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SUBJECT: Forwards "Susquehanna Steam Electric Station Unit 1,Primary Reactor Containment Integrated Leakage Rate Test," final reot.

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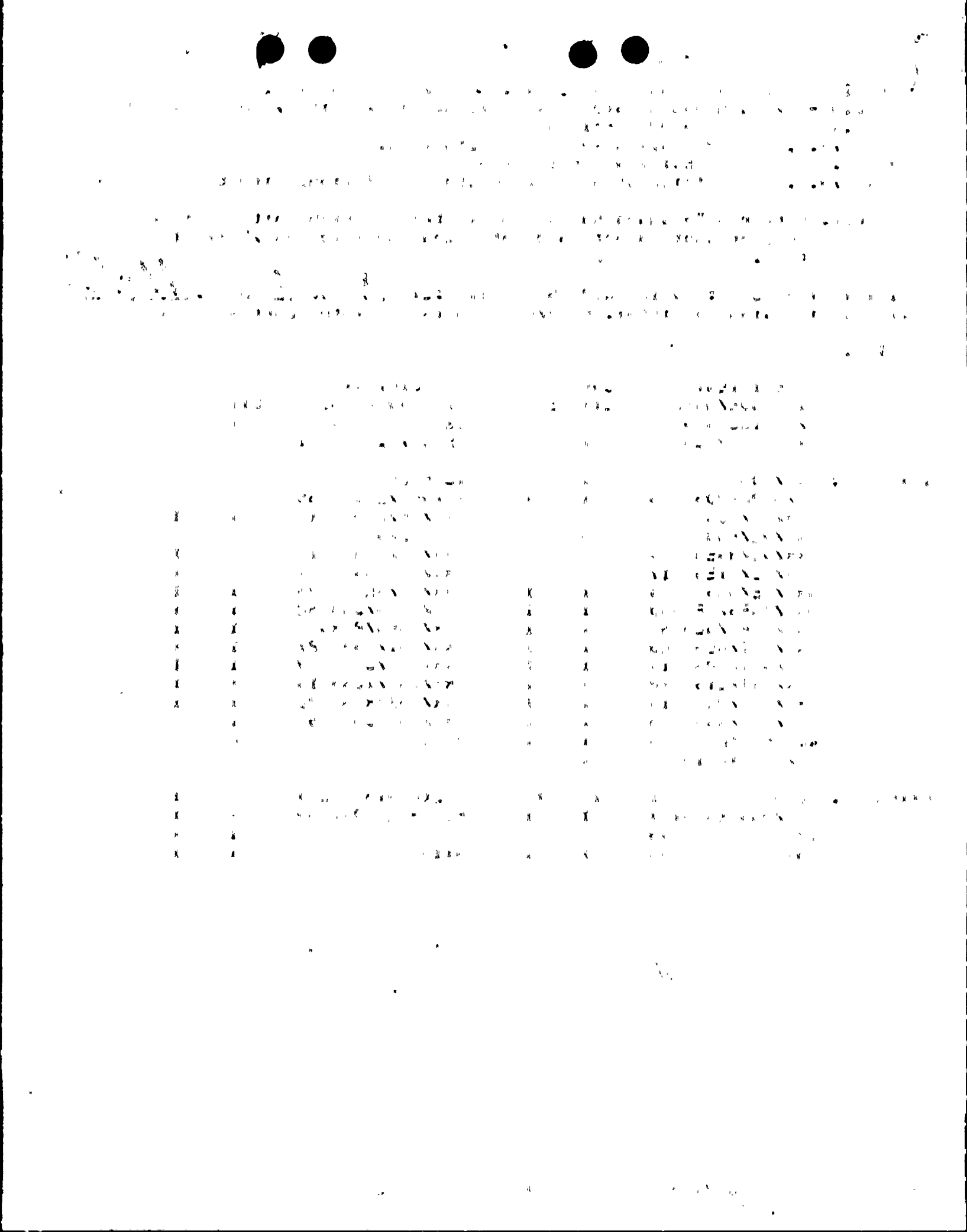

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AUG 3 1 1982

Mr. Harold Denton
Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PREOPERATIONAL ILRT
ER 100450 FILE 841/813-38
PLA-1256 Docket No. 50-387

Dear Mr. Denton:

Attached is the Susquehanna SES Unit 1 Summary Technical Report for the Preoperational Primary Reactor Containment Integrated Leak Rate Test which is forwarded in accordance with 10 CFR 50, Appendix J, Section V.B.

Very truly yours,

B. D. Kenyon
Vice President-Nuclear Operations

RMH/mks

Attachment

cc: R. L. Perch - NRC
G. Rhoads - NRC w/o attachment

B001

SUSQUEHANNA STEAM ELECTRIC STATION
PENNSYLVANIA POWER AND LIGHT COMPANY
BERWICK, PENNSYLVANIA

REACTOR CONTAINMENT BUILDING

INTEGRATED LEAKAGE RATE TEST

UNIT 1

FINAL REPORT

Bechtel Power Corporation
May 1982

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APPENDICES

1. INTRODUCTION

1.1 TEST IDENTIFICATION

The Reactor Containment Building Integrated Leakage Rate Test (ILRT) is a short duration (8-hour) preoperational containment test designed to verify that the actual containment leakage (Lam) is below site Technical Specifications for maximum allowable leakage (La). The drywell to suppression pool Bypass Test, which is part of the ILRT program and conducted subsequent to the ILRT, verifies that Bypass leakage meets FSAR acceptance criteria.

The ILRT and Bypass Test were performed at the Susquehanna Steam Electric Station Unit 1.

This unit is a boiling water reactor (BWR) enclosed within a GE Mark II steel lined containment. The containment is divided into two major compartments: the drywell containing the reactor and the suppression pool which serves as the major heat sink in case of a loss of coolant accident (LOCA). Both the drywell and wetwell (suppression pool) were tested during the ILRT.

1.2 PURPOSE OF ILRT AND BYPASS TEST

The purpose of the ILRT and Bypass Test is to comply with NRC acceptance criteria, regulatory guides and site Technical Specifications. These guides (10 CFR 50, Appendix J) specify acceptable test conditions, test frequency, maximum allowable leakage, and valve lineup.

Additionally, the ILRT provides test data to verify that the containment leakage rate satisfies site Technical Specifications and all requirements for containment integrity necessary for fuel load and subsequent power operation. The Bypass Test provides test data to verify that FSAR commitments are met regarding an equivalent maximum allowable bypass area between the drywell and suppression pool.

1.3 GOVERNING DOCUMENTS

All governing documents which provide design information, acceptance criteria, and recommended testing practice were used during the ILRT and Bypass Test.

Specifically, the FSAR provided data for Pa, La, drywell, suppression pool free air volume, and the bypass area. Preoperational Test Procedure P-59.2, Rev 2, Containment Integrated Leakage Rate Test, provided test direction and acceptance criteria for the ILRT. Procedure P-59.2 references BN-TOP-1, Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants, for short duration ILRT acceptance criteria. ANSI/ANS 56.8-1981, Containment System Leakage Testing Requirements, provided the necessary technical recommendations for instrument selection and calibration.

1.4 DRYWELL TO SUPPRESSION POOL BYPASS TEST

A successful drywell to suppression pool Bypass Test was conducted at 4.4 psig differential pressure. The test verified that the equivalent bypass area, as specified in the FSAR (Section 6.2.1.1.5.4, Analytical Results), was met and no unexpected leakage paths were found. A detailed description of the Bypass Test as well as volume weighting factors is supplied in Section 3.4.2, Test Phases.

2. SUMMARY

2.1 ACCEPTANCE CRITERIA

All acceptance criteria stated in P-59.2, Rev 2, were met upon successful completion of the ILRT and Bypass Test.

A successful short duration (8-hour) ILRT was conducted on May 23, 1982. All acceptance criteria specified in BN-TOP-1 and ANSI/ANS 56.8-1981 were satisfied. Subsequent to reaching a test pressure of 46.2 psig, all thermal stabilization requirements were met within 4 hours. ILRT data were recorded from 1200 to 2000 on May 23. A 4-hour Verification Test was also conducted from 2130 on May 23 to 0130 on May 24 with an induced leakage rate of 9.95 scfm (Li).

ILRT data verified that total containment leakage rate at Pa is below site Technical Specifications of 1.0 wt.%/day. Total Time calculations indicated a 95% upper confidence limit (UCL) of 0.379 wt.%/day with a calculated leakage rate of 0.287 wt.%/day. Calculated Mass Point indicated a 95% UCL of 0.294 wt.%/day with a calculated leakage rate of 0.287 wt.%/day. Verification Test data for Total Time fell within the upper limit (1.403 wt.%/day) and the lower limit (0.903 wt.%/day) with a calculated leakage rate of 1.034 wt.%/day. Verification Test data for Mass Point fell within the upper limit (1.403 wt.%/day) and the lower limit (0.903 wt.%/day) with a calculated leakage rate of 1.052 wt.%/day.

As required by P-59.2, Rev 2, a K factor was added to the Total Time calculations to account for increases in containment water inventory and exceptions to the valve lineup. The value of the K factor (0.137 wt.%/day) was added to the Total Time UCL yielding an adjusted Total Time 95% UCL of 0.516 wt.%/day. This is within the 0.75 wt.%/day (0.75 La) acceptance criteria.

A successful Bypass Test was completed on May 25, 1982. All acceptance criteria as specified in P-59.2, Rev 2, were satisfied. Specifically, a total bypass equivalent area of no more than .00926 ft^2 is required to meet acceptance criteria. A calculated bypass area of 0.01234 in^2 (.0000857 ft^2) was recorded which is within allowable limits.

2.2 CHRONOLOGY OF MAIN EVENTS

Pressurization for the ILRT began at 1537 on May 22, 1982. Containment pressurization was temporarily suspended at 1945 on May 22 to conduct a thorough search for leaks while at 10 psig. Pressurization resumed at 2338 on the same day. A containment pressure of 61 psia was reached at 0532 on May 23 followed by a 4-hour temperature stabilization. To facilitate stabilization, containment lighting, fans, and chillers were turned off. Temperature stabilization was completed at 1015 and the ILRT was started at 1200 on May 23. A successful ILRT was completed at 2000 on May 23. An induced flow of 9.95 scfm (0.865 wt%/day) was started at 2016. A successful

2.2 CHRONOLOGY OF MAIN EVENTS (CONT'D)

4-hour verification test was performed from 2130 on May 23 to 0130 on May 24. A successful Bypass Test was conducted from 2045 on May 24 to 0045 on May 25. (See page 2-3 for ILRT Pressure Cycle.)

2.3 LISTING OF CALCULATED LEAKAGE RATES

The following summary shows all test results recorded during the ILRT. All raw data from which these values were reduced are on file and exist as permanent plant records.

Test Method	Calculated Leakage wt.%/day	Acceptance Limits wt.%/day	95% UCL wt.%/day
a. ILRT			
Mass Point	0.287	0.75	0.294
Total Time	0.287	0.75	0.379
b. Verification			
Mass Point	1.052	0.903-1.403	N/A
Total Time	1.034	0.903-1.403	N/A

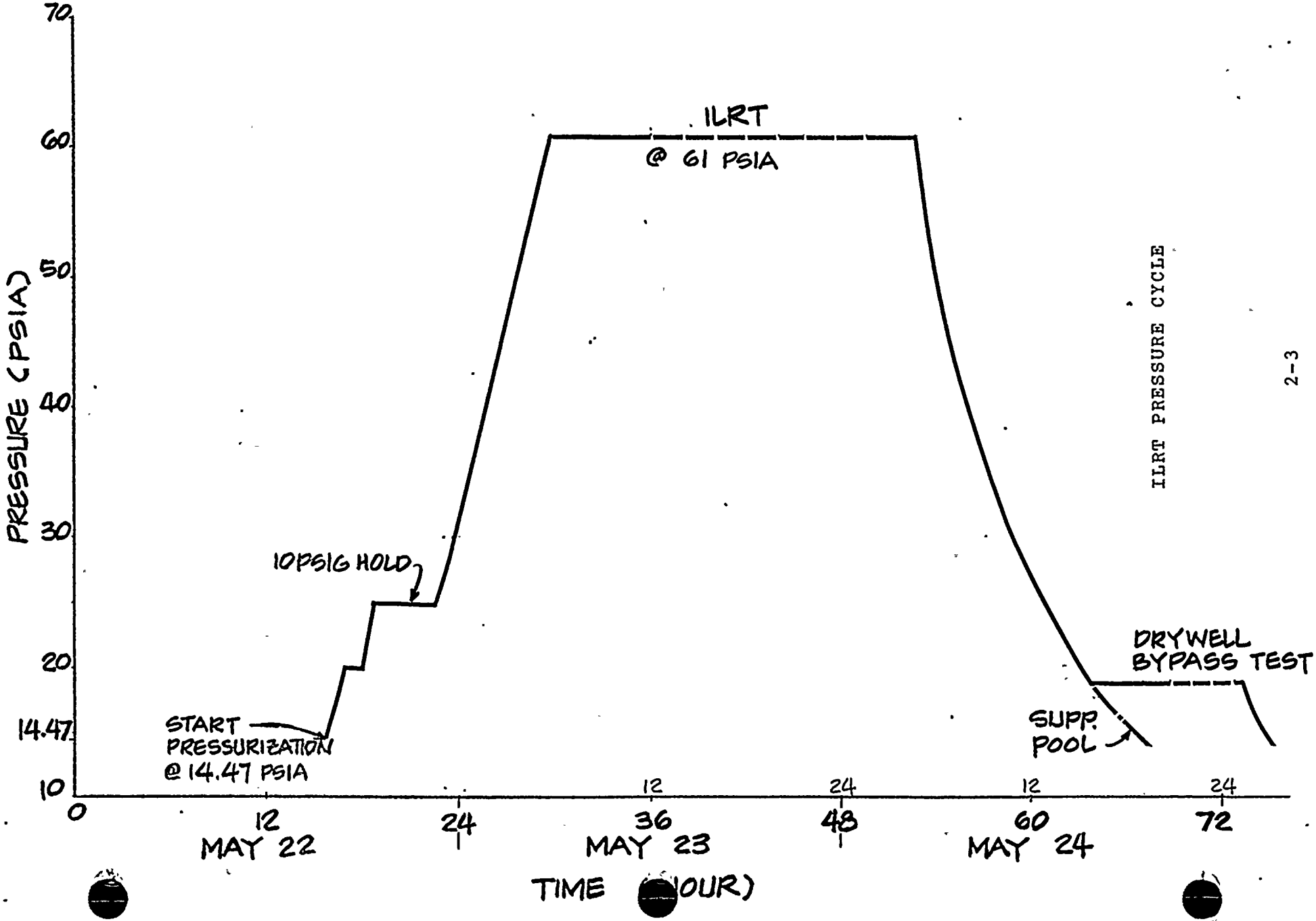
Bypass Test	Calculated Bypass Area (in^2)	95% Confidence Limits (in^2)
Total Time	0.01234	0.00666-0.01801

2.4 TEST EXCEPTIONS

There were two exceptions to the normal performance of the ILRT. First, the NRC requested that the valve lineups on the control rod drive (CRD) system be modified to expose check valves on the charging line to containment pressure and to vent downstream piping to atmospheric pressure. This was accomplished by opening CRD vent valves 46008 and 46017 (see P&ID M-146, Control Rod Drive). The second exception consisted of systems whose isolation valves were not in the normal valve lineups and were exceptions to containment isolation. These systems and their leakages are listed below:

Penetration	System	Leakage
X61-A	ILRT Leak Verification	0.9 ± 16 sccm
X53	Chilled Water Supply	598.6 ± 226 sccm
X54	Chilled Water Return	1315.5 ± 160 sccm
X218	Instrument Gas	9.2 ± 16 sccm
X93	TIP	130.9 ± 16 sccm
		TOTAL = 2473.1 sccm

SSES ILRT PRESSURE VS. TIME CURVE



ILRT PRESSURE CYCLE

2.4 TEST EXCEPTIONS (CONT'D)

In addition to the above two exceptions, an increase of 3/8-in. in suppression pool water level was observed. This reflects an equivalent leakage of 0.126 wt.%/day. The previously mentioned leakages were used to calculate a K factor of 0.137 wt.%/day. The adjusted Total Time 95% UCL plus K factor is 0.516 wt.%/day (0.379 + 0.137).

2.5 CONTAINMENT INSPECTION

As required by P-59.2, Rev 2, a containment inspection was performed prior to the ILRT. This inspection included a thorough walkdown of the drywell and suppression pool, inspection of liner plate, and verification that the lower diaphram containment liner was vented to prevent damage to the diaphram during depressurization. Inspection results indicated that the liner was intact and the containment was ready for the ILRT.

3. DISCUSSION

3.1 PLANT AND CONTAINMENT SYSTEMS

The containment is built to withstand an internal design pressure of 53.0 psig at a maximum temperature of 340°F in the drywell and 220°F in the suppression pool. A steel lined drywell and suppression pool with free air volumes of 239,600 ft^3 and 159,130 ft^3 (low water level) respectively provide the open volume and heat sink required to effectively contain and condense accident steam. Eighty-seven downcomers provide a defined pathway to direct accident steam from the drywell to the condensing water of the suppression pool. Postulated accident drywell pressure of up to 45 psig resulting from a recirculation line break and accident drywell temperature of 290.9°F are within design parameters of the containment.

3.2 ILRT REQUIREMENTS

ILRT requirements for acceptable test conditions are delineated in the FSAR, and federal regulations.

The suppression pool level was adjusted in order that maximum free air volume for the drywell and suppression pool, as specified in the FSAR, satisfy test condition requirements. Those systems which remain water filled during the ILRT were also specified in the FSAR.

Appendix J of 10 CFR 50 specifies those venting and draining requirements necessary to expose isolation valve seats to ILRT pressure. Appendix J also directs plant personnel to close isolation valves in a normal manner, i.e., without excessive exercising of the valve operators or forcing valve closure.

Completion of all local leakage rate tests is required, by procedure, prior to pressurization of the containment. Types B and C tests were completed prior to pressurization and satisfied the .6 La criteria required by 10 CFR 50, Appendix J. A summary of test results is included in Appendix A.

P-59.2, Rev 2, BN-TOP-1, and ANSI 56.8-1981 specify acceptance criteria requirements for data trends, minimal number of sensors, Instrument Selection Guide (see Appendix B for Instrument Selection Guide caculation), and minimal number of data points.

Appendix I to Standard Review Plan 6.2.1.1.C, Containment Systems Branch Steam Bypass for Mark II Containments, was used to revise FSAR Bypass Area Test acceptance criteria.

3.3 SYSTEM STATUS

The valve lineup was arranged in accordance with system status. This system status satisfied the requirements of the FSAR; 10 CFR 50, Appendix J; and site Technical Specifications. Systems that are normally filled with water

and designed to operate under post-LOCA conditions were not purposely vented to the containment atmosphere or to the outside atmosphere but remain water filled during the Type A Test. Although the piping in these sytems are not drained and vented, venting to the primary containment atmosphere does occur since the reactor vessel is vented to the primary containment atmosphere. This is also true for systems having penetrations which are open to the suppression pool. These normally water filled systems are: Reactor Core Isolation Cooling; Residual Heat Removal; Core Spray; and High Pressure Coolant Injection.

Systems not listed above but included in Section 2.4, Test Exceptions, were not vented as required by the FSAR. These systems and their associated local leakage rate test results were added to La as required by 10 CFR 50, Appendix J.

The CRD system was vented so that full ILRT pressure (Pa) was applied against the 185 check valves in the CRD charging lines and down stream vent valves opened to provide a leakage path to the atmosphere. During the ILRT, 17 of these check valves were found to be leaking.

During the ILRT, both the containment ventilation system and the cold water chillers were turned off to prevent any pertubations in the containment atmosphere which might affect leakage rate data.

3.4 TEST DESCRIPTION

3.4.1 Pressurization System

The containment was pressurized by three 1200 scfm oil-free diesel-driven compressors. Outlet air from the compressors was first cooled by a single pass water cooled heat exchanger. Moisture was then removed by a refrigeration unit downstream of the moisture separator. The dry air was pumped into the containment at about 60°F. The pressurization system also included a silencer used during depressurization. The silencer, pressurization skid, and containment were separated by isolation valves HV05916C, HV05916A, and HV05916B as indicated on P&ID M-159, Primary Containment Leakage Rate Testing (ILRT and LLRT).

3.4.2 Test Phases

The ILRT program was divided into 10 phases: initial pressurization to 10 psig; leak search period during 10 lb hold; continued pressurization to Pa; thermal stabilization period; 8-hour ILRT data taking period; induced flow stabilization period; Verification Test; depressurization to Bypass Test pressure; bypass data taking period; final depressurization to atmospheric pressure; and termination of the ILRT program.

Prior to pressurization, level readings were taken for reactor vessel, suppression pool, drywell floor drain sumps, and drywell equipment drain tank.

3.4.2 Test Phases (Cont'd)

The first phase - pressurization to 10 psig - occurred at a rate of approximately 4 psig per hour. This phase lasted for 3 hours with a 1 hour delay when a compressor hose coupling failed at 19.9 psia. Subsequent to completion of repairs, pressurization resumed and containment pressure reached 10 psig 1 hour later. During this phase, drywell cooling fan 1V414A tripped off line at 20 psia.

The second phase of the ILRT program began when the containment reached 10 psig. Leak search teams with preassigned search areas were dispatched to detect any leakage from the primary containment. Any leaks detected were documented in the test director's log book and pressurization was resumed. The most notable leak discovered at this time was coming from the CRD vent. The detected leakage rate measured 3750 ml/min (at 10 psig containment pressure) and reflected the leakage from 17 check valves on the individual CRD charging lines. To reduce loss of water inventory from the reactor vessel, these vent valves were closed and reopened when containment pressure reached Pa.

The third phase of the ILRT program - pressurization to Pa - occurred at a higher pressurization rate of 5.5 psi per hour. At 44.3 psia, fan 1V414A tripped again on thermal overload. The fan was reset 15 minutes after trip and continued to run for an additional 1 hour and 45 minutes until fan current readings were taken and the fans were turned off.

The fourth phase of the ILRT program consisted of containment air thermal stabilization. During this period, all drywell fans and chillers were turned off. All stabilization criteria of both BN-TOP-1 and ANSI/ANS 56.8-1981 were satisfied. Shortly before the end of stabilization period, CRD charging header was vented. Subsequent to venting these valves, a flow of 3700 ml/25 sec (148 ml/sec) was noted. Containment thermal stabilization was terminated 15 minutes later. Subsequent to completing stabilization, preparations began for a 8-hour short duration ILRT.

The fifth phase - ILRT data taking period - began after completion of stabilization. Suppression pool and reactor water levels were checked. The computer containment leakage rate program was loaded. All final preparations and procedural prerequisites were completed prior to data taking. Subsequent to beginning the data taking for the ILRT, leak search teams continued looking for signs of escaping air or water from the primary containment. Leakage through the CRD vents continued at 4000 ml/28 sec (143 ml/sec) and an increase of 3/8-in. in suppression pool water level over 8 hours (equivalent to 0.126 wt.%/day) was recorded. All other leakage paths discovered were noted in the test director's log during this period. At the end of the 8-hour period, ILRT data satisfied all acceptance criteria of BN-TOP-1 and ANSI/ANS 56.8-1981. As required by P-59.2, Rev 2, the K factor was calculated (see Section 3.5.4) and the Verification Test period began. See Section 2.3 and Appendix E for ILRT Summary Data.

The sixth and seventh phases of the ILRT program occurred during verification. During these phases, a 9.95 scfm (0.865 wt.%/day) flow was induced to verify proper ILRT instrument performance. Induced flow and containment

3.4.2 Test Phases (Cont'd)

atmosphere were allowed to stabilize during phase six. During phase seven, verification test data were recorded and analyzed for 4 hours. Subsequent to analysis the verification test data satisfied all acceptance criteria as defined in BN-TOP-1 and ANSI/ANS 56.8-1981. See Section 2.3 and Appendix E for Verification Summary data.

The eighth phase of the ILRT program was depressurization from Pa to Bypass Test pressure. No restraint was placed on the depressurization rate since all vent plugs had been removed from the drywell floor diaphram steel liner. Initial depressurization occurred at a rate of 7.5 psi/hr. The depressurization occurred at a slower rate from 40 psia to 35 psia (5 psia/hr). At 19 psia drywell pressure, HV15722 was closed to isolate the drywell from the suppression pool. The suppression pool was allowed to depressurize for an additional 3-1/2 hours until 14.6 psia was reached. Once this occurred, the suppression pool was isolated by closing HV15725 and HV15721. The differential pressure between the drywell and the suppression pool was recorded at 4.4 psi.

The ninth phase of the ILRT program was the performance of the Bypass Test. Since Bypass Area Test data were entered and reduced by the GE computer, information was hand entered on the portable terminal. Prior to beginning the Bypass Test, new volume fractions (see below) were calculated for the drywell and suppression pool. After the computer program was updated, raw data were entered and equivalent bypass area calculated after 4 hours of data collection.

