
	Equipment Hatch	0.006	0.004	0.002
6	CRD Hatch	0.003	0.003	0
16A	Core Spray	0.001	0.003	0
23	RBCCW Supply	0.070	0.005	0.065
25	Drywell Exhaust	0.748	0.177	0.571
35A	TIP	0.092	0.073	0.019
35B	TIP	0.092	0.073	0.019
35C	TIP	0.044	0.683	0
35D	TIP	0.044	0.683	0
39A	RHR Containment Spray	0.123	0.006	0.117
41	Recirc Pump Sample	0.005	0.002	0.003
51A	RHR Injection	0.222	0.385	0
52	HPCI Steam Supply	0.036	0.036	0
53	RCIC Steam Exhaust	0.028	0.002	0.026
200B	Torus Hatch North	0.021	0.110	0
211A	RHR to Torus	0.153	0.023	0.130
223	HPCI Exhaust Inboard Flange	0.002	0.002	0
223	HPCI Exhaust Outboard Flange	0.002	0.002	0
223	HPCI Exhaust	1.778	0.137	1.641
225	RCIC Exhaust Inboard Flange	0.001	0.001	0
225	RCIC Exhaust Outboard Flange	0.001	0.001	0
Leakage Summation				2.642

The LLRT results based on the above equate to a Type B and C leakage savings addition of 0.0125 %wt./day.

E. "As Found" Evaluation of the Containment

The results of the ILRT to be reported including all corrections for repair and/or adjustments are:

	Total Time Analysis (% wt./day)	Mass Point Analysis (% wt./day)
"As-Left" UCL Leakage Rate	0.3493	0.2740
Leakage Savings	0.0125	0.0125
"As-Found" Leakage Rate	0.3618	0.2865

The "as found" Total Time and Mass Point 95% UCL leakage rates are less than the test acceptance criteria of $0.75 L_a$ (0.750 % wt./day).

V. REFERENCES

- A. Pilgrim Nuclear Power Station, FSAR.
- B. Pilgrim Nuclear Power Station, Technical Specifications.
- C. Pilgrim Nuclear Power Station, Procedure 8.7.1.4.2 Rev. 10, Integrated Leakage Rate Test Surveillance Procedure.
- D. Code of Federal Regulations, Title 10, Part 50, Appendix J, Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors.
- E. ANSI/ANS 56.8-1987, Containment System Leakage Testing Requirements.
- F. Bechtel Topical Report BN-TOP-1, Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants, Revision 1, 1972.
- G. ANSI N45.4-1971, Leakage-Rate Testing of Containment Structures for Nuclear Reactors

Appendix A

STABILIZATION PHASE DATA

STABLIZATION MODE
OPTIONS

TIME : 0615
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 = 17
MODE DURATION (IN HRS) = 4.00
TOT TIME MEASURED LEAK = 0.2185
TOT TIME CALCULATED LEAK = 0.1048
TOT TIME 95% UCL = 0.3816
MASS PT LEAK = 0.1738
MASS PT 95% UCL = 0.2007

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

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP: 74.788/ -0.042
MASS: 80765.72/ -1.242

AVG PRESS: 60.687/ -0.006
AVG DEW PRESS: 0.3677/-0.0007
TOTAL PRESS: 61.055/ -0.006

STABLE MODE

PILGRIM NUCLEAR POWER STATION UNIT 1 Page 1

STABILIZATION SUMMARY UNIT 1						
		ANSI 56.8			BN-TOP-1	
TIME	TEMP	1 HR	4 HR	DIFF	BN1	BN2
0.00	75.842	0.0000	0.0000	0.0000	0.0000	0.0000
0.25	75.719	0.0000	0.0000	0.0000	0.0000	0.0000
0.50	75.617	0.0000	0.0000	0.0000	0.0000	0.0000
0.75	75.529	0.0000	0.0000	0.0000	0.0000	0.0000
1.00	75.452	0.3901	0.0000	0.0000	0.0000	0.0000
1.25	75.381	0.3382	0.0000	0.0000	0.0000	0.0000
1.50	75.308	0.3083	0.0000	0.0000	0.0000	0.0000
1.75	75.243	0.2856	0.0000	0.0000	0.0000	0.0000
2.00	75.187	0.2645	0.0000	0.0000	-0.3273	0.0000
2.25	75.130	0.2505	0.0000	0.0000	-0.2944	0.1317
2.50	75.074	0.2340	0.0000	0.0000	-0.2711	0.0929
2.75	75.022	0.2212	0.0000	0.0000	-0.2534	0.0710
3.00	74.971	0.2160	0.0000	0.0000	-0.2402	0.0527
3.25	74.921	0.2092	0.0000	0.0000	-0.2299	0.0414
3.50	74.875	0.1992	0.0000	0.0000	-0.2166	0.0531
3.75	74.830	0.1923	0.0000	0.0000	-0.2068	0.0392
4.00	74.788	0.1839	0.2636	-0.0798	-0.1999	0.0274

STABLE MODE

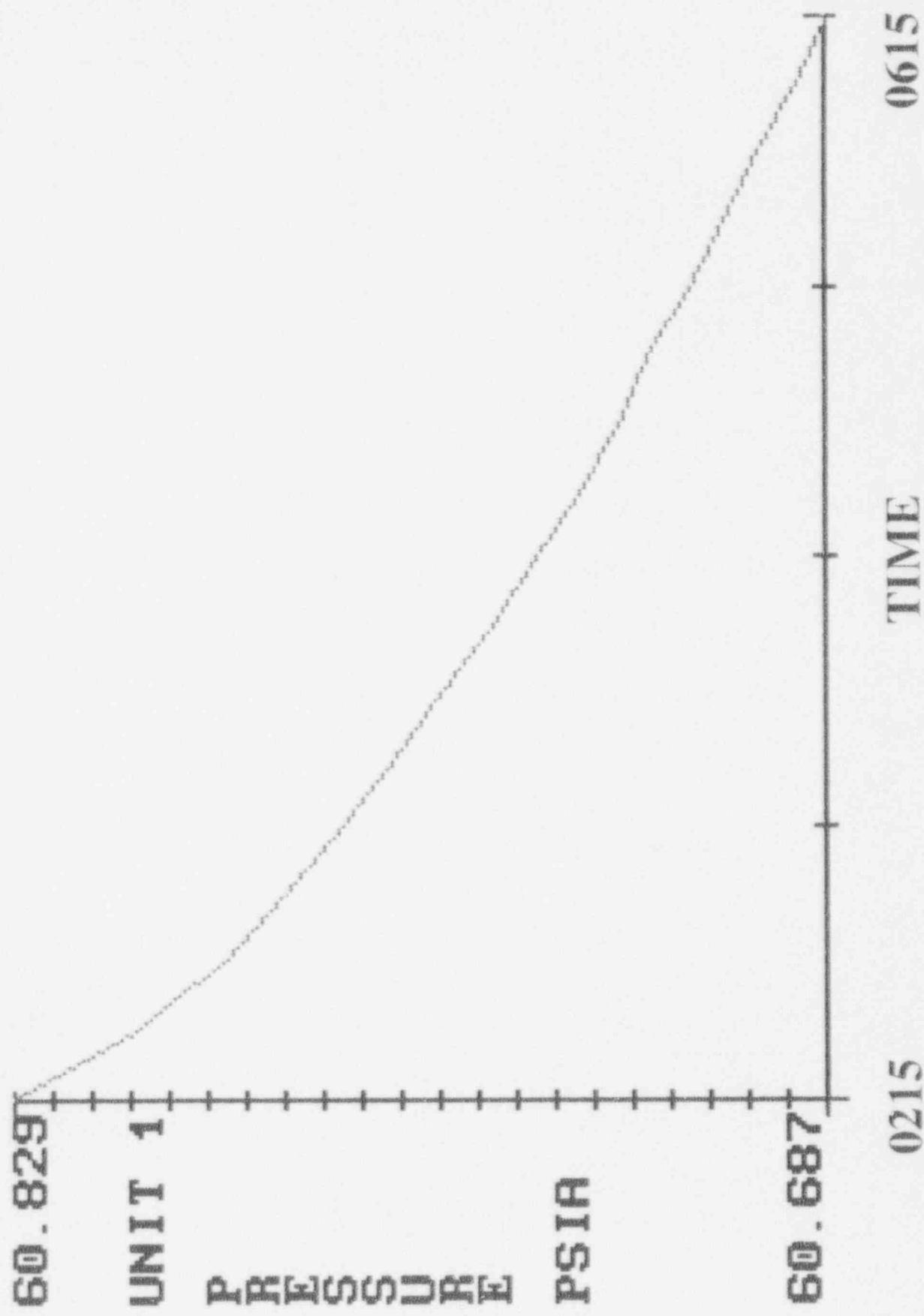
PILGRIM NUCLEAR POWER STATION UNIT 1 Page 1

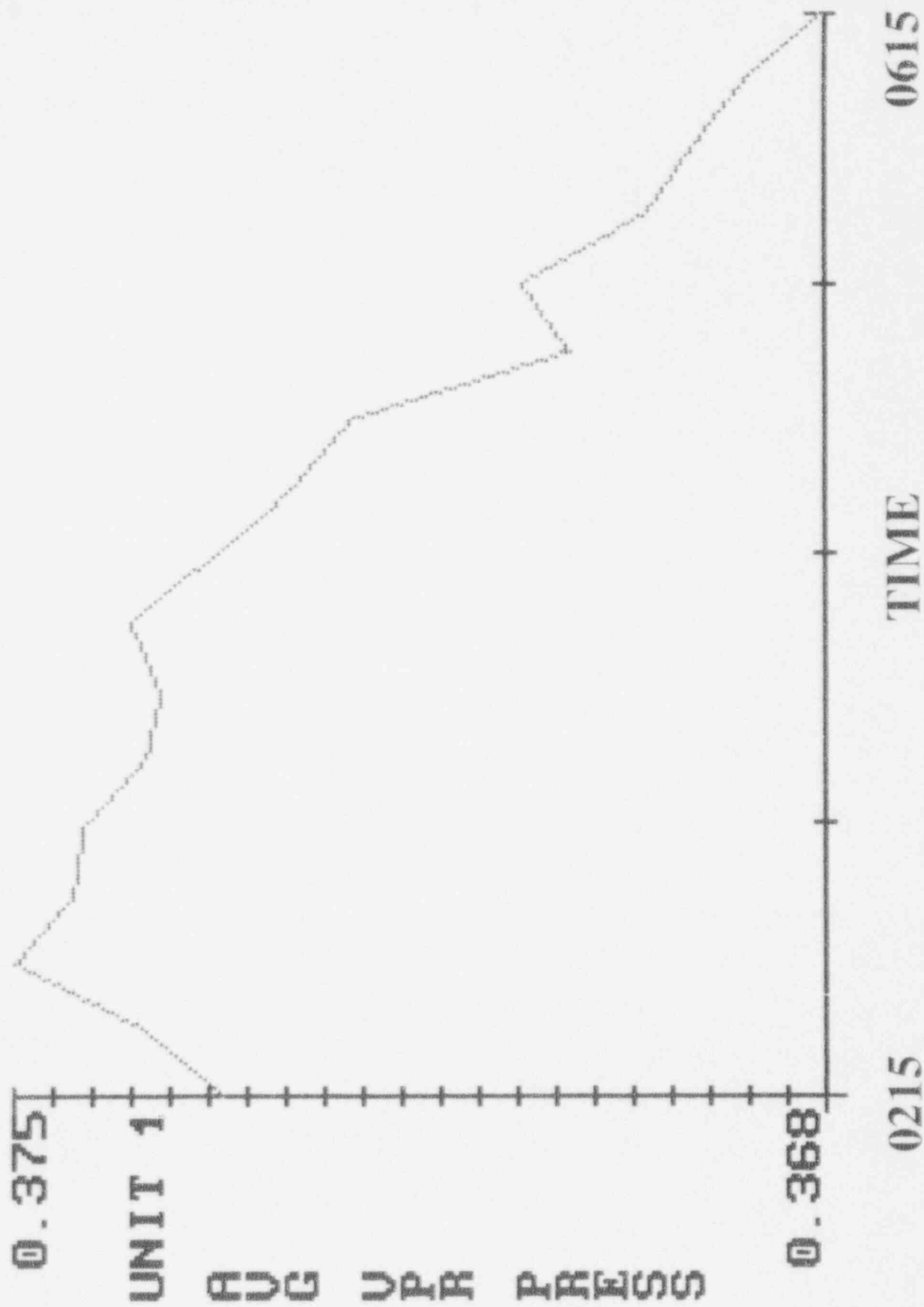
LEAKAGE RATE SUMMARY UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	UCL	LAM	UCL
139	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
139	0.25	0.9639	0.0000	0.0000	0.0000	0.0000
139	0.50	0.7523	0.7523	0.0000	0.7538	1.7970
139	0.75	0.5298	0.5316	0.5749	0.5310	0.9404
139	1.00	0.4527	0.4113	0.6805	0.4254	0.6631
139	1.25	0.4100	0.3403	0.6398	0.3689	0.5262
139	1.50	0.3599	0.2835	0.5761	0.3207	0.4397
139	1.75	0.3444	0.2487	0.5483	0.2949	0.3852
139	2.00	0.3181	0.2200	0.5186	0.2724	0.3450
139	2.25	0.3041	0.1991	0.4975	0.2564	0.3157
139	2.50	0.2855	0.1809	0.4765	0.2412	0.2915
139	2.75	0.2497	0.1586	0.4457	0.2191	0.2665
139	3.00	0.2481	0.1437	0.4277	0.2065	0.2484
139	3.25	0.2367	0.1308	0.4122	0.1952	0.2326
139	3.50	0.2274	0.1199	0.3990	0.1861	0.2196
139	3.75	0.2233	0.1115	0.3893	0.1793	0.2093
139	4.00	0.2185	0.1048	0.3816	0.1738	0.2007

STABLE MODE

Page 1

AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	TOT PRESS	MASS
139	0.00	75.842	70.787	0.373	61.202	80795.14
139	0.25	75.719	70.839	0.373	61.183	80787.03
139	0.50	75.617	70.923	0.375	61.169	80782.48
139	0.75	75.529	70.887	0.374	61.158	80781.77
139	1.00	75.452	70.880	0.374	61.147	80779.90
139	1.25	75.381	70.838	0.373	61.137	80777.88
139	1.50	75.308	70.829	0.373	61.128	80776.97
139	1.75	75.243	70.847	0.374	61.120	80774.85
139	2.00	75.187	70.791	0.373	61.112	80773.73
139	2.25	75.130	70.742	0.372	61.103	80772.12
139	2.50	75.074	70.704	0.372	61.096	80771.12
139	2.75	75.022	70.557	0.370	61.089	80772.03
139	3.00	74.971	70.590	0.370	61.082	80770.09
139	3.25	74.921	70.509	0.369	61.074	80769.24
139	3.50	74.875	70.477	0.369	61.068	80768.35
139	3.75	74.830	70.441	0.368	61.062	80766.96
139	4.00	74.788	70.383	0.368	61.055	80765.72





75.842

UNIT 1

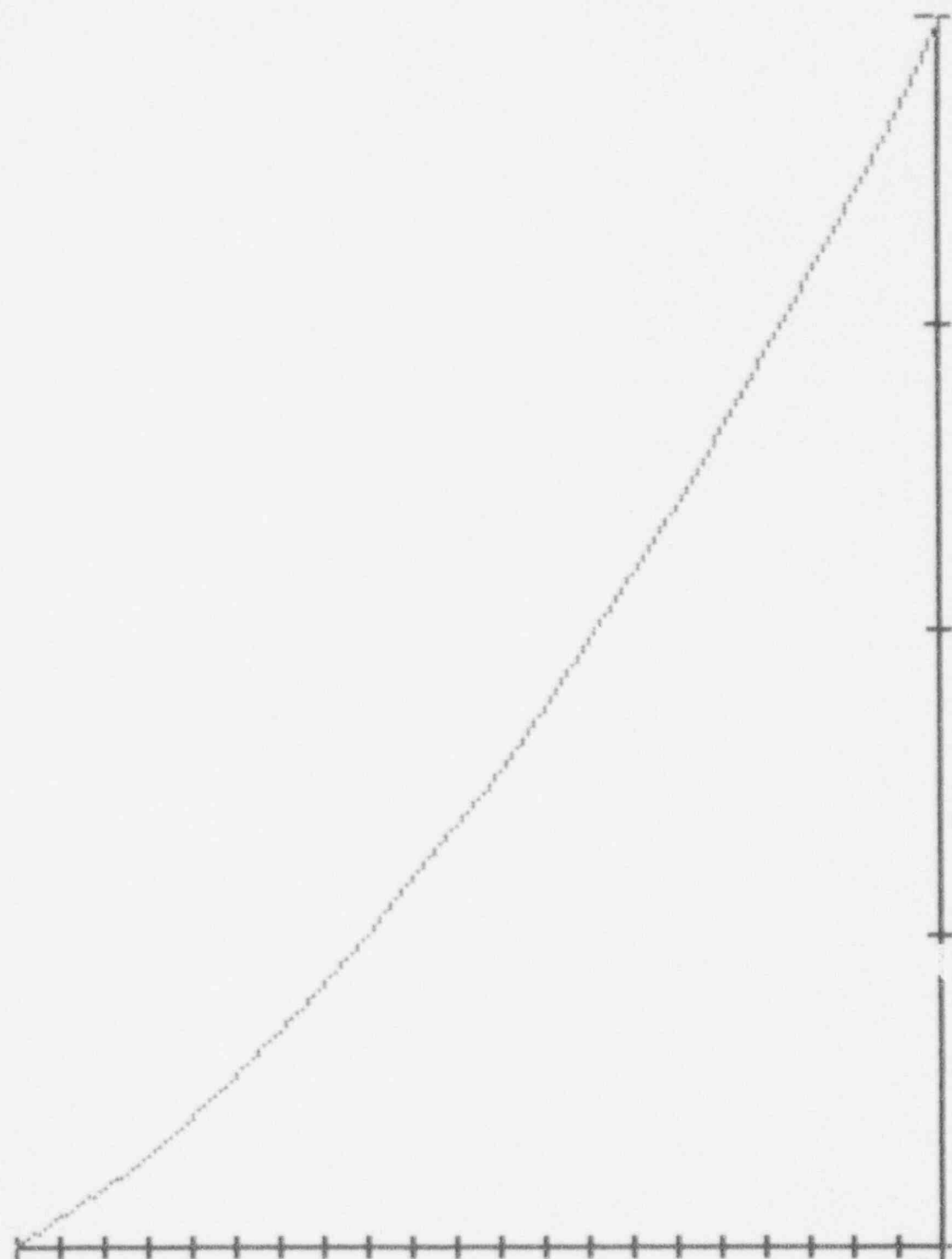
TEMPERATURE °F

74.788

0215

TIME

0615



0.8080

UNIT 1

MASS

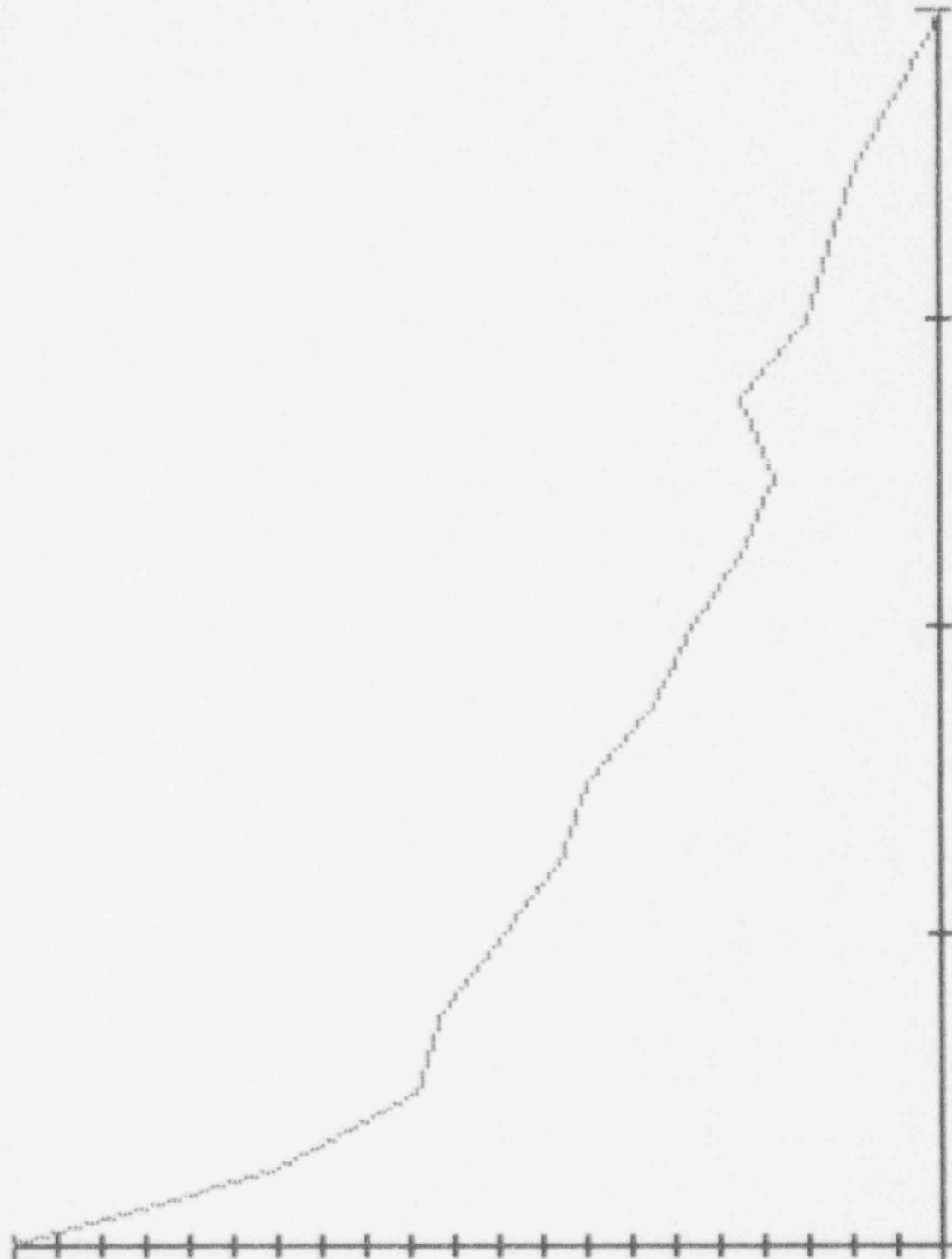
LBM
 $\times 10^5$

0.8077

0215

TIME

0615



0.914

UNIT 1

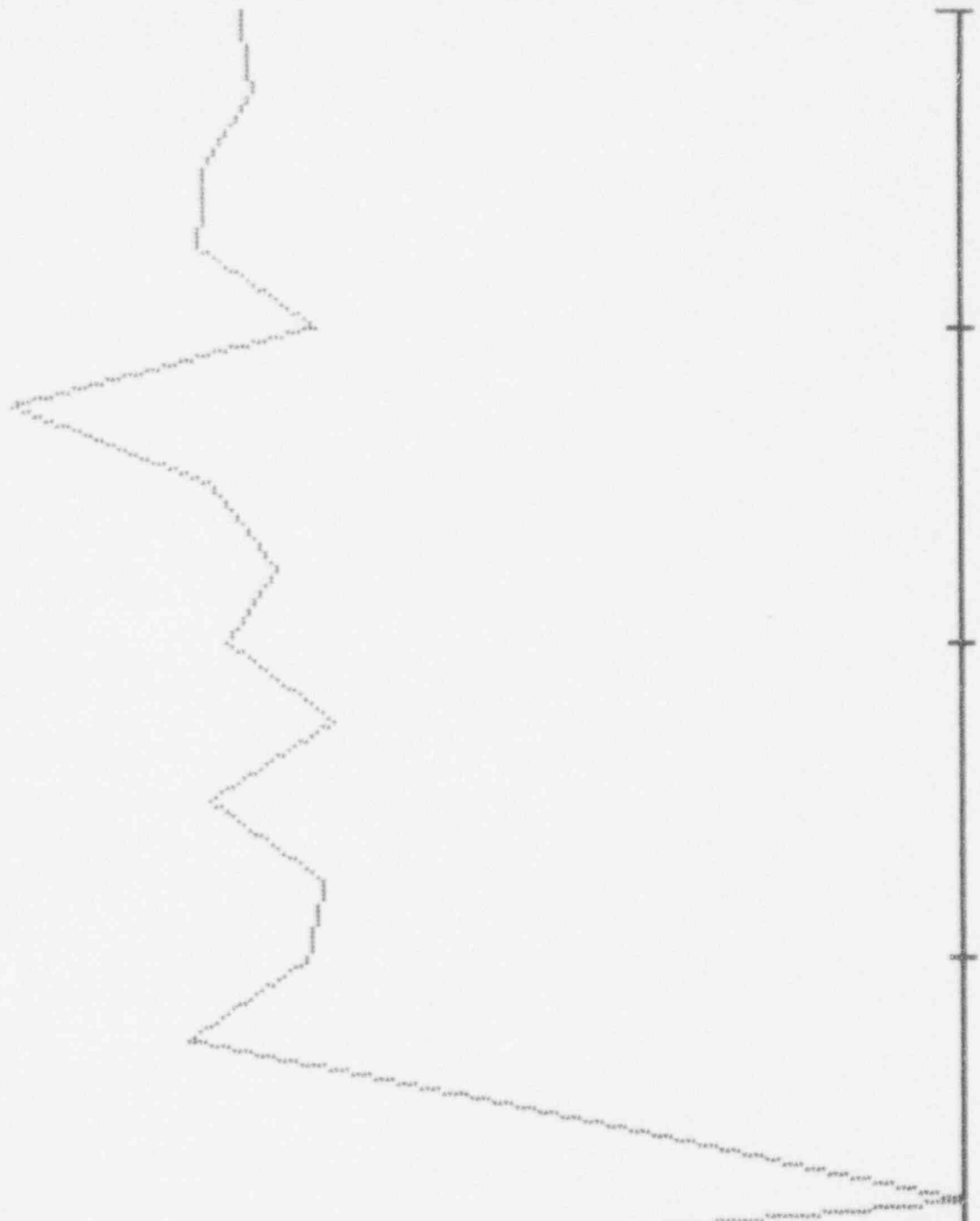
DIFF MASS
lbm

-8.109

0215

TIME

0615



0.9639

UNIT 1

TOT
TIME
ANAL.

WT%/
DAY

0.0000

.75 LA

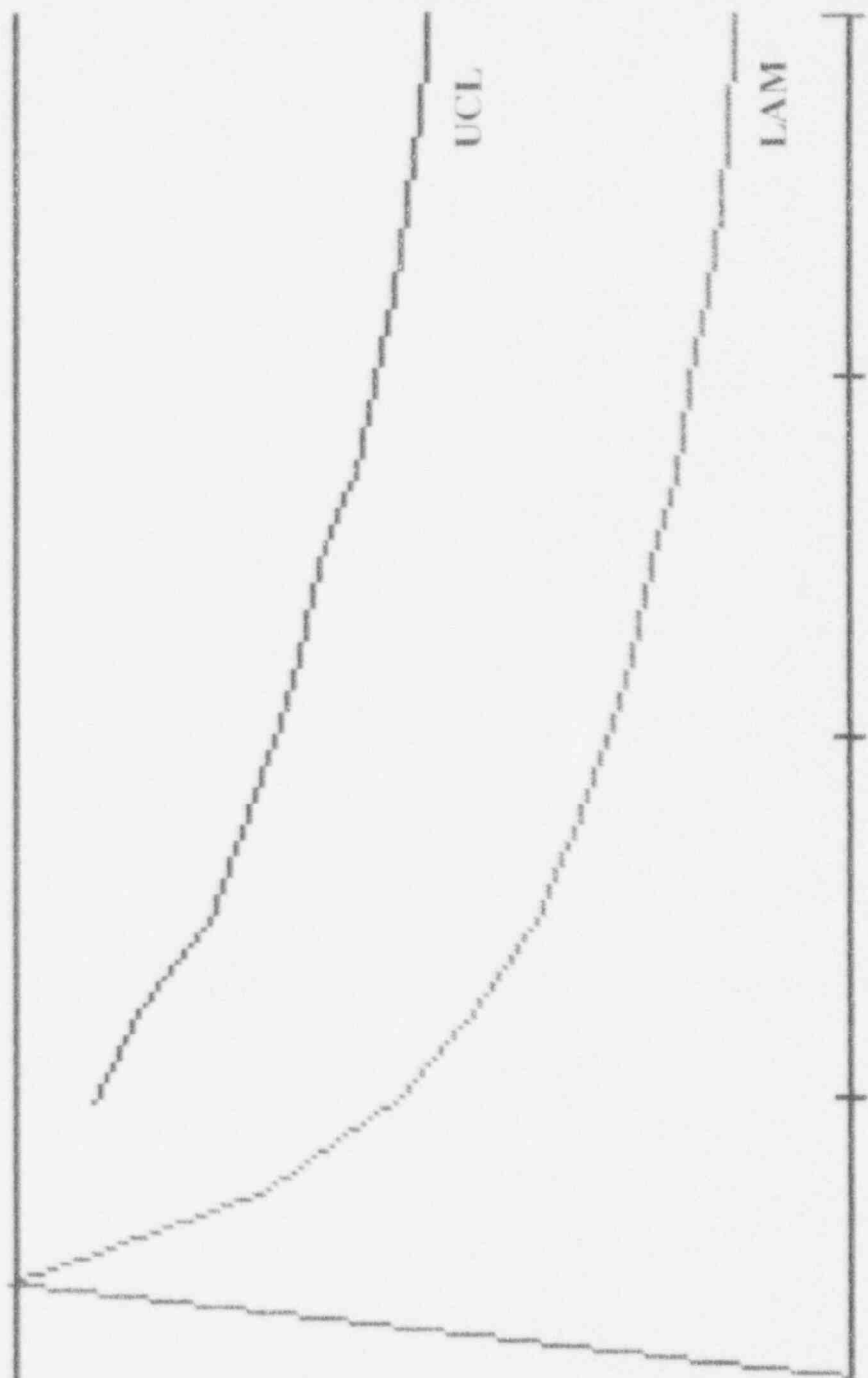
UCL

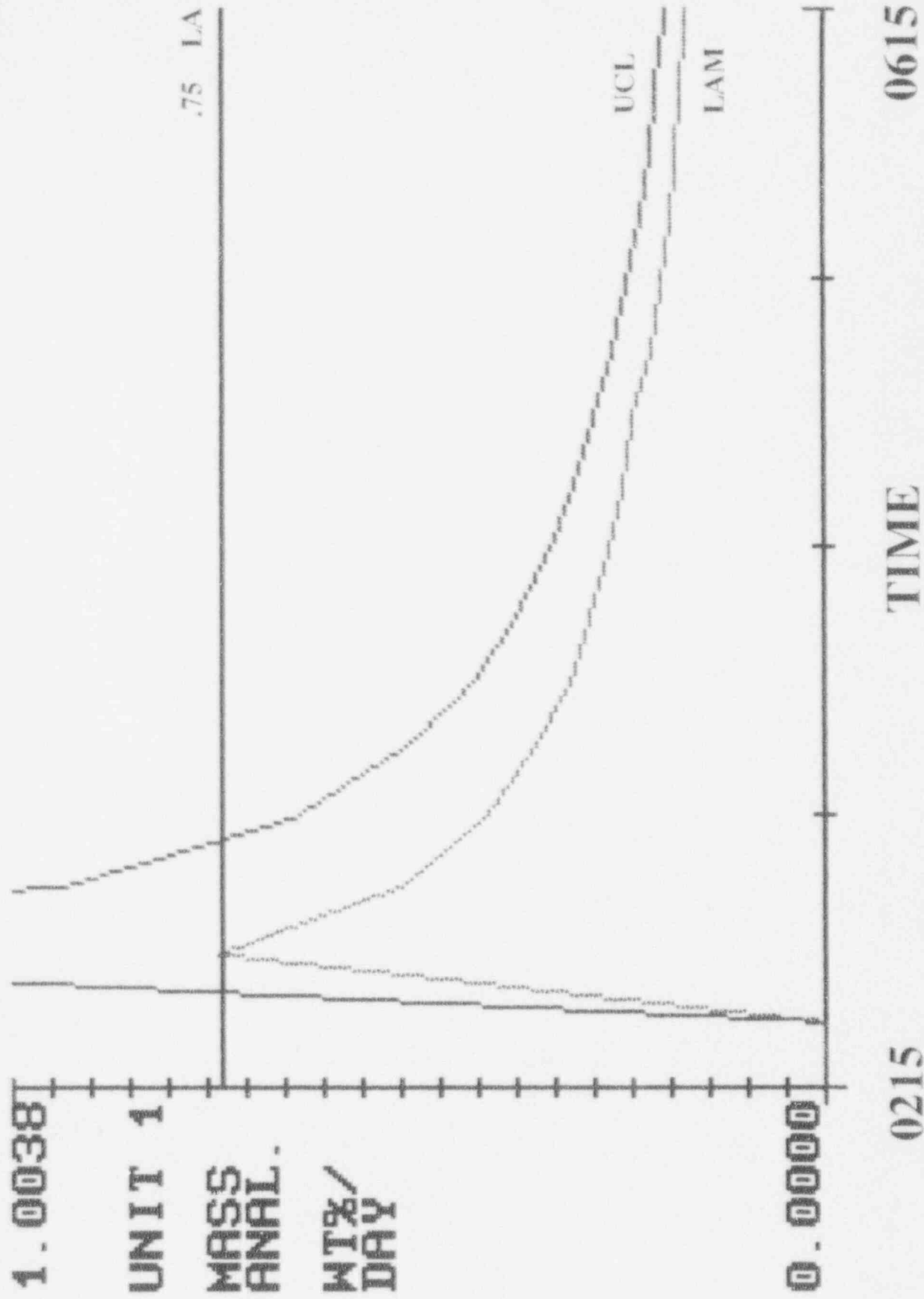
LAM

0215

TIME

0615





PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 02:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.1861	2	+61.2012

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.781	2	+81.989	3	+82.745
4	+84.764	5	+78.781	6	+78.671
7	+78.002	8	+78.895	9	+77.740
10	+76.740	11	+74.935	12	+75.018
13	+73.567	14	+73.236	15	+75.882
16	+74.278	17	+75.445	18	+74.404

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+75.585	2	+76.741
3	+71.099	4	+71.796
5	+70.398	6	+67.376
7	+71.819	8	+69.565
9	+69.289	10	+71.236

AVERAGE TEMPERATURE = +75.8421 DEG. F
AVERAGE PRESSURE = +61.2021 PSIA
MASS = +80795.14 LBM
AVG DEW POINT TEMP = +70.7869 DEG. F
AVG VAPOR PRESSURE = +0.3728 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 02:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.1664	2	+61.1820

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.703	2	+81.909	3	+82.680
4	+84.722	5	+78.691	6	+78.581
7	+77.889	8	+78.789	9	+77.626
10	+76.695	11	+74.871	12	+74.944
13	+73.427	14	+73.082	15	+75.749
16	+74.124	17	+75.307	18	+74.249

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+75.361	2	+76.735
3	+70.969	4	+71.751
5	+70.187	6	+67.088
7	+71.923	8	+69.942
9	+69.652	10	+71.107

AVERAGE TEMPERATURE = +75.7188 DEG. F
AVERAGE PRESSURE = +61.1826 PSIA
MASS = +80787.03 LBM
AVG DEW POINT TEMP = +70.8387 DEG. F
AVG VAPOR PRESSURE = +0.3734 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 02:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.1524	2	+61.1681

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.645	2	+81.854	3	+82.637
4	+84.689	5	+78.629	6	+78.521
7	+77.787	8	+78.706	9	+77.542
10	+76.663	11	+74.823	12	+74.876
13	+73.305	14	+72.984	15	+75.674
16	+73.985	17	+75.191	18	+74.115

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.331	2	+76.709
3	+70.892	4	+71.504
5	+70.087	6	+67.268
7	+71.991	8	+70.561
9	+69.779	10	+71.089

AVERAGE TEMPERATURE = +75.6167 DEG. F
AVERAGE PRESSURE = +61.1687 PSIA
MASS = +80782.48 LBM
AVG DEW POINT TEMP = +70.9230 DEG. F
AVG VAPOR PRESSURE = +0.3745 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 03:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.1417	2	+61.1569

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.600	2	+81.804	3	+82.586
4	+84.626	5	+78.577	6	+78.464
7	+77.714	8	+78.631	9	+77.471
10	+76.635	11	+74.780	12	+74.821
13	+73.204	14	+72.906	15	+75.612
16	+73.867	17	+75.090	18	+73.994

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+75.350	2	+76.624
3	+70.839	4	+71.411
5	+70.043	6	+66.845
7	+72.038	8	+70.692
9	+69.637	10	+71.052

AVERAGE TEMPERATURE = +75.5289 DEG. F
AVERAGE PRESSURE = +61.1577 PSIA
MASS = +80781.77 LBM
AVG DEW POINT TEMP = +70.8872 DEG. F
AVG VAPOR PRESSURE = +0.3741 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 03:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.1313	2	+61.1468

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.567	2	+81.760	3	+82.543
4	+84.602	5	+78.532	6	+78.412
7	+77.644	8	+78.566	9	+77.392
10	+76.611	11	+74.751	12	+74.770
13	+73.115	14	+72.830	15	+75.564
16	+73.764	17	+74.998	18	+73.888

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.303	2	+76.623
3	+70.754	4	+71.324
5	+69.998	6	+66.946
7	+71.741	8	+71.091
9	+69.505	10	+71.105

AVERAGE TEMPERATURE = +75.4520 DEG. F
AVERAGE PRESSURE = +61.1475 PSIA
MASS = +80779.90 LBM
AVG DEW POINT TEMP = +70.8795 DEG. F
AVG VAPOR PRESSURE = +0.3740 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 03:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.1207	2	+61.1371

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.527	2	+81.719	3	+82.498
4	+84.566	5	+78.501	6	+78.374
7	+77.577	8	+78.507	9	+77.327
10	+76.588	11	+74.722	12	+74.714
13	+73.040	14	+72.760	15	+75.517
16	+73.678	17	+74.906	18	+73.788

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.193	2	+76.605
3	+70.669	4	+71.248
5	+69.850	6	+67.090
7	+71.594	8	+71.200
9	+69.457	10	+71.109

AVERAGE TEMPERATURE = +75.3806 DEG. F
AVERAGE PRESSURE = +61.1373 PSIA
MASS = +80777.88 LBM
AVG DEW POINT TEMP = +70.8381 DEG. F
AVG VAPOR PRESSURE = +0.3734 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 03:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.1119	2	+61.1279

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.485	2	+81.683	3	+82.448
4	+84.513	5	+78.462	6	+78.338
7	+77.508	8	+78.444	9	+77.265
10	+76.557	11	+74.686	12	+74.668
13	+72.972	14	+72.704	15	+75.466
16	+73.574	17	+74.820	18	+73.696

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.205	2	+76.577
3	+70.685	4	+71.414
5	+70.050	6	+66.906
7	+71.370	8	+71.259
9	+69.307	10	+71.088

AVERAGE TEMPERATURE = +75.3084 DEG. F
AVERAGE PRESSURE = +61.1283 PSIA
MASS = +80776.97 LBM
AVG DEW POINT TEMP = +70.8286 DEG. F
AVG VAPOR PRESSURE = +0.3733 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 04:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.1027	2	+61.1196

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.452	2	+81.646	3	+82.404
4	+84.457	5	+78.432	6	+78.296
7	+77.447	8	+78.385	9	+77.220
10	+76.547	11	+74.655	12	+74.619
13	+72.897	14	+72.646	15	+75.445
16	+73.483	17	+74.747	18	+73.606

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.140	2	+76.541
3	+70.634	4	+71.160
5	+69.918	6	+66.979
7	+71.973	8	+71.550
9	+69.242	10	+71.080

AVERAGE TEMPERATURE = +75.2433 DEG. F
AVERAGE PRESSURE = +61.1196 PSIA
MASS = +80774.85 LBM
AVG DEW POINT TEMP = +70.8466 DEG. F
AVG VAPOR PRESSURE = +0.3735 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 04:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0953	2	+61.1112

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.420	2	+81.620	3	+82.359
4	+84.421	5	+78.413	6	+78.261
7	+77.397	8	+78.329	9	+77.159
10	+76.522	11	+74.643	12	+74.583
13	+72.837	14	+72.591	15	+75.408
16	+73.411	17	+74.676	18	+73.528

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.120	2	+76.548
3	+70.590	4	+70.967
5	+69.882	6	+66.842
7	+71.740	8	+71.176
9	+69.317	10	+71.114

AVERAGE TEMPERATURE = +75.1875 DEG. F
AVERAGE PRESSURE = +61.1117 PSIA
MASS = +80773.73 LBM
AVG DEW POINT TEMP = +70.7905 DEG. F
AVG VAPOR PRESSURE = +0.3728 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 04:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.0874	2	+61.1024

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.385	2	+81.593	3	+82.314
4	+84.344	5	+78.383	6	+78.231
7	+77.340	8	+78.290	9	+77.107
10	+76.503	11	+74.611	12	+74.536
13	+72.782	14	+72.534	15	+75.372
16	+73.340	17	+74.606	18	+73.449

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+75.048	2	+76.487
3	+70.496	4	+70.848
5	+69.887	6	+66.702
7	+71.779	8	+71.155
9	+69.215	10	+71.070

AVERAGE TEMPERATURE	=	+75.1300	DEG. F
AVERAGE PRESSURE	=	+61.1033	PSIA
MASS	=	+80772.12	LBM
AVG DEW POINT TEMP	=	+70.7419	DEG. F
AVG VAPOR PRESSURE	=	+0.3722	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 04:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0794	2	+61.0953

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.353	2	+81.552	3	+82.270
4	+84.300	5	+78.361	6	+78.202
7	+77.293	8	+78.229	9	+77.053
10	+76.481	11	+74.587	12	+74.494
13	+72.709	14	+72.487	15	+75.339
16	+73.265	17	+74.543	18	+73.380

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.112	2	+76.488
3	+70.481	4	+71.010
5	+69.788	6	+66.630
7	+71.584	8	+70.996
9	+69.255	10	+71.103

AVERAGE TEMPERATURE = +75.0744 DEG. F
AVERAGE PRESSURE = +61.0958 PSIA
MASS = +80771.12 LBM
AVG DEW POINT TEMP = +70.7041 DEG. F
AVG VAPOR PRESSURE = +0.3717 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 05:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0724	2	+61.0881

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.323	2	+81.516	3	+82.235
4	+84.257	5	+78.335	6	+78.192
7	+77.242	8	+78.179	9	+76.995
10	+76.464	11	+74.572	12	+74.449
13	+72.665	14	+72.435	15	+75.310
16	+73.185	17	+74.478	18	+73.318

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+75.055	2	+76.400
3	+70.448	4	+70.891
5	+69.741	6	+66.602
7	+71.016	8	+70.989
9	+69.028	10	+71.024

AVERAGE TEMPERATURE = +75.0221 DEG. F
AVERAGE PRESSURE = +61.0887 PSIA
MASS = +80772.03 LBM
AVG DEW POINT TEMP = +70.5570 DEG. F
AVG VAPOR PRESSURE = +0.3699 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 05:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0655	2	+61.0814

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.287	2	+81.478	3	+82.183
4	+84.214	5	+78.315	6	+78.169
7	+77.193	8	+78.131	9	+76.963
10	+76.447	11	+74.550	12	+74.413
13	+72.608	14	+72.381	15	+75.270
16	+73.124	17	+74.412	18	+73.257

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.919	2	+76.365
3	+70.377	4	+70.825
5	+69.736	6	+66.600
7	+71.295	8	+70.988
9	+69.074	10	+71.072

AVERAGE TEMPERATURE = +74.9715 DEG. F
AVERAGE PRESSURE = +61.0819 PSIA
MASS = +80770.09 LBM
AVG DEW POINT TEMP = +70.5896 DEG. F
AVG VAPOR PRESSURE = +0.3703 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 05:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0588	2	+61.0733

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.254	2	+81.438	3	+82.133
4	+84.135	5	+78.284	6	+78.155
7	+77.141	8	+78.088	9	+76.917
10	+76.437	11	+74.529	12	+74.371
13	+72.549	14	+72.331	15	+75.222
16	+73.051	17	+74.362	18	+73.198

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.969	2	+76.285
3	+70.325	4	+70.806
5	+69.769	6	+66.527
7	+71.011	8	+70.968
9	+68.958	10	+70.964

AVERAGE TEMPERATURE = +74.9208 DEG. F
AVERAGE PRESSURE = +61.0745 PSIA
MASS = +80769.24 LBM
AVG DEW POINT TEMP = +70.5091 DEG. F
AVG VAPOR PRESSURE = +0.3693 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 05:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.0525	2	+61.0671

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.221	2	+81.408	3	+82.088
4	+84.088	5	+78.265	6	+78.132
7	+77.103	8	+78.045	9	+76.869
10	+76.414	11	+74.516	12	+74.337
13	+72.499	14	+72.285	15	+75.204
16	+72.985	17	+74.305	18	+73.141

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.891	2	+76.295
3	+70.338	4	+70.643
5	+69.808	6	+66.480
7	+70.805	8	+70.983
9	+68.971	10	+70.977

AVERAGE TEMPERATURE = +74.8752 DEG. F
AVERAGE PRESSURE = +61.0682 PSIA
MASS = +30768.35 LBM
AVG DEW POINT TEMP = +70.4768 DEG. F
AVG VAPOR PRESSURE = +0.3689 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 06:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0460	2	+61.0603

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.187	2	+81.382	3	+82.048
4	+84.028	5	+78.245	6	+78.110
7	+77.055	8	+78.006	9	+76.831
10	+76.399	11	+74.491	12	+74.293
13	+72.454	14	+72.243	15	+75.187
16	+72.922	17	+74.252	18	+73.087

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.938	2	+76.159
3	+70.227	4	+70.790
5	+69.598	6	+66.370
7	+71.126	8	+70.839
9	+68.890	10	+70.901

AVERAGE TEMPERATURE	=	+74.8298	DEG. F
AVERAGE PRESSURE	=	+61.0616	PSIA
MASS	=	+80766.96	LBM
AVG DEW POINT TEMP	=	+70.4413	DEG. F
AVG VAPOR PRESSURE	=	+0.3684	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : STABLE
DATE : 139
TIME : 06:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0394	2	+61.0540

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.152	2	+81.341	3	+82.001
4	+83.982	5	+78.234	6	+78.098
7	+77.021	8	+77.965	9	+76.799
10	+76.382	11	+74.474	12	+74.261
13	+72.406	14	+72.199	15	+75.144
16	+72.863	17	+74.207	18	+73.036

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.831	2	+76.207
3	+70.230	4	+70.686
5	+69.700	6	+66.431
7	+70.577	8	+70.915
9	+68.865	10	+70.902

AVERAGE TEMPERATURE = +74.7876 DEG. F
AVERAGE PRESSURE = +61.0551 PSIA
MASS = +80765.72 LBM
AVG DEW POINT TEMP = +70.3832 DEG. F
AVG VAPOR PRESSURE = +0.3677 PSIA

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 1415

OF DATA POINTS = 33
MODE DURATION (IN HOURS) = 8.00
TOT TIME MEASURED LEAK = 0.1525
TOT TIME CALCULATED LEAK = 0.1289
TOT TIME 95% UCL = 0.2158
MASS POINT LEAK = 0.1331
MASS POINT 95% UCL = 0.1405
75% La = .75
MASS = 80724.67

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP:	73.941 / -0.031	AVG PRESS:	60.561 / -0.003
MASS:	80724.67 / +0.469	AVG DEW PRESS:	0.3609 / -0.0011
		TOTAL PRESS:	60.921 / -0.004

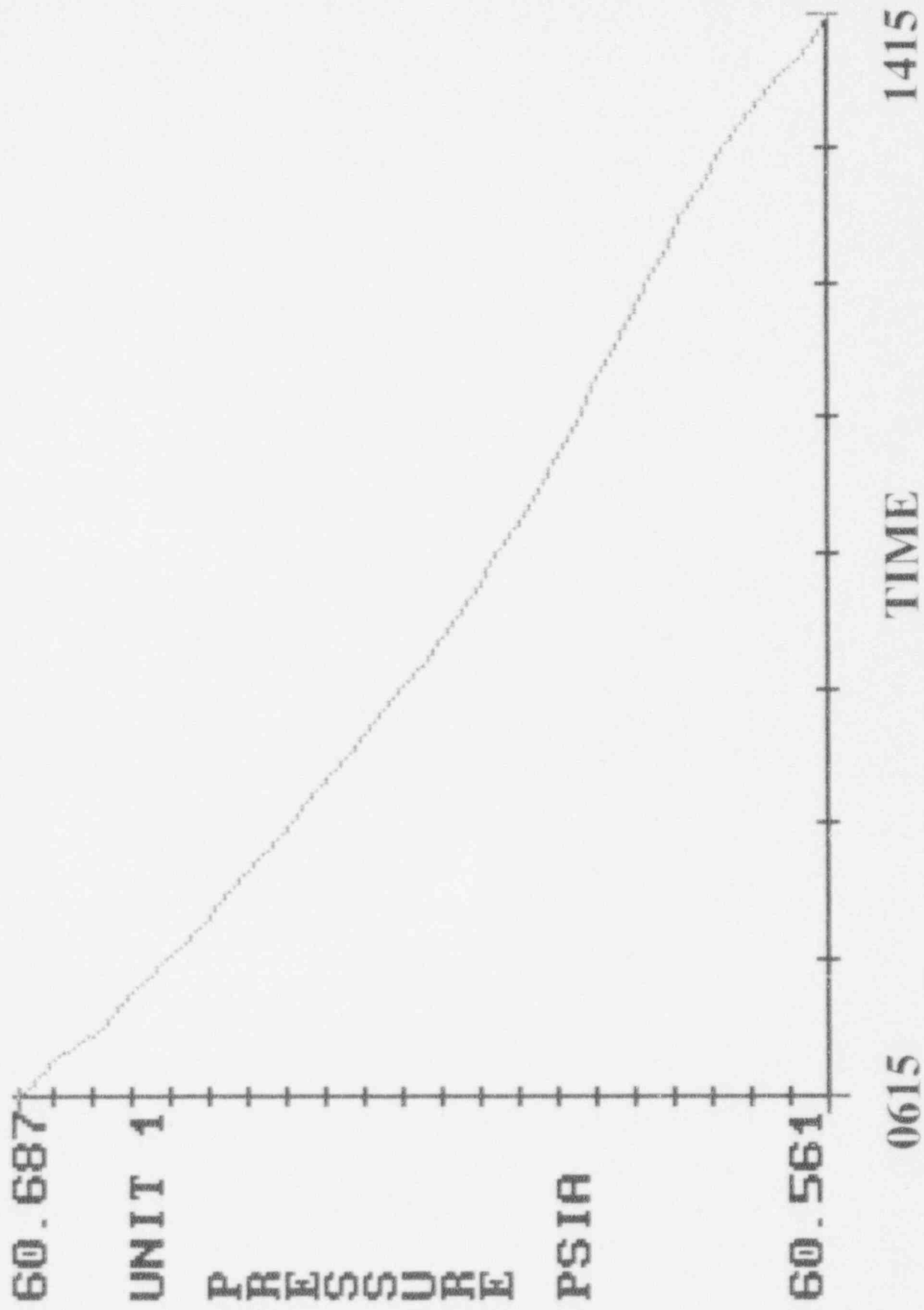
TEST MODE

Page 1

AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	TOT PRESS	MASS
139	0.00	74.788	70.383	0.368	61.055	80765.72
139	0.25	74.747	70.345	0.367	61.050	80765.17
139	0.50	74.713	70.460	0.369	61.043	80759.93
139	0.75	74.679	70.395	0.368	61.038	80759.21
139	1.00	74.647	70.373	0.368	61.033	80757.22
139	1.25	74.612	70.423	0.368	61.028	80754.95
139	1.50	74.575	70.311	0.367	61.022	80754.66
139	1.75	74.541	70.325	0.367	61.017	80752.79
139	2.00	74.511	70.278	0.366	61.012	80751.51
139	2.25	74.483	70.249	0.366	61.008	80750.61
139	2.50	74.452	70.252	0.366	61.002	80748.23
139	2.75	74.423	70.204	0.365	60.998	80747.76
139	3.00	74.394	70.243	0.366	60.994	80745.91
139	3.25	74.366	70.215	0.366	60.989	80744.82
139	3.50	74.341	70.194	0.365	60.985	80743.09
139	3.75	74.310	70.209	0.366	60.981	80742.66
139	4.00	74.285	70.131	0.365	60.977	80742.26
139	4.25	74.259	70.138	0.365	60.974	80741.70
139	4.50	74.236	70.121	0.364	60.971	80741.34
139	4.75	74.217	70.069	0.364	60.967	80740.26
139	5.00	74.193	70.076	0.364	60.964	80739.71
139	5.25	74.173	70.040	0.363	60.961	80739.11
139	5.50	74.153	70.003	0.363	60.958	80738.71
139	5.75	74.135	69.976	0.363	60.955	80737.27
139	6.00	74.114	69.976	0.363	60.952	80737.63
139	6.25	74.094	69.961	0.362	60.949	80736.10
139	6.50	74.081	69.912	0.362	60.946	80735.30
139	6.75	74.060	69.899	0.362	60.942	80733.39
139	7.00	74.045	69.884	0.361	60.939	80732.06
139	7.25	74.026	69.981	0.363	60.936	80729.49
139	7.50	74.003	69.900	0.362	60.931	80726.62
139	7.75	73.972	69.930	0.362	60.926	80724.20
139	8.00	73.941	69.840	0.361	60.921	80724.67

LEAKAGE RATE TREND SUMMARY UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
139	0.25	0.0645	0.0000	0.0000	0.0000	0.0000
139	0.50	0.3442	0.3442	0.3442	0.3430	0.3430
139	0.75	0.2576	0.3187	-0.0255	0.2949	-0.0480
139	1.00	0.2524	0.3013	-0.0174	0.2734	-0.0215
139	1.25	0.2560	0.2932	-0.0081	0.2666	-0.0068
139	1.50	0.2191	0.2682	-0.0250	0.2389	-0.0277
139	1.75	0.2195	0.2533	-0.0149	0.2271	-0.0118
139	2.00	0.2111	0.2402	-0.0131	0.2157	-0.0114
139	2.25	0.1995	0.2269	-0.0132	0.2046	-0.0111
139	2.50	0.2078	0.2207	-0.0063	0.2020	-0.0026
139	2.75	0.1940	0.2118	-0.0089	0.1945	-0.0075
139	3.00	0.1962	0.2060	-0.0058	0.1909	-0.0036
139	3.25	0.1910	0.2002	-0.0058	0.1872	-0.0037
139	3.50	0.1921	0.1961	-0.0041	0.1850	-0.0022
139	3.75	0.1827	0.1907	-0.0054	0.1807	-0.0042
139	4.00	0.1743	0.1846	-0.0061	0.1749	-0.0058
139	4.25	0.1679	0.1783	-0.0063	0.1692	-0.0057
139	4.50	0.1609	0.1718	-0.0065	0.1633	-0.0059
139	4.75	0.1593	0.1662	-0.0056	0.1582	-0.0052
139	5.00	0.1546	0.1608	-0.0055	0.1534	-0.0048
139	5.25	0.1506	0.1556	-0.0052	0.1486	-0.0048
139	5.50	0.1459	0.1504	-0.0052	0.1440	-0.0046
139	5.75	0.1470	0.1463	-0.0042	0.1406	-0.0034
139	6.00	0.1391	0.1415	-0.0047	0.1362	-0.0043
139	6.25	0.1408	0.1377	-0.0038	0.1332	-0.0030
139	6.50	0.1391	0.1343	-0.0035	0.1304	-0.0029
139	6.75	0.1423	0.1318	-0.0025	0.1291	-0.0013
139	7.00	0.1429	0.1297	-0.0021	0.1282	-0.0009
139	7.25	0.1485	0.1286	-0.0010	0.1286	0.0004
139	7.50	0.1549	0.1286	-0.0000	0.1300	0.0014
139	7.75	0.1592	0.1291	0.0005	0.1323	0.0023
139	8.00	0.1525	0.1289	-0.0003	0.1331	0.0009