Drywell Volume Fractions

Sensor	Volume Fraction
RTD 7	0.077
RTD 8	0.077
RTD 9	0.077
RTD 10	0.077
RTD 11	0.036
RTD 12	0.068
RTD 13	0.068
RTD 14	0.068
RTD 15	0.068
RTD 16	0.056
RTD 17	0.056
RTD 18	0.056
RTD 19	0.056
RTD 20	0.056
RTD 21	0.023
RTD 22	0.025
RTD 23	0.027
RTD 24	0.029
Dewcell 5	0.346
Dewcell 6	0.273
Dewcell 7	0.163
Dewcell 8	0.163
Dewcell 9	0.055

Suppression Pool Volume Fractions

Sensor	Volume Fraction
RTD 1	0.189
RTD 2	0.189
RTD 3	0.189
RTD 4	0.055
RTD 5	0.189
RTD 6	0.189
Dewcell 1	0.250
Dewcell 2	0.250
Dewcell 3	0.250
Dewcell 4	0.250

3.4.2 Test Phases (Cont'd)

The tenth and final phase of the ILRT program was depressurization of the drywell and suppression pool to atmospheric pressure. (See page 2-3 for ILRT Pressure Cycle.)

3.4.3 Instrumentation, Data, and Calculations

ILRT test data were gathered through sensors which were placed within the containment and a data acquisition system (see page 3-6). The data acquisition system received these inputs and fed them into a mini-computer which reduced the raw data to containment leakage.

3.4.3.1 Instrumentation

ILRT instrumentation was chosen for its stability and dependability. Instrumentation used during the ILRT satisfied all Instrument Selection Guide requirements for a short duration test (see Appendix B, Instrument Selection Guide). The instrumentation listed below performed satisfactorily during the test. High suppression pool moisture conditions, however, did require some adjustment during the later part of the Bypass Test.

a. Absolute Pressure (2 channels)

Mensor Quartz Manometer, Model No. 10100-001
PIT-05913 Capsule S/N 2699; gage S/N 1184
PIT-05914 (spare) Capsule S/N 1920; gage S/N 1182

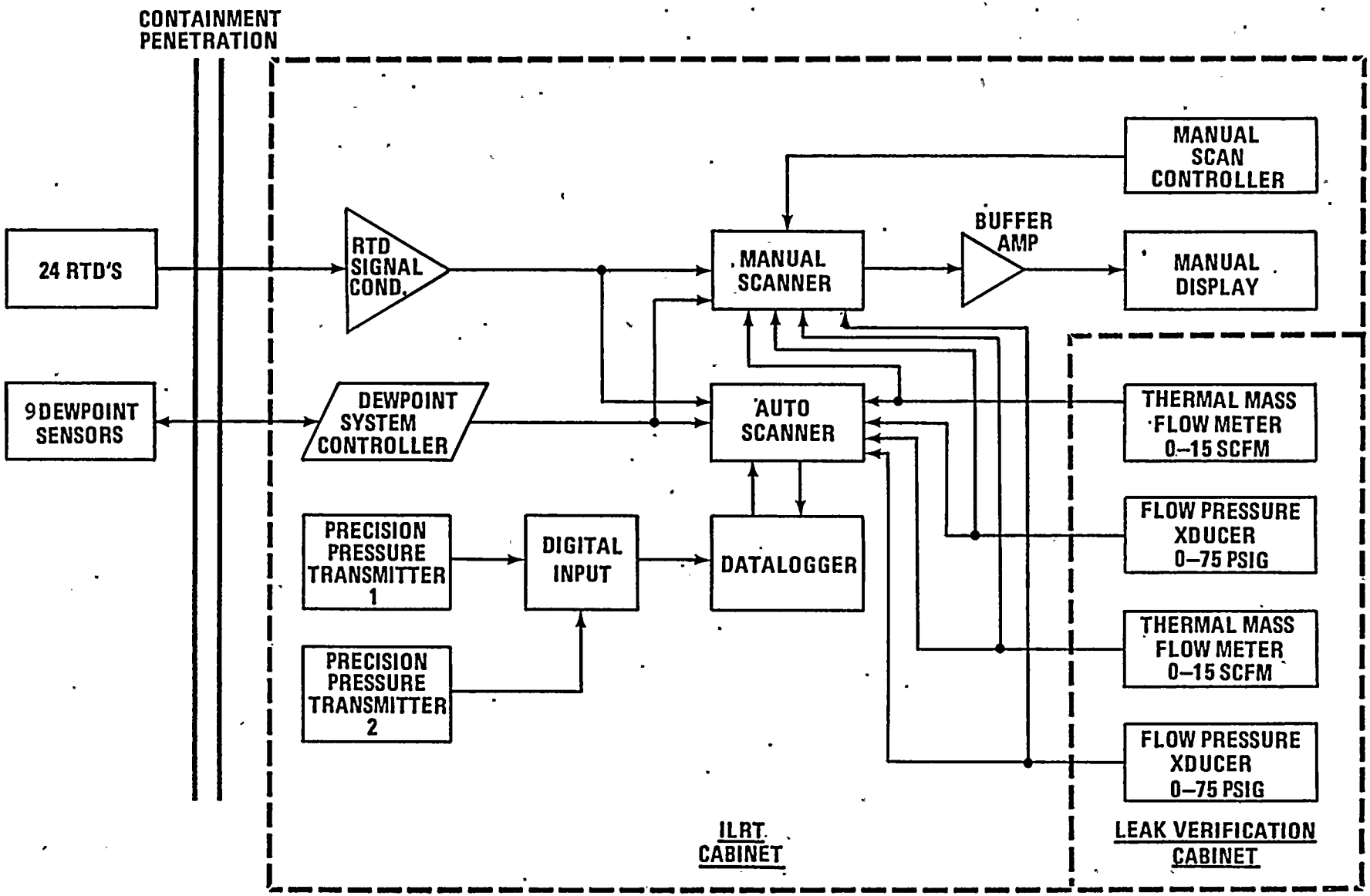
Range:	0-100 psia
Accuracy:	± 0.015% reading
Sensitivity:	± 0.001% full scale
Repeatability:	± 0.0005% full scale
Resolution:	0.001 psia
Calibration Date:	April 1982

b. Drybulb Temperature RTD (24 sensors)

Rosemount Resistance Temperature Detector Model No. 786517

Element:	Platinum
Resistance:	Ro = 100 ohms @ 32°F
Temperature Range:	60°F to 120°F
Accuracy:	± 0.5°F
Sensitivity:	± 0.02°F
Repeatability:	0.001°F
Resolution:	0.001°F
Calibration Date:	April 1982

ILRT DATA ACQUISITION SYSTEM



3.4.3.1 Instrumentation (Cont'd)

c. Dewpoint Temperature (9 sensors)

EG&G Inc., Model No. 660 Dewpoint Hygrometer

Accuracy:	± 0.76°F
Sensitivity:	± 0.2°F
Repeatability:	0.008°F
Resolution:	0.001°F from 32°F to 120°F
Calibration Date:	April 1982

d. Verification Flow Device (1 channel)

Volumetrics Thermal Mass Flow Meter, TSI Model No. 2013, S/N 1578

Range:	32°F to 120°F
Accuracy:	± 1.0% full scale
Sensitivity:	± 0.4% full scale
Repeatability:	± 0.01 scfm
Resolution:	0.01 scfm

Rotometer (backup)

Accuracy:	± 1.0% full scale
Sensitivity:	± 1.0% full scale
Repeatability:	± 0.04 scfm
Resolution:	0.13 scfm

The two flow measuring devices used for the verification portion of the ILRT were piped in series to provide redundant instrumentation. The first sensor was a mass flow element with calibrated circuitry which served as the primary element used for the Verification Test. The second sensor was a rotometer (0-10 scfm, Brooks Model 500-9;10A3500, Serial No. 663) which was used solely as a backup.

3.4.3.2 Sensor Location and Volume Fraction (see Table 1)

A mathematical model of the containment was developed using elevation and plan view construction drawings to define containment subvolume boundaries. Subsequent to subvolume boundary definition, volume fractions were assigned to each subvolume in the drywell and suppression pool. Sensors were then placed as near to the centroid of each subvolume as possible to detect changes in containment atmospheric conditions. Table 1 indicates sensor location relative to volume fraction assignment, while the table in Appendix C provides boundary definitions for each subvolume. Since the ILRT was performed with all ventilation off, sensors were also placed with considerations given to air stratification and slight thermal updrafts caused by natural convection. This was especially true for those sensors in the suppression pool where large open vertical spaces existed.

Sensor placement which considered the three criteria of nearness to subvolume centroid, air stratification, and natural convection occurring in large open areas provided stable and accurate representation of containment atmospheric conditions during the ILRT. Sensors placed in accordance to the above considerations and operating without the disturbance of containment ventilation or chiller operation yielded highly reliable short duration test data.

TABLE 1

CONTAINMENT TEMPERATURE AND DEWPOINT SENSOR LOCATION AND VOLUME FRACTIONS (ILRT)

RTD	Instrument No.	Elevation (ft)	Azimuth (degrees)	Distance from Center (ft)	Containment Volume Fraction	J-Box
1	TE05901A	690	002	32	0.074	TB0701
2	TE05901B	675	060	28	0.074	TB0695
3	TE05901C	690	120	32	0.074	TB0696
4	TE05901D	675	180	5	0.022	TB0702
5	TE05901E	675	250	32	0.074	TB0697
6	TE05901F	690	300	32	0.074	TB0698
7	TE05902A	709	013	29	0.047	TB0691
8	TE05902B	711	085	22	0.047	TB0600
9	TE05902C	713	180	31	0.047	TB0685
10	TE05902D	712	290	30	0.047	TB0694
11	TE05902E	712	0	2	0.022	TB0540
12	TE05903A	727	350	26	0.041	TB0693
13	TE05903B	725	90	25	0.042	TB0706
14	TE05903C	728	170	25	0.041	TB0689
15	TE05903D	727	280	26	0.042	TB0690
16	TE05904A	747	020	24	0.034	TB0686
17	TE05904B	746	165	27	0.034	TB0687
18	TE05904C	748	250	22	0.034	TB0699
19	TE05905A	775	210	17	0.034	TB0692
20	TE05905B	775	010	18	0.034	TB0684
21	TE05906A	784	270	20	0.014	TB0705
22	TE05906B	785	100	20	0.015	TB0728
23	TE05907A	799	090	8	0.016	TB0683
24	TE05907B	798	270	8	0.017	TB0727

ME	Instrument No.	Elevation (ft)	Azimuth (degrees)	Distance from Center (ft)	Containment Volume Fraction	J-Box
1	ME05901A	690	060	32	0.098	TB0695
2	ME05901B	690	240	32	0.098	TB0697
3	ME05901C	690	120	32	0.098	TB0696
4	ME05901D	690	300	32	0.099	TB0698
5	ME05902A	712	290	30	0.210	TB0694
6	ME05903	728	350	26	0.166	TB0693
7	ME05904	748	250	22	0.099	TB0699
8	ME05905	756	180	19	0.099	TB0692
9	ME05906	799	090	8	0.33	TB0705

3.4.3.2 Data System and Recording Intervals

The Data Acquisition System (DAS) for the containment integrated leakage rate test, as described in FSAR Table 6.2-70, consisted basically of a multiplexer, scanner, programmer, and coupler capable of an automatic periodic scan mode which was programmed to scan all sensors every 15 minutes.

An extremely tight calibration band was maintained during calibration because of the individual sensor signal conditioning cards of the DAS. These cards (which had adjustable settings for zero and span) allowed for direct one-to-one readout of containment sensors. No calibration curves were required for RTD drybulb temperature or dewcell temperature. Data output from the DAS appeared in two forms: a printed hard copy and LED visual display.

Fifteen minute data scans were chosen to provide frequent data inputs without accumulating excessive ILRT data. This satisfied all data requirements of BN-TOP-1 and ANSI/ANS 56.8-1981.

3.4.3.3 Computations

Raw data from containment sensors enter directly into the dedicated PDP-11 computer from the DAS by means of the RS-232 board which provide a DAS to computer interface. The data are reduced by Mass Point and Total Time computational methods setup in a Fortran format (see Appendix I). ILRT computations reduced the raw data at 15 minute intervals and two hard copies of the raw data were available subsequent to each scan. One copy was printed on the DAS; the second copy was printed on the PDP-11 computer printer. Both of these records have been maintained on site as permanent plant records.

Data reduction for the Bypass Test was performed by a portable terminal hooked into a GE main-frame computer by telephone modem. Raw data were typed into the terminal, reduced by the remote GE computer, and printed out on the terminal's self-contained line printer.

3.4.4 Significant Test Events

The most significant event noted was the opening of CRD vent valves. These valves are normally not open when performing an ILRT on GE BWR containments. The reason for this is that during normal plant operation, CRD system pressure is much higher than reactor pressure. Since the CRD pumps would normally be operational during an accident situation, no leakage would occur outside the containment from the check valves in question. During the ILRT, however, the test director ordered the vent valves opened. The rationale for opening these vents was that the section of piping which contains these check valves is not Q class or missile protected. Should scram inlet valve XV126 be opened during an accident and a break occur between the CRD pumps and the charging water header check valves, these check valves would be the only means of containment isolation. To verify that no significant amount of leakage is passing through the CRD check valves, the downstream vent valves on the scram discharge header, drive water header, and charging water header were opened after completing the Verification Test.

3.4.4 Significant Test Events (Cont'd)

The effect of opening the vents to allow leakage through the appropriate check valves was not measurable with ILRT instrumentation. (See Section 3.5.4, Special Calculations.)

3.5 TEST RESULTS

3.5.1 Stabilization

All stabilization criteria in BN-TOP-1 and ANSI/ANS 56.8-1981 were satisfied prior to analyzing leakage rate data for the short duration ILRT. Appendix D, Verification of Stabilization, provides data which verify that the rate of temperature change during the 4-hour stabilization period was within acceptable limits with data taken at 15 minute intervals. The temperatures used to calculate rate of temperatures change were the weighted average containment temperatures taken from the 15 minute scans. To aid containment stabilization, all ventilation fans, containment coolers, and lights were turned off once the pressure of Pa had been reached. All stabilization criteria were satisfied after a 4-hour period and the 8-hour ILRT data collection began.

3.5.2 Calculated + Penalty and Acceptance Leakage Rates

The values for the acceptable leakage rate, per site Technical Specifications, and calculated leakage rates were presented earlier in this report. Specific values assigned as penalties have been developed in Section 3.5.4, Special Calculations. Included in the calculation of the K factor is equivalent leakage which reflects increases in containment water inventory and some local leakage rate test results.

The equivalent leakage which comes from increases in sump levels and suppression pool levels has been added to the calculated leakage rate as a penalty. Increases in water inventory may mask real air leakage from the containment. For this reason, it is conservative to calculate the equivalent change in containment air mass resulting from an increase in water inventory and add this value to calculated leakage rate. An accurate measurement in suppression pool level was taken by connecting a piece of clear plastic tubing between the upper and lower legs of one of the suppression pool level instrumentation lines and noting the change in the hose water level. The change in the pool level (3/8 in.) was then used in the calculation of the K factor.

3.5.3 Verification Flow

Subsequent to collecting 8 hours of leakage rate data and calculating containment leakage, an induced flow was initiated to verify that ILRT instrumentation was working correctly. A flow equal to approximately La was induced after a stabilization period was completed. Verification flow data met all acceptance criteria of BN-TOP-1 and ANSI/ANS 56.8-1981. The induced flow rate and associated new calculated leakage rate as indicated in Section 2.3, Listing of Calculated Leakage Rates, were measured by a mass flow meter with an in-line rotameter as backup. Both instruments were recently calibrated with standards traceable to the National Bureau of Standards (NBS).

3.5.4 Special Calculations

As mentioned in Section 3.4.4, Significant Test Events, selected vents on the CRD system were opened to allow leakage through check valves located on the charging water header, scram discharge header, and drive water header. The vents were opened after the completion of the Verification Test and additional test data recorded. Although the vent on the charging water header was opened throughout the entire test, special calculations were performed after the remainder of the valves were opened. The opening of the additional vents increased flow by one half gpm (equivalent to .006 wt.%/day.

It should be noted that measured containment leakage appeared lower after the vents were opened. This leakage appears lower because the leakage was trending downward during the 8-hour ILRT (see Appendix E Trend Report). The Lam recorded for that period when the vents were open reflects the leakage normally expected if the trend report were extrapolated to the time when the line was vented.

Although this data are not considered ideal, they do provide a reliable indication that gross leakage was not caused by opening the vents.

The table below shows that the opening of these additional vents did not significantly affect ILRT results.

Methods	ILRT Results from Vents Shut wt.%/day	ILRT Results with Vents Open wt.%/day
Mass Point	Lam = 0.287 95% UCL = 0.294	Lam = 0.243 95% UCL = 0.260
Total Time	Lam = 0.287 95% UCL = 0.375	Lam = 0.253 95% UCL = 0.362

Special calculations were also performed to derive the K factor as mentioned in Section 2.4, Test Exceptions. The K factor when expressed in algebraic form is written as follows:

$K = (A + B)$ wt.%/day

where A = Total Type C leakage rate for penetrations not in normal ILRT lineup expressed in wt.%/day

B = Change in suppression pool water level (B_1), + change in equipment drain sump tank (B_2) wt.%/day

The calculation of A + B is as follows:

A^1 = 2473.1 sccm

La = 1.000 wt.%/day

= 318435 sccm

3.5.4 Special Calculations (Cont'd)

$$A = \frac{A}{La}^{1} = \frac{2473.1 \text{ sccm}}{318435 \text{ sccm}} = 0.008 \text{ wt.\%/day}$$

Change of suppression pool water level = 3/8 in. in 8 hours

$$B_1 = \frac{3}{8} \text{ in.} \times \frac{24}{8} \frac{\text{hr/day}}{\text{hr}} \times \frac{445.59 \text{ cu ft/in.}}{398{,}730 \text{ cu ft}} \times 100\%$$

$$= 0.126 \text{ wt.\%/day}$$

Change of equipment drain sump tank in 30 hours

Volume of tank = 120 cu ft
Percent change in volume = 14%
Total change = 0.14 x 120 = 16.8 cu ft in 30 hours

$$B_2 = \frac{16.8 \text{ cu ft} \times 24 \text{ hr/day}}{30 \text{ hr}} \times \frac{100\%}{398{,}730 \text{ cu ft}} = 0.003 \text{ wt.\%/day}$$

K = 0.137 wt.%/day

Adjusted Total Time 95% UCL = 0.379 + 0.1374 =
0.516 wt.%/day < .75 La

The sum of changes in suppression pool level, equipment drain tank level, and leakage for penetrations not in normal ILRT lineup is equivalent containment leakage of 0.137 wt.%/day (0.126 wt.%/day + 0.003 wt.%/day + 0.008 wt.%/day). The adjusted Total Time 95% UCL = 0.379 wt.%/day + 0.137 wt.%/day = 0.516 wt.%/day. Since the adjusted total containment leakage is less than .75 La (0.516 < 0.750), Lam is within site Technical Specifications.

3.5.5 Printed Reports and Raw Data

The printed reports and raw data for ILRT Total Time and Mass Point are included in Appendix E. These reports not only include final leakage rate test results but also all information necessary to satisfy BN-TOP-1 acceptance criteria. Specific information required by BN-TOP-1 ILRT acceptance criteria requires a calculated 95% UCL, trend report, and at least 20 data points taken at approximately equal intervals (no interval greater than 1 hour).

Appendix E also includes the printed reports and raw data for the Verification Test and Bypass Test. All acceptance criteria required for these two ILRT program test phases were met and are documented on the appropriate printed reports.

3.5.6 Plots

The plots for containment air mass, temperature, pressure, and vapor pressure are provided in Appendix F. These plots are furnished for both the 8-hour ILRT and the 4-hour Verification Test. The plots indicate containment atmospheric conditions were uniform and stable throughout the ILRT and the Verification Test.

3.6 INSTRUMENTATION AND EQUIPMENT

3.6.1 Instrumentation Type, Make Model, and Number Specifications

The ILRT instrumentation listed in Appendix G, ILRT Instrumentation, represents state-of-the art containment leakage rate testing equipment. Since this is an integrated system from sensor to display, the signal condition boards identification numbers have been listed. These boards allow the I&C Technician to "fit" the sensor curve in such a manner as to allow a one-to-one calibration. Subsequent to adjusting the trimpots on these cards the DAS readout displayed the actual containment atmospheric conditions. Additional details regarding ILRT instrumentation, which are not provided in 10 CFR 50, Appendix J, can be found in FSAR Table 6.2-20.

3.6.2 Calibration

The calibration of ILRT instrumentation met calibration recommendations of ANSI/ANS 56.8-1981, Section 4.3.1, Instrumentation for Type A Tests. Calibration for instrumentation was performed, in part, by the National Bureau of Standards, Susquehanna I&C personnel, and the supplier of the instrumentation system. The final report on the calibration is supplied in Appendix H, Report on Servicing and Calibration of the Integrated Leakage Rate Test System.

3.6.3 DAS/Computer

Raw sensor data were periodically scanned and fed directly through an RS-232 interface into a PDP-11 computer. The DAS, which performed 15 minute scans, scanned all sensor channels and produced a paper tape after each scan. This paper tape provided a hard copy of raw data and the time of each scan. Since signal conditioning cards were adjusted to match the RTD and dewcell sensor characteristic curve, a one-to-one calibration was established between sensor and DAS output.

A detailed description of the computer and program is provided in Section 3.7, Computational Techniques - Program Description, and Appendix I, Bechtel ILRT Computer Program.

3.6.4 Instrument/Equipment S/N List

All appropriate information on the instrumentation used during the ILRT is supplied in Appendix G, ILRT Instrumentation. The instrumentation supplied in this appendix meets the proper calibration period recommended by ANSI/ANS 56.8-1981 and all calibration data are retained as plant records at the site.

3.7 COMPUTATIONAL TECHNIQUES - PROGRAM DESCRIPTION

The computational techniques and ILRT program description are provided in Appendix I, Bechtel ILRT Computer Program. Appendix I is a description of the Total Time and Mass Plot calculation methods used during the ILRT. Although Mass Point was calculated along with Total Time, the Computational Techniques and Trend Reports associated with Total Time calculations and data reduction were used to satisfy BN-TOP-1 acceptance criteria for short duration testing.

4.0 CONCLUSIONS

The short duration ILRT was a successful containment leakage rate test which reflected a high degree of preparation, a well-organized LLRT program, stable containment atmospheric conditions, and reliable instrumentation. All leakage rate penalities were documented and applied against Lam. Test results verify that containment leakage is below site Technical Specifications requirements and 10 CFR 50, Appendix J, requirements. This unit meets all acceptance criteria and can provide a reliable enclosure to support full power operation at rated levels.

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE B TESTS

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Leakage Rate Hydraulic (cc/min)	Verified by Name /Date
5B-1	X-1	Equipment access hatch	3.5 ± 16	N/A	LCC 5/14/82
6B-1	X-2	Equipment access hatch with personnel lock	477.5 ± 162**	N/A	LCC 5/21/82
6B-2	X-2	Personnel lock barrell	**	N/A	LCC 5/2 1/82
6B-3	X-2	Personnel lock inner door	**	N/A	LCC 5/2 1/82
6B-4	X-2	Personnel lock outer door	**	N/A	LCC 5/2 1/82
7B	X-4	Drywell head access manhole	1.4 ± 16	N/A	LCC 4/3 0/82
8B	-	Drywell head	4.0 ± 16	N/A	LCC 5/1 4/82
10B	X-6	CRD removal hatch	0 ± 16	N/A	LCC 5/1 4/82
13B	X-35A*	TIP drive	3.8 ± 23	N/A	LCC 4/3 0/82
14B	X-35C*	TIP drive	2.3 ± 23	N/A	LCC 4/3 0/82
16B	X-35E*	TIP drive	3.0 ± 23	N/A	LCC 4/3 0/82
17B	X-35F*	TIP drive	4.3 ± 23	N/A	LCC 4/3 0/82
2B	X-100A	Neutron monitoring	1.6 ± 16	N/A	LCC 4/3 0/82
4B	X-100B	Neutron monitoring	Leakage included in X-104B	N/A	LCC 4/3 0/82
2B	X-100C	Neutron monitoring	Leakage included in X-100A	N/A	LCC 4/3 0/82

*Penetration requires both type B and type C test. Leakage rate listed is total penetration path leakage.