LEAKAGE RATE SUMMARY UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	UCL	LAM	UCL
139	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
139	0.25	0.0645	0.0000	0.0000	0.0000	0.0000
139	0.50	0.3442	0.3442	0.0000	0.3430	1.7213
139	0.75	0.2576	0.3187	1.7673	0.2949	0.5231
139	1.00	0.2524	0.3013	0.9195	0.2734	0.3828
139	1.25	0.2560	0.2932	0.7044	0.2666	0.3319
139	1.50	0.2191	0.2682	0.6003	0.2389	0.2929
139	1.75	0.2195	0.2533	0.5324	0.2271	0.2685
139	2.00	0.2111	0.2402	0.4838	0.2157	0.2491
139	2.25	0.1995	0.2269	0.4453	0.2046	0.2335
139	2.50	0.2078	0.2207	0.4184	0.2020	0.2254
139	2.75	0.1940	0.2118	0.3939	0.1945	0.2152
139	3.00	0.1962	0.2060	0.3749	0.1909	0.2086
139	3.25	0.1910	0.2002	0.3583	0.1872	0.2028
139	3.50	0.1921	0.1961	0.3450	0.1850	0.1985
139	3.75	0.1827	0.1907	0.3318	0.1807	0.1933
139	4.00	0.1743	0.1846	0.3190	0.1749	0.1874
139	4.25	0.1679	0.1783	0.3070	0.1692	0.1817
139	4.50	0.1609	0.1718	0.2954	0.1633	0.1760
139	4.75	0.1593	0.1662	0.2851	0.1582	0.1706
139	5.00	0.1546	0.1608	0.2755	0.1534	0.1656
139	5.25	0.1506	0.1556	0.2664	0.1486	0.1606
139	5.50	0.1459	0.1504	0.2578	0.1440	0.1558
139	5.75	0.1470	0.1463	0.2504	0.1406	0.1519
139	6.00	0.1391	0.1415	0.2427	0.1362	0.1475
139	6.25	0.1408	0.1377	0.2362	0.1332	0.1440
139	6.50	0.1391	0.1343	0.2303	0.1304	0.1407
139	6.75	0.1423	0.1318	0.2255	0.1291	0.1387
139	7.00	0.1429	0.1297	0.2215	0.1282	0.1372
139	7.25	0.1485	0.1286	0.2188	0.1286	0.1370
139	7.50	0.1549	0.1286	0.2176	0.1300	0.1380
139	7.75	0.1592	0.1291	0.2173	0.1323	0.1401
139	8.00	0.1525	0.1289	0.2158	0.1331	0.1405



0.369

UNIT 1

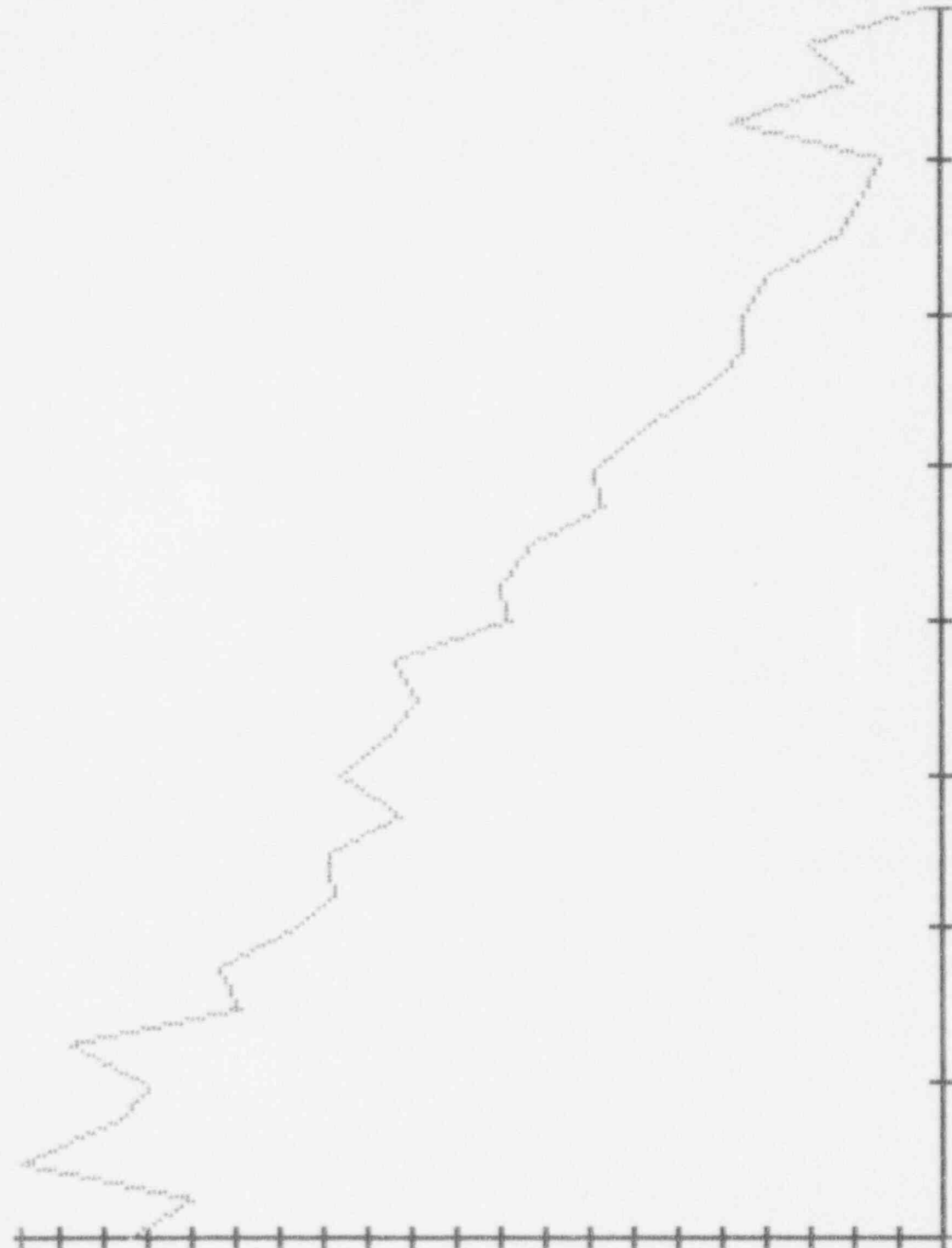
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0615

TIME

1415



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UNIT 1

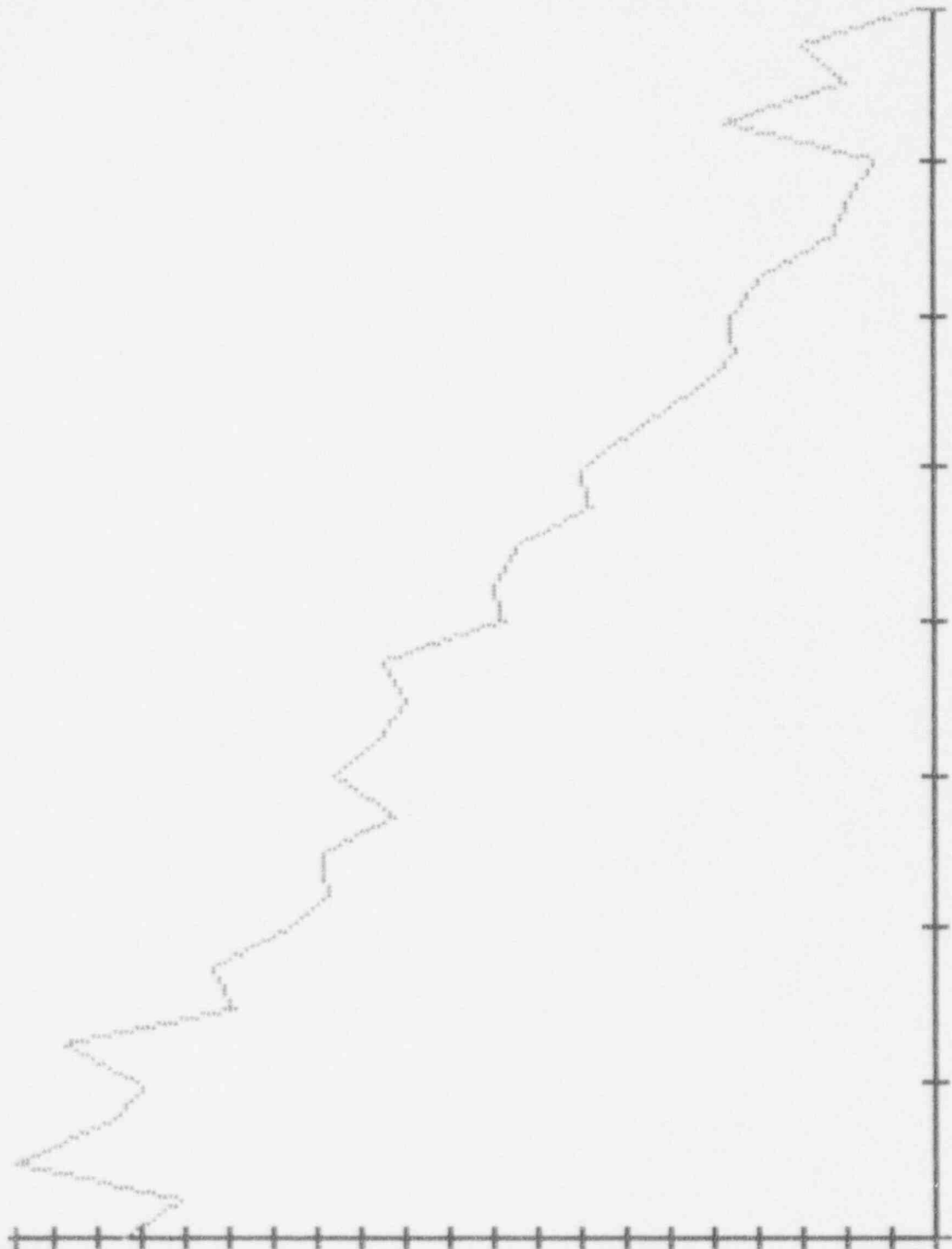
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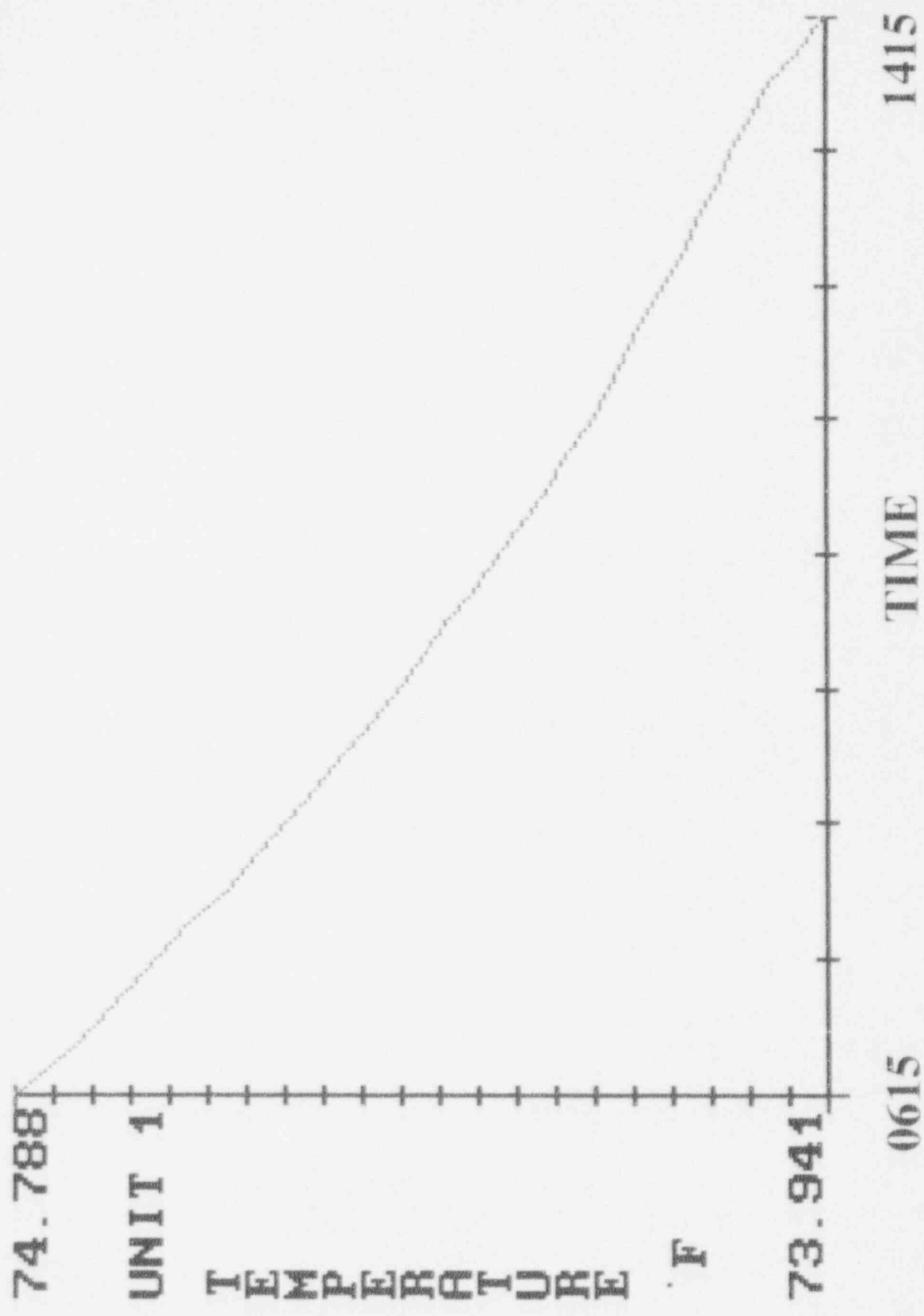
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0615

TIME

1415





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UNIT 1

MASS

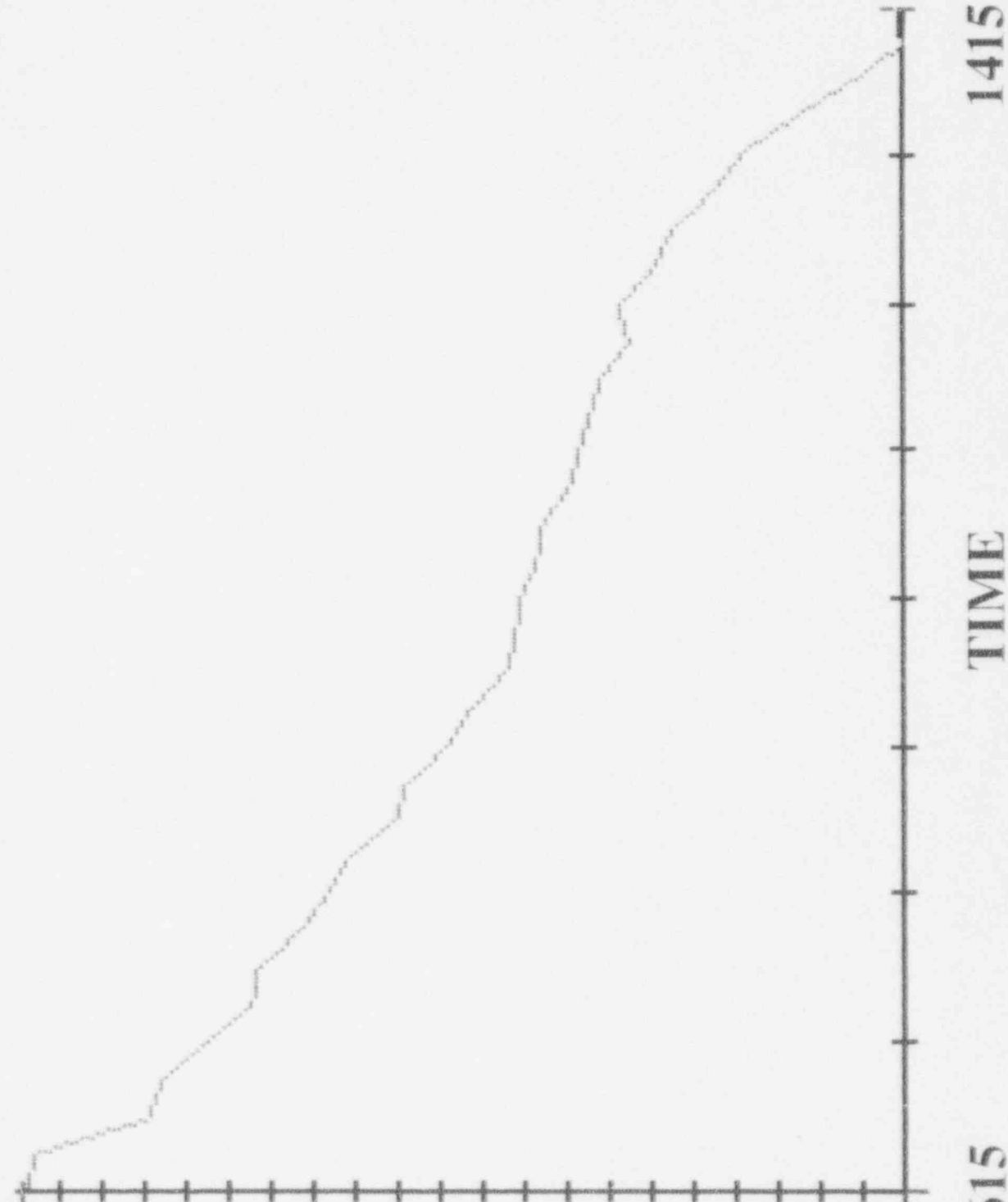
LBM
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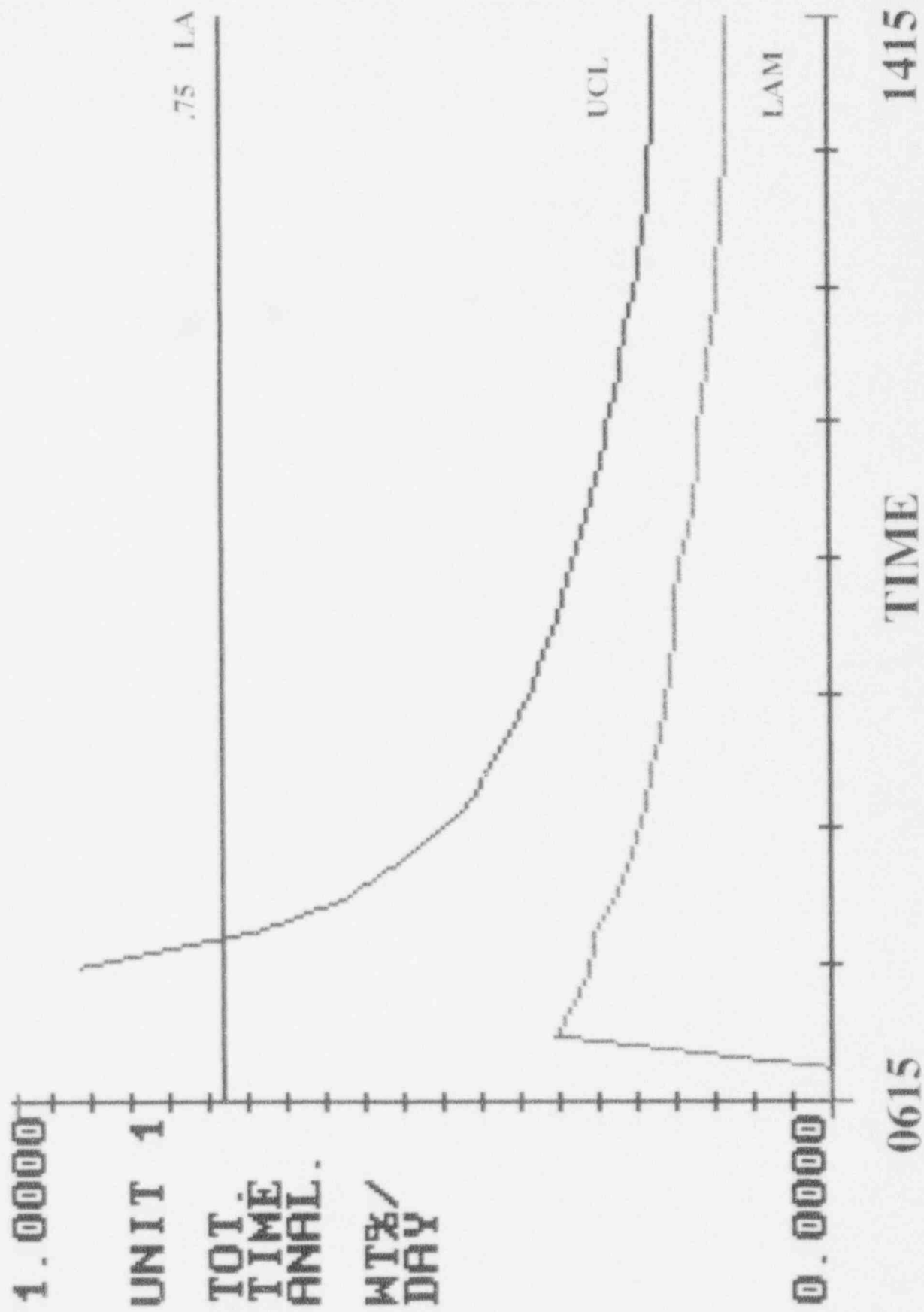
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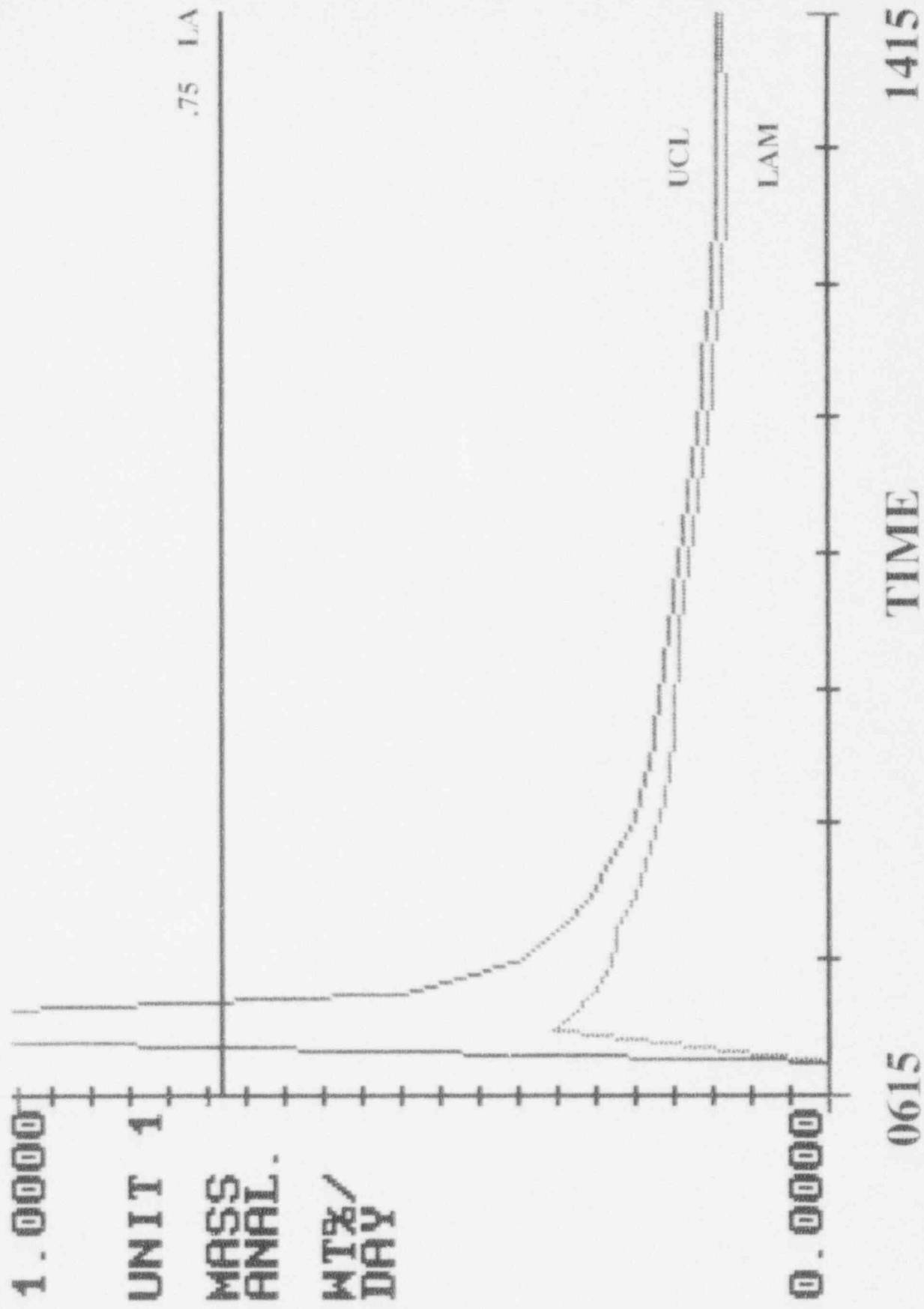
0615

TIME

1415







PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 06:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0394	2	+61.0540

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.152	2	+81.341	3	+82.001
4	+83.982	5	+78.234	6	+78.098
7	+77.021	8	+77.965	9	+76.799
10	+76.382	11	+74.474	12	+74.261
13	+72.406	14	+72.199	15	+75.144
16	+72.863	17	+74.207	18	+73.036

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.831	2	+76.207
3	+70.230	4	+70.686
5	+69.700	6	+66.431
7	+70.577	8	+70.915
9	+68.865	10	+70.902

AVERAGE TEMPERATURE = +74.7876 DEG. F
AVERAGE PRESSURE = +61.0551 PSIA
MASS = +80765.72 LBM
AVG DEW POINT TEMP = +70.3832 DEG. F
AVG VAPOR PRESSURE = +0.3677 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 06:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0338	2	+61.0487

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.120	2	+81.316	3	+81.953
4	+83.924	5	+78.216	6	+78.074
7	+76.983	8	+77.927	9	+76.766
10	+76.372	11	+74.451	12	+74.229
13	+72.364	14	+72.150	15	+75.121
16	+72.818	17	+74.162	18	+72.979

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.795	2	+76.154
3	+70.218	4	+70.681
5	+69.592	6	+66.241
7	+70.653	8	+70.817
9	+68.860	10	+70.853

AVERAGE TEMPERATURE = +74.7474 DEG. F
AVERAGE PRESSURE = +61.0497 PSIA
MASS = +80765.17 LBM
AVG DEW POINT TEMP = +70.3454 DEG. F
AVG VAPOR PRESSURE = +0.3672 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 06:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.0272	2	+61.0425

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.086	2	+81.288	3	+81.907
4	+83.871	5	+78.211	6	+78.053
7	+76.938	8	+77.877	9	+76.738
10	+76.352	11	+74.438	12	+74.197
13	+72.321	14	+72.104	15	+75.093
16	+72.793	17	+74.122	18	+72.938

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.875	2	+76.181
3	+70.201	4	+70.668
5	+69.823	6	+66.358
7	+71.046	8	+70.859
9	+68.944	10	+70.923

AVERAGE TEMPERATURE = +74.7131 DEG. F
AVERAGE PRESSURE = +61.0433 PSIA
MASS = +80759.93 LBM
AVG DEW POINT TEMP = +70.4596 DEG. F
AVG VAPOR PRESSURE = +0.3687 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 07:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0220	2	+61.0373

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.053	2	+81.261	3	+81.859
4	+83.809	5	+78.200	6	+78.029
7	+76.912	8	+77.843	9	+76.702
10	+76.340	11	+74.424	12	+74.166
13	+72.289	14	+72.058	15	+75.091
16	+72.751	17	+74.077	18	+72.895

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.822	2	+76.054
3	+70.152	4	+70.657
5	+69.744	6	+66.404
7	+70.977	8	+70.809
9	+68.839	10	+70.845

AVERAGE TEMPERATURE = +74.6792 DEG. F
AVERAGE PRESSURE = +61.0381 PSIA
MASS = +80759.21 LBM
AVG DEW POINT TEMP = +70.3952 DEG. F
AVG VAPOR PRESSURE = +0.3678 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 07:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.0163	2	+61.0321

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.011	2	+81.236	3	+81.817
4	+83.748	5	+78.188	6	+78.020
7	+76.869	8	+77.802	9	+76.686
10	+76.322	11	+74.404	12	+74.134
13	+72.255	14	+72.025	15	+75.065
16	+72.718	17	+74.049	18	+72.854

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.740	2	+75.978
3	+70.107	4	+70.578
5	+69.869	6	+66.253
7	+70.751	8	+70.917
9	+68.868	10	+70.778

AVERAGE TEMPERATURE = +74.6468 DEG. F
AVERAGE PRESSURE = +61.0326 PSIA
MASS = +80757.22 LBM
AVG DEW POINT TEMP = +70.3731 DEG. F
AVG VAPOR PRESSURE = +0.3676 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 07:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+61.0116	2	+61.0267

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.968	2	+81.202	3	+81.761
4	+83.700	5	+78.184	6	+77.999
7	+76.837	8	+77.772	9	+76.659
10	+76.307	11	+74.393	12	+74.106
13	+72.209	14	+71.992	15	+75.043
16	+72.675	17	+74.005	18	+72.812

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.743	2	+76.031
3	+70.103	4	+70.639
5	+69.996	6	+66.251
7	+71.081	8	+70.840
9	+68.850	10	+70.778

AVERAGE TEMPERATURE = +74.6118 DEG. F
AVERAGE PRESSURE = +61.0276 PSIA
MASS = +80754.95 LBM
AVG DEW POINT TEMP = +70.4232 DEG. F
AVG VAPOR PRESSURE = +0.3682 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 07:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0061	2	+61.0206

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.938	2	+81.150	3	+81.717
4	+83.654	5	+78.170	6	+77.985
7	+76.811	8	+77.741	9	+76.625
10	+76.297	11	+74.371	12	+74.070
13	+72.173	14	+71.957	15	+75.023
16	+72.623	17	+73.965	18	+72.766

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.686	2	+75.930
3	+70.089	4	+70.443
5	+69.869	6	+66.071
7	+70.880	8	+70.809
9	+68.703	10	+70.698

AVERAGE TEMPERATURE = +74.5750 DEG. F
AVERAGE PRESSURE = +61.0218 PSIA
MASS = +80754.66 LBM
AVG DEW POINT TEMP = +70.3111 DEG. F
AVG VAPOR PRESSURE = +0.3668 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 08:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+61.0009	2	+61.0157

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.903	2	+81.110	3	+81.661
4	+83.596	5	+78.156	6	+77.977
7	+76.781	8	+77.709	9	+76.598
10	+76.283	11	+74.352	12	+74.045
13	+72.148	14	+71.918	15	+74.982
16	+72.580	17	+73.931	18	+72.725

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.670	2	+75.912
3	+70.021	4	+70.529
5	+69.849	6	+66.080
7	+70.795	8	+70.958
9	+68.702	10	+70.717

AVERAGE TEMPERATURE = +74.5413 DEG. F
AVERAGE PRESSURE = +61.0167 PSIA
MASS = +80752.79 LBM
AVG DEW POINT TEMP = +70.3252 DEG. F
AVG VAPOR PRESSURE = +0.3670 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 08:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9960	2	+61.0107

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.856	2	+81.081	3	+81.603
4	+83.528	5	+78.151	6	+77.963
7	+76.754	8	+77.677	9	+76.572
10	+76.269	11	+74.333	12	+74.011
13	+72.102	14	+71.890	15	+74.953
16	+72.559	17	+73.896	18	+72.690

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.613	2	+75.891
3	+70.039	4	+70.529
5	+69.877	6	+65.958
7	+70.447	8	+70.941
9	+68.769	10	+70.655

AVERAGE TEMPERATURE = +74.5113 DEG. F
AVERAGE PRESSURE = +61.0118 PSIA
MASS = +80751.51 LBM
AVG DEW POINT TEMP = +70.2785 DEG. F
AVG VAPOR PRESSURE = +0.3664 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 08:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9917	2	+61.0065

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.821	2	+81.039	3	+81.554
4	+83.482	5	+78.146	6	+77.952
7	+76.724	8	+77.651	9	+76.542
10	+76.252	11	+74.318	12	+73.982
13	+72.072	14	+71.856	15	+74.939
16	+72.529	17	+73.863	18	+72.656

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.637	2	+75.766
3	+69.969	4	+70.508
5	+69.836	6	+65.926
7	+70.922	8	+70.637
9	+68.634	10	+70.630

AVERAGE TEMPERATURE = +74.4831 DEG. F
AVERAGE PRESSURE = +61.0075 PSIA
MASS = +80750.61 LBM
AVG DEW POINT TEMP = +70.2486 DEG. F
AVG VAPOR PRESSURE = +0.3660 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 08:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9860	2	+61.0016

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.784	2	+81.012	3	+81.508
4	+83.439	5	+78.134	6	+77.933
7	+76.695	8	+77.619	9	+76.522
10	+76.247	11	+74.304	12	+73.957
13	+72.037	14	+71.825	15	+74.919
16	+72.490	17	+73.833	18	+72.612

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.594	2	+75.788
3	+70.000	4	+70.417
5	+69.913	6	+66.052
7	+70.600	8	+70.756
9	+68.743	10	+70.638

AVERAGE TEMPERATURE = +74.4517 DEG. F
AVERAGE PRESSURE = +61.0022 PSIA
MASS = +80748.23 LBM
AVG DEW POINT TEMP = +70.2522 DEG. F
AVG VAPOR PRESSURE = +0.3661 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 09:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9820	2	+60.9971

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.745	2	+80.959	3	+81.452
4	+83.386	5	+78.131	6	+77.930
7	+76.673	8	+77.599	9	+76.489
10	+76.233	11	+74.280	12	+73.927
13	+71.999	14	+71.789	15	+74.900
16	+72.458	17	+73.797	18	+72.582

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.588	2	+75.708
3	+69.962	4	+70.423
5	+69.754	6	+65.948
7	+70.618	8	+70.652
9	+68.763	10	+70.582

AVERAGE TEMPERATURE = +74.4227 DEG. F
AVERAGE PRESSURE = +60.9980 PSIA
MASS = +80747.76 LBM
AVG DEW POINT TEMP = +70.2037 DEG. F
AVG VAPOR PRESSURE = +0.3655 PSIA

PILGRIM NUCLEAR POWER STATION 1
 INTEGRATED LEAK RATE TEST
 DATA POINT SUMMARY SHEET

TEST MODE : TEST
 DATE : 139
 TIME : 09:15

 Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9780	2	+60.9929

 RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.712	2	+80.916	3	+81.400
4	+83.318	5	+78.117	6	+77.912
7	+76.645	8	+77.572	9	+76.456
10	+76.220	11	+74.263	12	+73.895
13	+71.969	14	+71.770	15	+74.868
16	+72.428	17	+73.769	18	+72.553

 Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.590	2	+75.713
3	+69.944	4	+70.378
5	+69.951	6	+65.981
7	+70.408	8	+70.765
9	+68.919	10	+70.606

AVERAGE TEMPERATURE	=	+74.3944	DEG. F
AVERAGE PRESSURE	=	+60.9939	PSIA
MASS	=	+80745.91	LBM
AVG DEW POINT TEMP	=	+70.2435	DEG. F
AVG VAPOR PRESSURE	=	+0.3659	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 09:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9737	2	+60.9884

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.674	2	+80.878	3	+81.345
4	+83.270	5	+78.110	6	+77.897
7	+76.623	8	+77.543	9	+76.435
10	+76.209	11	+74.249	12	+73.870
13	+71.941	14	+71.740	15	+74.838
16	+72.400	17	+73.737	18	+72.516

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.585	2	+75.631
3	+70.000	4	+70.426
5	+69.834	6	+65.870
7	+70.561	8	+70.756
9	+68.773	10	+70.521

AVERAGE TEMPERATURE = +74.3661 DEG. F
AVERAGE PRESSURE = +60.9895 PSIA
MASS = +80744.82 LBM
AVG DEW POINT TEMP = +70.2146 DEG. F
AVG VAPOR PRESSURE = +0.3656 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 09:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9690	2	+60.9843

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.635	2	+80.836	3	+81.296
4	+83.233	5	+78.104	6	+77.882
7	+76.598	8	+77.521	9	+76.405
10	+76.196	11	+74.232	12	+73.842
13	+71.914	14	+71.710	15	+74.839
16	+72.371	17	+73.707	18	+72.488

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.535	2	+75.669
3	+69.917	4	+70.347
5	+69.870	6	+65.926
7	+70.501	8	+70.581
9	+68.909	10	+70.541

AVERAGE TEMPERATURE = +74.3410 DEG. F
AVERAGE PRESSURE = +60.9851 PSIA
MASS = +80743.09 LBM
AVG DEW POINT TEMP = +70.1945 DEG. F
AVG VAPOR PRESSURE = +0.3653 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 10:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9653	2	+60.9807

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.599	2	+80.807	3	+81.234
4	+83.181	5	+78.093	6	+77.888
7	+76.581	8	+77.490	9	+76.379
10	+76.187	11	+74.219	12	+73.806
13	+71.882	14	+71.677	15	+74.805
16	+72.317	17	+73.678	18	+72.461

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.467	2	+75.594
3	+69.895	4	+70.497
5	+69.947	6	+65.773
7	+70.654	8	+70.600
9	+68.754	10	+70.556

AVERAGE TEMPERATURE = +74.3100 DEG. F
AVERAGE PRESSURE = +60.9814 PSIA
MASS = +80742.66 LBM
AVG DEW POINT TEMP = +70.2089 DEG. F
AVG VAPOR PRESSURE = +0.3655 PSIA

FILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 10:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9612	2	+60.9765

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.568	2	+80.771	3	+81.208
4	+83.118	5	+78.084	6	+77.878
7	+76.566	8	+77.470	9	+76.356
10	+76.180	11	+74.197	12	+73.786
13	+71.848	14	+71.655	15	+74.783
16	+72.292	17	+73.648	18	+72.429

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.536	2	+75.626
3	+69.849	4	+70.302
5	+69.865	6	+65.765
7	+70.336	8	+70.672
9	+68.743	10	+70.456

AVERAGE TEMPERATURE = +74.2847 DEG. F
AVERAGE PRESSURE = +60.9772 PSIA
MASS = +80742.26 LBM
AVG DEW POINT TEMP = +70.1306 DEG. F
AVG VAPOR PRESSURE = +0.3645 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 10:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9580	2	+60.9732

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.553	2	+80.740	3	+81.176
4	+83.091	5	+78.080	6	+77.863
7	+76.535	8	+77.442	9	+76.331
10	+76.167	11	+74.181	12	+73.753
13	+71.831	14	+71.625	15	+74.770
16	+72.259	17	+73.615	18	+72.407

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.554	2	+75.594
3	+69.876	4	+70.308
5	+69.904	6	+65.699
7	+70.496	8	+70.574
9	+68.717	10	+70.459

AVERAGE TEMPERATURE = +74.2590 DEG. F
AVERAGE PRESSURE = +60.9740 PSIA
MASS = +80741.70 LBM
AVG DEW POINT TEMP = +70.1378 DEG. F
AVG VAPOR PRESSURE = +0.3646 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 10:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9551	2	+60.9699

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.534	2	+80.721	3	+81.165
4	+83.053	5	+78.062	6	+77.868
7	+76.517	8	+77.425	9	+76.306
10	+76.152	11	+74.161	12	+73.728
13	+71.794	14	+71.602	15	+74.748
16	+72.238	17	+73.595	18	+72.372

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.534	2	+75.641
3	+69.901	4	+70.331
5	+69.766	6	+65.570
7	+70.501	8	+70.576
9	+68.664	10	+70.502

AVERAGE TEMPERATURE = +74.2359 DEG. F
AVERAGE PRESSURE = +60.9709 PSIA
MASS = +80741.34 LBM
AVG DEW POINT TEMP = +70.1207 DEG. F
AVG VAPOR PRESSURE = +0.3644 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 11:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9513	2	+60.9665

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.517	2	+80.709	3	+81.153
4	+83.052	5	+78.059	6	+77.854
7	+76.497	8	+77.395	9	+76.288
10	+76.150	11	+74.147	12	+73.706
13	+71.772	14	+71.576	15	+74.740
16	+72.222	17	+73.571	18	+72.352

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.454	2	+75.655
3	+69.784	4	+70.243
5	+69.723	6	+65.602
7	+70.381	8	+70.653
9	+68.624	10	+70.398

AVERAGE TEMPERATURE	=	+74.2171	DEG. F
AVERAGE PRESSURE	=	+60.9673	PSIA
MASS	=	+80740.26	LBM
AVG DEW POINT TEMP	=	+70.0691	DEG. F
AVG VAPOR PRESSURE	=	+0.3638	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 11:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9484	2	+60.9632

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.500	2	+80.685	3	+81.138
4	+83.005	5	+78.051	6	+77.847
7	+76.473	8	+77.372	9	+76.263
10	+76.140	11	+74.128	12	+73.675
13	+71.755	14	+71.562	15	+74.722
16	+72.191	17	+73.543	18	+72.325

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.408	2	+75.692
3	+69.802	4	+70.308
5	+69.778	6	+65.634
7	+70.320	8	+70.664
9	+68.572	10	+70.431

AVERAGE TEMPERATURE = +74.1926 DEG. F
AVERAGE PRESSURE = +60.9642 PSIA
MASS = +80739.71 LBM
AVG DEW POINT TEMP = +70.0758 DEG. F
AVG VAPOR PRESSURE = +0.3639 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 11:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9449	2	+60.9604

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.491	2	+80.675	3	+81.123
4	+82.964	5	+78.039	6	+77.842
7	+76.457	8	+77.351	9	+76.234
10	+76.133	11	+74.111	12	+73.652
13	+71.727	14	+71.543	15	+74.705
16	+72.171	17	+73.518	18	+72.306

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.304	2	+75.684
3	+69.756	4	+70.196
5	+69.659	6	+65.674
7	+70.330	8	+70.621
9	+68.619	10	+70.396

AVERAGE TEMPERATURE = +74.1727 DEG. F
AVERAGE PRESSURE = +60.9610 PSIA
MASS = +80739.11 LBM
AVG DEW POINT TEMP = +70.0404 DEG. F
AVG VAPOR PRESSURE = +0.3634 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 11:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9419	2	+60.9574

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.480	2	+80.669	3	+81.124
4	+82.986	5	+78.036	6	+77.832
7	+76.439	8	+77.335	9	+76.214
10	+76.122	11	+74.095	12	+73.636
13	+71.698	14	+71.518	15	+74.688
16	+72.145	17	+73.499	18	+72.279

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.397	2	+75.717
3	+69.732	4	+70.171
5	+69.646	6	+65.496
7	+70.236	8	+70.589
9	+68.581	10	+70.364

AVERAGE TEMPERATURE = +74.1529 DEG. F
AVERAGE PRESSURE = +60.9580 PSIA
MASS = +80738.71 LBM
AVG DEW POINT TEMP = +70.0034 DEG. F
AVG VAPOR PRESSURE = +0.3630 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 12:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9389	2	+60.9535

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.478	2	+80.660	3	+81.116
4	+82.948	5	+78.036	6	+77.829
7	+76.416	8	+77.309	9	+76.196
10	+76.109	11	+74.087	12	+73.612
13	+71.678	14	+71.493	15	+74.679
16	+72.131	17	+73.473	18	+72.261

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.400	2	+75.744
3	+69.745	4	+70.113
5	+69.641	6	+65.422
7	+70.032	8	+70.603
9	+68.600	10	+70.363

AVERAGE TEMPERATURE = +74.1351 DEG. F
AVERAGE PRESSURE = +60.9546 PSIA
MASS = +80737.27 LBM
AVG DEW POINT TEMP = +69.9758 DEG. F
AVG VAPOR PRESSURE = +0.3626 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 12:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9363	2	+60.9518

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.469	2	+80.641	3	+81.108
4	+82.935	5	+78.029	6	+77.823
7	+76.397	8	+77.292	9	+76.173
10	+76.107	11	+74.062	12	+73.590
13	+71.659	14	+71.473	15	+74.657
16	+72.102	17	+73.451	18	+72.238

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.353	2	+75.745
3	+69.716	4	+70.236
5	+69.589	6	+65.344
7	+70.169	8	+70.570
9	+68.567	10	+70.329

AVERAGE TEMPERATURE = +74.1137 DEG. F
AVERAGE PRESSURE = +60.9524 PSIA
MASS = +80737.63 LBM
AVG DEW POINT TEMP = +69.9764 DEG. F
AVG VAPOR PRESSURE = +0.3626 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 12:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9333	2	+60.9477

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.464	2	+80.644	3	+81.109
4	+82.924	5	+78.017	6	+77.822
7	+76.377	8	+77.280	9	+76.154
10	+76.094	11	+74.047	12	+73.565
13	+71.631	14	+71.456	15	+74.647
16	+72.082	17	+73.427	18	+72.211

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.416	2	+75.747
3	+69.696	4	+70.184
5	+69.628	6	+65.288
7	+70.250	8	+70.515
9	+68.522	10	+70.277

AVERAGE TEMPERATURE = +74.0942 DEG. F
AVERAGE PRESSURE = +60.9489 PSIA
MASS = +80736.10 LBM
AVG DEW POINT TEMP = +69.9606 DEG. F
AVG VAPOR PRESSURE = +0.3624 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 12:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9303	2	+60.9452

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.453	2	+80.634	3	+81.106
4	+82.909	5	+78.009	6	+77.811
7	+76.359	8	+77.261	9	+76.144
10	+76.086	11	+74.041	12	+73.548
13	+71.611	14	+71.431	15	+74.641
16	+72.079	17	+73.409	18	+72.192

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.307	2	+75.678
3	+69.657	4	+70.141
5	+69.693	6	+65.125
7	+70.201	8	+70.465
9	+68.368	10	+70.268

AVERAGE TEMPERATURE = +74.0806 DEG. F
AVERAGE PRESSURE = +60.9461 PSIA
MASS = +80735.30 LBM
AVG DEW POINT TEMP = +69.9119 DEG. F
AVG VAPOR PRESSURE = +0.3618 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 13:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9260	2	+60.9416

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.448	2	+80.643	3	+81.101
4	+82.890	5	+78.000	6	+77.810
7	+76.339	8	+77.239	9	+76.113
10	+76.078	11	+74.025	12	+73.523
13	+71.590	14	+71.416	15	+74.623
16	+72.049	17	+73.388	18	+72.169

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.381	2	+75.662
3	+69.658	4	+70.141
5	+69.672	6	+65.156
7	+69.970	8	+70.471
9	+68.480	10	+70.256

AVERAGE TEMPERATURE = +74.0598 DEG. F
AVERAGE PRESSURE = +60.9422 PSIA
MASS = +80733.39 LBM
AVG DEW POINT TEMP = +69.8988 DEG. F
AVG VAPOR PRESSURE = +0.3617 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 13:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9233	2	+60.9386

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.442	2	+80.631	3	+81.094
4	+82.942	5	+77.998	6	+77.802
7	+76.321	8	+77.225	9	+76.097
10	+76.071	11	+74.010	12	+73.506
13	+71.576	14	+71.403	15	+74.623
16	+72.029	17	+73.373	18	+72.148

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.397	2	+75.673
3	+69.557	4	+70.111
5	+69.618	6	+65.278
7	+70.028	8	+70.517
9	+68.386	10	+70.257

AVERAGE TEMPERATURE = +74.0451 DEG. F
AVERAGE PRESSURE = +60.9393 PSIA
MASS = +80732.06 LBM
AVG DEW POINT TEMP = +69.8838 DEG. F
AVG VAPOR PRESSURE = +0.3615 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 13:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9204	2	+60.9357

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.433	2	+80.633	3	+81.100
4	+82.918	5	+77.992	6	+77.795
7	+76.304	8	+77.206	9	+76.079
10	+76.066	11	+73.995	12	+73.480
13	+71.549	14	+71.381	15	+74.607
16	+72.018	17	+73.343	18	+72.125

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.527	2	+76.121
3	+69.602	4	+70.123
5	+69.650	6	+65.644
7	+70.011	8	+70.490
9	+68.824	10	+70.257

AVERAGE TEMPERATURE = +74.0259 DEG. F
AVERAGE PRESSURE = +60.9364 PSIA
MASS = +80729.49 LBM
AVG DEW POINT TEMP = +69.9812 DEG. F
AVG VAPOR PRESSURE = +0.3627 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 13:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9149	2	+60.9297

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.432	2	+80.619	3	+81.100
4	+82.910	5	+77.984	6	+77.779
7	+76.252	8	+77.172	9	+76.042
10	+76.052	11	+73.963	12	+73.461
13	+71.514	14	+71.330	15	+74.593
16	+71.991	17	+73.336	18	+72.108

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.467	2	+75.807
3	+69.561	4	+70.056
5	+69.615	6	+65.401
7	+70.337	8	+70.368
9	+68.447	10	+70.173

AVERAGE TEMPERATURE	=	+74.0032	DEG. F
AVERAGE PRESSURE	=	+60.9307	PSIA
MASS	=	+80726.62	LBM
AVG DEW POINT TEMP	=	+69.8995	DEG. F
AVG VAPOR PRESSURE	=	+0.3617	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 14:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.9096	2	+60.9250

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.423	2	+80.612	3	+81.095
4	+82.931	5	+77.973	6	+77.769
7	+76.187	8	+77.099	9	+75.997
10	+75.040	11	+73.935	12	+73.423
13	+71.429	14	+71.250	15	+74.562
16	+71.974	17	+73.313	18	+72.097

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+74.608	2	+75.869
3	+69.600	4	+70.154
5	+69.744	6	+65.317
7	+70.049	8	+70.499
9	+68.543	10	+70.170

AVERAGE TEMPERATURE = +73.9718 DEG. F
AVERAGE PRESSURE = +60.9257 PSIA
MASS = +80724.20 LBM
AVG DEW POINT TEMP = +69.9299 DEG. F
AVG VAPOR PRESSURE = +0.3621 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : TEST
DATE : 139
TIME : 14:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.9056	2	+60.9205

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+80.423	2	+80.603	3	+81.093
4	+82.902	5	+77.948	6	+77.738
7	+76.131	8	+77.026	9	+75.942
10	+76.023	11	+73.902	12	+73.379
13	+71.376	14	+71.173	15	+74.532
16	+71.952	17	+73.297	18	+72.086

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+74.692	2	+75.869
3	+69.649	4	+70.079
5	+69.583	6	+65.172
7	+69.288	8	+70.590
9	+68.586	10	+70.242

AVERAGE TEMPERATURE = +73.9411 DEG. F
AVERAGE PRESSURE = +60.9214 PSIA
MASS = +80724.67 LBM
AVG DEW POINT TEMP = +69.8396 DEG. F
AVG VAPOR PRESSURE = +0.3609 PSIA

Appendix C

VERIFICATION PHASE DATA AND PLOTS

VERIFICATION MODE
OPTIONS:

TIME= 2230
TEST SUMMARY

- 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 =

OF DATA POINTS = 20
MODE DURATION (IN HOURS) = 5.00
TOT TIME MEASURED LEAK = 1.0981
TOT TIME CALCULATED LEAK = 1.0934
MASS PT LEAK = 1.0966
IMPOSED LEAK = 1.0106
TOT TIME UPPER LIMIT = 1.3895
TOT TIME LOWER LIMIT = 0.8895
MASS PT UPPER LIMIT = 1.3937
MASS PT LOWER LIMIT = 0.8937

TOT TIME VERIFICATION CRITERIA HAS BEEN MET

MASS PT VERIFICATION CRITERIA HAS BEEN MET

POINT SUMMARY: CURRENT VALUE/DIFFERENCE FROM PREVIOUS POINT

AVG TEMP:	73.728 / -0.005	AVG PRESS:	60.388 / -0.008
MASS:	80526.41 / -9.406	AVG DEW PRESS:	0.3577 / -0.0002
		TOTAL PRESS:	60.745 / -0.008

VERF MODE

Page 1

AVERAGE DATA VALUES						
DATE	TIME	RTD	DEW PT.	VAP PRESS	TOT PRESS	MASS
139	0.00	73.847	69.662	0.359	60.898	80711.05
139	0.25	73.847	69.646	0.359	60.891	80701.70
139	0.50	73.844	69.688	0.359	60.884	80692.35
139	0.75	73.838	69.678	0.359	60.876	80682.69
139	1.00	73.830	69.668	0.359	60.869	80674.11
139	1.25	73.826	69.669	0.359	60.861	80664.16
139	1.50	73.820	69.628	0.358	60.853	80655.52
139	1.75	73.809	69.624	0.358	60.846	80647.28
139	2.00	73.805	69.656	0.359	60.838	80636.80
139	2.25	73.801	69.556	0.357	60.830	80629.13
139	2.50	73.798	69.634	0.358	60.823	80618.20
139	3.00	73.784	69.543	0.357	60.807	80600.68
139	3.25	73.775	69.561	0.358	60.799	80591.80
139	3.50	73.770	69.661	0.359	60.792	80581.08
139	3.75	73.762	69.630	0.358	60.784	80571.77
139	4.00	73.756	69.577	0.358	60.777	80564.09
139	4.25	73.748	69.607	0.358	60.769	80554.40
139	4.50	73.740	69.574	0.358	60.760	80544.55
139	4.75	73.733	69.596	0.358	60.753	80535.82
139	5.00	73.728	69.579	0.358	60.745	80526.41

VERF MODE

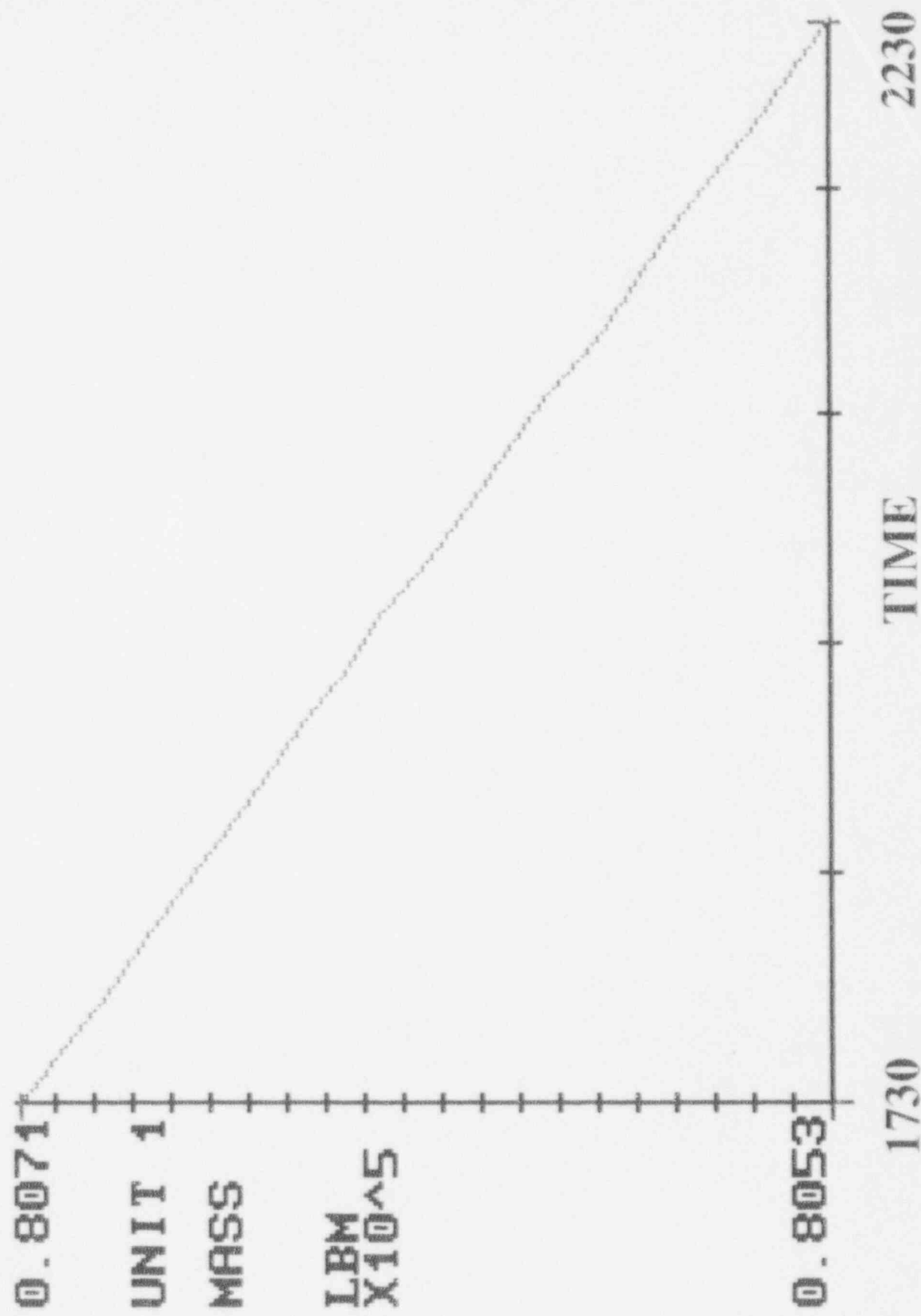
PILGRIM NUCLEAR POWER STATION UNIT 1 Page 1

LEAKAGE RATE TREND SUMMARY UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	CHANGE	LAM	CHANGE
139	0.25	1.1127	0.0000	0.0000	0.0000	0.0000
139	0.50	1.1122	1.1122	1.1122	1.1101	1.1101
139	0.75	1.1244	1.1223	0.0101	1.1233	0.0131
139	1.00	1.0986	1.1075	-0.0148	1.1044	-0.0189
139	1.25	1.1154	1.1110	0.0036	1.1101	0.0057
139	1.50	1.1009	1.1053	-0.0057	1.1039	-0.0063
139	1.75	1.0836	1.0941	-0.0113	1.0910	-0.0128
139	2.00	1.1040	1.0957	0.0017	1.0952	0.0041
139	2.25	1.0827	1.0889	-0.0068	1.0876	-0.0075
139	2.50	1.1046	1.0919	0.0030	1.0927	0.0051
139	3.00	1.0940	1.0893	-0.0025	1.0918	-0.0009
139	3.25	1.0911	1.0884	-0.0010	1.0903	-0.0015
139	3.50	1.1043	1.0915	0.0031	1.0948	0.0045
139	3.75	1.1045	1.0937	0.0023	1.0977	0.0029
139	4.00	1.0925	1.0925	-0.0012	1.0959	-0.0018
139	4.25	1.0961	1.0924	-0.0001	1.0956	-0.0003
139	4.50	1.1003	1.0932	0.0008	1.0966	0.0009
139	4.75	1.0970	1.0932	0.0000	1.0962	-0.0004
139	5.00	1.0981	1.0934	0.0002	1.0966	0.0004

VERF MODE

PILGRIM NUCLEAR POWER STATION UNIT 1 Page 1

LEAKAGE RATE SUMMARY UNIT 1						
		TOTAL TIME			MASS POINT	
DATE	TIME	TTLM	LMCALC	UCL	LAM	UCL
139	0.00	0.0000	0.0000	0.0000	0.0000	0.0000
139	0.25	1.1127	0.0000	0.0000	0.0000	0.0000
139	0.50	1.1122	1.1122	0.0000	1.1101	1.1263
139	0.75	1.1244	1.1223	1.1732	1.1233	1.1425
139	1.00	1.0986	1.1075	1.1679	1.1044	1.1308
139	1.25	1.1154	1.1110	1.1521	1.1101	1.1274
139	1.50	1.1009	1.1053	1.1381	1.1039	1.1178
139	1.75	1.0836	1.0941	1.1274	1.0910	1.1089
139	2.00	1.1040	1.0957	1.1270	1.0952	1.1094
139	2.25	1.0827	1.0889	1.1178	1.0876	1.1016
139	2.50	1.1046	1.0919	1.1218	1.0927	1.1053
139	3.00	1.0940	1.0893	1.1179	1.0918	1.1018
139	3.25	1.0911	1.0884	1.1147	1.0903	1.0987
139	3.50	1.1043	1.0915	1.1185	1.0948	1.1029
139	3.75	1.1045	1.0937	1.1206	1.0977	1.1052
139	4.00	1.0925	1.0925	1.1179	1.0959	1.1027
139	4.25	1.0961	1.0924	1.1166	1.0956	1.1016
139	4.50	1.1003	1.0932	1.1168	1.0966	1.1020
139	4.75	1.0970	1.0932	1.1160	1.0962	1.1010
139	5.00	1.0981	1.0934	1.1155	1.0966	1.1010



1.5937

UNIT 1

TOT
TIME
ANAL.