**Leakage rate listed for (6B-1) is the maximum of (6B-3 or 6B-4) plus (6B-2) plus (6B-1).

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE B TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Hydraulic (cc/min)	Verified by Name /Date
4B	X-100D	Neutron Monitoring	Leakage included in X-1043	N/A	LCC 4/3 0/82
3B	X-101A	M.V. power	Leakage included in X-101E	N/A	LCC 4/3 0/82
1B	X-101B	M.V. power	13.7 ± 16	N/A	LCC 4/3 0/82
3B	X-101C	M.V. power	Leakage included in X-101E	N/A	LCC 4/30/82
1B	X-101D	M.V. power	Leakage included in X-101D	N/A	LCC 4/30/82
3B	X-101E	M.V. power	109.2 ± 16	N/A	LCC 4/30/82
1B	X-101F	M.V. power	Leakage included in X-101B	N/A	LCC 4/30/82
3B	X-102A	Low level signal/ temperature	Leakage included in X-102A	N/A	LCC 4/30/82
1B	X-102B	Low level signal/ temperature	Leakage included in X-101B	N/A	LCC 4/30/82
2B	X-103A	Low level signal/ temperature	Leakage included in X-100A	N/A	LCC 4/30/82
4B	X-103B	Low level signal tempeature	Leakage included in X-104B	N/A	LCC 4/30/82
2B	X-104A	RPIS	Leakage included in X-100A	N/A	LCC 4/30/82
4B	X-104B	RPIS	9.5 ± 16	N/A	LCC 4/30/82
2B	X-104C	RPIS	Leakage included in X-100A	N/A	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE B TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Hydraulic (cc/min)	Verified by Name /Date
4B	X-104D	RPIS	Leakage included in X-104B	N/A	LCC 4/30/82
3B	X-105A	Low voltage power	Leakage included in X-101E	N/A	LCC 4/30/82
1B	X-105B	Low voltage power	Leakage included in X-101B	N/A	LCC 4/30/82
3B	X-105C	Low voltage power	Leakage included in X-101E	N/A	LCC 4/30/82
1B	X-105D	Low voltage power	Leakage included IN X-101B	N/A	LCC 4/30/82
3B	X-106A	Low voltage control	Leakage included in X-101E	N/A	LCC 4/30/82
1B	X-106B	Low voltage control	Leakage included in X-101B	N/A	LCC 4/30/82
3B	X-106C	Low voltage control	Leakage included in X-102A	N/A	LCC 4/30/82
1B	X-106D	Low voltage control	Leakage included in X-101B	N/A	LCC 4/30/82
1B	X-107	Low voltage power	Leakage included in X-101B	N/A	LCC 4/30/82
3B	X-108	Low voltage power	Leakage included in X-102A	N/A	LCC 4/30/82
11B	X-200A	Access hatch	2.7 $\pm$ 16	N/A	LCC 4/30/82
12B	X-200B	Access hatch	0.8 $\pm$ 16	N/A	LCC 4/30/82
4B	X-300	Low voltage control	Leakage included in X-104B	N/A	LCC 4/30/82
2B	X-301	Low voltage control	Leakage included in X-100A	N/A	LCC 4/30/82

Total Type B Leakage 639.8 $\pm$ 1173 (sccm)

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Hydraulic (cc/min)	Verified by Name /Date
1C	X-7A	Main steam	2382.7 ± 1600	N/A	LCC 4/30/82
2C	X-7B	Main steam	2843.7 ± 1600	N/A	LCC 4/30/82
3C	X-7C	Main steam	503.5 ± 161	N/A	LCC 5/14/82
4C	X-7D	Main steam	1234.5 ± 160	N/A	LCC 4/30/82
5C	X-8	Main steam line drain	2.8 ± 16	N/A	LCC 4/30/82
6C	X-9A	Feedwater	3282.7 ± 1600	N/A	LCC 5/14/82
6C, 7C	X-9B	Feedwater	3 ± 23	N/A	LCC 4/30/82
8C	X-10	RCIC turbine steam	122.9 ± 23	N/A	LCC 5/14/82
9C	X-11	HPCI turbine steam	202 ± 23	N/A	LCC 5/14/82
10C	X-12	RHR shutdown supply	3670 ± 1600	N/A	LCC 5/14/82
11C	X-13A	RHR shutdown return	1663.3 ± 160	N/A	LCC 5/14/82
12C	X-13B	RHR shutdown return	2835 ± 1600	N/A	LCC 5/14/82
13C	X-14	RWCU supply	N/A	81.0 ± 1.27	LCC 4/30/82
14C	X-16A	Core spray	14445 ± 1600	N/A	LCC 5/14/82
15C	X-16B	Core spray	1387 ± 160	N/A	LCC 5/14/82
16C	X-17	RPV head spray	3155 ± 1600	N/A	LCC 4/30/82
17C	X-19	Instrument gas	82 ± 23	N/A	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Leakage Rate Hydraulic (cc/min)	Verified by Name /Date
18C	X-21	Instrument gas	2.7 ± 27	N/A	LCC 4/30/82
19C	X-23	Closed cooling water supply	6.2 ± 16	N/A	LCC 4/30/82
20C	X-24	Closed cooling water return	6.2 ± 16	N/A	LCC 4/30/82
21C	X-25, 201A	Purge supply	2053 ± 1600	N/A	LCC 4/30/82
22C	X-26	Purge exhaust	398 ± 161	N/A	LCC 4/30/82
47C	X-31B	Mini purge to recirculate pump B	44 ± 23	N/A	LCC 4/30/82
23	X-39A	Containment spray	66.7 ± 23	N/A	LCC 4/30/82
24C	X-39B	Containment spray	54 ± 23	N/A	LCC 4/30/82
25C	X-41	Instrument gas	29.9 ± 27	N/A	LCC 4/30/82
26C	X-42	Standby liquid control	N/A	1.8 ± .9	LCC 5/14/82
28C	X-53	Chilled water supply	598.6 ± 226	N/A	LCC 4/30/82
29C	X-54	Chilled water return	1315.5 ± 160	N/A	LCC 4/30/82
30C	X-55	Chilled water supply	95 ± 16	N/A	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Hydraulic (cc/min)	Verified by Name /Date
31C	X-56	Chilled water return	262.5 ± 161	N/A	LCC 4/30/82
32C	X-60A	Oxygen sample	217 ± 160	N/A	LCC 4/30/82
33C	X-88A	Oxygen sample	1.1 ± 16	N/A	LCC 4/30/82
44C	X-88A	Oxygen sample	0.9 ± 16	N/A	LCC 4/30/82
48C	X-60A	Mini purge to recirculate pump A	0.0 ± 16	N/A	LCC 4/30/82
36C	X-61A	Demineralized water	1.2 ± 16	N/A	LCC 4/30/82
27C	X-61A	ILRT Leak Verification	0.9 ± 16	N/A	LCC 5/14/82
37C	X-72A	Liquid radwaste	2090 ± 1600	N/A	LCC 4/30/82
38C	X-72B	Liquid radwaste	673.8 ± 160	N/A	LCC 4/30/82
39C	X-80C	Oxygen analyzer	1.2 ± 16	N/A	LCC 4/30/82
40C	X-80C	Oxygen analyzer	1.3 ± 16	N/A	LCC 4/30/82
41C	X-80C	Oxygen analyzer/ nitrogen supply	1010 ± 160	N/A	LCC 4/30/82
42C	X-85A	Chilled water to recirculate pumps	3263 ± 1600	N/A	LCC 4/30/82
43C	X-85B	Chilled water to recirculate pumps	449.5 ± 160	N/A	LCC 4/30/82
44C	X-86A	Chilled water to recirculate pumps	2.7 ± 16	N/A	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Leakage Rate Hydraulic (cc/min)	Verified by Name /Date
45C	X-86B	Chilled water to recirculate pumps	450.8 ± 160	N/A	LCC 4/30/82
46C	X-87	Instrument gas	302.5 ± 161	N/A	LCC 4/30/82
49C	X-93	TIP instrument gas	53.7 ± 23	N/A	LCC 4/30/82
50C	X-202	Purge exhaust	350 ± 161	N/A	LCC 4/30/82
51C	X-203A	RHR pump suction	N/A	91.8 ± .7	LCC 4/30/82
52C	X-203B	RHR pump suction	N/A	43.2 ± .9	LCC 4/30/82
53C	X-203C	RHR pump suction	N/A	0.0 ± .9	LCC 4/30/82
54C	X-203D	RHR pump suction	N/A	136.8 ± .9	LCC 4/30/82
55C	X-204A	RHR pump test line	1297.0 ± 161	N/A	LCC 5/14/82
56C	X-204B	RHR pump test line	746.2 ± 161	N/A	LCC 5/14/82
55C	X-205A	Containment spray	Leakage included in X-204A	N/A	LCC 5/14/82
56C	X-205B	Containment spray	Leakage included in X-204B	N/A	LCC 5/14/82
57C	X-206A	Core spray pump suction	N/A	9 ± .9	LCC 4/30/82
58C	X-206B	Core spray pump suction	N/A	60 ± .9	LCC 4/30/82
59C	X-207A	Core spray pump test	N/A	60 ± .9	LCC 4/30/82
60C	X-207B	Core spray pump test	N/A	9 ± .9	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Leakage Rate Hydraulic (cc/min)	Verified by Name /Date
61C	X-208B	Core spray pump recirculate	N/A	0.0 ± .9	LCC 4/30/82
62C	X-208B	Core spray pump recirculate	N/A	6.3 ± .9	LCC 5/14/82
63C	X-209	HPCI pump suction	N/A	27 ± .9	LCC 5/14/82
64C	X-210	HPCI turbine exhaust	N/A	6.3 ± 1.27	LCC 5/14/82
65C	X-211	HPCI pump recirculate	N/A	9.0 ± 1.27	LCC 4/30/82
66C	X-214	RCIC pump suction	N/A	10.8 ± 1.27	LCC 5/14/82
67C	X-215	RCIC turbine exhaust	N/A	0.0 ± 1.27	LCC 4/30/82
68C	X-216	RCIC	N/A	14.4 ± 1.27	LCC 4/30/82
69C	X-217	RCIC vacuum pump discharge	N/A	0.0 ± .9	LCC 4/30/82
70C	X-218	Instrument gas	9.2 ± 16	N/A	LCC 5/14/82
71C	X-221A	Oxygen analyzer	3.3 ± 23	N/A	LCC 4/30/82
72C	X-221B	Oxygen analyzer	4.6 ± 23	N/A	LCC 4/30/82
73C	X-226A	RHR recirculate	N/A	0.0 ± 1.27	LCC 5/14/82
74C	X-226B	RHR recirculate	N/A	1.8 ± 1.27	LCC 4/30/82
75C	X-238A	Oxygen analyzer	5 ± 23	N/A	LCC 4/30/82
76C	X-238B	Oxygen analyzer/ nitrogen/supply	3.8 ± 23	N/A	LCC 4/30/82
77C	X-243	Suppression pool cleanup and drain	N/A	10.8 ± 1.27	LCC 4/30/82

APPENDIX A

SUMMARY OF TYPES B AND C TEST RESULTS

LOCAL LEAKAGE RATE TYPE C TESTS (CONT'D)

LLRT Package	Penetration	Description	Leakage Rate Pneumatic (sccm)	Hydraulic (cc/min)	Verified by Name /Date
78C	X-244	HPCI vaccum breaker	220.6 ± 1.61	N/A	LCC 4/30/82
79C	X-245	RCIC vacuum breaker	9.0 ± 162	N/A	LCC 4/30/82
80C	X-246A	RHR relief valve discharge	233.2 ± 162	N/A	LCC 4/30/82
81C	X-246B	RHR relief valve discharge	48.7 ± 32	N/A	LCC 4/30/82

Total Type C Pnuematic Leakage 54202.1 ± 5111.6 (sccm)
Total Type C Hydraulic Leakage 579.0 ± 9.5 (cc/min)

APPENDIX B

INSTRUMENT SELECTION GUIDE

ISG CALCULATION SHEET
(ANSI/ANS 56.8-1981)

Definitions

E = Sensitivity Error*
ε = Repeatability Error for Measurement System, Excluding Sensor**
e = Measurement System Error
N = Number of Sensors
t = Time (Duration of ILRT)
T = Temperature
P = Pressure

Pressure Measurement System Error

$E_p = \pm$ .001 psia***

$\varepsilon_p = \pm$ .0005 psia

$N_p = 1$

$$e_p = \pm \frac{[(E_p)^2 + (\varepsilon_p)^2]^{1/2}}{[N_p]^{1/2}}$$

$$e_p = \pm \frac{[(.001)^2 + (.0005)^2]^{1/2}}{[1]^{1/2}}$$

$$e_p = \pm 1.1180 \times 10^{-3} \text{ psia}$$

Temperature Measurement System Error

$E_T = \pm$ .01°F (°R)

$\varepsilon_T = \pm$ .001°F (°R)

$N_T = 24$

$$e_t = \pm \frac{[(E_T)^2 + (\varepsilon_T)^2]^{1/2}}{N_T^{1/2}}$$

$$e_T = \pm \frac{[(.01)^2 + (.001)^2]^{1/2}}{[24]^{1/2}}$$

$$e_T = \pm 2.0514 \times 10^{-3} \text{ °R}$$

*For the case were sensitivity errors are not equal, use the largest sensitivity error. A more accurate expression for the Instrument Selection Guide weights individual sensor sensitivity for their respective volume fractions, i.e., ANSI assumes equal sensitivities and equal volume fractions.

**If more than one electrical system is required for signal selection, conditioning, and amplification, the repeatabiilty error of each component is additive.

***If the sensitivity error for the pressure sensor is not available, a conservative valve for the Instrument Selection Guide is obtained by using the sensitivity error of the total pressure system (sensor to display).

INSTRUMENT SELECTION GUIDE (CONT'D)

Water Vapor Pressure Measurement System Error

At a dewpoint temperature of 70°F, the equivalent in water vapor presure change is calculated as shown in the sample calculation below titled "Partial Pressure."

$E_{pv}(T) = 0.2\ °F,\ 2.857 \times 10^{-3}$ psia

$\epsilon_{pv}(T) = .008\ °F,\ 1.143 \times 10^{-4}$ psia

$N_{pv} = 9$

$$e_{pv} = \pm \frac{[(E_{pv})^2 + (\epsilon_{pv})^2]^{1/2}}{[N_{pv}]^{1/2}}$$

$$e_{pv} = \pm \frac{[(2.857\times10^{-3})^2 + (1.143\times10^{-4})^2]^{1/2}}{[9]^{1/2}}$$

$$e_{pv} = \pm\ 9.531 \times 10^{-4} \text{ psia}$$

Parital Pressure (from Steam Tables) Calculated from Predicted Containment Vessel ILRT Temperatures

Sample Calculation

Assume dewpoint temperature is 70°F and dewpoint sensor sensitivity,

$E_{pv}(T)$, equal $\pm$ 2.0°F.

$70°F + 2°F \rightarrow P_v = 0.38844$ psia

$70°F - 2°F \rightarrow P_v = 0.33889$ psia

$\Delta P_v = 0.04955$ psi for a sensor sensitivity of $\pm$ 2.0°F or

$$\Delta P_v = \frac{0.04955 \text{ psi}}{4°F}$$

$= 0.01239$

°R = 534.5 °R taken from dry run

Actual Calculation

(+) 2 °F $\rightarrow P_v = 0.45664$ psia

(−) 2 °F $\rightarrow P_v = 0.39950$ psia

$P_v = 0.5714$ psi/4°F

$= 0.14285$ psi/°F

Calculate E_{pv} for $E_{pv}(T) = \pm$ __°

$E_{pv} = [\Delta P_v]\ [E_{pv}(T)]$

$E_{pv} = [.014285 \text{ psia/°F}]\ [0.2°F] =$

$E_{pv} = 2.857\times10^{-3}$ psia

NOTE: Perform the same calculation to calculate ϵ_{pv}

$\epsilon_{pv} = .014285 \times .008 = 1.143 \times 10^{-4}$ #/in^{2}ABS

APPENDIX B

INSTRUMENT SELECTION GUIDE (CONT'D)

Interpolation from Steam Tables

T	psia	
77	.45919	
76.83	.45664	.01499 x .83 = 0.45664
76	.44420	
73	.40177	0.39950
73.83	.39950	0.05714
72	.38844	

Calculation of Instrumentation Guide for an 8-Hour ILRT

Let P = 45.0 psig + 14.7 = 59.7 PSIA, Let T = 59.7°F + 460 = 534.5°R

$$ISG = \pm \frac{2400}{t} \left[2 \left(\frac{e_p}{P_p}\right)^2 + 2 \left(\frac{e_{pv}}{P_{pv}}\right)^2 + 2 \left(\frac{e_T}{T}\right)^2\right]^{1/2}$$

$$ISG = \pm \frac{2400}{8} \left[2 \left(\frac{1.1180 \times 10^{-3}}{59.7}\right)^2 + 2 \left(\frac{9.531 \times 10^{-4}}{59.7}\right)^2 + 2 \left(\frac{2.5014 \times 10^{-3}}{534.5}\right)^2\right]^{1/2}$$

$$ISG = \pm\ 0.010567 \leq 0.25\ La$$

ISG must satisfy the following acceptance criteria:

ISG $\leq$ 0.25 La wt%/day Yes - No

APPENDIX C

SENSOR LOCATION AND SUBVOLUME DEFINITION (Suppression Pool)

Instrument No.	Zone	Volume Fraction	Volume*	Elevation 1	Elevation 2	r_1	r_2	D	Δ Degree	Az_1	Az_2	Number
TE5901A	X/5	.074	30168	700.5	671	44'	14'		72°	324	036	1
TE5901B	X/5	.074	30168	700.5	671	44'	14'		72°	036	108	2
TE5901C	X/5	.074	30168	700.5	671	44'	14'		72°	108	180	3
TE5901D	IX	.022	8892	700.5	671	10'	0'		360°	5' from center		4
TE5901E	X/5	.074	30168	700.5	671	44'	14'		72°	180	252	5
TE5901F	X/5	.074	30168	700.5	671	44'	14'		72°	252	324	6
ME5901A	1/4 of IX + X	.098	41892	700.5	671	44' and 10'	14' 0'		90°	315	045	1
ME5901B	1/4 of IX + X	.098	41892	700.5	671	44' and 10'	14' 0'		90°	135	225	2
ME5901C	1/4 of IX + X	.098	41892	700.5	671	44' and 10'	14' 0'		90°	045	135	3
ME5901D	1/4 of IX + X	.099	41892	700.5	671	44' and 10'	14' 0'		90°	225	315	4

* Includes uniformly distributed factor for machinery and equipment

Volume = Volume Fraction x (total volume + equipment deduction/section volume fraction)

APPENDIX C

SENSOR LOCATION AND SUBVOLUME DEFINITION (Drywell) (Cont'd)

Instrument No.	Zone	Volume Fraction	Elevation 1**	Elevation 2**	Machine Factor	r_1	r_2	D	Δ Degree	Az_1 **	Az_2 **	# Volume	RTD
TE05902A	I	.047	719.08	702		43.4	39.2	29.75	89	316	045	19582	7
TE05902B	I	.047	719.08	702		43.4	39.2	29.75	91	045	136	19582	8
TE05902C	I	.047	719.08	702		43.4	39.2	29.75	89	136	224	19582	9
TE05920D	I	.047	719.08	702		43.3	39.2	29.75	91	224	315	19582	10
TE05902E	II	.022	729.8	704	0	-	-	20.75	360	0	360	8894	11
TE05903A	III	.041	739	719.08		39.2	33.3	29.75	91	314	045	16900	12
TE05903B	III	.042	739	719.08		39.2	33.3	29.75	89	046	135	17312	13
TE05923C	III	.041	739	719.08		39.2	33.3	29.75	91	135	226	16900	14
TE05923D	III	.042	739	719.08		39.2	33.3	29.75	89	226	315	17312	15
TE05904A	IV + V	.034	757.	739		33.3	28.0	29.75	118	326	84	13949	16
TE05904B	IV + V	.034	757.	739		33.3	28.0	29.75	121	84	205	13949	17
TE05904C	IV + V	.034	757.	739		33.3	28.0	29.75	121	205	326	13949	18
TE059054	IV + V	.034	778.7	757		28.0	21.8	29.75	180	185	265	13949	19
TE05905B	IV + V	.034	778.75	757		28.0	21.8	29.75	180	265	85	13949	20

*Includes machinery/equipment factor - uniformly distributed throughout

**Boundaries of volumes are elevation 1, elevation 2, Az_1, and Az_2

APPENDIX C

SENSOR LOCATION AND SUBVOLUME DEFINITION (Drywell) (Cont')

Instrument No.	Zone	Volume Fraction	Volume*	Elevation 1	Elevation 2	r_1	r_2	D	Δ Degree	Az_1	Az_2	Number
TE05906A	VI	.014	5887	791.75	778.75	21.8	19.0	22.8	180	0	180	21
TE05906B	VI	.015	6307	791.75	778.75	21.8	19.0	22.8	183	180	360	22
TE05907A	VII	.016	6511	813	791.75	-	-	-	180	0	180	23
TE05907B	VII	.017	6918	813	791.75	-	-	-	360	0	360	24
ME05902	I & II	.210	87280	729.8	704	-	-	-	360	0	360	5
ME05903	III	.166	68424	739	719.08	39.2	33.3	29.75	359	0	360	6
ME05904	IV, V, and VI	.099	40767	791.75	739	29.8	19.0	-	180	160	340	7
ME05905	IV, V, and VI	.099	40767	791.75	739	29.8	19.0	-	180	340	160	8
ME05907	VIII	.033	13467	729.8	704	-	-	-	360	0	360	9

* Includes uniformly distributed factor for machinery and equipment

Volume = volume fraction x (total volume + equipment dedection/section volume fraction)

APPENDIX D

VERIFICATION OF STABILIZATION

1	2	3	4	5
Time	Temperature	Average ΔT Over Last 4 Hours	Average ΔT Over Last Hour	5 = 3 - 4
t	T	$\frac{T_t - T_{t-4}}{4}$	$T_t - T_{t-1}$	
Hours	°R	°R/HR	°R/HR	°R/HR
0	528.87			
1	527.91			
2	528.86			
3	529.43			
4	529.78	+.228	+.35	-.122
5	530.03	+.530	+.25	+.280
6	530.23	+.343	+.45	-.107
7				
8				
9				
10				

(1) Column 5 < 0.5°R (ANSI -56.8 Criteria)

(2) $|(t_2 - t_4)/2| = |(528.86 - 529.78)/2| = 0.46°F < 1.0°R$ (BN-TOP-1 Criteria)

Based on the temperature stabilization criteria, the containment can be considered stabilized at the end of the fourth hour.