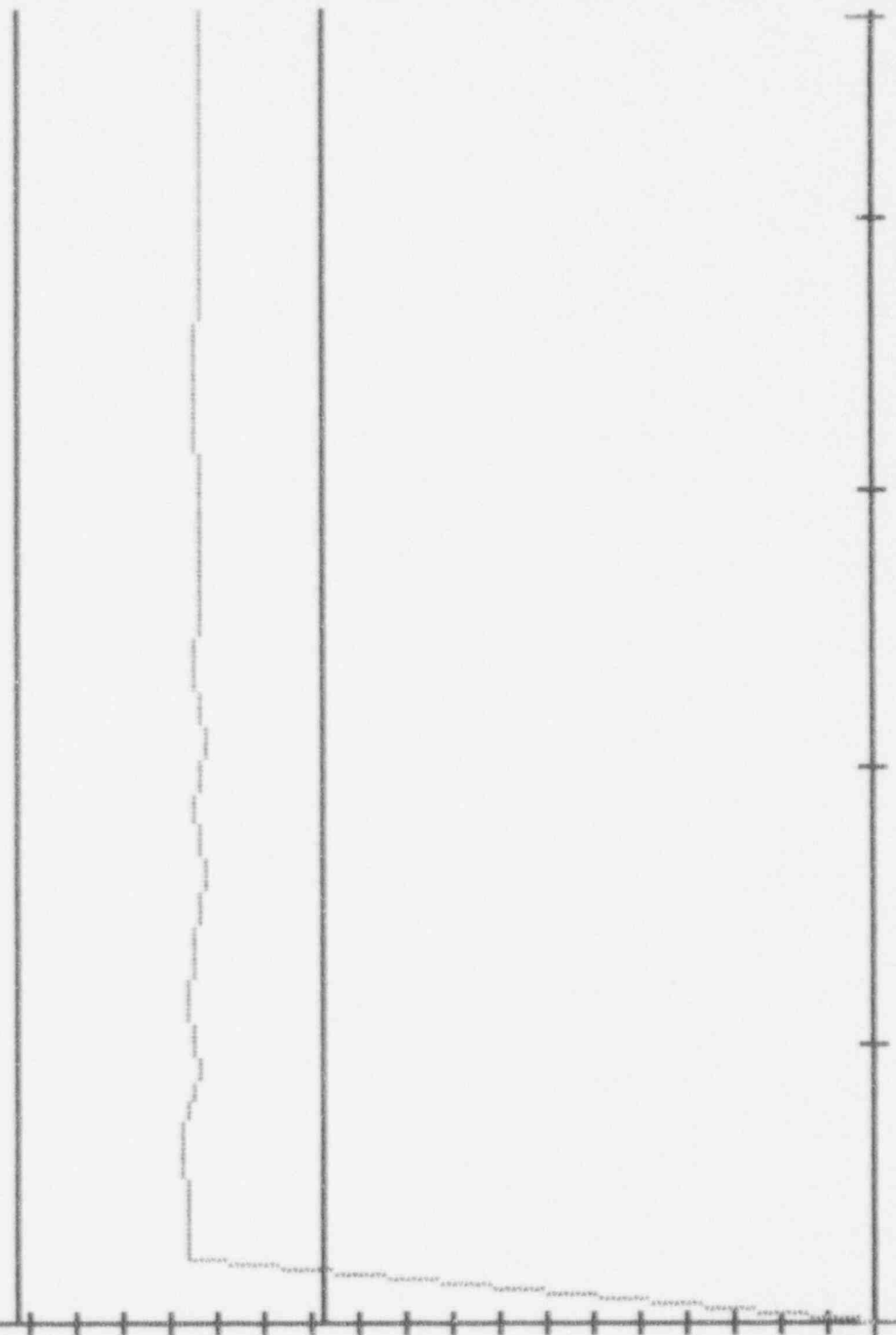
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DAY

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1730

TIME

2230



1.5937

UNIT 1

MASS
ANAL.

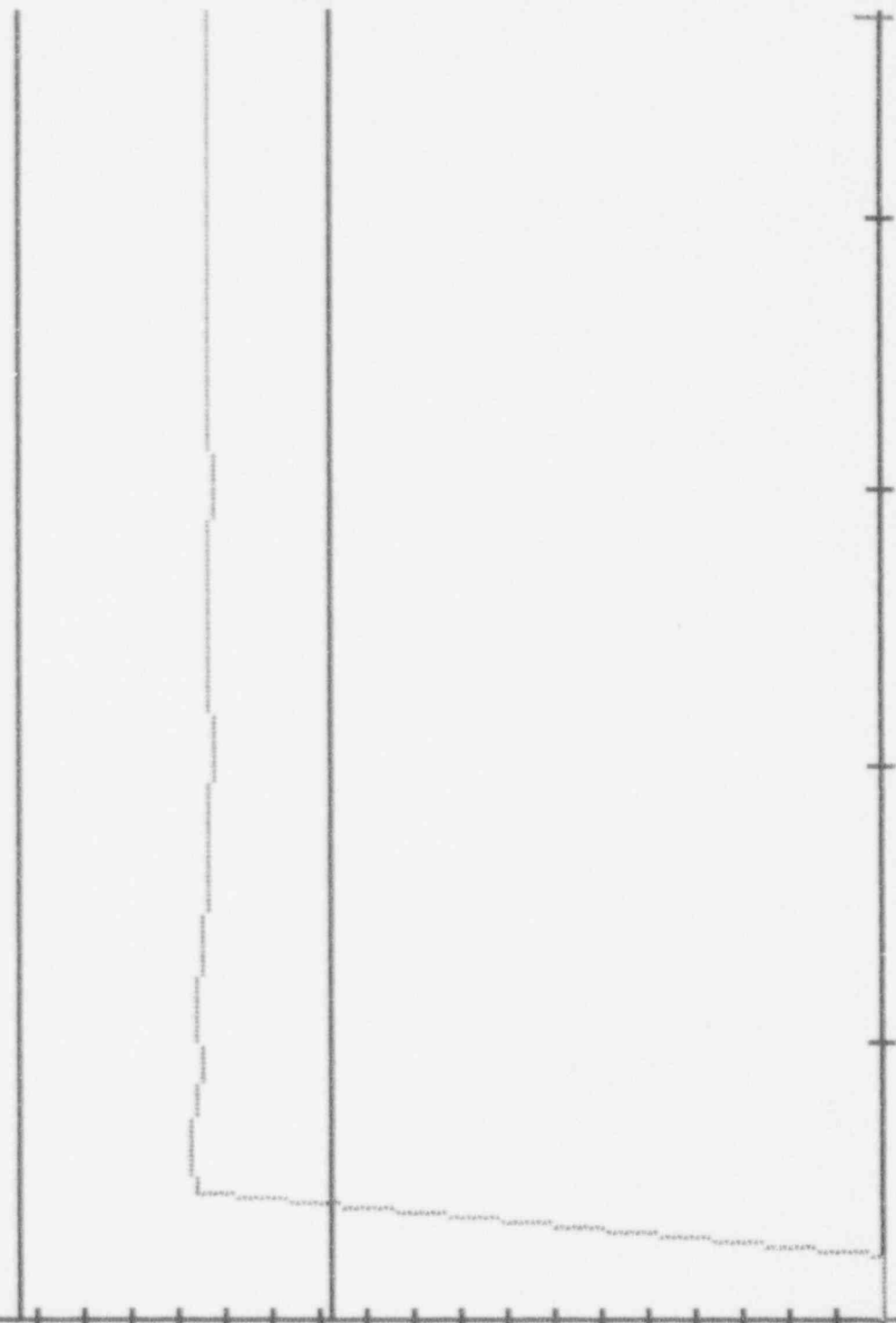
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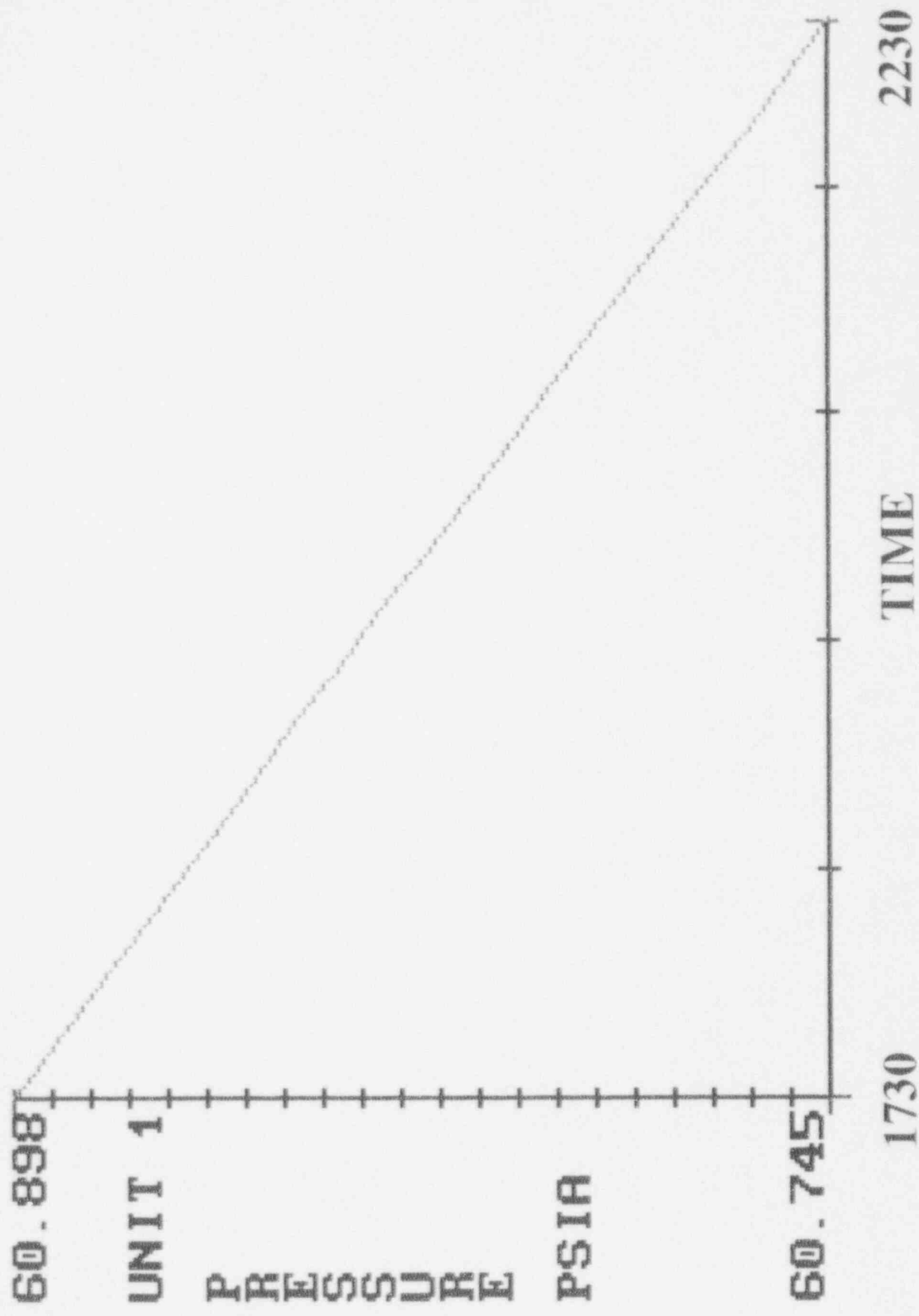
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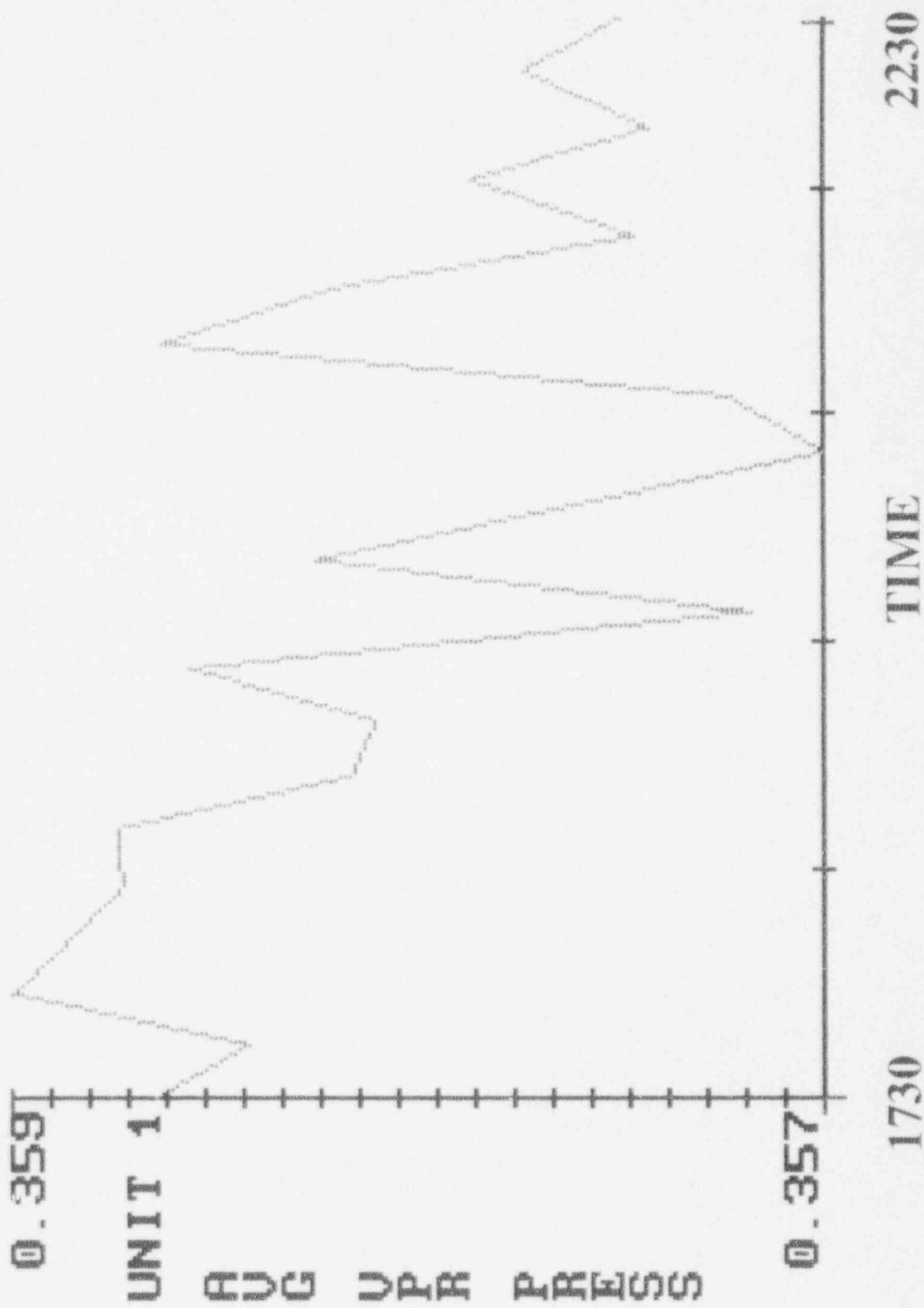
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TIME

2230







69.688

UNIT 1

ADG DEF TEMP

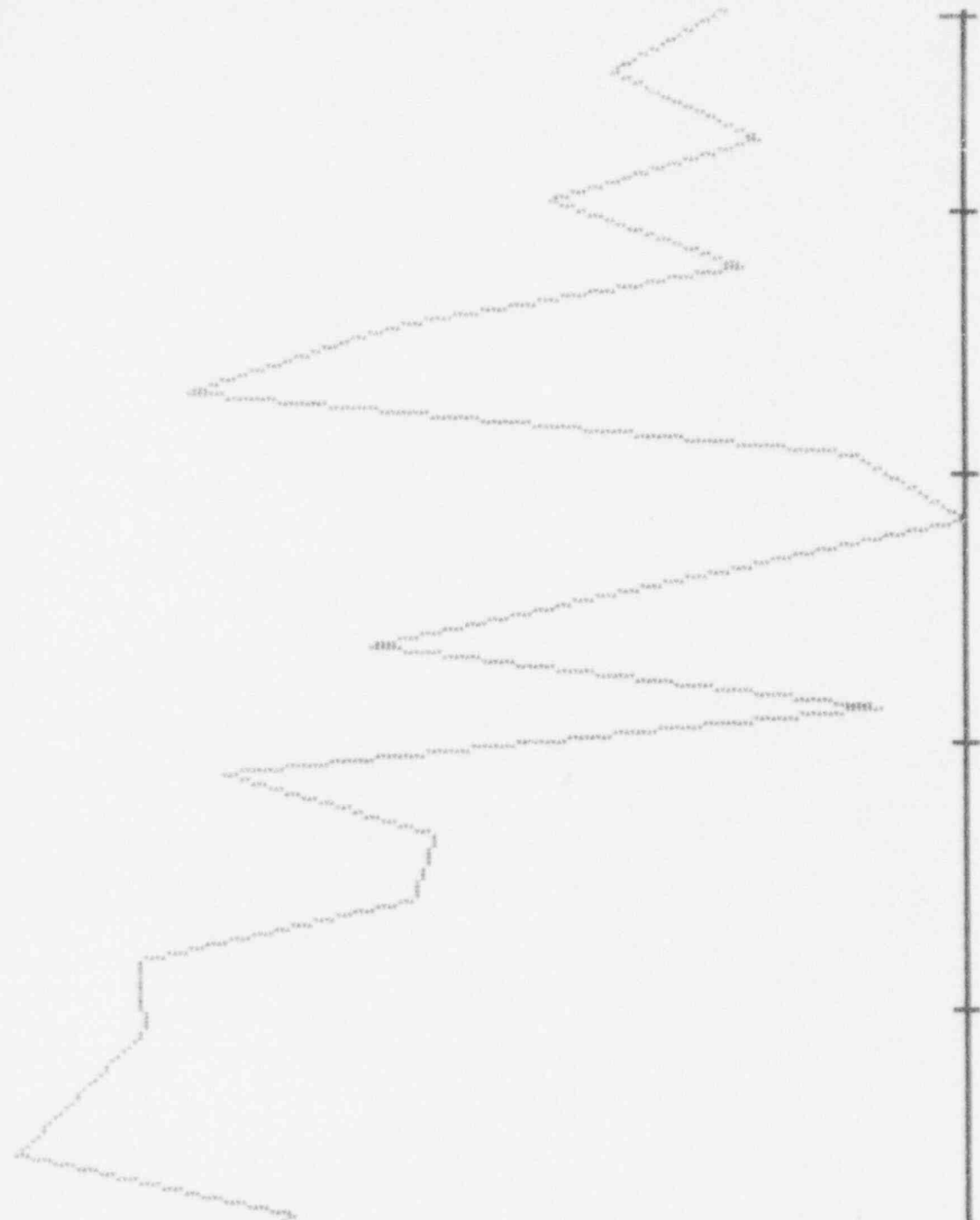
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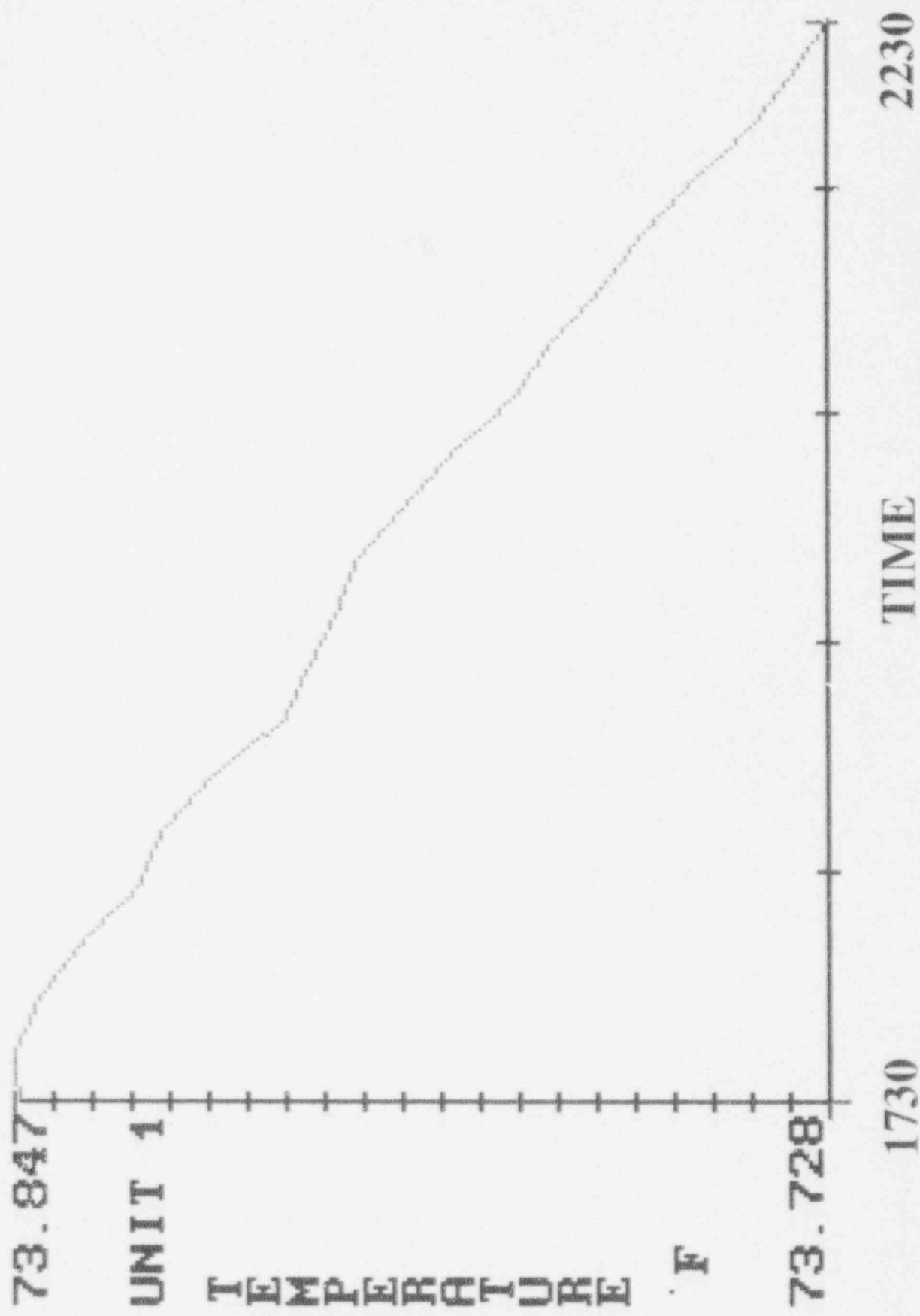
69.543

1730

TIME

2230





PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 17:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8821	2	+60.8979

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+80.956	2	+81.203	3	+81.471
4	+83.193	5	+78.340	6	+78.201
7	+76.014	8	+76.950	9	+75.758
10	+75.959	11	+73.780	12	+73.169
13	+71.237	14	+71.123	15	+74.396
16	+71.752	17	+73.129	18	+71.933

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.678	2	+74.382
3	+69.370	4	+69.901
5	+69.255	6	+64.247
7	+69.994	8	+70.477
9	+68.335	10	+70.013

AVERAGE TEMPERATURE = +73.8471 DEG. F
AVERAGE PRESSURE = +60.8984 PSIA
MASS = +80711.05 LBM
AVG DEW POINT TEMP = +69.6624 DEG. F
AVG VAPOR PRESSURE = +0.3588 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 17:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.8749	2	+60.8907

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.024	2	+81.296	3	+81.508
4	+83.249	5	+78.379	6	+78.236
7	+76.025	8	+76.953	9	+75.765
10	+75.954	11	+73.774	12	+73.171
13	+71.242	14	+71.118	15	+74.396
16	+71.742	17	+73.114	18	+71.922

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.577	2	+74.210
3	+69.347	4	+70.053
5	+69.321	6	+64.314
7	+69.807	8	+70.510
9	+68.277	10	+69.983

AVERAGE TEMPERATURE = +73.8472 DEG. F
AVERAGE PRESSURE = +60.8912 PSIA
MASS = +80701.70 LBM
AVG DEW POINT TEMP = +69.6461 DEG. F
AVG VAPOR PRESSURE = +0.3586 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 18:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.8682	2	+60.8836

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.094	2	+81.369	3	+81.553
4	+83.282	5	+78.423	6	+78.268
7	+76.023	8	+76.949	9	+75.767
10	+75.952	11	+73.774	12	+73.169
13	+71.236	14	+71.120	15	+74.383
16	+71.735	17	+73.099	18	+71.902

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.580	2	+74.187
3	+69.343	4	+69.994
5	+69.415	6	+64.225
7	+70.082	8	+70.479
9	+68.325	10	+69.988

AVERAGE TEMPERATURE = +73.8437 DEG. F
AVERAGE PRESSURE = +60.8843 PSIA
MASS = +80692.35 LBM
AVG DEW POINT TEMP = +69.6875 DEG. F
AVG VAPOR PRESSURE = +0.3591 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 18:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.8602	2	+60.8755

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.158	2	+81.451	3	+81.589
4	+83.317	5	+78.445	6	+78.303
7	+76.023	8	+76.944	9	+75.770
10	+75.961	11	+73.770	12	+73.165
13	+71.233	14	+71.114	15	+74.388
16	+71.709	17	+73.084	18	+71.885

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.521	2	+74.021
3	+69.373	4	+69.962
5	+69.337	6	+64.112
7	+69.144	8	+70.454
9	+68.379	10	+69.967

AVERAGE TEMPERATURE = +73.8377 DEG. F
AVERAGE PRESSURE = +60.8762 PSIA
MASS = +80682.69 LBM
AVG DEW POINT TEMP = +69.6777 DEG. F
AVG VAPOR PRESSURE = +0.3590 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 18:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8528	2	+60.8680

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.209	2	+81.497	3	+81.631
4	+83.347	5	+78.471	6	+78.332
7	+76.028	8	+76.939	9	+75.774
10	+75.952	11	+73.757	12	+73.160
13	+71.224	14	+71.114	15	+74.377
16	+71.684	17	+73.069	18	+71.869

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.562	2	+74.015
3	+69.441	4	+70.139
5	+69.238	6	+64.424
7	+70.090	8	+70.359
9	+68.306	10	+69.984

AVERAGE TEMPERATURE = +73.8298 DEG. F
AVERAGE PRESSURE = +60.8688 PSIA
MASS = +80674.11 LBM
AVG DEW POINT TEMP = +69.6682 DEG. F
AVG VAPOR PRESSURE = +0.3588 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 18:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8449	2	+60.8602

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.261	2	+81.539	3	+81.658
4	+83.365	5	+78.501	6	+78.350
7	+76.020	8	+76.945	9	+75.775
10	+75.950	11	+73.752	12	+73.158
13	+71.217	14	+71.112	15	+74.371
16	+71.677	17	+73.058	18	+71.855

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.515	2	+74.051
3	+69.458	4	+69.994
5	+69.190	6	+64.232
7	+69.992	8	+70.517
9	+68.417	10	+69.957

AVERAGE TEMPERATURE = +73.8262 DEG. F
AVERAGE PRESSURE = +60.8609 PSIA
MASS = +80664.16 LBM
AVG DEW POINT TEMP = +69.6693 DEG. F
AVG VAPOR PRESSURE = +0.3588 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 19:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8370	2	+60.8526

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.292	2	+81.569	3	+81.692
4	+83.353	5	+78.507	6	+78.369
7	+76.030	8	+76.940	9	+75.772
10	+75.950	11	+73.744	12	+73.156
13	+71.212	14	+71.106	15	+74.369
16	+71.656	17	+73.048	18	+71.839

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.417	2	+73.882
3	+69.451	4	+69.902
5	+69.218	6	+64.201
7	+69.985	8	+70.384
9	+68.407	10	+69.926

AVERAGE TEMPERATURE = +73.8196 DEG. F
AVERAGE PRESSURE = +60.8532 PSIA
MASS = +80655.52 LBM
AVG DEW POINT TEMP = +69.6277 DEG. F
AVG VAPOR PRESSURE = +0.3583 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 19:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.8295	2	+60.8452

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.324	2	+81.612	3	+81.697
4	+83.367	5	+78.526	6	+78.380
7	+76.020	8	+76.938	9	+75.774
10	+75.949	11	+73.736	12	+73.146
13	+71.204	14	+71.103	15	+74.354
16	+71.630	17	+73.028	18	+71.826

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.462	2	+73.970
3	+69.443	4	+70.107
5	+69.146	6	+64.204
7	+70.183	8	+70.349
9	+68.167	10	+69.935

AVERAGE TEMPERATURE	=	+73.8087	DEG. F
AVERAGE PRESSURE	=	+60.8457	PSIA
MASS	=	+80647.28	LBM
AVG DEW POINT TEMP	=	+69.6239	DEG. F
AVG VAPOR PRESSURE	=	+0.3583	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 19:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8219	2	+60.8371

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.350	2	+81.621	3	+81.713
4	+83.401	5	+78.541	6	+78.404
7	+76.026	8	+76.937	9	+75.772
10	+75.951	11	+73.728	12	+73.149
13	+71.199	14	+71.097	15	+74.363
16	+71.622	17	+73.011	18	+71.817

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.536	2	+73.948
3	+69.477	4	+70.063
5	+69.090	6	+64.164
7	+70.254	8	+70.431
9	+68.255	10	+69.961

AVERAGE TEMPERATURE	=	+73.8053	DEG. F
AVERAGE PRESSURE	=	+60.8379	PSIA
MASS	=	+80636.80	LBM
AVG DEW POINT TEMP	=	+69.6558	DEG. F
AVG VAPOR PRESSURE	=	+0.3587	PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 19:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8143	2	+60.8297

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.368	2	+81.656	3	+81.727
4	+83.424	5	+78.556	6	+78.408
7	+76.022	8	+76.930	9	+75.763
10	+75.953	11	+73.721	12	+73.143
13	+71.189	14	+71.087	15	+74.364
16	+71.622	17	+73.001	18	+71.804

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.435	2	+73.897
3	+69.408	4	+69.979
5	+69.039	6	+64.086
7	+70.005	8	+70.332
9	+68.149	10	+69.908

AVERAGE TEMPERATURE = +73.8008 DEG. F
AVERAGE PRESSURE = +60.8304 PSIA
MASS = +80629.13 LBM
AVG DEW POINT TEMP = +69.5560 DEG. F
AVG VAPOR PRESSURE = +0.3575 PSIA

PILGRIM NUCLEAR POWER STATION 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 20:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.8065	2	+60.8223

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.387	2	+81.679	3	+81.739
4	+83.405	5	+78.580	6	+78.413
7	+76.020	8	+76.927	9	+75.771
10	+75.945	11	+73.705	12	+73.142
13	+71.192	14	+71.082	15	+74.369
16	+71.625	17	+72.991	18	+71.791

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.350	2	+73.717
3	+69.466	4	+70.145
5	+69.117	6	+64.070
7	+70.146	8	+70.485
9	+68.221	10	+69.904

AVERAGE TEMPERATURE = +73.7977 DEG. F
AVERAGE PRESSURE = +60.8228 PSIA
MASS = +80618.20 LBM
AVG DEW POINT TEMP = +69.6336 DEG. F
AVG VAPOR PRESSURE = +0.3584 PSIA

Pilgrim Nuclear Power Plant 1
 INTEGRATED LEAK RATE TEST
 DATA POINT SUMMARY SHEET

TEST MODE : VERF
 DATE : 139
 TIME : 20:30

 Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.8065	2	+60.7907

 RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.422	2	+81.719	3	+81.756
4	+83.398	5	+78.600	6	+78.441
7	+76.023	8	+76.925	9	+75.771
10	+75.949	11	+73.699	12	+73.139
13	+71.178	14	+71.078	15	+74.346
16	+71.588	17	+72.965	18	+71.770

 Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.279	2	+73.717
3	+69.442	4	+70.094
5	+69.072	6	+64.114
7	+70.156	8	+70.152
9	+68.118	10	+69.842

AVERAGE TEMPERATURE	=	+73.7839	DEG. F
AVERAGE PRESSURE	=	+60.8070	PSIA
MASS	=	+80600.68	LBM
AVG DEW POINT TEMP	=	+69.5429	DEG. F
AVG VAPOR PRESSURE	=	+0.3573	PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 20:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7985	2	+60.7837

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.435	2	+81.732	3	+81.772
4	+83.361	5	+78.611	6	+78.441
7	+76.020	8	+76.909	9	+75.775
10	+75.946	11	+73.689	12	+73.135
13	+71.172	14	+71.070	15	+74.348
16	+71.572	17	+72.950	18	+71.756

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.519	2	+73.706
3	+69.463	4	+69.957
5	+69.064	6	+64.238
7	+70.228	8	+70.146
9	+68.201	10	+69.837

AVERAGE TEMPERATURE	=	+73.7746	DEG. F
AVERAGE PRESSURE	=	+60.7995	PSIA
MASS	=	+80591.80	LBM
AVG DEW POINT TEMP	=	+69.5606	DEG. F
AVG VAPOR PRESSURE	=	+0.3575	PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 21:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7916	2	+60.7759

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.453	2	+81.753	3	+81.765
4	+83.380	5	+78.625	6	+78.453
7	+76.018	8	+76.914	9	+75.771
10	+75.943	11	+73.679	12	+73.130
13	+71.167	14	+71.060	15	+74.347
16	+71.566	17	+72.942	18	+71.741

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.448	2	+73.725
3	+69.544	4	+70.101
5	+69.098	6	+64.205
7	+70.408	8	+70.388
9	+68.255	10	+69.883

AVERAGE TEMPERATURE	=	+73.7698	DEG. F
AVERAGE PRESSURE	=	+60.7921	PSIA
MASS	=	+80581.08	LBM
AVG DEW POINT TEMP	=	+69.6613	DEG. F
AVG VAPOR PRESSURE	=	+0.3588	PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 21:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7832	2	+60.7678

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.463	2	+81.767	3	+81.768
4	+83.423	5	+78.632	6	+78.466
7	+76.017	8	+76.900	9	+75.778
10	+75.942	11	+73.684	12	+73.124
13	+71.161	14	+71.056	15	+74.337
16	+71.546	17	+72.925	18	+71.734

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.318	2	+73.728
3	+69.497	4	+70.053
5	+69.109	6	+64.351
7	+70.338	8	+70.406
9	+68.163	10	+69.856

AVERAGE TEMPERATURE = +73.7620 DEG. F
AVERAGE PRESSURE = +60.7839 PSIA
MASS = +80571.77 LBM
AVG DEW POINT TEMP = +69.6302 DEG. F
AVG VAPOR PRESSURE = +0.3584 PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 21:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.7762	2	+60.7607

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.476	2	+81.785	3	+81.785
4	+83.387	5	+78.649	6	+78.469
7	+76.020	8	+76.900	9	+75.776
10	+75.941	11	+73.669	12	+73.126
13	+71.155	14	+71.053	15	+74.334
16	+71.533	17	+72.915	18	+71.724

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.396	2	+73.716
3	+69.499	4	+70.062
5	+69.025	6	+64.279
7	+70.411	8	+70.236
9	+68.035	10	+69.824

AVERAGE TEMPERATURE = +73.7562 DEG. F
AVERAGE PRESSURE = +60.7768 PSIA
MASS = +80564.09 LBM
AVG DEW POINT TEMP = +69.5770 DEG. F
AVG VAPOR PRESSURE = +0.3577 PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 21:45

Pressure Instruments in PSIA

channel	pressure	channel	pressure
1	+60.7685	2	+60.7528

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
1	+81.483	2	+81.793	3	+81.782
4	+83.388	5	+78.656	6	+78.478
7	+76.011	8	+76.884	9	+75.774
10	+75.943	11	+73.663	12	+73.120
13	+71.150	14	+71.049	15	+74.327
16	+71.522	17	+72.907	18	+71.711

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
1	+73.356	2	+73.753
3	+69.458	4	+70.030
5	+69.108	6	+64.311
7	+70.459	8	+70.136
9	+68.223	10	+69.850

AVERAGE TEMPERATURE = +73.7484 DEG. F
AVERAGE PRESSURE = +60.7690 PSIA
MASS = +80554.40 LBM
AVG DEW POINT TEMP = +69.6066 DEG. F
AVG VAPOR PRESSURE = +0.3581 PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 22:00

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7596	2	+60.7442

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.492	2	+81.791	3	+81.772
4	+83.391	5	+78.669	6	+78.489
7	+76.003	8	+76.884	9	+75.767
10	+75.938	11	+73.645	12	+73.113
13	+71.145	14	+71.041	15	+74.327
16	+71.508	17	+72.895	18	+71.697

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.570	2	+73.595
3	+69.440	4	+70.050
5	+69.062	6	+64.193
7	+70.382	8	+70.235
9	+68.094	10	+69.793

AVERAGE TEMPERATURE = +73.7398 DEG. F
AVERAGE PRESSURE = +60.7603 PSIA
MASS = +80544.55 LBM
AVG DEW POINT TEMP = +69.5742 DEG. F
AVG VAPOR PRESSURE = +0.3577 PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 22:15

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7527	2	+60.7371

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.501	2	+81.806	3	+81.774
4	+83.363	5	+78.681	6	+78.493
7	+75.996	8	+76.888	9	+75.756
10	+75.933	11	+73.634	12	+73.110
13	+71.139	14	+71.042	15	+74.317
16	+71.502	17	+72.882	18	+71.686

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.486	2	+73.468
3	+69.484	4	+70.071
5	+69.105	6	+64.043
7	+70.361	8	+70.278
9	+68.207	10	+69.782

AVERAGE TEMPERATURE	=	+73.7334	DEG. F
AVERAGE PRESSURE	=	+60.7533	PSIA
MASS	=	+80535.82	LBM
AVG DEW POINT TEMP	=	+69.5965	DEG. F
AVG VAPOR PRESSURE	=	+0.3580	PSIA

Pilgrim Nuclear Power Plant 1
INTEGRATED LEAK RATE TEST
DATA POINT SUMMARY SHEET

TEST MODE : VERF
DATE : 139
TIME : 22:30

Pressure Instruments in PSIA

channel	pressure	channel	pressure
-----	-----	-----	-----
1	+60.7449	2	+60.7292

RTDs in degrees F

channel	temp.	channel	temp.	channel	temp.
-----	-----	-----	-----	-----	-----
1	+81.502	2	+81.828	3	+81.767
4	+83.385	5	+78.687	6	+78.499
7	+75.995	8	+76.882	9	+75.741
10	+75.934	11	+73.625	12	+73.109
13	+71.145	14	+71.037	15	+74.319
16	+71.439	17	+72.873	18	+71.676

Dew Cell temperatures in degrees F

channel	cell temp	channel	cell temp
-----	-----	-----	-----
1	+73.506	2	+73.529
3	+69.399	4	+70.001
5	+69.083	6	+64.172
7	+70.358	8	+70.265
9	+68.179	10	+69.792

AVERAGE TEMPERATURE = +73.7282 DEG. F
AVERAGE PRESSURE = +60.7454 PSIA
MASS = +80526.41 LBM
AVG DEW POINT TEMP = +69.5794 DEG. F
AVG VAPOR PRESSURE = +0.3577 PSIA

Appendix D

INSTRUMENT SELECTION GUIDE CALCULATIONS

INSTRUMENTATION SELECTION GUIDE CALCULATION

A. Instrument Specifications

1. Total, Absolute Pressure
 - a. Paroscientific Precision Pressure Gages
 - b. No. of sensors used in calculation: 2
 - c. Range: 0-100 psia (direct reading)
 - d. Accuracy: ± 0.010 psia
 - e. Sensitivity: 0.0005 psia
 - f. Repeatability: 0.01 psia
 - g. Resolution: 0.0001 psi
2. Water Vapor Pressure
 - a. Foxboro Lithium Chloride Dewcells
 - b. No. of sensors: 10
 - c. Calibrated range: 37.5 - 100°F
 - d. Accuracy: $\pm 1.5^\circ\text{F}$
 - e. Sensitivity: 0.5°F
 - f. Repeatability: 0.5°F
3. Drybulb Temperature
 - a. 100 ohm platinum RTDs
 - b. No. of sensors: 18
 - c. Calibrated range: 60 - 110°F
 - d. Accuracy: $\pm 0.5^\circ\text{F}$
 - e. Sensitivity: 0.001°F
 - f. Repeatability: 0.1°F

4. Data Acquisition System

- a. Fluke Model 2285
- b. Drybulb Signal Conditioning/Readout
 - 1) Repeatability: $\pm 0.001^{\circ}\text{F}$
 - 2) Resolution: 0.001°F
- c. Dewpoint Signal Conditioning/Readout
 - 1) Repeatability: $\pm 0.001^{\circ}\text{F}$
 - 2) Resolution: 0.001°F

B. Instrument and Measurement System Errors

1. Definitions

- a. e = the error associated with the measurement of change in a given parameter.
- b. E = the error associated with the sensitivity of the sensor.
- c. ϵ = the error associated with the measurement system readout and signal conditioning (excludes sensor), including resolution and repeatability.
 - 1) Instrumentation errors (e.g., repeatability and resolution) are combined using a root-sum-square formula (per ANSI/ANS 56.8-1987, Appendix G).
 - 2) In cases where repeatability is tested and specified for both the sensor and the readout device, the largest source of error is used to calculate ϵ .

C. Instrument Errors

1. Total, Absolute Pressure

a. Sensitivity

$$E_p = \pm 0.001 \text{ psia (per manufacturer spec.)}$$

b. Resolution and Repeatability

$$\begin{aligned}\epsilon_p &= \pm [(0.0001)^2 + (0.01 \text{ psia})^2]^{1/2} \\ &= \pm [1 \times 10^{-8} + 1 \times 10^{-4}]^{1/2} \\ &= \pm [1.0001 \times 10^{-4}]^{1/2}\end{aligned}$$

$$\epsilon_p = \pm 1 \times 10^{-2} \text{ psia}$$

c. Measurement System Error

$$\begin{aligned}\epsilon_p &= \pm [(E_p)^2 + (\epsilon_p)^2]^{1/2} / [\text{no. of sensors}]^{1/2} \\ &= \pm [(0.0005)^2 + (1 \times 10^{-2})^2]^{1/2} / (2)^{1/2} \\ &= \pm [2.5 \times 10^{-7} + 1 \times 10^{-4}]^{1/2} / 1.414 \\ &= \pm [1.0025 \times 10^{-4}]^{1/2} / 1.414\end{aligned}$$

$$\epsilon_p = \pm 7.081 \times 10^{-3} \text{ psia}$$

2. Drybulb Temperature

a. Sensitivity

$$E_T = \pm 0.001^\circ\text{F}$$

b. Resolution and Repeatability

$$\begin{aligned}\epsilon_T &= \pm [(0.001)^2 + (0.1)^2]^{1/2} \\ &= \pm [1 \times 10^{-6} + 1 \times 10^{-2}]^{1/2} \\ &= \pm [1 \times 10^{-2}]^{1/2}\end{aligned}$$

$$\epsilon_T = \pm 0.100^\circ\text{F}$$

c. Measurement System Error

$$\begin{aligned}\epsilon_T &= \pm [(E_T)^2 + (\epsilon_T)^2]^{1/2} / (\text{no. of sensors})^{1/2} \\ &= \pm [(0.001)^2 + (0.1)^2]^{1/2} / (18)^{1/2} \\ &= \pm [1 \times 10^{-6} + 1 \times 10^{-2}]^{1/2} / 4.243 \\ &= \pm [1 \times 10^{-2}]^{1/2} / 4.243\end{aligned}$$

$$\epsilon_T = \pm 0.0236^\circ\text{F}$$

3. Water Vapor Pressure

a. Sensitivity

$$E_{pv} = \pm 0.5^{\circ}\text{F}$$

b. Resolution and Repeatability

$$e_{pv} = \pm [(.001^{\circ}\text{F})^2 + (0.5)^2]^{1/2}$$

$$= \pm [1 \times 10^{-6}\text{F} + .25]^{1/2}$$

$$= \pm [.25]^{1/2}$$

$$e_{pv} = \pm 0.5^{\circ}\text{F}$$

c. At 75 F dewpoint, water vapor pressure change/ $^{\circ}\text{F}$ is 0.0143 psia/ $^{\circ}\text{F}$

d. Measurement System Error

$$e_{pv} = \pm [(E_{pv})^2 + (e_{pv})^2]^{1/2}/(\text{no. of sensors})^{1/2}$$

$$= \pm [(.5)^2 + (.5)^2]^{1/2}/(10)^{1/2}$$

$$= \pm [0.5]^{1/2}/3.162$$

$$= \pm 0.2236^{\circ}\text{F} \times 0.0143 \text{ psia}/^{\circ}\text{F}$$

$$e_{pv} = \pm 3.13 \times 10^{-3} \text{ psia}$$

D. Instrumentation Selection Guide Formula (24 hr. Test)

$$= \pm 100 [2(1.157 \times 10^{-4})^2 + 2(5.114 \times 10^{-5})^2 + 2(4.333 \times 10^{-5})^2]^{1/2}$$

$$= \pm 100 [2(1.339 \times 10^{-8}) + 2(2.615 \times 10^{-9}) + 2(1.877 \times 10^{-9})]^{1/2}$$

$$= \pm 100 [2.678 \times 10^{-8} + 5.230 \times 10^{-9} + 3.754 \times 10^{-9}]^{1/2}$$

$$= \pm 100 [3.576 \times 10^{-8}]^{1/2}$$

$$= \pm 100 [1.891 \times 10^{-4}]$$

$$\text{ISG} = \pm 0.0189\%/ \text{day}$$

E. ISG at 8 hours:

$$\text{ISG} = \pm \frac{2400}{8} [1.891 \times 10^{-4}]$$

$$= \pm 300 [1.891 \times 10^{-4}]$$

$$\text{ISG} = \pm 0.0567\%/ \text{day}$$

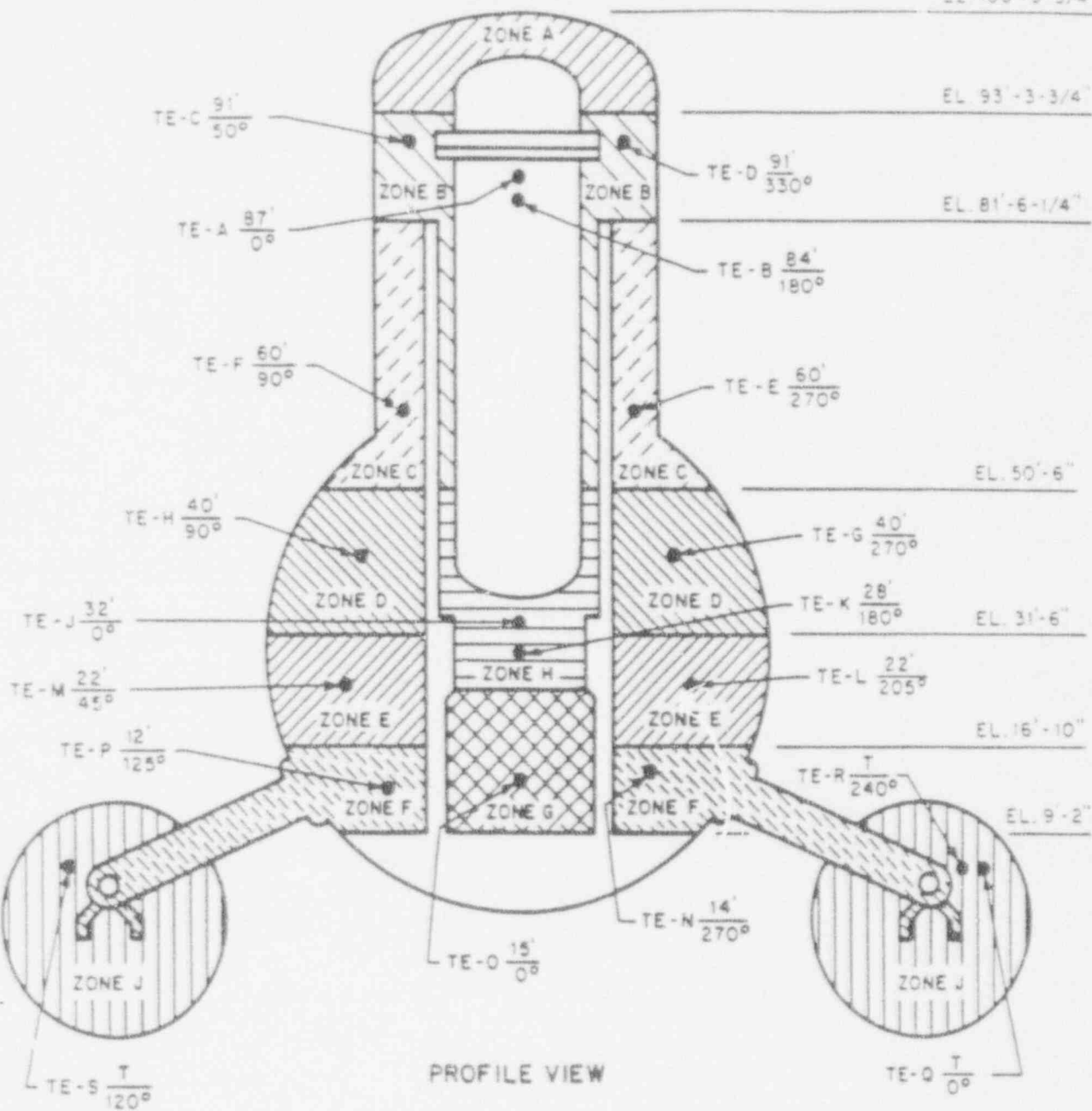
F. ISG Acceptance Criteria

1. ISG must be $\leq 25\% L_s$
2. $25\% (1\% \text{ wt/day}) = .25\%/ \text{day}$
3. $\text{ISG} = 0.0189\% \leq 0.25\%/ \text{day}$
for 24 hours
4. $\text{ISG} = 0.0567\% \leq 0.25\%/ \text{day}$
for 8 hours

Appendix E
SENSOR LOCATIONS

TE - $\frac{\text{ELEVATION}}{\text{AZIMUTH}}$

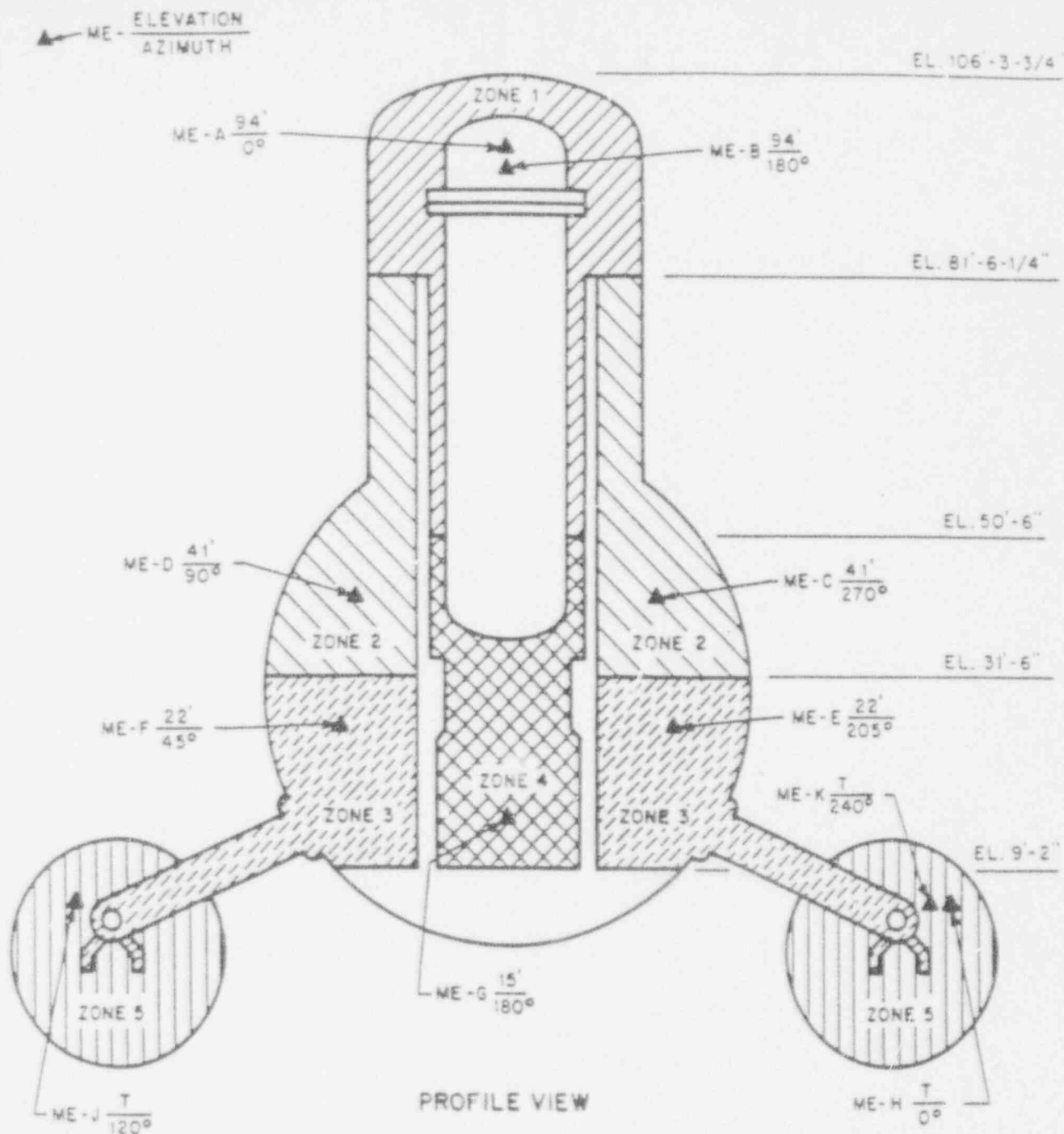
EL. 106'-3 3/4"



NOTES:

1. ZONE BOUNDARIES ARE APPROXIMATE, REFERENCE PNPS CALC. No. MB-009.
2. INSTRUMENT ELEVATION AND AZIMUTH POSITIONS ARE APPROXIMATE.