APPENDIX E

PRINTED REPORTS FOR SHORT DURATION (8-HOUR) ILRT

SUSQUEHANNA SHORT DURATION ILRT

TREND REPORT
LEAKAGE RATES (WEIGHT PERCENT/DAY)

TIME AND DATE AT START OF TEST: 1200 0523
ELAPSED TIME: 8.00 HOURS

NO. DATA POINTS	ELAPSED TIME	TOTAL-TIME ANALYSIS MEAN	TOTAL-TIME ANALYSIS CALCULATED	MASS-POINT ANALYSIS CALCULATED	MASS-POINT ANALYSIS 95% UCL
10	2.25	0.349	0.361	0.339	0.370
11	2.50	0.348	0.356	0.337	0.362
12	2.75	0.347	0.350	0.333	0.354
13	3.00	0.346	0.345	0.329	0.347
14	3.25	0.344	0.339	0.324	0.341
15	3.50	0.343	0.335	0.322	0.336
16	3.75	0.342	0.333	0.322	0.334
17	4.00	0.341	0.329	0.319	0.330
18	4.25	0.340	0.328	0.319	0.329
19	4.50	0.339	0.325	0.317	0.326
20	4.75	0.337	0.320	0.313	0.322
21	5.00	0.336	0.318	0.311	0.319
22	5.25	0.334	0.313	0.305	0.315
23	5.50	0.332	0.307	0.299	0.310
24	5.75	0.331	0.304	0.297	0.307
25	6.00	0.329	0.299	0.292	0.302
26	6.25	0.327	0.296	0.289	0.299
27	6.50	0.326	0.292	0.285	0.295
28	6.75	0.325	0.292	0.287	0.297
29	7.00	0.324	0.291	0.287	0.296
30	7.25	0.324	0.292	0.290	0.299
31	7.50	0.323	0.290	0.289	0.297
32	7.75	0.322	0.289	0.288	0.296
33	8.00	0.321	0.287	0.287	0.294

APPENDIX E

PRINTED REPORTS FOR SHORT DURATION (8-HOUR) ILRT (CONT'D)

SUSQUEHANNA SHORT DURATION ILRT

LEAKAGE RATE (WEIGHT PERCENT/DAY)
TOTAL-TIME ANALYSIS

TIME AND DATE AT START OF TEST: 1200 0523
ELAPSED TIME: 8.00 HOURS

TIME	TEMP. (R)	PRESSURE (PSIA)	MEASURED LEAKAGE RATE
1200	530.283	60.7368	
1215	530.331	60.7412	0.168
1230	530.376	60.7417	0.461
1245	530.414	60.7442	0.399
1300	530.456	60.7466	0.397
1315	530.491	60.7501	0.334
1330	530.527	60.7508	0.370
1345	530.570	60.7554	0.323
1400	530.606	60.7561	0.350
1415	530.642	60.7585	0.342
1430	530.675	60.7602	0.340
1445	530.709	60.7623	0.334
1500	530.742	60.7644	0.330
1515	530.779	60.7669	0.324
1530	530.806	60.7677	0.327
1545	530.838	60.7692	0.329
1600	530.864	60.7708	0.322
1615	530.891	60.7712	0.327
1630	530.922	60.7736	0.319
1645	530.949	60.7758	0.310
1700	530.975	60.7763	0.314
1715	530.999	60.7790	0.299
1730	531.028	60.7817	0.290
1745	531.055	60.7813	0.301
1800	531.076	60.7842	0.286
1815	531.102	60.7847	0.290
1830	531.130	60.7869	0.285
1845	531.154	60.7836	0.310
1900	531.177	60.7859	0.301
1915	531.220	60.7864	0.314
1930	531.219	60.7881	0.295
1945	531.247	60.7893	0.295
2000	531.272	60.7911	0.291

MEAN OF MEASURED LEAKAGE RATES	=	0.321
MAXIMUM ALLOWABLE LEAKAGE RATE	=	1.000
75 % OF MAXIMUM ALLOWABLE LEAKAGE RATE	=	0.750
THE UPPER 95% CONFIDENCE LIMIT	=	0.379
THE CALCULATED LEAKAGE RATE	=	0.287

APPENDIX E

PRINTED REPORTS FOR SHORT DURATION (8-HOUR) ILRT (CONT'D)

SUSQUEHANNA SHORT DURATION ILRT

LEAKAGE RATE (WEIGHT PERCENT/DAY)
MASS-POINT ANALYSIS

TIME AND DATE AT START OF TEST: 1200 0523
ELAPSED TIME: 8.00 HOURS

TIME	TEMP (R)	PRESSURE (PSIA)	CTMT. AIR MASS (LBM)	MASS LOSS (LBM)	TOT.AVG. MASS LOSS (LBM/HR)
1200	530.283	60.7368	123268.		
1215	530.331	60.7412	123266.	2.2	8.7
1230	530.376	60.7417	123256.	9.7	23.7
1245	530.414	60.7442	123253.	3.5	20.5
1300	530.456	60.7466	123248.	5.0	20.4
1315	530.491	60.7501	123247.	1.1	17.2
1330	530.527	60.7508	123240.	7.0	19.0
1345	530.570	60.7554	123239.	0.6	16.6
1400	530.606	60.7561	123232.	6.9	18.0
1415	530.642	60.7585	123229.	3.6	17.6
1430	530.675	60.7602	123225.	4.1	17.5
1445	530.709	60.7623	123221.	3.6	17.2
1500	530.742	60.7644	123217.	3.6	16.9
1515	530.779	60.7669	123214.	3.3	16.7
1530	530.806	60.7677	123210.	4.7	16.8
1545	530.838	60.7692	123205.	4.5	16.9
1600	530.864	60.7708	123202.	2.8	16.5
1615	530.891	60.7712	123197.	5.3	16.8
1630	530.922	60.7736	123195.	2.4	16.4
1645	530.949	60.7758	123193.	1.7	15.9
1700	530.975	60.7763	123188.	5.0	16.1
1715	530.999	60.7790	123188.	0.1	15.4
1730	531.028	60.7817	123186.	1.4	14.9
1745	531.055	60.7813	123179.	6.9	15.5
1800	531.076	60.7842	123180.	-0.9	14.7
1815	531.102	60.7847	123175.	5.1	14.9
1830	531.130	60.7869	123173.	2.1	14.6
1845	531.154	60.7836	123161.	12.1	15.9
1900	531.177	60.7859	123160.	0.8	15.4
1915	531.220	60.7864	123151.	8.9	16.1
1930	531.219	60.7881	123155.	-3.5	15.1
1945	531.247	60.7893	123151.	3.9	15.1
2000	531.272	60.7911	123149.	2.3	15.0

FREE AIR VOLUME USED (MILLIONS OF CU. FT.) = 0.399

REGRESSION LINE
INTERCEPT (LBM) = 123264.
SLOPE (LBM/HR) = -14.7

MAXIMUM ALLOWABLE LEAKAGE RATE = 1.000
75 % OF MAXIMUM ALLOWABLE LEAKAGE RATE = 0.750
THE UPPER 95% CONFIDENCE LIMIT = 0.294
THE CALCULATED LEAKAGE RATE = 0.287

CONT. FREE AIR VOLUME AT TIME 2000 = 398730.

PRINTED REPORTS FOR SHORT DURATION (8-HOUR) ILRT (CONT'D)

ILRT.DAT

SUSQUEHANNA SHORT DURATION ILRT

ALMAX = 1.000 VOL = 398730.00

VRATET = 0.000 VRATEM = 0.000 VRATEP = 0.000

TIME	DATE	TEMP	PRESSURE	VPRS	VOLUME
1200	523	530.28265	60.736790	0.29150170	398730.
1215	523	530.33069	60.741226	0.29100040	398730.
1230	523	530.37604	60.741657	0.29254058	398730.
1245	523	530.41370	60.744232	0.29291743	398730.
1300	523	530.45557	60.746555	0.29355425	398730.
1315	523	530.49146	60.750126	0.29293397	398730.
1330	523	530.52728	60.750771	0.29426137	398730.
1345	523	530.56989	60.755363	0.29360896	398730.
1400	523	530.60577	60.756077	0.29486379	398730.
1415	523	530.64227	60.758503	0.29440656	398730.
1430	523	530.67487	60.760193	0.29469043	398730.
1445	523	530.70874	60.762299	0.29455337	398730.
1500	523	530.74219	60.764366	0.29544026	398730.
1515	523	530.77881	60.766930	0.29484650	398730.
1530	523	530.80585	60.767712	0.29504654	398730.
1545	523	530.83832	60.769211	0.29551983	398730.
1600	523	530.86401	60.770782	0.29591849	398730.
1615	523	530.89087	60.771236	0.29743046	398730.
1630	523	530.92212	60.773628	0.29701269	398730.
1645	523	530.94879	60.775837	0.29677245	398730.
1700	523	530.97485	60.776344	0.29725018	398730.
1715	523	530.99854	60.778984	0.29756388	398730.
1730	523	531.02777	60.781651	0.29686862	398730.
1745	523	531.05487	60.781334	0.29915547	398730.
1800	523	531.07556	60.784172	0.29730105	398730.
1815	523	531.10199	60.784702	0.29873884	398730.
1830	523	531.13013	60.786880	0.29853201	398730.
1845	523	531.15369	60.783600	0.30181286	398730.
1900	523	531.17719	60.785881	0.30150235	398730.
1915	523	531.21979	60.786385	0.30198163	398730.
1930	523	531.21942	60.788082	0.30126810	398730.
1945	523	531.24689	60.789280	0.30204388	398730.
2000	523	531.27240	60.791073	0.30025002	398730.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1200 0523

TEMP	1 =	537.00800	(7734.)
TEMP	2 =	536.96301	(7729.)
TEMP	3 =	537.29004	(7762.)
TEMP	4 =	538.14899	(7848.)
TEMP	5 =	537.03101	(7736.)
TEMP	6 =	536.88403	(7721.)
TEMP	7 =	525.04602	(6538.)
TEMP	8 =	525.35199	(6568.)
TEMP	9 =	525.54004	(6587.)
TEMP	10 =	525.57300	(6590.)
TEMP	11 =	526.39502	(6673.)
TEMP	12 =	525.79803	(6613.)
TEMP	13 =	525.72101	(6605.)
TEMP	14 =	525.82202	(6615.)
TEMP	15 =	525.84503	(6618.)
TEMP	16 =	526.28400	(6661.)
TEMP	17 =	526.13403	(6646.)
TEMP	18 =	525.97101	(6630.)
TEMP	19 =	526.14502	(6648.)
TEMP	20 =	526.51001	(6684.)
TEMP	21 =	526.38000	(6671.)
TEMP	22 =	526.65002	(6698.)
TEMP	23 =	526.85101	(6718.)
TEMP	24 =	526.59601	(6693.)
PRES	1 =	61.028290	(61902.)
VPRS	1 =	0.44745287	(7622.)
VPRS	2 =	0.43949714	(7568.)
VPRS	3 =	0.43916222	(7565.)
VPRS	4 =	0.43349838	(7527.)
VPRS	5 =	0.20326716	(5360.)
VPRS	6 =	0.19224595	(5208.)
VPRS	7 =	0.18617944	(5121.)
VPRS	8 =	0.19426350	(5236.)
VPRS	9 =	0.19283471	(5217.)

CTMT. FREE AIR VOL.. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1200
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.28265

CORRECTED PRESSURE (PSIA) = 60.736790

VAPOR PRESSURE (PSIA) = 0.29150170

CTMT. AIR MASS (LBM) = 123268.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1215 0523

TEMP	1 =	537.02502	(7736.)
TEMP	2 =	536.94403	(7727.)
TEMP	3 =	537.26599	(7760.)
TEMP	4 =	538.15002	(7848.)
TEMP	5 =	536.99701	(7733.)
TEMP	6 =	536.83704	(7717.)
TEMP	7 =	525.14001	(6547.)
TEMP	8 =	525.45905	(6579.)
TEMP	9 =	525.63702	(6597.)
TEMP	10 =	525.68402	(6601.)
TEMP	11 =	526.48804	(6682.)
TEMP	12 =	525.88403	(6621.)
TEMP	13 =	525.80200	(6613.)
TEMP	14 =	525.91003	(6624.)
TEMP	15 =	525.94000	(6627.)
TEMP	16 =	526.34802	(6668.)
TEMP	17 =	526.21906	(6655.)
TEMP	18 =	526.05103	(6638.)
TEMP	19 =	526.21704	(6655.)
TEMP	20 =	526.59705	(6693.)
TEMP	21 =	526.46704	(6680.)
TEMP	22 =	526.70801	(6704.)
TEMP	23 =	527.00201	(6733.)
TEMP	24 =	526.74304	(6707.)
PRES	1 =	61.032227	(61906.)
VPRS	1 =	0.44592395	(7612.)
VPRS	2 =	0.43933696	(7567.)
VPRS	3 =	0.43866724	(7562.)
VPRS	4 =	0.43083403	(7508.)
VPRS	5 =	0.20406111	(5371.)
VPRS	6 =	0.19528309	(5251.)
VPRS	7 =	0.17905025	(5016.)
VPRS	8 =	0.19422762	(5236.)
VPRS	9 =	0.19328707	(5223.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1215
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.33069

CORRECTED PRESSURE (PSIA) = 60.741226

VAPOR PRESSURE (PSIA) = 0.29100040

CTMT. AIR MASS (LBM) = 123266.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1230 0523

TEMP	1 =	536.99902	(7733.)
TEMP	2 =	536.89703	(7723.)
TEMP	3 =	537.23999	(7757.)
TEMP	4 =	538.15503	(7849.)
TEMP	5 =	536.96399	(7729.)
TEMP	6 =	536.81604	(7715.)
TEMP	7 =	525.26105	(6559.)
TEMP	8 =	525.57300	(6590.)
TEMP	9 =	525.72504	(6606.)
TEMP	10 =	525.78101	(6611.)
TEMP	11 =	526.58600	(6692.)
TEMP	12 =	525.96399	(6629.)
TEMP	13 =	525.90002	(6623.)
TEMP	14 =	525.98505	(6632.)
TEMP	15 =	526.03503	(6637.)
TEMP	16 =	526.42902	(6676.)
TEMP	17 =	526.30304	(6663.)
TEMP	18 =	526.15399	(6648.)
TEMP	19 =	526.27899	(6661.)
TEMP	20 =	526.67499	(6700.)
TEMP	21 =	526.53601	(6687.)
TEMP	22 =	526.79303	(6712.)
TEMP	23 =	527.15399	(6748.)
TEMP	24 =	526.83801	(6717.)
PRES	1 =	61.034199	(61908.)
VPRS	1 =	0.44644853	(7615.)
VPRS	2 =	0.44009423	(7572.)
VPRS	3 =	0.43809938	(7558.)
VPRS	4 =	0.42734927	(7484.)
VPRS	5 =	0.20465469	(5379.)
VPRS	6 =	0.20171638	(5339.)
VPRS	7 =	0.18431985	(5095.)
VPRS	8 =	0.19513230	(5249.)
VPRS	9 =	0.19363169	(5228.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1230
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.37604

CORRECTED PRESSURE (PSIA) = 60.741657

VAPOR PRESSURE (PSIA) = 0.29254058

CTMT. AIR MASS (LBM) = 123256.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1245 0523

TEMP 1 =	536.96704	(7730.)
TEMP 2 =	536.86102	(7719.)
TEMP 3 =	537.21704	(7755.)
TEMP 4 =	538.11200	(7844.)
TEMP 5 =	536.91302	(7724.)
TEMP 6 =	536.77399	(7710.)
TEMP 7 =	525.34802	(6568.)
TEMP 8 =	525.68201	(6601.)
TEMP 9 =	525.81702	(6615.)
TEMP 10 =	525.87103	(6620.)
TEMP 11 =	526.68701	(6702.)
TEMP 12 =	526.05304	(6638.)
TEMP 13 =	525.96906	(6630.)
TEMP 14 =	526.08002	(6641.)
TEMP 15 =	526.11304	(6644.)
TEMP 16 =	526.49902	(6683.)
TEMP 17 =	526.38104	(6671.)
TEMP 18 =	526.21301	(6654.)
TEMP 19 =	526.36700	(6670.)
TEMP 20 =	526.74805	(6708.)
TEMP 21 =	526.59705	(6693.)
TEMP 22 =	526.85400	(6718.)
TEMP 23 =	527.30200	(6763.)
TEMP 24 =	526.94904	(6728.)
PRES 1 =	61.037151	(61911.)
VPRS 1 =	0.44607377	(7613.)
VPRS 2 =	0.43884197	(7563.)
VPRS 3 =	0.43801194	(7557.)
VPRS 4 =	0.42915928	(7497.)
VPRS 5 =	0.20525573	(5387.)
VPRS 6 =	0.20009883	(5317.)
VPRS 7 =	0.18838575	(5153.)
VPRS 8 =	0.19597240	(5260.)
VPRS 9 =	0.19430663	(5237.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1245
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.41370

CORRECTED PRESSURE (PSIA) = 60.744232

VAPOR PRESSURE (PSIA) = 0.29291743

CTMT. AIR MASS (LBM) = 123253.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1300 0523

TEMP	1 =	536.91901	(7725.)
TEMP	2 =	536.84503	(7718.)
TEMP	3 =	537.16901	(7750.)
TEMP	4 =	538.08502	(7842.)
TEMP	5 =	536.90704	(7724.)
TEMP	6 =	536.76001	(7709.)
TEMP	7 =	525.46399	(6579.)
TEMP	8 =	525.79102	(6612.)
TEMP	9 =	525.91803	(6625.)
TEMP	10 =	525.96600	(6630.)
TEMP	11 =	526.77399	(6710.)
TEMP	12 =	526.12799	(6646.)
TEMP	13 =	526.03900	(6637.)
TEMP	14 =	526.15900	(6649.)
TEMP	15 =	526.19299	(6652.)
TEMP	16 =	526.57001	(6690.)
TEMP	17 =	526.46503	(6680.)
TEMP	18 =	526.29102	(6662.)
TEMP	19 =	526.42004	(6675.)
TEMP	20 =	526.81604	(6715.)
TEMP	21 =	526.67804	(6701.)
TEMP	22 =	526.91400	(6724.)
TEMP	23 =	527.44000	(6777.)
TEMP	24 =	527.04803	(6738.)

PRES	1 =	61.040108	(61914.)

VPRS	1 =	0.44482970	(7604.)
VPRS	2 =	0.43820125	(7559.)
VPRS	3 =	0.43773535	(7556.)
VPRS	4 =	0.42939976	(7498.)
VPRS	5 =	0.20594577	(5396.)
VPRS	6 =	0.20303717	(5357.)
VPRS	7 =	0.18952024	(5169.)
VPRS	8 =	0.19658983	(5269.)
VPRS	9 =	0.19487382	(5245.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1300
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.45557

CORRECTED PRESSURE (PSIA) = 60.746555

VAPOR PRESSURE (PSIA) = 0.29355425

CTMT. AIR MASS (LBM) = 123248.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1315 0523

TEMP	1 =	536.91199	(7724.)
TEMP	2 =	536.81299	(7714.)
TEMP	3 =	537.14099	(7747.)
TEMP	4 =	538.06104	(7839.)
TEMP	5 =	536.85699	(7719.)
TEMP	6 =	536.71503	(7705.)
TEMP	7 =	525.55804	(6589.)
TEMP	8 =	525.88501	(6621.)
TEMP	9 =	526.00299	(6633.)
TEMP	10 =	526.05499	(6639.)
TEMP	11 =	526.85803	(6719.)
TEMP	12 =	526.20703	(6654.)
TEMP	13 =	526.12402	(6645.)
TEMP	14 =	526.22400	(6655.)
TEMP	15 =	526.27399	(6660.)
TEMP	16 =	526.62799	(6696.)
TEMP	17 =	526.52502	(6686.)
TEMP	18 =	526.36499	(6670.)
TEMP	19 =	526.46704	(6680.)
TEMP	20 =	526.90704	(6724.)
TEMP	21 =	526.75604	(6709.)
TEMP	22 =	526.97205	(6730.)
TEMP	23 =	527.56799	(6790.)
TEMP	24 =	527.12701	(6746.)
PRES	1 =	61.043060	(61917.)
VPRS	1 =	0.44598398	(7612.)
VPRS	2 =	0.43785200	(7556.)
VPRS	3 =	0.43795386	(7557.)
VPRS	4 =	0.42914504	(7496.)
VPRS	5 =	0.20707837	(5411.)
VPRS	6 =	0.20139731	(5335.)
VPRS	7 =	0.18116349	(5048.)
VPRS	8 =	0.19798279	(5288.)
VPRS	9 =	0.19573542	(5257.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1315
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.49146

CORRECTED PRESSURE (PSIA) = 60.750126

VAPOR PRESSURE (PSIA) = 0.29293397

CTMT. AIR MASS (LBM) = 123247.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1330 0523

TEMP 1 =	536.87903	(7721.)
TEMP 2 =	536.76703	(7710.)
TEMP 3 =	537.11401	(7744.)
TEMP 4 =	538.06403	(7839.)
TEMP 5 =	536.83301	(7716.)
TEMP 6 =	536.69604	(7703.)
TEMP 7 =	525.66901	(6600.)
TEMP 8 =	525.97205	(6630.)
TEMP 9 =	526.09802	(6643.)
TEMP 10 =	526.12103	(6645.)
TEMP 11 =	526.93201	(6726.)
TEMP 12 =	526.28601	(6662.)
TEMP 13 =	526.18402	(6651.)
TEMP 14 =	526.30701	(6664.)
TEMP 15 =	526.33899	(6667.)
TEMP 16 =	526.72003	(6705.)
TEMP 17 =	526.62305	(6695.)
TEMP 18 =	526.45703	(6679.)
TEMP 19 =	526.50299	(6683.)
TEMP 20 =	526.92004	(6725.)
TEMP 21 =	526.79700	(6713.)
TEMP 22 =	527.05902	(6739.)
TEMP 23 =	527.69904	(6803.)
TEMP 24 =	527.20099	(6753.)

PRES 1 =	61.045033	(61919.)

VPRS 1 =	0.44565415	(7610.)
VPRS 2 =	0.43702197	(7551.)
VPRS 3 =	0.43715307	(7552.)
VPRS 4 =	0.42833906	(7491.)
VPRS 5 =	0.20727010	(5413.)
VPRS 6 =	0.20220610	(5346.)
VPRS 7 =	0.19476610	(5243.)
VPRS 8 =	0.19852844	(5296.)
VPRS 9 =	0.19646779	(5267.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1330
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.52728

CORRECTED PRESSURE (PSIA) = 60.750771

VAPOR PRESSURE (PSIA) = 0.29426137

CTMT. AIR MASS (LBM) = 123240.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1345 0523

TEMP	1 =	536.87000	(7720.)
TEMP	2 =	536.75000	(7708.)
TEMP	3 =	537.09802	(7743.)
TEMP	4 =	538.07202	(7840.)
TEMP	5 =	536.82104	(7715.)
TEMP	6 =	536.65503	(7699.)
TEMP	7 =	525.76404	(6609.)
TEMP	8 =	526.06000	(6639.)
TEMP	9 =	526.19104	(6652.)
TEMP	10 =	526.19604	(6653.)
TEMP	11 =	527.01703	(6735.)
TEMP	12 =	526.33899	(6667.)
TEMP	13 =	526.26202	(6659.)
TEMP	14 =	526.38202	(6671.)
TEMP	15 =	526.40704	(6674.)
TEMP	16 =	526.77704	(6711.)
TEMP	17 =	526.68701	(6702.)
TEMP	18 =	526.53601	(6687.)
TEMP	19 =	526.60504	(6694.)
TEMP	20 =	527.04004	(6737.)
TEMP	21 =	526.88605	(6722.)
TEMP	22 =	527.11005	(6744.)
TEMP	23 =	527.81903	(6815.)
TEMP	24 =	527.28101	(6761.)
PRES	1 =	61.048973	(61923.)
VPRS	1 =	0.44431996	(7601.)
VPRS	2 =	0.43748799	(7554.)
VPRS	3 =	0.43756062	(7554.)
VPRS	4 =	0.42548284	(7471.)
VPRS	5 =	0.20778400	(5420.)
VPRS	6 =	0.20163475	(5338.)
VPRS	7 =	0.19125332	(5194.)
VPRS	8 =	0.19857870	(5297.)
VPRS	9 =	0.19662577	(5269.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1345
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.56989

CORRECTED PRESSURE (PSIA) = 60.755363

VAPOR PRESSURE (PSIA) = 0.29360896

CTMT. AIR MASS (LBM) = 123239.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1400 0523

TEMP	1 =	536.85803	(7719.)
TEMP	2 =	536.71906	(7705.)
TEMP	3 =	537.06000	(7739.)
TEMP	4 =	538.04602	(7838.)
TEMP	5 =	536.79901	(7713.)
TEMP	6 =	536.62103	(7695.)
TEMP	7 =	525.85101	(6618.)
TEMP	8 =	526.14001	(6647.)
TEMP	9 =	526.28400	(6661.)
TEMP	10 =	526.29004	(6662.)
TEMP	11 =	527.09003	(6742.)
TEMP	12 =	526.43903	(6677.)
TEMP	13 =	526.33899	(6667.)
TEMP	14 =	526.45099	(6678.)
TEMP	15 =	526.47601	(6681.)
TEMP	16 =	526.83203	(6716.)
TEMP	17 =	526.77502	(6711.)
TEMP	18 =	526.58301	(6691.)
TEMP	19 =	526.64801	(6698.)
TEMP	20 =	527.09302	(6742.)
TEMP	21 =	526.96704	(6730.)
TEMP	22 =	527.14899	(6748.)
TEMP	23 =	527.95001	(6828.)
TEMP	24 =	527.38202	(6771.)
PRES	1 =	61.050941	(61925.)
VPRS	1 =	0.44547415	(7609.)
VPRS	2 =	0.43709475	(7551.)
VPRS	3 =	0.43697822	(7550.)
VPRS	4 =	0.42990205	(7502.)
VPRS	5 =	0.20899586	(5436.)
VPRS	6 =	0.20174606	(5339.)
VPRS	7 =	0.19558464	(5255.)
VPRS	8 =	0.19933459	(5307.)
VPRS	9 =	0.19732940	(5279.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME =.1400
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.60577

CORRECTED PRESSURE (PSIA) = 60.756077

VAPOR PRESSURE (PSIA) = 0.29486379

CTMT. AIR MASS (LBM) = 123232.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1415 0523

TEMP	1 =	536.82202	(7715.)
TEMP	2 =	536.70502	(7704.)
TEMP	3 =	537.03204	(7736.)
TEMP	4 =	538.02600	(7836.)
TEMP	5 =	536.78302	(7711.)
TEMP	6 =	536.60504	(7694.)
TEMP	7 =	525.93402	(6626.)
TEMP	8 =	526.24701	(6658.)
TEMP	9 =	526.35901	(6669.)
TEMP	10 =	526.38000	(6671.)
TEMP	11 =	527.17804	(6751.)
TEMP	12 =	526.49200	(6682.)
TEMP	13 =	526.42603	(6676.)
TEMP	14 =	526.51404	(6684.)
TEMP	15 =	526.53503	(6687.)
TEMP	16 =	526.88501	(6721.)
TEMP	17 =	526.82501	(6716.)
TEMP	18 =	526.65100	(6698.)
TEMP	19 =	526.73303	(6706.)
TEMP	20 =	527.15503	(6749.)
TEMP	21 =	527.03003	(6736.)
TEMP	22 =	527.21802	(6755.)
TEMP	23 =	528.06000	(6839.)
TEMP	24 =	527.44702	(6778.)
PRES	1 =	61.052910	(61927.)
VPRS	1 =	0.44470972	(7603.)
VPRS	2 =	0.43673083	(7549.)
VPRS	3 =	0.43716750	(7552.)
VPRS	4 =	0.42720795	(7483.)
VPRS	5 =	0.20955579	(5443.)
VPRS	6 =	0.20313361	(5358.)
VPRS	7 =	0.19064778	(5186.)
VPRS	8 =	0.19960168	(5310.)
VPRS	9 =	0.19781044	(5286.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1415
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.64227

CORRECTED PRESSURE (PSIA) = 60.758503

VAPOR PRESSURE (PSIA) = 0.29440656

CTMT. AIR MASS (LBM) = 123229.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1430 0523

TEMP	1 =	536.81201	(7714.)
TEMP	2 =	536.68103	(7701.)
TEMP	3 =	537.01300	(7734.)
TEMP	4 =	538.04504	(7838.)
TEMP	5 =	536.74603	(7708.)
TEMP	6 =	536.55804	(7689.)
TEMP	7 =	526.01404	(6634.)
TEMP	8 =	526.32599	(6666.)
TEMP	9 =	526.44299	(6677.)
TEMP	10 =	526.41699	(6675.)
TEMP	11 =	527.25800	(6759.)
TEMP	12 =	526.57104	(6690.)
TEMP	13 =	526.47601	(6681.)
TEMP	14 =	526.59100	(6692.)
TEMP	15 =	526.61304	(6694.)
TEMP	16 =	526.93500	(6727.)
TEMP	17 =	526.88403	(6721.)
TEMP	18 =	526.71503	(6705.)
TEMP	19 =	526.79901	(6713.)
TEMP	20 =	527.22900	(6756.)
TEMP	21 =	527.08002	(6741.)
TEMP	22 =	527.27301	(6760.)
TEMP	23 =	528.17401	(6850.)
TEMP	24 =	527.54102	(6787.)
PRES	1 =	61.054882	(61929.)
VPRS	1 =	0.44467965	(7603.)
VPRS	2 =	0.43740043	(7553.)
VPRS	3 =	0.43617740	(7545.)
VPRS	4 =	0.42686856	(7480.)
VPRS	5 =	0.21058357	(5457.)
VPRS	6 =	0.20321524	(5359.)
VPRS	7 =	0.19140640	(5197.)
VPRS	8 =	0.19996525	(5315.)
VPRS	9 =	0.19815506	(5291.)