ILRT RESISTANCE TEMPERATURE
DETECTOR LOCATIONS
PILGRIM NUCLEAR POWER STATION-UNIT No. 1



NOTES:

1. ZONE BOUNDARIES ARE APPROXIMATE, REFERENCE PNPS CALC. No. MB-009.
2. INSTRUMENT ELEVATION AND AZIMUTH POSITIONS ARE APPROXIMATE.

ILRT DEWPOINT TEMPERATURE
SENSOR LOCATIONS
PILGRIM NUCLEAR POWER STATION-UNIT No. 1

SENSOR LOCATIONS AND VOLUME FRACTIONS

SENSOR NUMBER	LOCATION	ELEV. (FEET)	AZIMUTH (DEGREES)	VOLUME WEIGHTING FACTOR
TE-A	DRYWELL	87	0	0.014678
TE-B	DRYWELL	84	180	0.014678
TE-C	DRYWELL	91	50	0.009113
TE-D	DRYWELL	91	330	0.009113
TE-E	DRYWELL	60	270	0.025920
TE-F	DRYWELL	60	90	0.025921
TE-G	DRYWELL	39	270	0.069702
TE-H	DRYWELL	39	90	0.069703
TE-J	DRYWELL	32	0	0.005330
TE-K	DRYWELL	28	180	0.005330
TE-L	DRYWELL	22	205	0.071493
TE-M	DRYWELL	22	45	0.071494
TE-N	DRYWELL	14	270	0.056466
TE-O	DRYWELL	15	0	0.020245
TE-P	DRYWELL	12	125	0.056467
TE-Q	TORUS		0	0.158115
TE-R	TORUS		240	0.158116
TE-S	TORUS		120	0.158116
ME-A	DRYWELL	94	0	0.023791
ME-B	DRYWELL	94	180	0.023792
ME-C	DRYWELL	39	270	0.095622
ME-D	DRYWELL	39	90	0.095623
ME-E	DRYWELL	22	205	0.127960
ME-F	DRYWELL	15	180	0.030905
ME-G	DRYWELL	22	45	0.127960
ME-H	TORUS		0	0.158115
ME-J	TORUS		120	0.158116
ME-K	TORUS		240	0.158116

Appendix F

DESCRIPTION OF GENERAL PHYSICS ILRT COMPUTER PROGRAM

DESCRIPTION OF GENERAL PHYSICS ILRT COMPUTER PROGRAM

The following paragraphs describe the various features and attributes of the General Physics ILRT Data Management computer program and the process used to certify it each application.

REDUNDANCY

The General Physics ILRT team was equipped with two fully operational IBM compatible microcomputers during the ILRT for on site data reduction and analysis. The computer software and hardware interfaced directly with the Fluke Model 2285B Data Acquisition System for the test.

Two computers were brought on site for 100% redundancy, as each computer and its software was capable of independently performing the ILRT. The General Physics ILRT Data Management Software is also capable of accepting manual input of raw sensor data and performing all required sensor data conversions if the data logger would cease to function. The program installed on each computer was designed to write to the hard drive and the back-up disk in the "A" drive to protect against the unlikely event of a disk "crash."

The General Physics ILRT Data Management Computer Program is written in IBM's BASIC and Microsoft's Quick Basic 4.5. BASIC 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 its speed of operation the program was then compiled into an executable command file. Compiling was accomplished using the Microsoft's Quick Basic 4.5 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.

SECURITY

In addition to execution speed, compiling has the added benefit of making the program more secure as compiled programs cannot be edited or changed. Also, as the program does not need to be attended to operate, a password is required to change modes of operation, start times or to enter the data editing routine. The data editing routine itself is purposely designed to be extremely user un-friendly and implementable only by the GP programmers as General Physics believes that the integrity of the raw data files is paramount.

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 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 five 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.

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 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.

COMPUTER PROGRAM CERTIFICATION

The computer program used by General Physics and has been previously certified for six tests at the San Onofre Nuclear Generating Station and over a dozen other ILRT's.

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 established from the data which is used to verify performance of the program prior to usage.

Additionally, a hand calculated data set was entered into the program to further verify performance, as configured for the ILRT. Acceptable agreement was obtained between the hand calculated results and the computer results, within the limits of truncation and round-off error.

Once the computer was linked to the data acquisition device and a complete data stream was available, the input function of each mode of the program was verified by comparing the data logger's output to the computer's printed data point summary.

General Physics also provided printouts of the installed constants for the test such as:

1. Volume Fractions for ILRT Measurement System Sensors
2. Installed Calibration Constants

The microcomputer hardware and software remains the property of General Physics. General Physics supplied Boston Edison Company with certification documents for the ILRT microcomputer software for the ILRT in accordance with paragraph 4.2 of General Physics Corporation's CLRT Project Procedures Manual and the Purchase Order requirements.

Appendix G

RFO 9 LOCAL LEAKAGE TEST SUMMARIES

**1993 LOCAL LEAK RATE SUMMARY
TYPE B DOUBLE GASKETED SEALS**

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
N/A	GIBS MANWAY 0°,45°,90°,135°	0.088	0.088	
N/A	GIBS MANWAY 180°,225°,270°,315°	0.006	0.006	
N/A	DRYWELL HEAD	0.059	0.010	
1	EQUIPMENT HATCH	0.006	0.005	
2	AIRLOCK INNER SEAL	0.022	0.004	
	AIRLOCK OUTER SEAL	0.005	0.005	
4	DRYWELL HEAD ACCESS HATCH	0.115	0.115	
6	CRD REMOVAL HATCH	0.003	0.003	
25	AO-5044A INBOARD FLANGE	0.002	0.002	
	AO-5044B INBOARD FLANGE	0.014	0.014	
	AO-5044B OUTBOARD FLANGE	0.001	0.001	
26	AO-5035B INBOARD FLANGE	0.003	0.003	
	AO-5035A INBOARD FLANGE	0.003	0.003	
	AO-5035A OUTBOARD FLANGE	0.002	0.002	
35A 35B 35C 35D	TIP DRIVE FLANGES (4 INNER)	0.032	0.032	
35A 35B 35C 35D	TIP DRIVE FLANGES (4 OUTER)	0.008	0.008	
35E	TIP N ₂ PURGE	0.005	0.005	
43	DRYWELL TEST CONNECTION FLANGE	0.003	0.003	
47	ILRT TEST CONNECTION FLANGE	0.009	0.009	
200A	TORUS ACCESS HATCH - EAST	0.003	0.003	

**1993 LOCAL LEAK RATE SUMMARY
TYPE B DOUBLE GASKETED SEALS**

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
200B	TORUS ACCESS HATCH - NORTH	0.021	0.111	
205	AO-5036B INBOARD FLANGE	0.003	0.003	
	AO-5036A INBOARD FLANGE	0.002	0.002	
	AO-5036A OUTBOARD FLANGE	0.003	0.003	
223	HPCI STEAM TO TORUS INBOARD FLANGE & OUTBOARD FLANGE	0.004	0.020	
	2301-74 INBOARD & OUTBOARD FLANGE	0.002	0.002	
225	1301-64 INBOARD & OUTBOARD FLANGE	0.003	0.003	
	RCIC STEAM TO TORUS INBOARD FLANGE & OUTBOARD FLANGE	0.002	0.002	
227	AO-5040A INBOARD & OUTBOARD FLANGE	0.004	0.004	
	AO-5040B INBOARD & OUTBOARD FLANGE	0.004	0.004	
227A	X-212A SEAT FLANGE	0.004	0.004	
227B	X-212B SEAT FLANGE	0.004	0.004	
227	AO-5042A INBOARD FLANGE	0.003	0.003	
	AO-5042A INBOARD & OUTBOARD FLANGE	0.004	0.004	
	AO-5025 INBOARD FLANGE	0.003	0.003	
230	TORUS TEST CONNECTION FLANGE	0.003	0.003	

**1993 LOCAL LEAK RATE SUMMARY
TYPE B TESTABLE PENETRATIONS**

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
2	AIRLOCK INTEGRATED	0.317	5.14	
7A 53	MAIN STEAM & RCIC STEAM TO TURBINE	0.042	0.042	
7B 7C	MAIN STEAM (2)	0.091	0.091	
7D 8	MAIN STEAM & MAIN STEAM DRAIN	0.003	0.003	
9A 9B	FEEDWATER (2)	0.029	0.029	
12	RHR SUCTION FROM RECIRC	0.726	0.726	
51A	RHR RETURN TO RECIRC	0.004	0.004	
14 16A	CLEANUP SUPPLY CORE SPRAY	0.003	0.003	TESTED TOGETHER
16B	CORE SPRAY	0.005	0.005	
17	RX VESSEL HEAD SPRAY	0.487	0.487	
51B	RHR RETURN TO RECIRC	0.005	0.005	
201G	VENT LINE	0.004	0.004	
52	HPCI STEAM TO TURBINE	0.014	0.014	
201H	VENT LINE	0.005	0.005	
100C/D 102A,103 A,X-105B 104G,H/J	NEUTRON MONITORING(4) ELECTRICAL(3) CRD POSITION(3)	0.108	0.108	
100A 101A/B 104D/E/F	NEUTRON MONITORING ELECTRICAL(2) CRD POSITION(3)	0.046	0.046	
100E 102B,103 B,105A 104B	NEUTRON MONITORING ELECTRICAL(3) CRD POSITION	0.028	0.028	
104A/C	CRD POSITION(2)	0.026	0.026	
100B 106B	NEUTRON MONITORING DRYWELL HUMIDITY	0.077	0.077	

1993 LOCAL LEAK RATE SUMMARY
TYPE B TESTABLE PENETRATIONS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
101C	ELECTRICAL	0.026	0.026	
201A	VENT LINE	0.002	0.002	
201B	VENT LINE	0.004	0.004	
201C	VENT LINE	0.011	0.011	
201D	VENT LINE	0.013	0.013	
201E	VENT LINE	0.003	0.003	
201F	VENT LINE	0.006	0.006	
202A	ELECTRICAL	0.188	0.188	
202B	ELECTRICAL	0.019	0.019	

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
7A	MAIN STEAM AO-203-1A AO-203-2A	3.331 1.793	3.331 1.793	
7B	MAIN STEAM AO-203-1B AO-203-2B	0.550 0.550	0.550 0.550	
7C	MAIN STEAM AO-203-1C AO-203-2C	6.295 2.494	6.295 2.494	
7D	MAIN STEAM AO-203-1D AO-203-2D	0.542 1.884	0.542 1.884	
8	MAIN STEAM DRAIN MO-220-1 MO-220-2	1.906 1.906	1.906 1.906	
9A	FEEDWATER 6-58A 6-62A	0.058 0.001	0.058 0.001	TESTED WITH MO-1301-49
	RWCU RETURN MO-1201-80	0.003	0.003	
	RCIC DISCHARGE MO-1301-49			TESTED WITH 6-62A
9B	FEEDWATER 6-58B 6-62B	0.025 0.205	0.025 0.205	TESTED WITH MO-2301-8
	HPCI DISCHARGE MO-2301-8			TESTED WITH 6-62B
12	RHR SUCTION FROM RECIRC MO-1001-47 MO-1001-50	0.399 0.925	0.399 0.925	
14	RWCU INLET MO-1201-2 MO-1201-5	0.774	0.774	
15E	H ₂ O ₂ ANALYZER "B" SV-5065-35B SV-5065-31B	0.011 0.005	0.011 0.005	
16A	CORE SPRAY TO REACTOR MO-1400-24A MO-1400-25A	0.002	0.006	TESTED IN PARALLEL

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
16B	CORE SPRAY TO REACTOR MO-1400-24B MO-1400-25B	2.250	2.250	TESTED IN PARALLEL
18	DRYWELL FLOOR DRAIN AO-7017A AO-7017B	3.010 3.318	3.010 3.318	
19	DRYWELL EQUIP- MENT DRAIN AO-7011A AO-7011B	0.024 1.323	0.024 1.323	
22	INSTRUMENT AIR TO DRYWELL 31-CK-167	1.483	1.483	
23	RBCCW SUPPLY 30-CK-432	0.070	0.005	
24	RBCCW RETURN MO-4002	0.004	0.004	
25	DRYWELL PURGE EXHAUST AO-5044A AO-5044B	0.062	0.062	TESTED IN PARALLEL
	DRYWELL VENT EXHAUST AO-5043A AO-5043B	1.496	0.354	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5082A SV-5081B	0.002	0.002	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5081A SV-5082B	0.002	0.002	TESTED IN PARALLEL
26	DRYWELL PURGE INLET AO-5035A AO-5035B AO-5033B	1.815	1.815	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5085A SV-5085B	0.076	0.076	TESTED IN PARALLEL

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
26	POST ACCIDENT PURGE & VENT SV-5086A SV-5086B	0.036	0.036	TESTED IN PARALLEL
	DRYWELL MAKEUP GAS 9-CK-340	0.081	0.081	TESTED IN PARALLEL
	DRYWELL MAKEUP GAS AO-5033A	0.524	0.524	
29E	H ₂ O ₂ ANALYZER "A" SV-5065-37A SV-5065-33A	2.230 0.326	2.230 0.326	
32A	C-19 RETURN TO DRYWELL CV-5065-91 CV-5065-92	0.136 0.077	0.136 0.077	
35A	TIP BALL VALVE 4 45-300D	0.092	0.073	
35B	TIP BALL VALVE 3 45-300C			TESTED WITH 45-300D
35C	TIP BALL VALVE 1 45-300A	0.044	0.683	
35D	TIP BALL VALVE 2 45-300B			TESTED WITH 45-300A
35E	TIP N ₂ PURGE CHECK	0.005	0.005	
39A	CONTAINMENT SPRAY MO-1001-23A MO-1001-26A	0.246	0.012	TESTED IN PARALLEL
39B	CONTAINMENT SPRAY MO-1001-23B MO-1001-26B	3.558	3.558	TESTED IN PARALLEL
40Aa	JET PUMP SENSING LINE PASS SV-5065-63 SV-5065-64	0.006 0.010	0.006 0.010	
40De	JET PUMP SENSING LINE PASS SV-5065-85 SV-5065-86	0.473 0.002	0.473 0.002	

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
41	RECIRC PUMP B DISCH SAMPLE AO-220-44 AO-220-45	0.003 0.090	0.003 0.090	
42	STANDBY LIQUID CONTROL 1101-16	0.013	0.013	
43	DRYWELL TEST CONNECTION 45-HO-106	0.050	0.050	
46A	RECIRC PUMP SEAL 262-FO13A 262-FO17A	1.211 0.986	1.211 0.986	
46B	RECIRC PUMP SEAL 262-FO13B 262-FO17B	3.963 3.818	3.963 3.818	
46F	H ₂ O ₂ ANALYZER "A" RETURN SV-5065-26A SV-5065-24A	0.077 0.011	0.077 0.011	
47	DRYWELL TEST 45-HO-102 45-HO-104	0.144	0.144	TESTED IN PARALLEL
	45-HO-103 45-HO-105	0.132	0.132	TESTED IN PARALLEL
50Ad	H ₂ O ₂ ANALYZER "B" SV-5065-13B SV-5065-20B	0.154	0.154	
51A	RHR VESSEL RETURN MO-1001-28A MO-1001-29A	0.474 0.222	0.525 0.385	
51B	RHR VESSEL RETURN MO-1001-28B MO-1001-29B	0.780 2.425	0.780 2.425	
52	HPCI STEAM TO TURBINE MO-2301-4 MO-2301-5	0.072	0.042	TESTED IN PARALLEL

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
53	RCIC STEAM TO TURBINE MO-1301-16 MO-1301-17	0.055	0.003	TESTED IN PARALLEL
106Ab	H ₂ O ₂ ANALYZER "A" SV-5065-14A SV-5065-21A	0.033 0.033	0.033 0.033	
205	TORUS MAKEUP GAS 9-CK-341 AO-5033-C	0.248 0.226	0.248 0.226	
	POST ACCIDENT PURGE & VENT SV-5087A SV-5087B	0.232	0.232	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5088A SV-5088B	0.230	0.230	TESTED IN PARALLEL
	TORUS PURGE INLET (X-205) AO-5036A AO-5036B	1.340	1.340	TESTED IN PARALLEL
211A	RHR TO TORUS SPRAY MO-1001-34A MO-1001-37A	0.306	0.046	TESTED IN PARALLEL
211B	RHR TO TORUS SPRAY MO-1001-34B MO-1001-37B	0.078	0.078	TESTED IN PARALLEL
219	HPCI VACUUM BREAKER MO-2301-33 MO-2301-34	0.747 0.476	0.747 0.476	
223	HPCI EXHAUST 2301-74 2301-45 2301-218	SEE APP. I 1.778 0.095	0.137	REPAIRED/MODIFIED STOP CHECK POPPET

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
223	CV-9068A CV-9068B CV-9068B	0.031	0.015 0.012	AS FOUND TESTED IN PARALLEL AS LEFT TESTED SEPARATELY (NEW VALVES)
227A	TORUS VACUUM BREAKERS AO-5040A X-212A	0.057	0.057	TESTED IN PARALLEL
227B	TORUS VACUUM BREAKERS AO-5040B X-212B	0.004	0.004	TESTED IN PARALLEL
227	TORUS EXHAUST VALVE BYPASS AO-5041A AO-5041B	0.310	0.310	TESTED IN PARALLEL
	TORUS MAIN EXHAUST & DIRECT VENT AO-5042A AO-5042B AO-5025	0.612	0.612	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5084A SV-5083B	0.274	0.274	TESTED IN PARALLEL
	POST ACCIDENT PURGE & VENT SV-5083A SV-5084B	0.094	0.094	TESTED IN PARALLEL
228C	H ₂ O ₂ ANALYZER "B" SV-5065-15B SV-5065-22B	0.008 0.034	0.008 0.034	
228E	AIR TO TORUS VACUUM BREAKERS CV-5046 31-CK-434	2.338 0.830	2.338 0.830	
228G	GAS SAMPLE RETURN-PASS SV-5065-77 SV-5065-78	0.402 0.195	0.402 0.195	

1993 LOCAL LEAK RATE SUMMARY
TYPE C TESTS

PEN. NO.	DESCRIPTION	AS FOUND LEAKAGE (SLM)	AS LEFT LEAKAGE (SLM)	COMMENT
228H	GAS SAMPLE RETURN-PASS SV-5065-71 SV-5065-72	0.004 0.020	0.004 0.020	
228J	H ₂ O ₂ ANALYZER "A" SV-5065-11A SV-5065-18A	0.010 0.051	0.010 0.051	
228K	H ₂ O ₂ ANALYZER "B" RETURN SV-5065-25B SV-5065-27B	0.503 0.464	0.503 0.464	

APPENDIX H

1991/1992 LOCAL LEAK RATE TEST DATA

1991/1992 LOCAL LEAK RATE TEST DATA

PEN NO.	DESCRIPTION	TYPE TEST	EQUIPMENT/ VALVE TESTED	LEAKAGE (SLM) DATE TESTED	NOTES
1	EQUIPMENT HATCH	B	DOUBLE O-RING	0.014/10-31-91 0.009/11-4-91	
2	AIRLOCK INNER SEAL	B	DOUBLE O-RING	TESTED 25 TIMES FROM 7-23-91 THRU 12-23-92 LEAKAGE RANGED FROM 0.003 TO 0.215 (NO FAILURES)	
	AIRLOCK OUTER SEAL	B	DOUBLE O-RING	TESTED 26 TIMES FROM 7-23-91 THRU 12-23-92 LEAKAGE RANGED FROM 0.003 TO 0.019 (ONE FAILURE)	
	AIRLOCK INTEGRATED TEST	B		2.140/7-25-91 0.690/8-10-91 0.755/10-31-91 3.040/11-18-91 3.110/11-19-91 0.355/3-26-92 0.618/4-13-92 0.360/10-23-92 3.300/11-21-92 0.256/12-16-92	
8	MAIN STEAM DRAIN	C	MO-220-1	0.870/10-28-92 1.430/11-5-92	
9A	FEEDWATER	C	6-58A	0.062/10-26-92	
	RCIC DISCH	C	6-62A MO-1301-49	0.062/10-26-92 0.062/10-26-92 0.460/11-3-92	
9B	FEEDWATER	C	6-58B	0.054/10-26-92	
	HPCI DISCH	C	6-62B MO-2301-8	0.151/10-26-92 0.159/11-19-92	WITH 6-62B BETWEEN SEATS
16B	CORE SPRAY TO REACTOR	C	MO-1400-24B MO-1400-25B	1.225/11-2-92 0.958/11-16-92	TESTED IN PARALLEL
39B	CONTAINMENT SPRAY	C	MO-1001-23B MO-1001-26B	5.040/11-2-92 0.179/11-19-92	TESTED IN PARALLEL
51B	RHR VESSEL RETURN	C	MO-1001-28B	0.080/11-2-92 0.056/11-18-92	

1991/1992 LOCAL LEAK RATE TEST DATA

PEN NO.	DESCRIPTION	TYPE TEST	EQUIPMENT/ VALVE TESTED	LEAKAGE (SLM) DATE TESTED	NOTES
53	RCIC STEAM TO TURBINE	C	MO-1301-16 MO-1301-17	0.099/3-27-92 0.120/4-4-92 0.050/10-28-92 0.117/11-20-92	TESTED IN PARALLEL MO-1301-16 MANUALLY CLOSED & GAGGED AFTER TEST VOLUME WOULD NOT PRESSURIZE
211B	RHR TO TORUS SPRAY	C	MO-1001-34B MO-1001-37B	0.034/11-2-92 0.660/11-18/92	TESTED IN PARALLEL

APPENDIX I

2301-74 FAILURE ANALYSIS TEAM REPORT

FAILURE ANALYSIS TEAM
2301-74 VALVE

R. O'Neill *EO*
G. Choquette *goc*
G. James *GJ*
T. Satterfield (A/D)
M. Cowell (A/D)
D. Heard *DH*
P. Manderino *PM*
G. McCarthy
M. McClellan

cc: N. Desmond
J. Bellefeuille
W. Grieves
G. Dyckman
L. McDonald

Problem Description: The 2301-74, HPCI Torus Discharge Valve (Turbine Exhaust Stop Check Valve), failed its RFO-09 LLRT.

Valve Data: 23-CK-2301-74 HPCI Torus Discharge Valve; 20", 150#, Y Globe Stop Check Valve, soft seat; manufactured by Anchor/Darling.

Valve History:

1984	- Installed
1987 (RFO-07)	- LLRT failed (see TCH 88-20)
9/1988	- LLRT passed
4/1990	- LLRT passed
5/1991 (RFO-08)	- LLRT failed (see MSED 91-181)
4/1993	- LLRT failed

As Found Conditions (RFO-09):

General:

- 1) Valve seat, body and disc seats all found in generally good condition and within manufacturer's tolerances.
- 2) Disc not centered (radially) in bore.
- 3) Disc vertical position was not equi-distant from top flange (cocked within bore).
- 4) Soft seat was chipped at the 2 o'clock position - matching a nick on the seat ring (not considered a contributing cause).

Specifics:

- 1) Anchor/Darling Component Inspection & Repair Report (Attachment 1A & 1B)
- 2) Anchor/Darling Initial Poppett & Valve as Found Measurements and Drawings (Attachments 2A thru 2D)
- 3) Anchor/Darling Follow-up Poppett Detail Measurements and Drawing (Attachment 3)

Immediate Actions Taken: Initiated PR93.0235, no other immediate actions were necessary as the plant was in cold shutdown.

Root and Contributing Cause:

The direct cause of the LLRT failure is improper disc seating and alignment. This has been attributed to less than optimum valve design for the conditions the valve is normally operated. Valve installation and maintenance have been adequate. The failure was caused by the interaction of several design parameters and valve disc as-found condition, rather than from the affect of only one condition. Parameters contributing to the improper valve seating are: shortened disc height to width ratio, disc skirt guides to body bore tolerances, distortion of the disc upper guide skirt, disc and valve geometry that results in a low center of gravity (CG), excessive resilient seat projection, and low closing force. Failure to optimize valve design to compensate for the interaction of each of these parameters and the uniqueness of design is the root cause.

Each contributing cause is listed below along with a brief discussion and recommended corrective action (as necessary).

- 1) Disc height is limited due to the location and orientation of the valve. The piping where the valve is installed is very close to the ceiling of the HPCI quadrant. This minimizes vertical space above the valve for disassembly and/or valve top works. This reduced vertical clearance is one of the limiting design factors which led to the use of an angle lift check and also limited the available stroke and therefore overall length of the check valve disc subassembly. The valve manufacturer has indicated that without vertical space limitations the preferred disc guide separation height should be equal to the disc width. For the 2301-74, an approx. 18" diameter disc, that would result in an 18" disc guide height. The actual guide height is approx. 9" as set by design. This 'shortened' disc allows for greater angular rotation at the seats and therefore more cocking of the valve within the valve body bore, for a given tolerance in diametrical dimensions.

Lengthening the disc guide separation to the maximum extent possible within the constraints of the current valve body is required.

- 2) Disc subassembly misalignment was not prevented by internal valve tolerances. Less than optimum internal tolerances are a contributing cause. Internal valve tolerances should be optimized to ensure proper disc subassembly alignment.
- 3) Distortion of the disc subassembly allowed cocking within the guides by effectively reducing the disc guide separation height. Thermal and mechanical distortion are the contributing failure mechanisms.

Thermal distortion can be limited by providing greater mass or limiting thin cross-sections in the upper disc skirt subassembly and center pipe.

Mechanical distortion could be caused by hydrodynamic transients which would have placed high loads on the disc subassembly possibly leading to skirt distortion. The HPCI exhaust line has a history of these transients. The last documented transient occurred on 5/18/85 (well after 2301-74 installation) and is described in NED 85-527. This transient was attributed to water induction from the torus into the HPCI turbine exhaust line after a turbine start, trip and an auto restart. The resulting waterhammer resulted in damage to snubbers on the HPCI exhaust line. Future transients have been mitigated by design changes which included installation of vacuum breakers to prevent water induction (PDC 85-59).

Additionally, mechanical distortion could have been caused by improper disc handling during shipment, installation or subsequent handling during maintenance. Typically receipt inspection would not be detailed enough to identify this type of problem. Mechanical distortion through waterhammer has been prevented by installation of PDC 85-59. Distortion caused by improper disc handling, if it occurred, is considered to have been an isolated occurrence.

- 4) The disc's center of gravity is approx. 4" above the bottom or seating end of the disc. This Y angle lift check causes the disc to travel in a plane approx. 45 degrees from vertical. Because of this angle of travel and the low center of gravity a rotational force acts upon the disc encouraging cocking (i.e., the CG's vertical component always leads the lower guide and disc seat during closing of the disc).

Lengthening the disc guide height and increasing the upper skirt mass will cause the center of gravity to move further up the disc assembly as compared to the as found disc. This will lessen the rotational force that encourages disc cocking.

- 5) Excessive soft seat projection was determined to be a contributing factor. F&MR 91-198 was written 05/31/91 to document that subsequent to machining the disc hard seat the soft seat projection exceeded the value specified by the vendor and contained in PNPS drawing M132C-4. The root cause analysis completed for this problem concluded, based on the vendor's (Anchor/Darling) input, that the soft seat projection was adequate for one cycle. Soft seat projection should be decreased.
- 6) Securing steam to the HPCI turbine results in cycling of the 2301-45 and 2301-74 valves as exhaust steam pressure reduces to torus pressure. Review of EPIC traces of turbine exhaust pressure and interviews with the System Engineer have indicated such. Therefore, the last stroke that the 2301-74 experiences is most likely the result of relieving trapped pressure between the 45 and 74 valves and is more of a 'burp' than a full stroke. This results in a low disc closing force. The valve manufacturer has indicated that the valve as designed would be expected to close properly if closed from a fully open position which results in a larger closing force. Combining all of the other disc factors with this low closing force allowed the disc to cock and prevented the disc from finding the body seat properly.

The 'burping' of the 2301-74 valve is considered normal system interaction and no actions are recommended to modify system operations. Implementation of the above disc modifications will provide adequate compensation for this mode of valve operation.

The 2301-74 valve was built for this special application. The design issues are unique to this system and application and therefore no other corrective actions are planned.

Anchor/Darling analysis of the condition can be found in Attachment 4A thru 4E.