CTMT. FREE AIR VOL. =. 398730.

SUMMARY OF CORRECTED DATA

TIME = 1430
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.67487

CORRECTED PRESSURE (PSIA) = 60.760193

VAPOR PRESSURE (PSIA) = 0.29469043

CTMT. AIR MASS (LBM) = 123225.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1445 0523

TEMP	1 =	536.77002	(7710.)
TEMP	2 =	536.65204	(7698.)
TEMP	3 =	536.98999	(7732.)
TEMP	4 =	538.02301	(7835.)
TEMP	5 =	536.72101	(7705.)
TEMP	6 =	536.57904	(7691.)
TEMP	7 =	526.09705	(6643.)
TEMP	8 =	526.40704	(6674.)
TEMP	9 =	526.51300	(6684.)
TEMP	10 =	526.47900	(6681.)
TEMP	11 =	527.31000	(6764.)
TEMP	12 =	526.61902	(6695.)
TEMP	13 =	526.54401	(6687.)
TEMP	14 =	526.66400	(6699.)
TEMP	15 =	526.67102	(6700.)
TEMP	16 =	526.99304	(6732.)
TEMP	17 =	526.95502	(6729.)
TEMP	18 =	526.77301	(6710.)
TEMP	19 =	526.89703	(6723.)
TEMP	20 =	527.28601	(6762.)
TEMP	21 =	527.14203	(6747.)
TEMP	22 =	527.32404	(6765.)
TEMP	23 =	528.28802	(6862.)
TEMP	24 =	527.61700	(6795.)
PRES	1 =	61.056850	(61931.)
VPRS	1 =	0.44418547	(7600.)
VPRS	2 =	0.43665797	(7548.)
VPRS	3 =	0.43635225	(7546.)
VPRS	4 =	0.42754725	(7485.)
VPRS	5 =	0.21089804	(5461.)
VPRS	6 =	0.20209481	(5344.)
VPRS	7 =	0.18997264	(5176.)
VPRS	8 =	0.20138991	(5335.)
VPRS	9 =	0.19877973	(5299.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1445
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.70874

CORRECTED PRESSURE (PSIA) = 60.762299

VAPOR PRESSURE (PSIA) = 0.29455337

CTMT. AIR MASS (LBM) = 123221.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1500 0523

TEMP	1 =	536.73004	(7706.)
TEMP	2 =	536.62500	(7696.)
TEMP	3 =	536.99902	(7733.)
TEMP	4 =	537.98804	(7832.)
TEMP	5 =	536.71204	(7704.)
TEMP	6 =	536.56604	(7690.)
TEMP	7 =	526.17603	(6651.)
TEMP	8 =	526.49500	(6682.)
TEMP	9 =	526.59204	(6692.)
TEMP	10 =	526.55902	(6689.)
TEMP	11 =	527.38800	(6772.)
TEMP	12 =	526.68701	(6702.)
TEMP	13 =	526.60400	(6693.)
TEMP	14 =	526.74603	(6708.)
TEMP	15 =	526.73303	(6706.)
TEMP	16 =	527.03601	(6737.)
TEMP	17 =	527.00604	(6734.)
TEMP	18 =	526.81403	(6714.)
TEMP	19 =	526.92004	(6725.)
TEMP	20 =	527.32104	(6765.)
TEMP	21 =	527.22400	(6755.)
TEMP	22 =	527.37701	(6771.)
TEMP	23 =	528.40900	(6874.)
TEMP	24 =	527.69800	(6803.)
PRES	1 =	61.059807	(61934.)
VPRS	1 =	0.44345742	(7595.)
VPRS	2 =	0.43642500	(7547.)
VPRS	3 =	0.43617740	(7545.)
VPRS	4 =	0.42698163	(7481.)
VPRS	5 =	0.21210223	(5476.)
VPRS	6 =	0.20262162	(5351.)
VPRS	7 =	0.19582158	(5258.)
VPRS	8 =	0.20246580	(5349.)
VPRS	9 =	0.19963878	(5311.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1500
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.74219

CORRECTED PRESSURE (PSIA) = 60.764366

VAPOR PRESSURE (PSIA) = 0.29544026

CTMT. AIR MASS (LBM) = 123217.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1515 0523

TEMP	1 =	536.75201	(7708.)
TEMP	2 =	536.61902	(7695.)
TEMP	3 =	536.97302	(7730.)
TEMP	4 =	538.00604	(7834.)
TEMP	5 =	536.69604	(7703.)
TEMP	6 =	536.51703	(7685.)
TEMP	7 =	526.24603	(6658.)
TEMP	8 =	526.57404	(6690.)
TEMP	9 =	526.64801	(6698.)
TEMP	10 =	526.62402	(6695.)
TEMP	11 =	527.47803	(6781.)
TEMP	12 =	526.74603	(6708.)
TEMP	13 =	526.67804	(6701.)
TEMP	14 =	526.79602	(6713.)
TEMP	15 =	526.80499	(6714.)
TEMP	16 =	527.09302	(6742.)
TEMP	17 =	527.08502	(6742.)
TEMP	18 =	526.91602	(6725.)
TEMP	19 =	526.97101	(6730.)
TEMP	20 =	527.38104	(6771.)
TEMP	21 =	527.27704	(6761.)
TEMP	22 =	527.42303	(6775.)
TEMP	23 =	528.52100	(6885.)
TEMP	24 =	527.77704	(6811.)
PRES	1 =	61.061775	(61936.)
VPRS	1 =	0.44286045	(7591.)
VPRS	2 =	0.43689102	(7550.)
VPRS	3 =	0.43629405	(7546.)
VPRS	4 =	0.42764628	(7486.)
VPRS	5 =	0.21233997	(5479.)
VPRS	6 =	0.19962393	(5311.)
VPRS	7 =	0.19378965	(5230.)
VPRS	8 =	0.20231001	(5347.)
VPRS	9 =	0.19982426	(5313.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1515
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.77881

CORRECTED PRESSURE (PSIA) = 60.766930

VAPOR PRESSURE (PSIA) = 0.29484650

CTMT. AIR MASS (LBM) = 123214.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1530 0523

TEMP 1 =	536.73004	(7706.)
TEMP 2 =	536.60199	(7693.)
TEMP 3 =	536.95001	(7728.)
TEMP 4 =	537.97900	(7831.)
TEMP 5 =	536.65503	(7699.)
TEMP 6 =	536.51501	(7685.)
TEMP 7 =	526.32404	(6665.)
TEMP 8 =	526.64899	(6698.)
TEMP 9 =	526.71399	(6704.)
TEMP 10 =	526.68903	(6702.)
TEMP 11 =	527.51202	(6784.)
TEMP 12 =	526.80701	(6714.)
TEMP 13 =	526.72900	(6706.)
TEMP 14 =	526.86902	(6720.)
TEMP 15 =	526.85602	(6719.)
TEMP 16 =	527.12799	(6746.)
TEMP 17 =	527.13104	(6746.)
TEMP 18 =	526.95502	(6729.)
TEMP 19 =	527.03802	(6737.)
TEMP 20 =	527.41504	(6775.)
TEMP 21 =	527.32202	(6765.)
TEMP 22 =	527.47400	(6780.)
TEMP 23 =	528.62604	(6896.)
TEMP 24 =	527.83502	(6817.)
PRES 1 =	61.062759	(61937.)
VPRS 1 =	0.44393796	(7598.)
VPRS 2 =	0.43646878	(7547.)
VPRS 3 =	0.43526018	(7539.)
VPRS 4 =	0.42795730	(7488.)
VPRS 5 =	0.21299197	(5488.)
VPRS 6 =	0.19911194	(5304.)
VPRS 7 =	0.19455792	(5241.)
VPRS 8 =	0.20285904	(5354.)
VPRS 9 =	0.20055142	(5323.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1530
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.80585

CORRECTED PRESSURE (PSIA) = 60.767712

VAPOR PRESSURE (PSIA) = 0.29504654

CTMT. AIR MASS (LBM) = 123210.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1545 0523

TEMP	1 =	536.70300	(7703.)
TEMP	2 =	536.58405	(7691.)
TEMP	3 =	536.94403	(7727.)
TEMP	4 =	537.94800	(7828.)
TEMP	5 =	536.65802	(7699.)
TEMP	6 =	536.50800	(7684.)
TEMP	7 =	526.39600	(6673.)
TEMP	8 =	526.71301	(6704.)
TEMP	9 =	526.77301	(6710.)
TEMP	10 =	526.74701	(6708.)
TEMP	11 =	527.59503	(6793.)
TEMP	12 =	526.86304	(6719.)
TEMP	13 =	526.76703	(6710.)
TEMP	14 =	526.91504	(6725.)
TEMP	15 =	526.91803	(6725.)
TEMP	16 =	527.19104	(6752.)
TEMP	17 =	527.19202	(6752.)
TEMP	18 =	527.00800	(6734.)
TEMP	19 =	527.12000	(6745.)
TEMP	20 =	527.47601	(6781.)
TEMP	21 =	527.36200	(6769.)
TEMP	22 =	527.52899	(6786.)
TEMP	23 =	528.73700	(6907.)
TEMP	24 =	527.90204	(6823.)

PRES	1 =	61.064732	(61939.)

VPRS	1 =	0.44363225	(7596.)
VPRS	2 =	0.43607554	(7544.)
VPRS	3 =	0.43601733	(7544.)
VPRS	4 =	0.42507279	(7468.)
VPRS	5 =	0.21354420	(5495.)
VPRS	6 =	0.19854999	(5296.)
VPRS	7 =	0.20069982	(5325.)
VPRS	8 =	0.20406111	(5371.)
VPRS	9 =	0.20065530	(5325.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1545
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.83832

CORRECTED PRESSURE (PSIA) = 60.769211

VAPOR PRESSURE (PSIA) = 0.29551983

CTMT. AIR MASS (LBM) = 123205.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1600 0523

TEMP	1 =	536.68304	(7701.)
TEMP	2 =	536.56500	(7689.)
TEMP	3 =	536.89404	(7722.)
TEMP	4 =	537.97601	(7831.)
TEMP	5 =	536.64001	(7697.)
TEMP	6 =	536.46802	(7680.)
TEMP	7 =	526.46600	(6680.)
TEMP	8 =	526.78900	(6712.)
TEMP	9 =	526.83801	(6717.)
TEMP	10 =	526.79602	(6713.)
TEMP	11 =	527.65704	(6799.)
TEMP	12 =	526.93304	(6726.)
TEMP	13 =	526.82001	(6715.)
TEMP	14 =	526.97900	(6731.)
TEMP	15 =	526.96301	(6729.)
TEMP	16 =	527.24200	(6757.)
TEMP	17 =	527.23999	(6757.)
TEMP	18 =	527.06201	(6739.)
TEMP	19 =	527.15002	(6748.)
TEMP	20 =	527.53400	(6786.)
TEMP	21 =	527.41803	(6775.)
TEMP	22 =	527.56500	(6789.)
TEMP	23 =	528.83099	(6916.)
TEMP	24 =	528.00299	(6833.)

PRES	1 =	61.066700	(61941.)

VPRS	1 =	0.44286045	(7591.)
VPRS	2 =	0.43642500	(7547.)
VPRS	3 =	0.43553677	(7541.)
VPRS	4 =	0.42514345	(7468.)
VPRS	5 =	0.21401496	(5501.)
VPRS	6 =	0.19941616	(5308.)
VPRS	7 =	0.20233226	(5347.)
VPRS	8 =	0.20453599	(5377.)
VPRS	9 =	0.20153086	(5336.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1600
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.86401

CORRECTED PRESSURE (PSIA) = 60.770782

VAPOR PRESSURE (PSIA) = 0.29591849

CTMT. AIR MASS (LBM) = 123202.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1615 0523

TEMP 1 =	536.67902	(7701.)
TEMP 2 =	536.51703	(7685.)
TEMP 3 =	536.89899	(7723.)
TEMP 4 =	537.92700	(7826.)
TEMP 5 =	536.62604	(7696.)
TEMP 6 =	536.42999	(7676.)
TEMP 7 =	526.53802	(6687.)
TEMP 8 =	526.84204	(6717.)
TEMP 9 =	526.90601	(6724.)
TEMP 10 =	526.85901	(6719.)
TEMP 11 =	527.72302	(6805.)
TEMP 12 =	526.98199	(6731.)
TEMP 13 =	526.87701	(6721.)
TEMP 14 =	527.03003	(6736.)
TEMP 15 =	527.02704	(6736.)
TEMP 16 =	527.29803	(6763.)
TEMP 17 =	527.29102	(6762.)
TEMP 18 =	527.12402	(6745.)
TEMP 19 =	527.21503	(6755.)
TEMP 20 =	527.56799	(6790.)
TEMP 21 =	527.44800	(6778.)
TEMP 22 =	527.63104	(6796.)
TEMP 23 =	528.92804	(6926.)
TEMP 24 =	528.03503	(6837.)

PRES 1 =	61.068668	(61943.)

VPRS 1 =	0.44283134	(7591.)
VPRS 2 =	0.43585715	(7543.)
VPRS 3 =	0.43603200	(7544.)
VPRS 4 =	0.42606258	(7475.)
VPRS 5 =	0.21479011	(5511.)
VPRS 6 =	0.20683295	(5408.)
VPRS 7 =	0.20219125	(5345.)
VPRS 8 =	0.20490699	(5382.)
VPRS 9 =	0.20196126	(5342.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1615
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.89087

CORRECTED PRESSURE (PSIA) = 60.771236

VAPOR PRESSURE (PSIA) = 0.29743046

CTMT. AIR MASS (LBM) = 123197.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1630 0523

TEMP 1 =	536.66101	(7699.)
TEMP 2 =	536.51501	(7685.)
TEMP 3 =	536.87604	(7721.)
TEMP 4 =	537.90399	(7823.)
TEMP 5 =	536.59204	(7692.)
TEMP 6 =	536.40399	(7673.)
TEMP 7 =	526.60901	(6694.)
TEMP 8 =	526.90802	(6724.)
TEMP 9 =	526.96399	(6729.)
TEMP 10 =	526.95404	(6728.)
TEMP 11 =	527.79401	(6812.)
TEMP 12 =	527.04004	(6737.)
TEMP 13 =	526.92499	(6725.)
TEMP 14 =	527.09503	(6743.)
TEMP 15 =	527.07404	(6740.)
TEMP 16 =	527.36499	(6770.)
TEMP 17 =	527.36401	(6769.)
TEMP 18 =	527.19202	(6752.)
TEMP 19 =	527.24805	(6758.)
TEMP 20 =	527.62201	(6795.)
TEMP 21 =	527.52002	(6785.)
TEMP 22 =	527.69702	(6803.)
TEMP 23 =	529.02301	(6935.)
TEMP 24 =	528.12701	(6846.)
PRES 1 =	61.070641	(61945.)
VPRS 1 =	0.44310805	(7593.)
VPRS 2 =	0.43595901	(7543.)
VPRS 3 =	0.43518731	(7538.)
VPRS 4 =	0.42470515	(7465.)
VPRS 5 =	0.21530424	(5518.)
VPRS 6 =	0.20343041	(5362.)
VPRS 7 =	0.20339331	(5362.)
VPRS 8 =	0.20574543	(5393.)
VPRS 9 =	0.20248067	(5349.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1630
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.92212

CORRECTED PRESSURE (PSIA) = 60.773628

VAPOR PRESSURE (PSIA) = 0.29701269

CTMT. AIR MASS (LBM) = 123195.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1645 0523

TEMP	1 =	536.63104	(7696.)
TEMP	2 =	536.50299	(7683.)
TEMP	3 =	536.85004	(7718.)
TEMP	4 =	537.91199	(7824.)
TEMP	5 =	536.59406	(7692.)
TEMP	6 =	536.42004	(7675.)
TEMP	7 =	526.67200	(6700.)
TEMP	8 =	526.96600	(6730.)
TEMP	9 =	527.01202	(6734.)
TEMP	10 =	526.99103	(6732.)
TEMP	11 =	527.85199	(6818.)
TEMP	12 =	527.10101	(6743.)
TEMP	13 =	526.97601	(6731.)
TEMP	14 =	527.15503	(6749.)
TEMP	15 =	527.13300	(6746.)
TEMP	16 =	527.38904	(6772.)
TEMP	17 =	527.39600	(6773.)
TEMP	18 =	527.21100	(6754.)
TEMP	19 =	527.31500	(6764.)
TEMP	20 =	527.65704	(6799.)
TEMP	21 =	527.58301	(6791.)
TEMP	22 =	527.71301	(6804.)
TEMP	23 =	529.11304	(6944.)
TEMP	24 =	528.19000	(6852.)

PRES	1 =	61.072609	(61947.)

VPRS	1 =	0.44224894	(7587.)
VPRS	2 =	0.43537661	(7539.)
VPRS	3 =	0.43504179	(7537.)
VPRS	4 =	0.42652917	(7478.)
VPRS	5 =	0.21575511	(5523.)
VPRS	6 =	0.20314847	(5358.)
VPRS	7 =	0.19989848	(5314.)
VPRS	8 =	0.20622030	(5400.)
VPRS	9 =	0.20205025	(5343.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1645
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.94879

CORRECTED PRESSURE (PSIA) = 60.775837

VAPOR PRESSURE (PSIA) = 0.29677245

CTMT. AIR MASS (LBM) = 123193.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1700 0523

TEMP	1 =	536.63501	(7696.)
TEMP	2 =	536.49402	(7682.)
TEMP	3 =	536.81799	(7715.)
TEMP	4 =	537.90601	(7824.)
TEMP	5 =	536.55499	(7689.)
TEMP	6 =	536.38800	(7672.)
TEMP	7 =	526.73199	(6706.)
TEMP	8 =	527.01404	(6734.)
TEMP	9 =	527.07001	(6740.)
TEMP	10 =	527.03003	(6736.)
TEMP	11 =	527.91602	(6825.)
TEMP	12 =	527.16602	(6750.)
TEMP	13 =	527.02802	(6736.)
TEMP	14 =	527.19702	(6753.)
TEMP	15 =	527.18402	(6751.)
TEMP	16 =	527.42902	(6776.)
TEMP	17 =	527.45404	(6778.)
TEMP	18 =	527.26501	(6760.)
TEMP	19 =	527.37701	(6771.)
TEMP	20 =	527.73505	(6807.)
TEMP	21 =	527.64001	(6797.)
TEMP	22 =	527.75299	(6808.)
TEMP	23 =	529.19604	(6953.)
TEMP	24 =	528.29602	(6863.)
PRES	1 =	61.073593	(61948.)
VPRS	1 =	0.44236547	(7587.)
VPRS	2 =	0.43649778	(7547.)
VPRS	3 =	0.43492526	(7536.)
VPRS	4 =	0.42240030	(7449.)
VPRS	5 =	0.21649869	(5533.)
VPRS	6 =	0.20339331	(5362.)
VPRS	7 =	0.20466952	(5379.)
VPRS	8 =	0.20700932	(5410.)
VPRS	9 =	0.20294069	(5355.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1700
DATE = 0523

TEMPERATURE. (DEGREES R.) = 530.97485

CORRECTED PRESSURE (PSIA) = 60.776344

VAPOR PRESSURE (PSIA) = 0.29725018

CTMT. AIR MASS (LBM) = 123188.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1715 0523

TEMP 1 =	536.57300	(7690.)
TEMP 2 =	536.45703	(7679.)
TEMP 3 =	536.81702	(7715.)
TEMP 4 =	537.92004	(7825.)
TEMP 5 =	536.55103	(7688.)
TEMP 6 =	536.36700	(7670.)
TEMP 7 =	526.80902	(6714.)
TEMP 8 =	527.07501	(6741.)
TEMP 9 =	527.13300	(6746.)
TEMP 10 =	527.07501	(6741.)
TEMP 11 =	527.97699	(6831.)
TEMP 12 =	527.19904	(6753.)
TEMP 13 =	527.08099	(6741.)
TEMP 14 =	527.26404	(6759.)
TEMP 15 =	527.24200	(6757.)
TEMP 16 =	527.49103	(6782.)
TEMP 17 =	527.48401	(6781.)
TEMP 18 =	527.32300	(6765.)
TEMP 19 =	527.42999	(6776.)
TEMP 20 =	527.73700	(6807.)
TEMP 21 =	527.65002	(6798.)
TEMP 22 =	527.83203	(6816.)
TEMP 23 =	529.29004	(6962.)
TEMP 24 =	528.36200	(6869.)
PRES 1 =	61.076550	(61951.)
VPRS 1 =	0.44203055	(7585.)
VPRS 2 =	0.43562421	(7541.)
VPRS 3 =	0.43530384	(7539.)
VPRS 4 =	0.42518598	(7469.)
VPRS 5 =	0.21698120	(5539.)
VPRS 6 =	0.20474377	(5380.)
VPRS 7 =	0.20256972	(5350.)
VPRS 8 =	0.20704767	(5410.)
VPRS 9 =	0.20287392	(5355.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1715
DATE = 0523

TEMPERATURE (DEGREES R.) = 530.99854

CORRECTED PRESSURE (PSIA) = 60.778984

VAPOR PRESSURE (PSIA) = 0.29756388

CTMT. AIR MASS (LBM) = 123188.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1730 0523

TEMP	1 =	536.55902	(7689.)
TEMP	2 =	536.46204	(7679.)
TEMP	3 =	536.79199	(7712.)
TEMP	4 =	537.87305	(7820.)
TEMP	5 =	536.54999	(7688.)
TEMP	6 =	536.35303	(7668.)
TEMP	7 =	526.86304	(6719.)
TEMP	8 =	527.13904	(6747.)
TEMP	9 =	527.19904	(6753.)
TEMP	10 =	527.13000	(6746.)
TEMP	11 =	528.02899	(6836.)
TEMP	12 =	527.25903	(6759.)
TEMP	13 =	527.12604	(6746.)
TEMP	14 =	527.31903	(6765.)
TEMP	15 =	527.29199	(6762.)
TEMP	16 =	527.52399	(6785.)
TEMP	17 =	527.53601	(6787.)
TEMP	18 =	527.36804	(6770.)
TEMP	19 =	527.47900	(6781.)
TEMP	20 =	527.81702	(6815.)
TEMP	21 =	527.74902	(6808.)
TEMP	22 =	527.83899	(6817.)
TEMP	23 =	529.36804	(6970.)
TEMP	24 =	528.44000	(6877.)
PRES	1 =	61.078518	(61953.)
VPRS	1 =	0.44203055	(7565.)
VPRS	2 =	0.43562421	(7541.)
VPRS	3 =	0.43536204	(7539.)
VPRS	4 =	0.42674127	(7480.)
VPRS	5 =	0.21815978	(5554.)
VPRS	6 =	0.20089275	(5328.)
VPRS	7 =	0.19637448	(5266.)
VPRS	8 =	0.20813681	(5425.)
VPRS	9 =	0.20415755	(5372.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1730
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.02777

CORRECTED PRESSURE (PSIA) = 60.781651

VAPOR PRESSURE (PSIA) = 0.29686862

CTMT. AIR MASS (LBM) = 123186.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1745 0523

TEMP	1 =	536.54901	(7688.)
TEMP	2 =	536.44904	(7678.)
TEMP	3 =	536.78601	(7712.)
TEMP	4 =	537.85803	(7819.)
TEMP	5 =	536.50299	(7683.)
TEMP	6 =	536.35400	(7668.)
TEMP	7 =	526.92603	(6726.)
TEMP	8 =	527.17999	(6751.)
TEMP	9 =	527.25403	(6758.)
TEMP	10 =	527.20203	(6753.)
TEMP	11 =	528.08600	(6842.)
TEMP	12 =	527.31299	(6764.)
TEMP	13 =	527.18903	(6752.)
TEMP	14 =	527.35803	(6769.)
TEMP	15 =	527.34204	(6767.)
TEMP	16 =	527.56702	(6790.)
TEMP	17 =	527.60303	(6793.)
TEMP	18 =	527.41400	(6774.)
TEMP	19 =	527.54401	(6787.)
TEMP	20 =	527.84204	(6817.)
TEMP	21 =	527.78900	(6812.)
TEMP	22 =	527.87305	(6820.)
TEMP	23 =	529.44104	(6977.)
TEMP	24 =	528.54102	(6887.)
PRES	1 =	61.080490	(61955.)
VPRS	1 =	0.44185579	(7584.)
VPRS	2 =	0.43534750	(7539.)
VPRS	3 =	0.43779367	(7556.)
VPRS	4 =	0.42437989	(7463.)
VPRS	5 =	0.21818353	(5554.)
VPRS	6 =	0.21003130	(5449.)
VPRS	7 =	0.20350461	(5363.)
VPRS	8 =	0.20890382	(5435.)
VPRS	9 =	0.20484762	(5381.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1745
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.05487

CORRECTED PRESSURE (PSIA) = 60.781334

VAPOR PRESSURE (PSIA) = 0.29915547

CTMT. AIR MASS (LBM) = 123179.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1800 0523

TEMP	1 =	536.49402	(7682.)
TEMP	2 =	536.44000	(7677.)
TEMP	3 =	536.75800	(7709.)
TEMP	4 =	537.89203	(7822.)
TEMP	5 =	536.50604	(7684.)
TEMP	6 =	536.33502	(7667.)
TEMP	7 =	526.97803	(6731.)
TEMP	8 =	527.23004	(6756.)
TEMP	9 =	527.30200	(6763.)
TEMP	10 =	527.20905	(6754.)
TEMP	11 =	528.16003	(6849.)
TEMP	12 =	527.36401	(6769.)
TEMP	13 =	527.23999	(6757.)
TEMP	14 =	527.39703	(6773.)
TEMP	15 =	527.39600	(6773.)
TEMP	16 =	527.61304	(6794.)
TEMP	17 =	527.64600	(6798.)
TEMP	18 =	527.46399	(6779.)
TEMP	19 =	527.54700	(6788.)
TEMP	20 =	527.89301	(6822.)
TEMP	21 =	527.83600	(6817.)
TEMP	22 =	527.92902	(6826.)
TEMP	23 =	529.50702	(6984.)
TEMP	24 =	528.64099	(6897.)
PRES	1 =	61.081474	(61956.)
VPRS	1 =	0.44179758	(7584.)
VPRS	2 =	0.43537661	(7539.)
VPRS	3 =	0.43511465	(7538.)
VPRS	4 =	0.42695346	(7481.)
VPRS	5 =	0.21880050	(5562.)
VPRS	6 =	0.20954810	(5443.)
VPRS	7 =	0.18409775	(5091.)
VPRS	8 =	0.20934100	(5440.)
VPRS	9 =	0.20438758	(5375.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1800
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.07556

CORRECTED PRESSURE (PSIA) = 60.784172

VAPOR PRESSURE (PSIA) = 0.29730105

CTMT. AIR MASS (LBM) = 123180.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1815 0523

TEMP	1 =	536.50299	(7683.)
TEMP	2 =	536.41101	(7674.)
TEMP	3 =	536.76001	(7709.)
TEMP	4 =	537.87604	(7821.)
TEMP	5 =	536.48102	(7681.)
TEMP	6 =	536.30701	(7664.)
TEMP	7 =	527.01904	(6735.)
TEMP	8 =	527.29199	(6762.)
TEMP	9 =	527.36603	(6770.)
TEMP	10 =	527.25000	(6758.)
TEMP	11 =	528.21204	(6854.)
TEMP	12 =	527.41400	(6774.)
TEMP	13 =	527.29199	(6762.)
TEMP	14 =	527.45203	(6778.)
TEMP	15 =	527.44403	(6777.)
TEMP	16 =	527.67804	(6801.)
TEMP	17 =	527.70001	(6803.)
TEMP	18 =	527.51001	(6784.)
TEMP	19 =	527.60699	(6794.)
TEMP	20 =	527.93500	(6827.)
TEMP	21 =	527.86005	(6819.)
TEMP	22 =	527.97101	(6830.)
TEMP	23 =	529.58405	(6991.)
TEMP	24 =	528.72003	(6905.)
PRES	1 =	61.083443	(61958.)
VPRS	1 =	0.44187036	(7584.)
VPRS	2 =	0.43502724	(7537.)
VPRS	3 =	0.43485263	(7536.)
VPRS	4 =	0.42282447	(7452.)
VPRS	5 =	0.21941744	(5570.)
VPRS	6 =	0.20742351	(5415.)
VPRS	7 =	0.20549315	(5390.)
VPRS	8 =	0.20924129	(5439.)
VPRS	9 =	0.20481794	(5381.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1815
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.10199

CORRECTED PRESSURE (PSIA) = 60.784702

VAPOR PRESSURE (PSIA) = 0.29873884

CTMT. AIR MASS (LBM) = 123175.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1830 0523

TEMP	1 =	536.49603	(7683.)
TEMP	2 =	536.42102	(7675.)
TEMP	3 =	536.72400	(7705.)
TEMP	4 =	537.84705	(7818.)
TEMP	5 =	536.48602	(7682.)
TEMP	6 =	536.30603	(7664.)
TEMP	7 =	527.08801	(6742.)
TEMP	8 =	527.33203	(6766.)
TEMP	9 =	527.41699	(6775.)
TEMP	10 =	527.29700	(6763.)
TEMP	11 =	528.27203	(6860.)
TEMP	12 =	527.45300	(6778.)
TEMP	13 =	527.34802	(6768.)
TEMP	14 =	527.48602	(6782.)
TEMP	15 =	527.50000	(6783.)
TEMP	16 =	527.71704	(6805.)
TEMP	17 =	527.73901	(6807.)
TEMP	18 =	527.57001	(6790.)
TEMP	19 =	527.65900	(6799.)
TEMP	20 =	527.97504	(6831.)
TEMP	21 =	527.91400	(6824.)
TEMP	22 =	528.01904	(6835.)
TEMP	23 =	529.64703	(6998.)
TEMP	24 =	528.83002	(6916.)
PRES	1 =	61.085411	(61960.)
VPRS	1 =	0.44219083	(7586.)
VPRS	2 =	0.43582806	(7543.)
VPRS	3 =	0.43389162	(7529.)
VPRS	4 =	0.42355978	(7457.)
VPRS	5 =	0.22008188	(5578.)
VPRS	6 =	0.20417982	(5372.)
VPRS	7 =	0.20527798	(5387.)
VPRS	8 =	0.21023074	(5452.)
VPRS	9 =	0.20563416	(5392.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1830
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.13013

CORRECTED PRESSURE (PSIA) = 60.786880

VAPOR PRESSURE (PSIA) = 0.29853201

CTMT. AIR MASS (LBM) = 123173.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1845 0523

TEMP 1 =	536.48004	(7681.)
TEMP 2 =	536.38000	(7671.)
TEMP 3 =	536.75000	(7708.)
TEMP 4 =	537.84003	(7817.)
TEMP 5 =	536.45001	(7678.)
TEMP 6 =	536.27002	(7660.)
TEMP 7 =	527.14001	(6747.)
TEMP 8 =	527.38000	(6771.)
TEMP 9 =	527.47003	(6780.)
TEMP 10 =	527.36005	(6769.)
TEMP 11 =	528.32001	(6865.)
TEMP 12 =	527.52002	(6785.)
TEMP 13 =	527.39001	(6772.)
TEMP 14 =	527.55005	(6788.)
TEMP 15 =	527.57001	(6790.)
TEMP 16 =	527.77002	(6810.)
TEMP 17 =	527.78003	(6811.)
TEMP 18 =	527.60004	(6793.)
TEMP 19 =	527.69000	(6802.)
TEMP 20 =	528.01001	(6834.)
TEMP 21 =	527.94000	(6827.)
TEMP 22 =	528.03003	(6836.)
TEMP 23 =	529.71002	(7004.)
TEMP 24 =	528.95001	(6928.)

PRES 1 =	61.085411	(61960.)

VPRS 1 =	0.44128805	(7580.)
VPRS 2 =	0.43546402	(7540.)
VPRS 3 =	0.43429920	(7532.)
VPRS 4 =	0.42497376	(7467.)
VPRS 5 =	0.22056440	(5584.)
VPRS 6 =	0.21977341	(5574.)
VPRS 7 =	0.20977819	(5446.)
VPRS 8 =	0.21100542	(5462.)
VPRS 9 =	0.20602740	(5397.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1845
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.15369

CORRECTED PRESSURE (PSIA) = 60.783600

VAPOR PRESSURE (PSIA) = 0.30181286

CTMT. AIR MASS (LBM) = 123161.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1900 0523

TEMP	1 =	536.48004	(7681.)
TEMP	2 =	536.37000	(7670.)
TEMP	3 =	536.70001	(7703.)
TEMP	4 =	537.86005	(7819.)
TEMP	5 =	536.44000	(7677.)
TEMP	6 =	536.23999	(7657.)
TEMP	7 =	527.20001	(6753.)
TEMP	8 =	527.44000	(6777.)
TEMP	9 =	527.51001	(6784.)
TEMP	10 =	527.40002	(6773.)
TEMP	11 =	528.37000	(6870.)
TEMP	12 =	527.55005	(6788.)
TEMP	13 =	527.44000	(6777.)
TEMP	14 =	527.61005	(6794.)
TEMP	15 =	527.63000	(6796.)
TEMP	16 =	527.81000	(6814.)
TEMP	17 =	527.81000	(6814.)
TEMP	18 =	527.65002	(6798.)
TEMP	19 =	527.75000	(6808.)
TEMP	20 =	528.06000	(6839.)
TEMP	21 =	527.98999	(6832.)
TEMP	22 =	528.07001	(6840.)
TEMP	23 =	529.78003	(7011.)
TEMP	24 =	529.03003	(6936.)
PRES	1 =	61.087383	(61962.)
VPRS	1 =	0.44099680	(7578.)
VPRS	2 =	0.43502724	(7537.)
VPRS	3 =	0.43400803	(7530.)
VPRS	4 =	0.42426684	(7462.)
VPRS	5 =	0.22151358	(5596.)
VPRS	6 =	0.21755859	(5546.)
VPRS	7 =	0.21046849	(5455.)
VPRS	8 =	0.21054521	(5456.)
VPRS	9 =	0.20617580	(5399.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1900
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.17719

CORRECTED PRESSURE (PSIA) = 60.785881

VAPOR PRESSURE (PSIA) = 0.30150235

CTMT. AIR MASS (LBM) = 123160.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1915 0523

TEMP	1 =	536.48004	(7681.)
TEMP	2 =	536.37000	(7670.)
TEMP	3 =	536.67999	(7701.)
TEMP	4 =	537.84003	(7817.)
TEMP	5 =	536.45001	(7678.)
TEMP	6 =	536.23999	(7657.)
TEMP	7 =	527.25000	(6758.)
TEMP	8 =	527.48004	(6781.)
TEMP	9 =	527.58002	(6791.)
TEMP	10 =	527.45001	(6778.)
TEMP	11 =	528.42004	(6875.)
TEMP	12 =	527.62000	(6795.)
TEMP	13 =	527.48004	(6781.)
TEMP	14 =	527.63000	(6796.)
TEMP	15 =	527.65002	(6798.)
TEMP	16 =	527.87000	(6820.)
TEMP	17 =	527.86005	(6819.)
TEMP	18 =	527.67999	(6801.)
TEMP	19 =	527.77002	(6810.)
TEMP	20 =	528.11005	(6844.)
TEMP	21 =	528.04004	(6837.)
TEMP	22 =	528.11005	(6844.)
TEMP	23 =	530.83002	(7116.)
TEMP	24 =	529.11005	(6944.)
PRES	1 =	61.088367	(61963.)
VPRS	1 =	0.43997759	(7571.)
VPRS	2 =	0.43473598	(7535.)
VPRS	3 =	0.43444481	(7533.)
VPRS	4 =	0.42681202	(7480.)
VPRS	5 =	0.22143450	(5595.)
VPRS	6 =	0.21890330	(5563.)
VPRS	7 =	0.21062189	(5457.)
VPRS	8 =	0.21146560	(5468.)
VPRS	9 =	0.20617580	(5399.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1915
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.21979

CORRECTED PRESSURE (PSIA) = 60.786385

VAPOR PRESSURE (PSIA) = 0.30198163

CTMT. AIR MASS (LBM) = 123151.

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1930 0523

TEMP	1 =	536.44702	(7678.)
TEMP	2 =	536.34302	(7667.)
TEMP	3 =	536.66101	(7699.)
TEMP	4 =	537.83405	(7816.)
TEMP	5 =	536.39502	(7673.)
TEMP	6 =	536.23303	(7656.)
TEMP	7 =	527.27802	(6761.)
TEMP	8 =	527.52704	(6786.)
TEMP	9 =	527.62903	(6796.)
TEMP	10 =	527.49902	(6783.)
TEMP	11 =	528.46204	(6879.)
TEMP	12 =	527.67200	(6800.)
TEMP	13 =	527.50604	(6784.)
TEMP	14 =	527.67700	(6801.)
TEMP	15 =	527.69604	(6803.)
TEMP	16 =	527.87799	(6821.)
TEMP	17 =	527.91400	(6824.)
TEMP	18 =	527.72601	(6806.)
TEMP	19 =	527.82904	(6816.)
TEMP	20 =	528.13300	(6846.)
TEMP	21 =	528.09003	(6842.)
TEMP	22 =	528.15601	(6849.)
TEMP	23 =	529.88702	(7022.)
TEMP	24 =	529.19000	(6952.)
PRES	1 =	61.089352	(61964.)
VPRS	1 =	0.44128805	(7580.)
VPRS	2 =	0.43558043	(7541.)
VPRS	3 =	0.43432829	(7532.)
VPRS	4 =	0.42404050	(7460.)
VPRS	5 =	0.22207512	(5603.)
VPRS	6 =	0.21559696	(5521.)
VPRS	7 =	0.20750019	(5416.)
VPRS	8 =	0.21210223	(5476.)
VPRS	9 =	0.20682526	(5408.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1930
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.21942

CORRECTED PRESSURE (PSIA) = 60.788082

VAPOR PRESSURE (PSIA) = 0.30126810

CTMT. AIR MASS (LBM) = 123155.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 1945 0523

TEMP	1 =	536.45404	(7678.)
TEMP	2 =	536.34705	(7668.)
TEMP	3 =	536.67401	(7700.)
TEMP	4 =	537.80902	(7814.)
TEMP	5 =	536.37701	(7671.)
TEMP	6 =	536.21600	(7655.)
TEMP	7 =	527.33704	(6767.)
TEMP	8 =	527.57501	(6791.)
TEMP	9 =	527.67102	(6800.)
TEMP	10 =	527.55200	(6788.)
TEMP	11 =	528.50903	(6884.)
TEMP	12 =	527.70703	(6804.)
TEMP	13 =	527.56403	(6789.)
TEMP	14 =	527.71704	(6805.)
TEMP	15 =	527.75702	(6809.)
TEMP	16 =	527.93903	(6827.)
TEMP	17 =	527.95703	(6829.)
TEMP	18 =	527.76202	(6809.)
TEMP	19 =	527.86700	(6820.)
TEMP	20 =	528.17804	(6851.)
TEMP	21 =	528.10602	(6844.)
TEMP	22 =	528.19702	(6853.)
TEMP	23 =	529.93903	(7027.)
TEMP	24 =	529.24701	(6958.)
PRES	1 =	61.091324	(61966.)
VPRS	1 =	0.43952626	(7568.)
VPRS	2 =	0.43408081	(7531.)
VPRS	3 =	0.43425554	(7532.)
VPRS	4 =	0.42382839	(7459.)
VPRS	5 =	0.22265518	(5610.)
VPRS	6 =	0.22013728	(5579.)
VPRS	7 =	0.20923363	(5439.)
VPRS	8 =	0.21268514	(5484.)
VPRS	9 =	0.20739281	(5415.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 1945
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.24689

CORRECTED PRESSURE (PSIA) = 60.789280

VAPOR PRESSURE (PSIA) = 0.30204388

CTMT. AIR MASS (LBM) = 123151.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2000 0523

TEMP	1 =	536.42999	(7676.)
TEMP	2 =	536.33203	(7666.)
TEMP	3 =	536.66699	(7700.)
TEMP	4 =	537.77100	(7810.)
TEMP	5 =	536.40399	(7673.)
TEMP	6 =	536.20599	(7654.)
TEMP	7 =	527.39001	(6772.)
TEMP	8 =	527.63000	(6796.)
TEMP	9 =	527.71204	(6804.)
TEMP	10 =	527.58203	(6791.)
TEMP	11 =	528.57001	(6890.)
TEMP	12 =	527.73901	(6807.)
TEMP	13 =	527.60602	(6794.)
TEMP	14 =	527.76105	(6809.)
TEMP	15 =	527.79700	(6813.)
TEMP	16 =	527.97504	(6831.)
TEMP	17 =	528.01300	(6834.)
TEMP	18 =	527.82202	(6815.)
TEMP	19 =	527.92004	(6825.)
TEMP	20 =	528.22400	(6855.)
TEMP	21 =	528.13000	(6846.)
TEMP	22 =	528.24200	(6857.)
TEMP	23 =	530.00104	(7033.)
TEMP	24 =	529.33899	(6967.)
PRES	1 =	61.091324	(61966.)
VPRS	1 =	0.42525664	(7469.)
VPRS	2 =	0.42887652	(7495.)
VPRS	3 =	0.43394974	(7530.)
VPRS	4 =	0.42655745	(7478.)
VPRS	5 =	0.22346400	(5620.)
VPRS	6 =	0.21759024	(5546.)
VPRS	7 =	0.20991629	(5448.)
VPRS	8 =	0.21307629	(5489.)
VPRS	9 =	0.20802942	(5423.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2000
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.27240

CORRECTED PRESSURE (PSIA) = 60.791073

VAPOR PRESSURE (PSIA) = 0.30025002

CTMT. AIR MASS (LBM) = 123149.

APPENDIX E

SHORT DURATION (8-HOUR) ILRT RAW DATA

SUMMARY OF MEASURED DATA AT 2015 0523

TEMP	1 =	536.41101	(7674.)
TEMP	2 =	536.30402	(7663.)
TEMP	3 =	536.65802	(7699.)
TEMP	4 =	537.80304	(7813.)
TEMP	5 =	536.37903	(7671.)
TEMP	6 =	536.17999	(7651.)
TEMP	7 =	527.43701	(6777.)
TEMP	8 =	527.67102	(6800.)
TEMP	9 =	527.76703	(6810.)
TEMP	10 =	527.61499	(6795.)
TEMP	11 =	528.59601	(6893.)
TEMP	12 =	527.78101	(6811.)
TEMP	13 =	527.63104	(6796.)
TEMP	14 =	527.82001	(6815.)
TEMP	15 =	527.84406	(6817.)
TEMP	16 =	528.01001	(6834.)
TEMP	17 =	528.05200	(6838.)
TEMP	18 =	527.87103	(6820.)
TEMP	19 =	527.95203	(6828.)
TEMP	20 =	528.24304	(6857.)
TEMP	21 =	528.15601	(6849.)
TEMP	22 =	528.27502	(6861.)
TEMP	23 =	530.06104	(7039.)
TEMP	24 =	529.42902	(6976.)
PRES	1 =	61.093292	(61968.)
VPRS	1 =	0.43581361	(7542.)
VPRS	2 =	0.43341118	(7526.)
VPRS	3 =	0.43373135	(7528.)
VPRS	4 =	0.42422432	(7462.)
VPRS	5 =	0.22381531	(5624.)
VPRS	6 =	0.21657777	(5534.)
VPRS	7 =	0.21013102	(5451.)
VPRS	8 =	0.21307629	(5489.)
VPRS	9 =	0.20824422	(5426.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2015
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.29041

CORRECTED PRESSURE (PSIA) = 60.791882

VAPOR PRESSURE (PSIA) = 0.30141065

CTMT. AIR MASS (LBM) = 123146.

APPENDIX E

PRINTED REPORTS FOR VERIFICATION TESTS

SUSQUEHANNA VERIFICATION TEST

LEAKAGE RATE (WEIGHT PERCENT/DAY)
TOTAL-TIME ANALYSIS

TIME AND DATE AT START OF TEST: 2130 0523
ELAPSED TIME: 4.00 HOURS

TIME	TEMP. (R)	PRESSURE (PSIA)	MEASURED LEAKAGE RATE
2130	531.393	60.7727	
2145	531.413	60.7674	1.199
2200	531.432	60.7627	1.133
2215	531.445	60.7586	1.052
2230	531.467	60.7543	1.061
2245	531.487	60.7502	1.048
2300	531.504	60.7455	1.049
2315	531.516	60.7400	1.053
2330	531.533	60.7347	1.066
2345	531.550	60.7312	1.043
0	531.568	60.7263	1.049
15	531.587	60.7211	1.059
30	531.603	60.7167	1.052
45	531.616	60.7121	1.045
100	531.633	60.7068	1.051
115	531.647	60.7009	1.061
130	531.668	60.6962	1.064

MEAN OF MEASURED LEAKAGE RATES = 1.068

VERIFICATION TEST LEAKAGE RATE UPPER LIMIT = 1.403
VERIFICATION TEST LEAKAGE RATE LOWER LIMIT = 0.903
THE CALCULATED LEAKAGE RATE = 1.034

PRINTED REPORTS FOR VERIFICATION TESTS (CONT'D)

SUSQUEHANNA VERIFICATION TEST

LEAKAGE RATE (WEIGHT PERCENT/DAY)
MASS-POINT ANALYSIS

TIME AND DATE AT START OF TEST: 2130 0523
ELAPSED TIME: 4.00 HOURS

TIME	TEMP (R)	PRESSURE (PSIA)	CTMT. AIR MASS (LBM)	MASS LOSS (LBM)	TOT.AVG. MASS LOSS (LBM/HR)
2130	531.393	60.7727	123083.		
2145	531.413	60.7674	123068.	15.4	61.5
2200	531.432	60.7627	123054.	13.7	58.1
2215	531.445	60.7586	123043.	11.4	54.0
2230	531.467	60.7543	123029.	13.9	54.4
2245	531.487	60.7502	123016.	12.8	53.8
2300	531.504	60.7455	123003.	13.5	53.8
2315	531.516	60.7400	122989.	13.8	54.0
2330	531.533	60.7347	122974.	14.8	54.7
2345	531.550	60.7312	122963.	11.0	53.5
0	531.568	60.7263	122949.	14.1	53.8
15	531.587	60.7211	122934.	14.9	54.3
30	531.603	60.7167	122922.	12.4	53.9
45	531.616	60.7121	122909.	12.4	53.6
100	531.633	60.7068	122895.	14.4	53.9
115	531.647	60.7009	122879.	15.3	54.4
130	531.668	60.6962	122865.	14.4	54.6

FREE AIR VOLUME USED (MILLIONS OF CU. FT.) = 0.399

REGRESSION LINE
INTERCEPT (LBM) = 123083.
SLOPE (LBM/HR) = -53.9

VERIFICATION TEST LEAKAGE RATE UPPER LIMIT = 1.403
VERIFICATION TEST LEAKAGE RATE LOWER LIMIT = 0.903
THE CALCULATED LEAKAGE RATE = 1.052

CONT. FREE AIR VOLUME AT TIME 130 = 398730.