Actions Necessary to Prevent Recurrence:

- 1) Provide a new disc subassembly that has the following design characteristics:
(Action - D. Heard)
 - A) Maximize the disc subassembly guide length within the constraints of the existing valve body and bonnet.
 - B) As built guide diameter to results and .026 - .035 in. diametral clearance between existing valve body guides and disc guides.
 - C) Increased disc guide edge radius to 1/4R (reduce chance of edge catching).
 - D) Increase disc stem hole diameter.
 - E) Decreased resilient seat projection.
 - F) Increased resistance to disc distortion for the area of the disc upper guide skirt.
- 2) Develop PDC to install the new disc.
(Action - J. Gerety)

Contingencies:

- 1) Save old disc subassembly (Action - D. Heard)
Pursue use-as-is justification. (Action - NED)
- 2) Develop FRN to modify old disc subassembly
(Action - G. Choquette)
 - A) Raise the disc skirt on the center pipe so that the inside of the skirt is flush with the top of the pipe.
 - B) Reduce the clearance between the disc guide and body bore by applying additional hardfacing to the disc OD and remachine. The as found diametral clearance will be decreased from .049 - .057 to .026 - 0.35 (new design).
 - C) Increase the radius on the guide edges from 1/8R to 1/4R. (This will reduce the chance of edge "catching".)

- D) Decrease the resilient seat (soft seat) projection to .020 - 0.25.
(This will improve the seal life and provide continuous seal contact at initial closure.)

COMPONENT INSPECTION & REPAIR REPORT



CHECK VALVE DATA SHEET

Valve No. 2301-74 W.O. NO. 50082
 Manufacturer ADV Size 20"
 Customer RECO Type _____
 As Found Position _____ As Left Position _____
 Reported Problem: VALVE LEAKS BY

AS FOUND:

	GALLED	PITTED	ERODED	CORRODED	BENT	CRACKED	O.K.	OTHER
DISC	LOW	18.204	0	18.203	X			
HARDFACE	18.206	0	18.207	X				WASHER
STEM/SHAFT								
BONNET								
DISC STOP								
SEATS	SOFT SEAT	GOOD BUT 1 SIDE FLAT	1 SIDE FLAT	1 SIDE FLAT	WASHER			LOW
STUFFING BOX								EDGE
BODY	18.256 12-6	3-8	18.260	X				4-11 18.259
PRESSURE SEAL								
HINGE ARM	NA	NA	NA	NA	NA	NA	NA	NA
SPRING								

GROUNDERS - STRAIGHT

AS LEFT:

ACTION TAKEN	STEM	DISC	BONNET	SEATS	PRESS. SEAL	HINGE	BODY	BACKSEAT	BOX
REPLACED									
HAND LAPPED									
MACHINE LAPPED									
CLEANED									
OTHER									

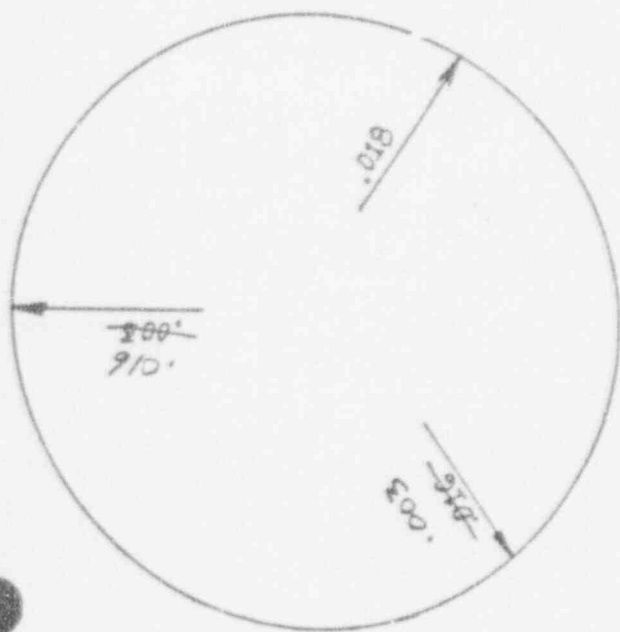
"AS FOUND" STROKE TEST PERFORMED. _____

LOCKING DEVICES ARE INTACT. _____

POST REWORK SEATING SURFACE INSPECTION PERFORMED. _____

"AS LEFT" STROKE TEST PERFORMED. _____

ADDITIONAL COMMENTS/ACTION: _____



CLEARANCE BETWEEN PLUG AND BODY



TOP OF PLUG TO TOP OF BODY

NEED 18-19 OUTSIDE MICROMETER FOR PLUG
5/8 HOLES FOR LIFTING PLUG

Inspection

STELLITE HAS SMALL INDICATION OUTSIDE OF SEALING SURFACE ON THE DISC & POPPET SEAT RING

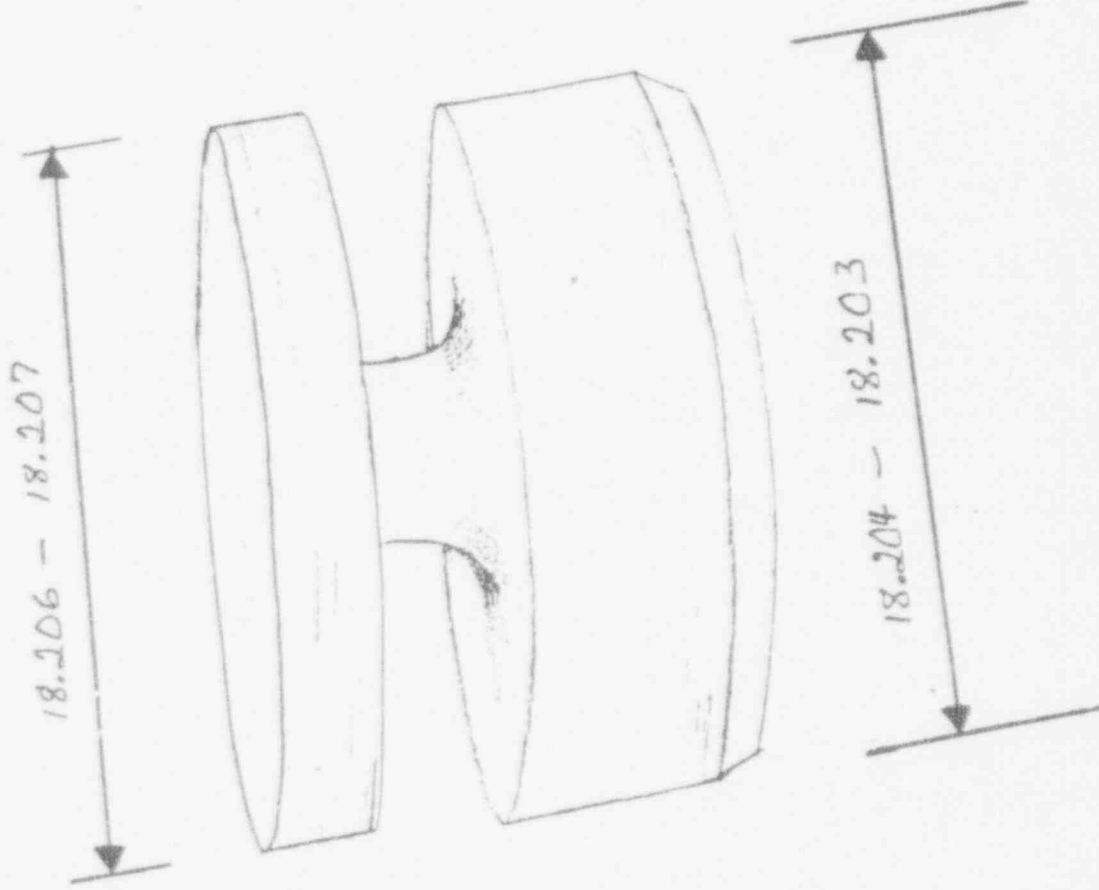
THE DISC WAS FOUND TO BE OFF CENTER DURING THE AS FOUND INSPECTION. SEE FIG 1.A.

SOFT SEAT HAS SMALL

PIECE MISSING AT THE 2 O'CLOCK LOCATION APPROXIMATELY $\frac{1}{32}$ DEEP X $\frac{1}{8}$ IN DIA.

LOCK WELDS ON RETAINER SCREWS FOR SOFT SEAT ARE STILL IN GOOD CONDITION. ONE SCREW WAS NOT COMPLETELY PULLED UP INTO THE RETAINER RING SCREW COUNTER BORE.

ALL DIMENSIONS TAKEN OF POPPET AND IN BODY BORE ARE WITHIN DESIGN TOLERANCES. SEE FIG. 1A



-2301-74

AS FOUND

Body Bore

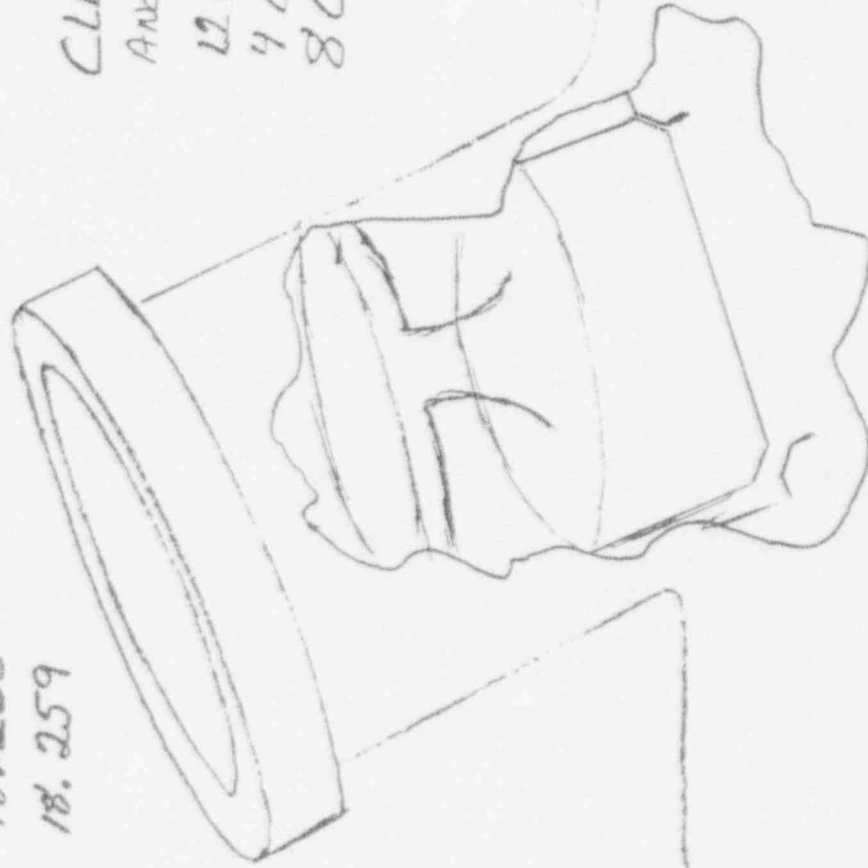
12 O'clock - 6 O'clock 18.256
3 O'clock - 9 O'clock 18.260
4 O'clock - 10 O'clock 18.259

Top of Poppet to Top of Valve
12 O'clock 13 3/8
3 O'clock 13 3/16
6 O'clock 13 3/16
9 O'clock 13 3/8

CLEARANCE BETWEEN PLUG

AND BODY BORE

12 O'clock .003
4 O'clock .018
8 O'clock .016



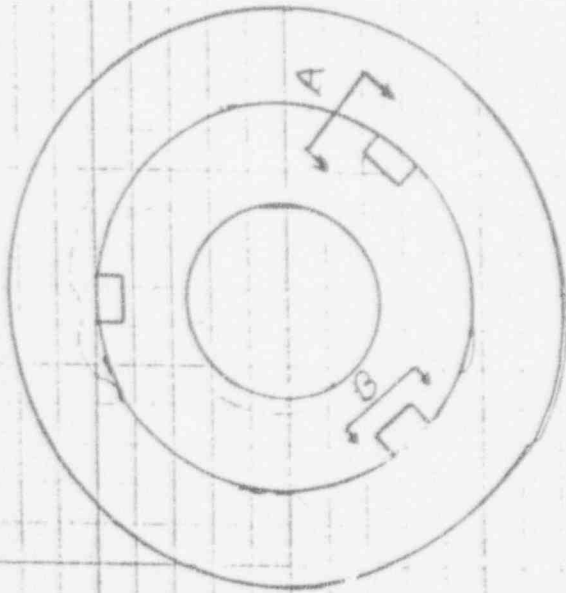
2B

Fig 1.A

-2301-74

Anchor Darling Dwg. NO W8121415 R/E1

Top



View B - Typical 2 Guides at

4 O'clock & 8 O'clock

Weld Metal Buildup $\pm .005$ $\pm .015$ $\pm .000$



Existing Base Material

View Looking Into Valve

View A - Typical 2 Guides at 4 O'clock & 8 O'clock

Weld Metal Buildup

$\pm .005$
 $\pm .015$ $\pm .000$

Existing Base Material

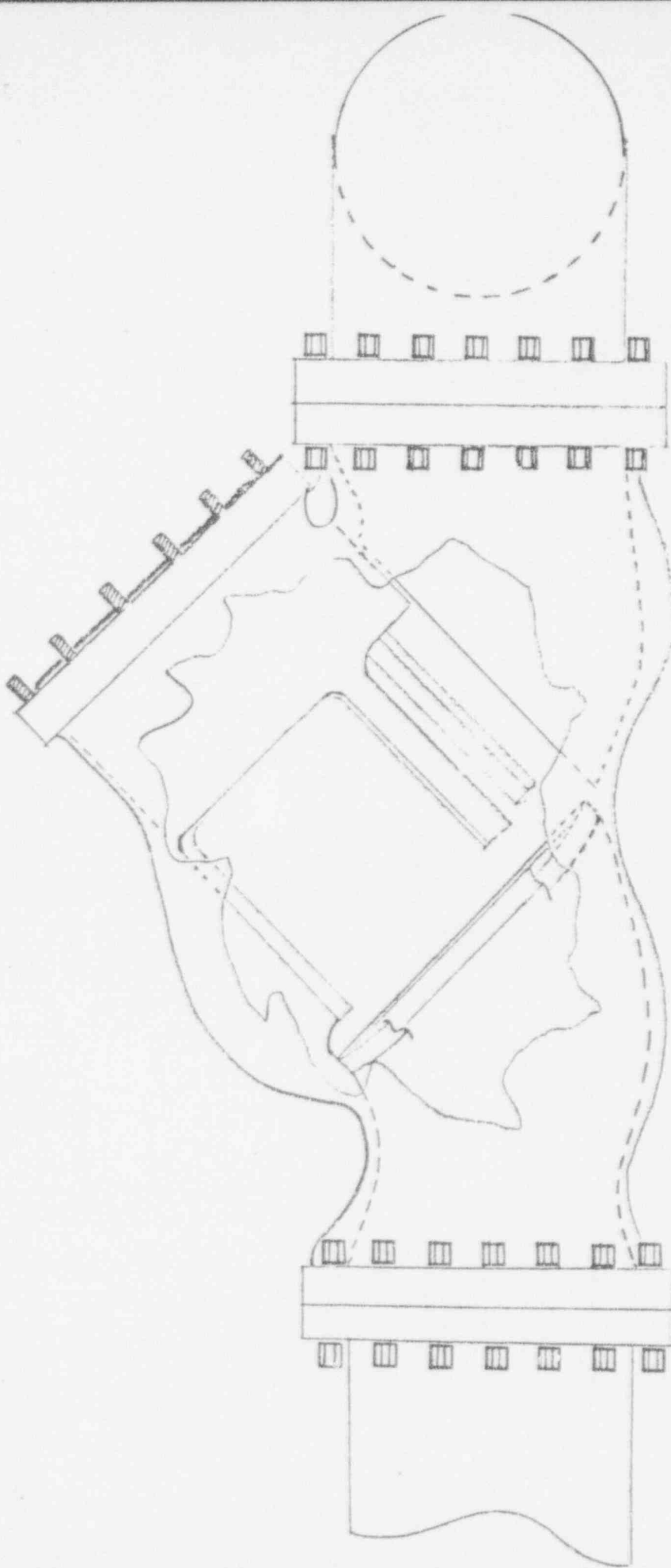
Full Body Bore

1" taper from Built up Area to Full body Bore.

2C

4/14/93 2: ~~Entire~~

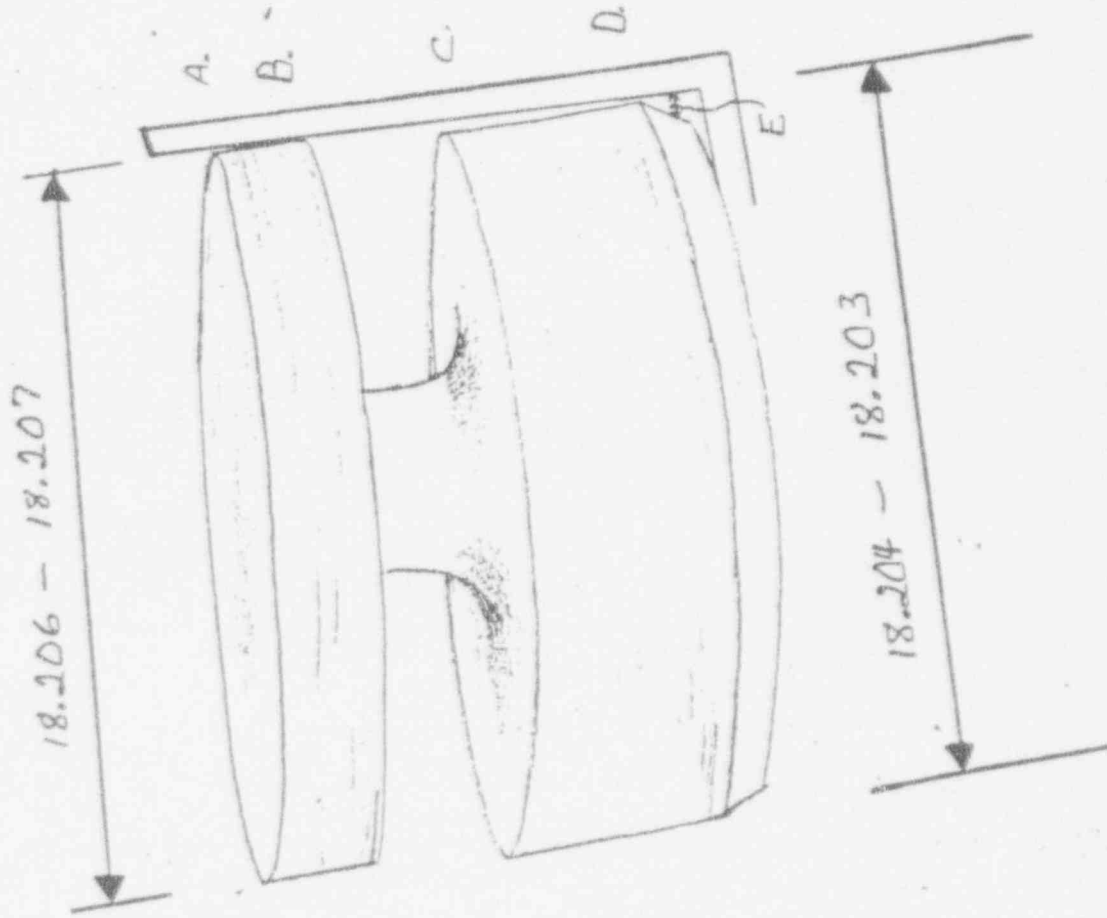
2301-74



"Catfish"

20

Soft Seat Protrusion
 .037 - .043



Disc	60'clock to 30'clock	Disc Skirt	60'clock to 30'clock
C.	D.	A.	B.
0	0	.027	0
.004	0	.021	0
.004	0	.009	0
60'clock to 90'clock		60'clock to 90'clock	
C.	D.	A.	B.
.0	.0	.027	0
.0	.0	.027	.0
.0	.0	.014	.0
90'clock to 30'clock		90'clock to 30'clock	
C.	D.	A.	B.
.0	.0	.0	.0
.003	.0	.0	.0
.004	.0	.005	.0
.004	.0	.009	.0
.004	.0	.006	.0
.0	.0	.0	.0
.0	.0	.005	.0

**MECHANICAL
SERVICES
DIVISION**Frank Velez
Director

Anchor/Darling Valve Company • P.O. Box 3428, 701 First Street • Williamsport, PA 17701 • Phone (717) 327-4858 • FAX (717) 327-4940

DATE 4-20-93TELECOPIER NUMBER 508-747-8718TO Tim Satterfield / Dave HeardNUMBER OF PAGES 3 PLUS INSTRUCTION SHEET = 4MESSAGE FROM Mark Cowell

4A

Sheet 1/3

A/DV Engineering evaluation of 20"-150 wye
Globe Stop Check Valve Drawing No.
W 8121415, S.O. E9982-2, Tag. MO-2301-74.

It is believed the root cause of the disc seating and alignment problem is the height of the disc subassembly guide and disc to body clearance. The guide height must be sufficient to prevent disc binding. Generally the guide height should be equal to the guide diameter, however since space and time are limited a combination of modifications can be made to improve performance. See attached sketch

- (1) Remove the disc skirt and raise it on the center pipe so that the inside of the skirt is flush with the top of the pipe. This will increase the guide height from $9\frac{3}{4}$ to $11\frac{9}{16}$.
- (2) Reduce the clearance between the disc guide and body bore by applying additional hand facing to the disc OD and remachine. The diametral clearance will be decreased from .049 - .057 to .026 - .035.
- (3) Increase the radius on the guide edges from $\frac{1}{8} R$ to $\frac{1}{4} R$. This will reduce the chance of edge "catching".

4B

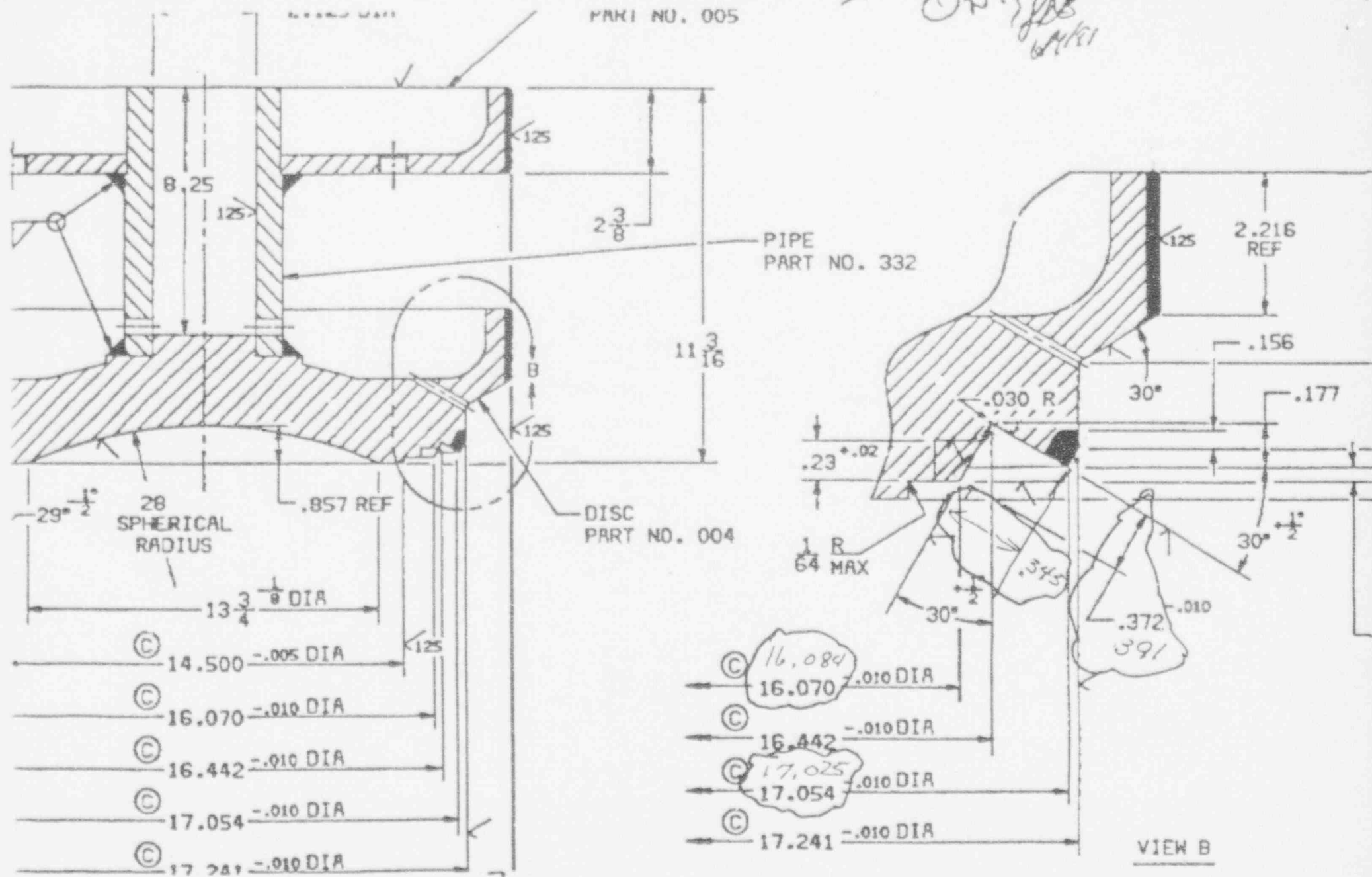
Sheet 2/3

- (4) Increase the diameter of the stem hole in the disc subassembly from 2.125 to 2.25. This will double the clearance between the stem and disc insuring the stem does not contact the disc and cause misalignment.
- (5) Decrease the resilient seat projection to .020 to .025. This will improve the seal life and provide continuous seal contact at initial closure.

Mark D. Cowell
Mark D. Cowell, PE
Project Engineer

4C

Information Only



卒

PR 93.0235

Document type and number

10 CFR 50.73 EVALUATION FORM

900/C

I. 10 CFR 50.73 Evaluation required? ☒ Yes ☐ No.A. If Yes, is 10 CFR 50.73 reporting applicable? ☐ Yes ☒ No ☐ N/AB. If I.A is Yes, identify the applicable 10 CFR 50.73 subpart(s): N/AC. If I.A is yes, identify the applicable LER number: N/A

D. Basis: REVIEW OF PAID M-243 TECHSPEC - 4.7.A.2.a, and discussion
WITH THE PR ORIGINATOR REGARDING THE LLRT RESULTS FOR THE IN-SITU
CHEMUR 2301-45. ESSENTIALLY, THE AS-FOUND TEST RESULTS OF C/C-2301-45
WERE SATISFACTORY. THEREFORE, EVEN THOUGH C/C-2301-74 DID NOT HAVE
SATISFACTORY AS-FOUND TEST RESULTS, THE SATISFACTORY AS-FOUND TEST RESULTS
OF C/C-2301-45 INDICATES THE CONTAINMENT FUNCTION OF THE TURBINE
EXHAUST PIPING (TO/FROM TURBINE/HPCL TURBINE) WAS NOT UNACCEPTABLY
AFFECTED.

II. Prepared By: W. E. Ellis 4/23/93

Compliance Division Engineer/Date

III. Reviewed By: W. G. Day 4/26/93

Compliance Division Reviewer/Date

NP2110MX

MAINTENANCE REQUEST FILE (1 OF 5)

05/06/93

NP2100DG NEXT PAGE 1

15:20:51

----- ORIGINATING SECTION -----

19103911 00 TYPE UNIT 1 DATE 8/20/91 NUC CLASS (S/N) S PRI 3

ESR# TAG LOC

STATUS A2 INITIALS GB REMARKS ACTIVE

WORK TYPE P SUB TYPE TP IN

SYSTEM LOADED DATE 8/20/91 TIME 20:41:12 LEAD MR #

SUPPORT N

----- EQUIPMENT INFORMATION -----

EQUIPMENT ID 23-CK-2301-74 DESC HPCI TORUS DISCHG VLV SYS 23 TRAIN

Q/NON-Q Q LOCATION -4'

PWT / OPS N TRENDING N

SYSTEM RSP ENGINEER

----- PROBLEM/WORK REQUESTED -----

REPLACE SOFT SEAT ON HPCI TURB EXHAUST STOP CHECK VALVE CK-2

301-74 WIT H NEW SMALLER DIAMETER SOFT SEAT TO PREVENT PINCH

ING OF THE SEAT. REMOVED FROM MCO 9 AND ADDED TO RFO 9 PER T CONT Y

INITIATOR D. FERRARO

DATE

OPS RV NWE

DATE 8/20/91

WPT RECEIVED DATE 8/20/91 DATE WORK REQD

----- CROSS REFERENCES -----

CONTROL #

WRT #

REFERENCE DOC# PR91.0198.01

SEC CONT

IND SFTY

PHONE

PDC/FRN#

REJECT CODE

RESP PERSON

DATE

ENTER DATA OR COMPLETE TRANSACTION

PF: 11-TEXT 13-HELP 14-ALIAS 15-EXIT 16-COMMIT 17-DTL 18-QUIT 20-LIST

4B

A

==PC LINE 2 COL 22