PRINTED REPORTS FOR VERIFICATION TESTS (CONT'D)

TEST.DAT

SUSQUEHANNA VERIFICATION TEST

ALMAX = 1.000 VOL = 398730.00

VRATET = 1.153 VRATEM = 1.153 VRATEP = 1.166

TIME	DATE	TEMP	PRESSURE	VPRS	VOLUME
2030	523	531.31433	60.791206	0.30208570	398730.
2045	523	531.33148	60.786640	0.30271029	398730.
2100	523	531.35114	60.782059	0.30236676	398730.
2115	523	531.37244	60.776264	0.30323720	398730.
2130	523	531.39331	60.772675	0.30289033	398730.
2145	523	531.41339	60.767387	0.30325145	398730.
2200	523	531.43152	60.762703	0.30301094	398730.
2215	523	531.44458	60.758553	0.30322409	398730.
2230	523	531.46729	60.754272	0.30356267	398730.
2245	523	531.48706	60.750210	0.30368873	398730.
2300	523	531.50385	60.745472	0.30448389	398730.
2315	523	531.51593	60.740021	0.30501249	398730.
2330	523	531.53339	60.734684	0.30542383	398730.
2345	523	531.55023	60.731201	0.30496493	398730.
0	524	531.56830	60.726273	0.30496955	398730.
15	524	531.58734	60.721088	0.30523035	398730.
30	524	531.60266	60.716690	0.30569163	398730.
45	524	531.61584	60.712059	0.30539599	398730.
100	524	531.63251	60.706841	0.30568972	398730.
115	524	531.64691	60.700928	0.30667788	398730.
130	524	531.66797	60.696239	0.30644378	398730.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2030 0523

TEMP	1 =	536.39099	(7672.)
TEMP	2 =	536.29700	(7663.)
TEMP	3 =	536.65802	(7699.)
TEMP	4 =	537.77502	(7811.)
TEMP	5 =	536.36102	(7669.)
TEMP	6 =	536.19000	(7652.)
TEMP	7 =	527.48901	(6782.)
TEMP	8 =	527.71600	(6805.)
TEMP	9 =	527.83099	(6816.)
TEMP	10 =	527.65100	(6798.)
TEMP	11 =	528.64502	(6898.)
TEMP	12 =	527.82703	(6816.)
TEMP	13 =	527.66302	(6799.)
TEMP	14 =	527.84900	(6818.)
TEMP	15 =	527.89099	(6822.)
TEMP	16 =	528.06201	(6839.)
TEMP	17 =	528.09601	(6843.)
TEMP	18 =	527.92004	(6825.)
TEMP	19 =	528.00201	(6833.)
TEMP	20 =	528.26599	(6860.)
TEMP	21 =	528.17999	(6851.)
TEMP	22 =	528.32300	(6865.)
TEMP	23 =	530.10602	(7044.)
TEMP	24 =	529.50500	(6984.)
PRES	1 =	61.093292	(61968.)
VPRS	1 =	0.43662885	(7548.)
VPRS	2 =	0.43242100	(7519.)
VPRS	3 =	0.43406627	(7530.)
VPRS	4 =	0.42443654	(7463.)
VPRS	5 =	0.22465682	(5635.)
VPRS	6 =	0.21796201	(5551.)
VPRS	7 =	0.21153462	(5469.)
VPRS	8 =	0.21365155	(5497.)
VPRS	9 =	0.20933338	(5440.).

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2030
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.31433

CORRECTED PRESSURE (PSIA) = 60.791206

VAPOR PRESSURE (PSIA) = 0.30208570

CTMT. AIR MASS (LBM) = 123139.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2045 0523

TEMP	1 =	536.37201	(7670.)
TEMP	2 =	536.27399	(7660.)
TEMP	3 =	536.63000	(7696.)
TEMP	4 =	537.74603	(7808.)
TEMP	5 =	536.35504	(7669.)
TEMP	6 =	536.16302	(7649.)
TEMP	7 =	527.53802	(6787.)
TEMP	8 =	527.76501	(6810.)
TEMP	9 =	527.85303	(6818.)
TEMP	10 =	527.71600	(6805.)
TEMP	11 =	528.68903	(6902.)
TEMP	12 =	527.86304	(6819.)
TEMP	13 =	527.70905	(6804.)
TEMP	14 =	527.88904	(6822.)
TEMP	15 =	527.93604	(6827.)
TEMP	16 =	528.10504	(6844.)
TEMP	17 =	528.12701	(6846.)
TEMP	18 =	527.96802	(6830.)
TEMP	19 =	528.02002	(6835.)
TEMP	20 =	528.29102	(6862.)
TEMP	21 =	528.21600	(6855.)
TEMP	22 =	528.35803	(6869.)
TEMP	23 =	530.16199	(7049.)
TEMP	24 =	529.57404	(6990.)

PRES	1 =	61.089352	(61964.)

VPRS	1 =	0.43664339	(7548.)
VPRS	2 =	0.43122706	(7511.)
VPRS	3 =	0.43419734	(7531.)
VPRS	4 =	0.42486072	(7466.)
VPRS	5 =	0.22514701	(5641.)
VPRS	6 =	0.22051693	(5583.)
VPRS	7 =	0.21230930	(5479.)
VPRS	8 =	0.21462399	(5509.)
VPRS	9 =	0.20888852	(5434.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2045
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.33148

CORRECTED PRESSURE (PSIA) = 60.786640

VAPOR PRESSURE (PSIA) = 0.30271029

CTMT. AIR MASS (LBM) = 123126.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2100 0523

TEMP 1 =	536.35101	(7668.)
TEMP 2 =	536.25800	(7659.)
TEMP 3 =	536.62604	(7696.)
TEMP 4 =	537.78503	(7812.)
TEMP 5 =	536.33301	(7666.)
TEMP 6 =	536.13800	(7647.)
TEMP 7 =	527.58405	(6791.)
TEMP 8 =	527.80402	(6813.)
TEMP 9 =	527.89404	(6822.)
TEMP 10 =	527.76404	(6809.)
TEMP 11 =	528.73199	(6906.)
TEMP 12 =	527.91302	(6824.)
TEMP 13 =	527.75104	(6808.)
TEMP 14 =	527.92004	(6825.)
TEMP 15 =	527.95502	(6829.)
TEMP 16 =	528.14703	(6848.)
TEMP 17 =	528.17102	(6850.)
TEMP 18 =	527.99402	(6832.)
TEMP 19 =	528.08301	(6841.)
TEMP 20 =	528.33099	(6866.)
TEMP 21 =	528.26801	(6860.)
TEMP 22 =	528.39001	(6872.)
TEMP 23 =	530.20905	(7054.)
TEMP 24 =	529.63403	(6996.)
PRES 1 =	61.084427	(61959.)
VPRS 1 =	0.43734223	(7553.)
VPRS 2 =	0.43239200	(7519.)
VPRS 3 =	0.43367323	(7528.)
VPRS 4 =	0.42471939	(7465.)
VPRS 5 =	0.22591500	(5650.)
VPRS 6 =	0.21657777	(5534.)
VPRS 7 =	0.21075232	(5459.)
VPRS 8 =	0.21628508	(5530.)
VPRS 9 =	0.20954043	(5443.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2100
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.35114

CORRECTED PRESSURE (PSIA) = 60.782059

VAPOR PRESSURE (PSIA) = 0.30236676

CTMT. AIR MASS (LBM) = 123112.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2115 0523

TEMP 1 =	536.35004	(7668.)
TEMP 2 =	536.25104	(7658.)
TEMP 3 =	536.61401	(7694.)
TEMP 4 =	537.77502	(7811.)
TEMP 5 =	536.31299	(7664.)
TEMP 6 =	536.14301	(7647.)
TEMP 7 =	527.65100	(6798.)
TEMP 8 =	527.83704	(6817.)
TEMP 9 =	527.95703	(6829.)
TEMP 10 =	527.79999	(6813.)
TEMP 11 =	528.77100	(6910.)
TEMP 12 =	527.95099	(6828.)
TEMP 13 =	527.80200	(6813.)
TEMP 14 =	527.95404	(6828.)
TEMP 15 =	528.01001	(6834.)
TEMP 16 =	528.14600	(6848.)
TEMP 17 =	528.20001	(6853.)
TEMP 18 =	528.03302	(6836.)
TEMP 19 =	528.10199	(6843.)
TEMP 20 =	528.35803	(6869.)
TEMP 21 =	528.28802	(6862.)
TEMP 22 =	528.42200	(6875.)
TEMP 23 =	530.26404	(7059.)
TEMP 24 =	529.69299	(7002.)

PRES 1 =	61.079502	(61954.)

VPRS 1 =	0.43834689	(7560.)
VPRS 2 =	0.43255195	(7520.)
VPRS 3 =	0.43338197	(7526.)
VPRS 4 =	0.42559591	(7471.)
VPRS 5 =	0.22585781	(5649.)
VPRS 6 =	0.21991578	(5576.)
VPRS 7 =	0.21285389	(5486.)
VPRS 8 =	0.21579470	(5524.)
VPRS 9 =	0.20943305	(5442.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2115
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.37244

CORRECTED PRESSURE (PSIA) = 60.776264

VAPOR PRESSURE (PSIA) = 0.30323720

CTMT. AIR MASS (LBM) = 123095.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2130 0523

TEMP	1 =	536.35101	(7668.)
TEMP	2 =	536.22900	(7656.)
TEMP	3 =	536.60004	(7693.)
TEMP	4 =	537.77502	(7811.)
TEMP	5 =	536.32202	(7665.)
TEMP	6 =	536.13800	(7647.)
TEMP	7 =	527.68604	(6802.)
TEMP	8 =	527.88904	(6822.)
TEMP	9 =	527.98004	(6831.)
TEMP	10 =	527.84601	(6818.)
TEMP	11 =	528.80902	(6914.)
TEMP	12 =	527.98004	(6831.)
TEMP	13 =	527.83502	(6817.)
TEMP	14 =	527.99103	(6832.)
TEMP	15 =	528.04602	(6838.)
TEMP	16 =	528.17902	(6851.)
TEMP	17 =	528.23901	(6857.)
TEMP	18 =	528.08002	(6841.)
TEMP	19 =	528.14301	(6847.)
TEMP	20 =	528.39600	(6873.)
TEMP	21 =	528.31799	(6865.)
TEMP	22 =	528.44702	(6878.)
TEMP	23 =	530.32001	(7065.)
TEMP	24 =	529.75104	(7008.)
PRES	1 =	61.075565	(61950.)
VPRS	1 =	0.44009423	(7572.)
VPRS	2 =	0.43240643	(7519.)
VPRS	3 =	0.43327999	(7525.)
VPRS	4 =	0.42344663	(7456.)
VPRS	5 =	0.22680554	(5661.)
VPRS	6 =	0.21653031	(5533.)
VPRS	7 =	0.21236302	(5480.)
VPRS	8 =	0.21710773	(5540.)
VPRS	9 =	0.20944841	(5442.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2130
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.39331

CORRECTED PRESSURE (PSIA) = 60.772675

VAPOR PRESSURE (PSIA) = 0.30289033

CTMT. AIR MASS (LBM) = 123083.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2145 0523

TEMP	1 =	536.33704	(7667.)
TEMP	2 =	536.22205	(7655.)
TEMP	3 =	536.59601	(7693.)
TEMP	4 =	537.73700	(7807.)
TEMP	5 =	536.33405	(7666.)
TEMP	6 =	536.12000	(7645.)
TEMP	7 =	527.72302	(6805.)
TEMP	8 =	527.92902	(6826.)
TEMP	9 =	528.04504	(6838.)
TEMP	10 =	527.89001	(6822.)
TEMP	11 =	528.84204	(6917.)
TEMP	12 =	527.99701	(6833.)
TEMP	13 =	527.86304	(6819.)
TEMP	14 =	528.04004	(6837.)
TEMP	15 =	528.08899	(6842.)
TEMP	16 =	528.20801	(6854.)
TEMP	17 =	528.27002	(6860.)
TEMP	18 =	528.09900	(6843.)
TEMP	19 =	528.17303	(6850.)
TEMP	20 =	528.44299	(6877.)
TEMP	21 =	528.35901	(6869.)
TEMP	22 =	528.47601	(6881.)
TEMP	23 =	530.36401	(7069.)
TEMP	24 =	529.80902	(7014.)
PRES	1 =	61.070641	(61945.)
VPRS	1 =	0.43855083	(7561.)
VPRS	2 =	0.43195510	(7516.)
VPRS	3 =	0.43389162	(7529.)
VPRS	4 =	0.42350325	(7457.)
VPRS	5 =	0.22771241	(5672.)
VPRS	6 =	0.21909313	(5565.)
VPRS	7 =	0.21173404	(5472.)
VPRS	8 =	0.21641167	(5532.)
VPRS	9 =	0.20964018	(5444.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2145
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.41339

CORRECTED PRESSURE (PSIA) = 60.767387

VAPOR PRESSURE (PSIA) = 0.30325145

CTMT. AIR MASS (LBM) = 123068.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2200 0523

TEMP 1 =	536.32501	(7666.)
TEMP 2 =	536.23004	(7656.)
TEMP 3 =	536.57202	(7690.)
TEMP 4 =	537.73102	(7806.)
TEMP 5 =	536.29504	(7663.)
TEMP 6 =	536.10303	(7643.)
TEMP 7 =	527.76202	(6809.)
TEMP 8 =	527.96600	(6830.)
TEMP 9 =	528.06702	(6840.)
TEMP 10 =	527.93201	(6826.)
TEMP 11 =	528.88904	(6922.)
TEMP 12 =	528.06201	(6839.)
TEMP 13 =	527.90802	(6824.)
TEMP 14 =	528.07300	(6840.)
TEMP 15 =	528.12201	(6845.)
TEMP 16 =	528.24603	(6858.)
TEMP 17 =	528.30304	(6863.)
TEMP 18 =	528.13800	(6847.)
TEMP 19 =	528.21704	(6855.)
TEMP 20 =	528.46906	(6880.)
TEMP 21 =	528.43500	(6877.)
TEMP 22 =	528.50201	(6883.)
TEMP 23 =	530.42902	(7076.)
TEMP 24 =	529.86902	(7020.)
PRES 1 =	61.065716	(61940.)
VPRS 1 =	0.43843418	(7560.)
VPRS 2 =	0.43250829	(7520.)
VPRS 3 =	0.43307617	(7524.)
VPRS 4 =	0.42255586	(7450.)
VPRS 5 =	0.22751635	(5670.)
VPRS 6 =	0.21670435	(5535.)
VPRS 7 =	0.21379729	(5498.)
VPRS 8 =	0.21755068	(5546.)
VPRS 9 =	0.20997764	(5449.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2200
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.43152

CORRECTED PRESSURE (PSIA) = 60.762703

VAPOR PRESSURE (PSIA) = 0.30301094

CTMT. AIR MASS (LBM) = 123054.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2215 0523

TEMP	1 =	536.28302	(7661.)
TEMP	2 =	536.22101	(7655.)
TEMP	3 =	536.55402	(7688.)
TEMP	4 =	537.69000	(7802.)
TEMP	5 =	536.25800	(7659.)
TEMP	6 =	536.09406	(7642.)
TEMP	7 =	527.79901	(6813.)
TEMP	8 =	528.00500	(6834.)
TEMP	9 =	528.11401	(6844.)
TEMP	10 =	527.96600	(6830.)
TEMP	11 =	528.92603	(6926.)
TEMP	12 =	528.08405	(6841.)
TEMP	13 =	527.95502	(6829.)
TEMP	14 =	528.10199	(6843.)
TEMP	15 =	528.16699	(6850.)
TEMP	16 =	528.26501	(6860.)
TEMP	17 =	528.34900	(6868.)
TEMP	18 =	528.17004	(6850.)
TEMP	19 =	528.24603	(6858.)
TEMP	20 =	528.51300	(6884.)
TEMP	21 =	528.44904	(6878.)
TEMP	22 =	528.53699	(6887.)
TEMP	23 =	530.48199	(7081.)
TEMP	24 =	529.92700	(7026.)
PRES	1 =	61.061775	(61936.)
VPRS	1 =	0.43834689	(7560.)
VPRS	2 =	0.43224624	(7518.)
VPRS	3 =	0.43322179	(7525.)
VPRS	4 =	0.42142463	(7442.)
VPRS	5 =	0.22791667	(5675.)
VPRS	6 =	0.21729755	(5543.)
VPRS	7 =	0.21550994	(5520.)
VPRS	8 =	0.21740042	(5544.)
VPRS	9 =	0.21021537	(5452.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2215
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.44458

CORRECTED PRESSURE (PSIA) = 60.758553

VAPOR PRESSURE (PSIA) = 0.30322409

CTMT. AIR MASS (LBM) = 123043.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2230 0523

TEMP	1 =	536.27100	(7660.)
TEMP	2 =	536.19501	(7653.)
TEMP	3 =	536.56799	(7690.)
TEMP	4 =	537.69702	(7803.)
TEMP	5 =	536.27399	(7660.)
TEMP	6 =	536.08600	(7642.)
TEMP	7 =	527.84406	(6817.)
TEMP	8 =	528.04199	(6837.)
TEMP	9 =	528.16504	(6850.)
TEMP	10 =	528.01202	(6834.)
TEMP	11 =	528.95300	(6928.)
TEMP	12 =	528.10803	(6844.)
TEMP	13 =	527.97205	(6830.)
TEMP	14 =	528.15302	(6848.)
TEMP	15 =	528.20703	(6854.)
TEMP	16 =	528.30304	(6863.)
TEMP	17 =	528.38202	(6871.)
TEMP	18 =	528.20703	(6854.)
TEMP	19 =	528.31104	(6864.)
TEMP	20 =	528.54199	(6887.)
TEMP	21 =	528.46802	(6880.)
TEMP	22 =	528.58203	(6891.)
TEMP	23 =	530.52502	(7086.)
TEMP	24 =	529.97302	(7030.)

PRES	1 =	61.057835	(61932.)

VPRS	1 =	0.43760428	(7555.)
VPRS	2 =	0.43236268	(7519.)
VPRS	3 =	0.43294507	(7523.)
VPRS	4 =	0.42343250	(7456.)
VPRS	5 =	0.22875816	(5685.)
VPRS	6 =	0.21827050	(5555.)
VPRS	7 =	0.21282318	(5486.)
VPRS	8 =	0.21871348	(5561.)
VPRS	9 =	0.21100542	(5462.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2230
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.46729

CORRECTED PRESSURE (PSIA) = 60.754272

VAPOR PRESSURE (PSIA) = 0.30356267

CTMT. AIR MASS (LBM) = 123029.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2245 0523

TEMP 1 =	536.27100	(7660.)
TEMP 2 =	536.20001	(7653.)
TEMP 3 =	536.53900	(7687.)
TEMP 4 =	537.70001	(7803.)
TEMP 5 =	536.26202	(7659.)
TEMP 6 =	536.09003	(7642.)
TEMP 7 =	527.87402	(6820.)
TEMP 8 =	528.08099	(6841.)
TEMP 9 =	528.20001	(6853.)
TEMP 10 =	528.05103	(6838.)
TEMP 11 =	528.99603	(6933.)
TEMP 12 =	528.16003	(6849.)
TEMP 13 =	528.02399	(6835.)
TEMP 14 =	528.19501	(6853.)
TEMP 15 =	528.23700	(6857.)
TEMP 16 =	528.33502	(6867.)
TEMP 17 =	528.41003	(6874.)
TEMP 18 =	528.23700	(6857.)
TEMP 19 =	528.31604	(6865.)
TEMP 20 =	528.57703	(6891.)
TEMP 21 =	528.50500	(6884.)
TEMP 22 =	528.61304	(6894.)
TEMP 23 =	530.57104	(7090.)
TEMP 24 =	530.03204	(7036.)

PRES 1 =	61.053898	(61928.)

VPRS 1 =	0.43737134	(7553.)
VPRS 2 =	0.43119794	(7511.)
VPRS 3 =	0.43288687	(7522.)
VPRS 4 =	0.42275393	(7451.)
VPRS 5 =	0.22896245	(5687.)
VPRS 6 =	0.21970223	(5573.)
VPRS 7 =	0.21349815	(5495.)
VPRS 8 =	0.21869764	(5560.)
VPRS 9 =	0.21070628	(5458.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2245
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.48706

CORRECTED PRESSURE (PSIA) = 60.750210

VAPOR PRESSURE (PSIA) = 0.30368873

CTMT. AIR MASS (LBM) = 123016.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2300 0523

TEMP	1 =	536.26300	(7659.)
TEMP	2 =	536.19202	(7652.)
TEMP	3 =	536.54901	(7688.)
TEMP	4 =	537.69104	(7802.)
TEMP	5 =	536.24902	(7658.)
TEMP	6 =	536.07800	(7641.)
TEMP	7 =	527.91003	(6824.)
TEMP	8 =	528.13104	(6846.)
TEMP	9 =	528.22205	(6855.)
TEMP	10 =	528.07501	(6841.)
TEMP	11 =	529.03601	(6937.)
TEMP	12 =	528.17603	(6851.)
TEMP	13 =	528.05499	(6839.)
TEMP	14 =	528.20905	(6854.)
TEMP	15 =	528.27600	(6861.)
TEMP	16 =	528.37701	(6871.)
TEMP	17 =	528.40399	(6873.)
TEMP	18 =	528.26904	(6860.)
TEMP	19 =	528.37103	(6870.)
TEMP	20 =	528.61200	(6894.)
TEMP	21 =	528.53503	(6887.)
TEMP	22 =	528.64600	(6898.)
TEMP	23 =	530.61499	(7095.)
TEMP	24 =	530.08600	(7042.)
PRES	1 =	61.049957	(61924.)
VPRS	1 =	0.43857983	(7561.)
VPRS	2 =	0.43205696	(7517.)
VPRS	3 =	0.43316346	(7524.)
VPRS	4 =	0.42241442	(7449.)
VPRS	5 =	0.22973038	(5697.)
VPRS	6 =	0.22155315	(5597.)
VPRS	7 =	0.21345212	(5494.)
VPRS	8 =	0.22001864	(5577.)
VPRS	9 =	0.21083665	(5460.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2300
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.50385

CORRECTED PRESSURE (PSIA) = 60.745472

VAPOR PRESSURE (PSIA) = 0.30448389

CTMT. AIR MASS (LBM) = 123003.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2315 0523

TEMP	1 =	536.24402	(7657.)
TEMP	2 =	536.18304	(7651.)
TEMP	3 =	536.51904	(7685.)
TEMP	4 =	537.69403	(7802.)
TEMP	5 =	536.22803	(7656.)
TEMP	6 =	536.06403	(7639.)
TEMP	7 =	527.93201	(6826.)
TEMP	8 =	528.15204	(6848.)
TEMP	9 =	528.26001	(6859.)
TEMP	10 =	528.12000	(6845.)
TEMP	11 =	529.06299	(6939.)
TEMP	12 =	528.21399	(6854.)
TEMP	13 =	528.08405	(6841.)
TEMP	14 =	528.23901	(6857.)
TEMP	15 =	528.30103	(6863.)
TEMP	16 =	528.40601	(6874.)
TEMP	17 =	528.44800	(6878.)
TEMP	18 =	528.30902	(6864.)
TEMP	19 =	528.37903	(6871.)
TEMP	20 =	528.64301	(6897.)
TEMP	21 =	528.55499	(6889.)
TEMP	22 =	528.66602	(6900.)
TEMP	23 =	530.67102	(7100.)
TEMP	24 =	530.13300	(7046.)
PRES	1 =	61.045033	(61919.)
VPRS	1 =	0.43802652	(7558.)
VPRS	2 =	0.43159118	(7513.)
VPRS	3 =	0.43330911	(7525.)
VPRS	4 =	0.42426684	(7462.)
VPRS	5 =	0.23005904	(5701.)
VPRS	6 =	0.22333325	(5618.)
VPRS	7 =	0.21450534	(5507.)
VPRS	8 =	0.21975757	(5574.)
VPRS	9 =	0.21046849	(5455.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2315
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.51593

CORRECTED PRESSURE (PSIA) = 60.740021

VAPOR PRESSURE (PSIA) = 0.30501249

CTMT. AIR MASS (LBM) = 122989.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2330 0523

TEMP	1 =	536.24200	(7657.)
TEMP	2 =	536.16199	(7649.)
TEMP	3 =	536.48102	(7681.)
TEMP	4 =	537.69299	(7802.)
TEMP	5 =	536.22101	(7655.)
TEMP	6 =	536.06604	(7640.)
TEMP	7 =	527.96399	(6829.)
TEMP	8 =	528.18903	(6852.)
TEMP	9 =	528.30402	(6863.)
TEMP	10 =	528.15802	(6849.)
TEMP	11 =	529.09802	(6943.)
TEMP	12 =	528.26703	(6860.)
TEMP	13 =	528.11499	(6845.)
TEMP	14 =	528.27502	(6861.)
TEMP	15 =	528.33405	(6866.)
TEMP	16 =	528.44403	(6877.)
TEMP	17 =	528.48004	(6881.)
TEMP	18 =	528.34100	(6867.)
TEMP	19 =	528.41602	(6875.)
TEMP	20 =	528.67499	(6900.)
TEMP	21 =	528.59003	(6892.)
TEMP	22 =	528.69702	(6903.)
TEMP	23 =	530.71704	(7105.)
TEMP	24 =	530.17200	(7050.)
PRES	1 =	61.040108	(61914.)
VPRS	1 =	0.43744421	(7554.)
VPRS	2 =	0.43325099	(7525.)
VPRS	3 =	0.43288687	(7522.)
VPRS	4 =	0.42300829	(7453.)
VPRS	5 =	0.23037937	(5705.)
VPRS	6 =	0.22554736	(5646.)
VPRS	7 =	0.21448950	(5507.)
VPRS	8 =	0.22001070	(5577.)
VPRS	9 =	0.21087503	(5460.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2330
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.53339

CORRECTED PRESSURE (PSIA) = 60.734684

VAPOR PRESSURE (PSIA) = 0.30542383

CTMT. AIR MASS (LBM) = 122974.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2345 0523

TEMP	1 =	536.22101	(7655.)
TEMP	2 =	536.15601	(7649.)
TEMP	3 =	536.47400	(7680.)
TEMP	4 =	537.69000	(7802.)
TEMP	5 =	536.21802	(7655.)
TEMP	6 =	536.03400	(7636.)
TEMP	7 =	528.01404	(6834.)
TEMP	8 =	528.21704	(6855.)
TEMP	9 =	528.34406	(6867.)
TEMP	10 =	528.20300	(6853.)
TEMP	11 =	529.13501	(6946.)
TEMP	12 =	528.28302	(6861.)
TEMP	13 =	528.16400	(6849.)
TEMP	14 =	528.32001	(6865.)
TEMP	15 =	528.37799	(6871.)
TEMP	16 =	528.47400	(6880.)
TEMP	17 =	528.51001	(6884.)
TEMP	18 =	528.37500	(6871.)
TEMP	19 =	528.45300	(6878.)
TEMP	20 =	528.69904	(6903.)
TEMP	21 =	528.57104	(6890.)
TEMP	22 =	528.72803	(6906.)
TEMP	23 =	530.76300	(7109.)
TEMP	24 =	530.22504	(7056.)
PRES	1 =	61.036167	(61910.)
VPRS	1 =	0.43791020	(7557.)
VPRS	2 =	0.43122706	(7511.)
VPRS	3 =	0.43191132	(7516.)
VPRS	4 =	0.42276794	(7451.)
VPRS	5 =	0.23103693	(5712.)
VPRS	6 =	0.22127630	(5593.)
VPRS	7 =	0.21751906	(5546.)
VPRS	8 =	0.22081757	(5587.)
VPRS	9 =	0.21100542	(5462.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 2345
DATE = 0523

TEMPERATURE (DEGREES R.) = 531.55023

CORRECTED PRESSURE (PSIA) = 60.731201

VAPOR PRESSURE (PSIA) = 0.30496493

CTMT. AIR MASS (LBM) = 122963.

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 0 0524

TEMP	1 =	536.21802	(7655.)
TEMP	2 =	536.15503	(7649.)
TEMP	3 =	536.46704	(7680.)
TEMP	4 =	537.69403	(7802.)
TEMP	5 =	536.21301	(7654.)
TEMP	6 =	536.02704	(7636.)
TEMP	7 =	528.04102	(6837.)
TEMP	8 =	528.24103	(6857.)
TEMP	9 =	528.37201	(6870.)
TEMP	10 =	528.22003	(6855.)
TEMP	11 =	529.17603	(6951.)
TEMP	12 =	528.32904	(6866.)
TEMP	13 =	528.20300	(6853.)
TEMP	14 =	528.34705	(6868.)
TEMP	15 =	528.41101	(6874.)
TEMP	16 =	528.49304	(6882.)
TEMP	17 =	528.53101	(6886.)
TEMP	18 =	528.38501	(6871.)
TEMP	19 =	528.50500	(6884.)
TEMP	20 =	528.73999	(6907.)
TEMP	21 =	528.64703	(6898.)
TEMP	22 =	528.76202	(6909.)
TEMP	23 =	530.80603	(7114.)
TEMP	24 =	530.28302	(7061.)
PRES	1 =	61.031242	(61905.)
VPRS	1 =	0.43769181	(7555.)
VPRS	2 =	0.43150365	(7513.)
VPRS	3 =	0.43242100	(7519.)
VPRS	4 =	0.42191970	(7445.)
VPRS	5 =	0.23163542	(5719.)
VPRS	6 =	0.22079378	(5587.)
VPRS	7 =	0.21687047	(5537.)
VPRS	8 =	0.22119722	(5592.)
VPRS	9 =	0.21142724	(5468.)

CTMT. FREE AIR VOL. = 398730..

SUMMARY OF CORRECTED DATA

TIME = 0
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.56830

CORRECTED PRESSURE (PSIA) = 60.726273

VAPOR PRESSURE (PSIA) = 0.30496955

CTMT. AIR MASS (LBM) = 122949.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 15 0524

TEMP 1 =	536.22205	(7655.)
TEMP 2 =	536.14801	(7648.)
TEMP 3 =	536.45404	(7678.)
TEMP 4 =	537.70404	(7803.)
TEMP 5 =	536.21002	(7654.)
TEMP 6 =	536.01001	(7634.)
TEMP 7 =	528.07501	(6841.)
TEMP 8 =	528.29602	(6863.)
TEMP 9 =	528.41003	(6874.)
TEMP 10 =	528.28003	(6861.)
TEMP 11 =	529.21704	(6955.)
TEMP 12 =	528.34406	(6867.)
TEMP 13 =	528.22900	(6856.)
TEMP 14 =	528.37701	(6871.)
TEMP 15 =	528.44202	(6877.)
TEMP 16 =	528.52802	(6886.)
TEMP 17 =	528.55902	(6889.)
TEMP 18 =	528.42700	(6876.)
TEMP 19 =	528.53003	(6886.)
TEMP 20 =	528.77301	(6910.)
TEMP 21 =	528.64600	(6898.)
TEMP 22 =	528.78003	(6911.)
TEMP 23 =	530.86200	(7119.)
TEMP 24 =	530.34406	(7067.)

PRES 1 =	61.026318	(61900.)

VPRS 1 =	0.43888563	(7564.)
VPRS 2 =	0.43143100	(7512.)
VPRS 3 =	0.43311980	(7524.)
VPRS 4 =	0.42174989	(7444.)
VPRS 5 =	0.23204009	(5724.)
VPRS 6 =	0.22108644	(5591.)
VPRS 7 =	0.21615066	(5528.)
VPRS 8 =	0.22146612	(5595.)
VPRS 9 =	0.21174175	(5472.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 15
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.58734

CORRECTED PRESSURE (PSIA) = 60.721088

VAPOR PRESSURE (PSIA) = 0.30523035

CTMT. AIR MASS (LBM) = 122934.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 30 0524

TEMP 1 =	536.20801	(7654.)
TEMP 2 =	536.14404	(7647.)
TEMP 3 =	536.45502	(7679.)
TEMP 4 =	537.68304	(7801.)
TEMP 5 =	536.18799	(7652.)
TEMP 6 =	536.02301	(7635.)
TEMP 7 =	528.11401	(6844.)
TEMP 8 =	528.30304	(6863.)
TEMP 9 =	528.44501	(6878.)
TEMP 10 =	528.29199	(6862.)
TEMP 11 =	529.23401	(6956.)
TEMP 12 =	528.40002	(6873.)
TEMP 13 =	528.26404	(6859.)
TEMP 14 =	528.42401	(6875.)
TEMP 15 =	528.47101	(6880.)
TEMP 16 =	528.53601	(6887.)
TEMP 17 =	528.58301	(6891.)
TEMP 18 =	528.45703	(6879.)
TEMP 19 =	528.56702	(6890.)
TEMP 20 =	528.78802	(6912.)
TEMP 21 =	528.64203	(6897.)
TEMP 22 =	528.80701	(6914.)
TEMP 23 =	530.91199	(7124.)
TEMP 24 =	530.40100	(7073.)
PRES 1 =	61.022381	(61896.)
VPRS 1 =	0.43792465	(7557.)
VPRS 2 =	0.43023697	(7504.)
VPRS 3 =	0.43227535	(7518.)
VPRS 4 =	0.42003903	(7432.)
VPRS 5 =	0.23243631	(5729.)
VPRS 6 =	0.22437908	(5631.)
VPRS 7 =	0.21834961	(5556.)
VPRS 8 =	0.22218131	(5604.)
VPRS 9 =	0.21193348	(5474.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 30
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.60266

CORRECTED PRESSURE (PSIA) = 60.716690

VAPOR PRESSURE (PSIA) = 0.30569163

CTMT. AIR MASS (LBM) = 122922.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 45 0524

TEMP 1 =	536.18103	(7651.)
TEMP 2 =	536.13403	(7646.)
TEMP 3 =	536.43701	(7677.)
TEMP 4 =	537.68304	(7801.)
TEMP 5 =	536.20203	(7653.)
TEMP 6 =	535.98901	(7632.)
TEMP 7 =	528.15900	(6849.)
TEMP 8 =	528.33405	(6866.)
TEMP 9 =	528.46600	(6880.)
TEMP 10 =	528.31604	(6865.)
TEMP 11 =	529.27301	(6960.)
TEMP 12 =	528.41302	(6874.)
TEMP 13 =	528.29303	(6862.)
TEMP 14 =	528.43799	(6877.)
TEMP 15 =	528.50903	(6884.)
TEMP 16 =	528.59705	(6893.)
TEMP 17 =	528.60400	(6893.)
TEMP 18 =	528.48602	(6882.)
TEMP 19 =	528.58405	(6891.)
TEMP 20 =	528.82001	(6915.)
TEMP 21 =	528.69604	(6903.)
TEMP 22 =	528.84204	(6917.)
TEMP 23 =	530.95404	(7128.)
TEMP 24 =	530.45300	(7078.)
PRES 1 =	61.017456	(61891.)
VPRS 1 =	0.43671617	(7549.)
VPRS 2 =	0.43057200	(7506.)
VPRS 3 =	0.43185323	(7515.)
VPRS 4 =	0.42413953	(7461.)
VPRS 5 =	0.23277345	(5733.)
VPRS 6 =	0.22076216	(5587.)
VPRS 7 =	0.21737669	(5544.)
VPRS 8 =	0.22275320	(5611.)
VPRS 9 =	0.21177241	(5472.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 45
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.61584

CORRECTED PRESSURE (PSIA) = 60.712059

VAPOR PRESSURE (PSIA) = 0.30539599

CTMT. AIR MASS (LBM) = 122909.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 100 0524

TEMP 1 =	536.17401	(7650.)
TEMP 2 =	536.12799	(7646.)
TEMP 3 =	536.44501	(7678.)
TEMP 4 =	537.63000	(7796.)
TEMP 5 =	536.15704	(7649.)
TEMP 6 =	535.99701	(7633.)
TEMP 7 =	528.17804	(6851.)
TEMP 8 =	528.36499	(6870.)
TEMP 9 =	528.51105	(6884.)
TEMP 10 =	528.37103	(6870.)
TEMP 11 =	529.32300	(6965.)
TEMP 12 =	528.45001	(6878.)
TEMP 13 =	528.32501	(6866.)
TEMP 14 =	528.46100	(6879.)
TEMP 15 =	528.53003	(6886.)
TEMP 16 =	528.61005	(6894.)
TEMP 17 =	528.65802	(6899.)
TEMP 18 =	528.52100	(6885.)
TEMP 19 =	528.62305	(6895.)
TEMP 20 =	528.84802	(6918.)
TEMP 21 =	528.71399	(6904.)
TEMP 22 =	528.86603	(6920.)
TEMP 23 =	531.00299	(7133.)
TEMP 24 =	530.51202	(7084.)

PRES 1 =	61.012531	(61886.)

VPRS 1 =	0.43635225	(7546.)
VPRS 2 =	0.43111053	(7510.)
VPRS 3 =	0.43226081	(7518.)
VPRS 4 =	0.42186296	(7445.)
VPRS 5 =	0.23378508	(5745.)
VPRS 6 =	0.22193624	(5601.)
VPRS 7 =	0.21728967	(5543.)
VPRS 8 =	0.22330061	(5618.)
VPRS 9 =	0.21204852	(5476.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 100
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.63251

CORRECTED PRESSURE (PSIA) = 60.706841

VAPOR PRESSURE (PSIA) = 0.30568972

CTMT. AIR MASS (LBM) = 122895.

APPENDIX E

VERIFICATION TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 115 0524

TEMP 1 =	536.18103	(7651.)
TEMP 2 =	536.09601	(7643.)
TEMP 3 =	536.43201	(7676.)
TEMP 4 =	537.63300	(7796.)
TEMP 5 =	536.15002	(7648.)
TEMP 6 =	535.98303	(7631.)
TEMP 7 =	528.21399	(6854.)
TEMP 8 =	528.41504	(6875.)
TEMP 9 =	528.53003	(6886.)
TEMP 10 =	528.41003	(6874.)
TEMP 11 =	529.33301	(6966.)
TEMP 12 =	528.48700	(6882.)
TEMP 13 =	528.35199	(6868.)
TEMP 14 =	528.52600	(6886.)
TEMP 15 =	528.56201	(6889.)
TEMP 16 =	528.64099	(6897.)
TEMP 17 =	528.64703	(6898.)
TEMP 18 =	528.53503	(6887.)
TEMP 19 =	528.63501	(6896.)
TEMP 20 =	528.87701	(6921.)
TEMP 21 =	528.76105	(6909.)
TEMP 22 =	528.88501	(6921.)
TEMP 23 =	531.04504	(7138.)
TEMP 24 =	530.56403	(7089.)
PRES 1 =	61.007607	(61881.)
VPRS 1 =	0.43705121	(7551.)
VPRS 2 =	0.43095034	(7509.)
VPRS 3 =	0.43167838	(7514.)
VPRS 4 =	0.42364457	(7458.)
VPRS 5 =	0.23418975	(5750.)
VPRS 6 =	0.22510618	(5640.)
VPRS 7 =	0.21888746	(5563.)
VPRS 8 =	0.22361927	(5622.)
VPRS 9 =	0.21250874	(5482.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 115
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.64691

CORRECTED PRESSURE (PSIA) = 60.700928

VAPOR PRESSURE (PSIA) = 0.30667788

CTMT. AIR MASS (LBM) = 122879.

APPENDIX E

VERIFICATION TEST RAW DATA

SUMMARY OF MEASURED DATA AT 130 0524

TEMP 1 =	536.13904	(7647.)
TEMP 2 =	536.10803	(7644.)
TEMP 3 =	536.44202	(7677.)
TEMP 4 =	537.62201	(7795.)
TEMP 5 =	536.17004	(7650.)
TEMP 6 =	535.97400	(7630.)
TEMP 7 =	528.26001	(6859.)
TEMP 8 =	528.43701	(6877.)
TEMP 9 =	529.56104	(6889.)
TEMP 10 =	528.40704	(6874.)
TEMP 11 =	529.38904	(6972.)
TEMP 12 =	528.53101	(6886.)
TEMP 13 =	528.39801	(6873.)
TEMP 14 =	528.53302	(6886.)
TEMP 15 =	528.60303	(6893.)
TEMP 16 =	528.68903	(6902.)
TEMP 17 =	528.71002	(6904.)
TEMP 18 =	528.59705	(6893.)
TEMP 19 =	528.68402	(6901.)
TEMP 20 =	528.89899	(6923.)
TEMP 21 =	528.76202	(6909.)
TEMP 22 =	528.92902	(6926.)
TEMP 23 =	531.09406	(7142.)
TEMP 24 =	530.60303	(7093.)

PRES 1 =	61.002682	(61876.)

VPRS 1 =	0.43700731	(7551.)
VPRS 2 =	0.43116885	(7511.)
VPRS 3 =	0.43246463	(7519.)
VPRS 4 =	0.42193371	(7446.)
VPRS 5 =	0.23450162	(5753.)
VPRS 6 =	0.22268784	(5611.)
VPRS 7 =	0.21953610	(5571.)
VPRS 8 =	0.22481206	(5637.)
VPRS 9 =	0.21234766	(5480.)

CTMT. FREE AIR VOL. = 398730.

SUMMARY OF CORRECTED DATA

TIME = 130
DATE = 0524

TEMPERATURE (DEGREES R.) = 531.66797

CORRECTED PRESSURE (PSIA) = 60.696239

VAPOR PRESSURE (PSIA) = 0.30644378

CTMT. AIR MASS (LBM) = 122865.

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA

SBP 07/02/82 15:27PDT

SUMMARY DATA

SUSQUEHANNA UNIT 1 BYPASS TEST
COD = 0.60 TVOL = 159130.00

TIME	DATE	DRYTMP	DRYPRS	DRYVAP	SP TMP	SP PRS	SP VAP
2045	524	528.87698	18.859256	0.152480	534.43692	14.408735	0.407312
2100	524	528.91189	18.861217	0.154139	534.46503	14.412652	0.407757
2115	524	528.94573	18.863179	0.155691	534.49905	14.417548	0.405832
2130	524	528.98574	18.864160	0.146116	534.53252	14.420486	0.409781
2145	524	528.98991	18.865140	0.145700	534.57142	14.424403	0.408682
2200	524	529.04855	18.867102	0.161615	534.60032	14.428320	0.404626
2215	524	529.08770	18.869064	0.160526	534.62489	14.433217	0.405348
2230	524	529.11785	18.870044	0.153230	534.66080	14.436155	0.403600
2245	524	529.15224	18.871025	0.153230	534.69238	14.439093	0.409024
2300	524	529.17623	18.872006	0.153230	534.70482	14.443989	0.408750
2315	524	529.20950	18.872987	0.153230	534.72237	14.445948	0.409298
2330	524	529.23932	18.873967	0.162859	534.75317	14.448886	0.412689
2345	524	529.27171	18.874948	0.163672	534.77475	14.452803	0.408719
0	525	529.30116	18.875929	0.165070	534.78609	14.455740	0.408323
15	525	529.32433	18.876910	0.165934	534.79663	14.458678	0.409785
30	525	529.34954	18.877891	0.167076	534.81876	14.461616	0.410201
45	525	529.38366	18.878871	0.168822	534.83255	14.464554	0.407848
0	0	0.0	0.0	0.0	0.0	0.0	0.0

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUSQUEHANNA UNIT 1 BYPASS TEST

BYPASS AREA (SQUARE INCHES)
TOTAL-TIME ANALYSIS

TIME AND DATE AT START OF TEST: 2045 0524
ELAPSED TIME: 4.00 HOURS

TIME	DRYTMP	DRYPRS	DRYVAP	SP TMP	SP PRS	SP VAP	AREA
2045	528.877	18.859	0.152	534.437	14.409	0.407	
2100	528.912	18.861	0.154	534.465	14.413	0.408	0.01267
2115	528.946	18.863	0.156	534.499	14.418	0.406	0.02006
2130	528.986	18.864	0.146	534.533	14.420	0.410	0.01046
2145	528.990	18.865	0.146	534.571	14.424	0.409	0.01247
2200	529.049	18.867	0.162	534.600	14.428	0.405	0.01666
2215	529.088	18.869	0.161	534.625	14.433	0.405	0.01660
2230	529.118	18.870	0.153	534.661	14.436	0.404	0.01671
2245	529.152	18.871	0.153	534.692	14.439	0.409	0.01270
2300	529.176	18.872	0.153	534.705	14.444	0.409	0.01379
2315	529.210	18.873	0.153	534.722	14.446	0.409	0.01285
2330	529.239	18.874	0.163	534.753	14.449	0.413	0.01115
2345	529.272	18.875	0.164	534.775	14.453	0.409	0.01304
0	529.301	18.876	0.165	534.786	14.456	0.408	0.01312
15	529.324	18.877	0.166	534.797	14.459	0.410	0.01258
30	529.350	18.878	0.167	534.819	14.462	0.410	0.01234
45	529.384	18.879	0.169	534.833	14.465	0.408	0.01300

S. P. FREE AIR VOLUME (CU. FT.) = 159130.00
COEFFICIENT OF DISCHARGE = 0.60

MEAN MEASURED BYPASS AREA (SQ. IN.) = 0.01376

THE LOWER 95% CONFIDENCE LIMIT = 0.00666
THE UPPER 95% CONFIDENCE LIMIT = 0.01801
THE CALCULATED BYPASS AREA = 0.01234

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2045 0524

TEMP	1 =	534.360	(7469.)
TEMP	2 =	534.150	(7448.)
TEMP	3 =	534.590	(7492.)
TEMP	4 =	537.030	(7736.)
TEMP	5 =	534.290	(7462.)
TEMP	6 =	534.040	(7437.)
TEMP	7 =	528.140	(6847.)
TEMP	8 =	528.240	(6857.)
TEMP	9 =	528.480	(6881.)
TEMP	10 =	528.450	(6878.)
TEMP	11 =	529.690	(7002.)
TEMP	12 =	528.570	(6890.)
TEMP	13 =	528.340	(6867.)
TEMP	14 =	528.640	(6897.)
TEMP	15 =	528.710	(6904.)
TEMP	16 =	528.880	(6921.)
TEMP	17 =	528.780	(6911.)
TEMP	18 =	528.740	(6907.)
TEMP	19 =	528.990	(6932.)
TEMP	20 =	529.190	(6952.)
TEMP	21 =	529.150	(6948.)
TEMP	22 =	529.360	(6969.)
TEMP	23 =	532.540	(7287.)
TEMP	24 =	532.210	(7254.)
PRES	1 =	18.859	(18962.)
PRES	2 =	14.409	(14435.)
VPRS	1 =	0.410	(7358.)
VPRS	2 =	0.405	(7324.)
VPRS	3 =	0.408	(7341.)
VPRS	4 =	0.407	(7335.)
VPRS	5 =	0.151	(4569.)
VPRS	6 =	0.151	(4568.)
VPRS	7 =	0.149	(4522.)
VPRS	8 =	0.152	(4586.)
VPRS	9 =	0.175	(4958.)

SUMMARY OF CORRECTED DATA

TIME = 2045
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	528.877	534.437
PRESSURE (PSIA)	18.859	14.409
VAPOR PRESSURE (PSIA)	0.152	0.407

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2100 0524

TEMP 1 =	534.420	(7475.)
TEMP 2 =	534.160	(7449.)
TEMP 3 =	534.620	(7495.)
TEMP 4 =	537.060	(7739.)
TEMP 5 =	534.290	(7462.)
TEMP 6 =	534.080	(7441.)
TEMP 7 =	528.170	(6850.)
TEMP 8 =	528.280	(6861.)
TEMP 9 =	528.510	(6884.)
TEMP 10 =	528.480	(6881.)
TEMP 11 =	529.720	(7005.)
TEMP 12 =	528.610	(6894.)
TEMP 13 =	528.380	(6871.)
TEMP 14 =	528.670	(6900.)
TEMP 15 =	528.750	(6908.)
TEMP 16 =	528.920	(6925.)
TEMP 17 =	528.810	(6914.)
TEMP 18 =	528.770	(6910.)
TEMP 19 =	529.010	(6934.)
TEMP 20 =	529.230	(6956.)
TEMP 21 =	529.210	(6954.)
TEMP 22 =	529.390	(6972.)
TEMP 23 =	532.580	(7291.)
TEMP 24 =	532.260	(7259.)
PRES 1 =	18.861	(18964.)
PRES 2 =	14.413	(14439.)
VPRS 1 =	0.411	(7364.)
VPRS 2 =	0.406	(7329.)
VPRS 3 =	0.408	(7343.)
VPRS 4 =	0.407	(7335.)
VPRS 5 =	0.153	(4596.)
VPRS 6 =	0.154	(4621.)
VPRS 7 =	0.149	(4532.)
VPRS 8 =	0.154	(4606.)
VPRS 9 =	0.175	(4960.)

SUMMARY OF CORRECTED DATA

TIME = 2100
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	528.912	534.465
PRESSURE (PSIA)	18.861	14.413
VAPOR PRESSURE (PSIA)	0.154	0.408

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2115 0524

TEMP 1 =	534.450	(7478.)
TEMP 2 =	534.200	(7453.)
TEMP 3 =	534.660	(7499.)
TEMP 4 =	537.060	(7739.)
TEMP 5 =	534.330	(7466.)
TEMP 6 =	534.110	(7444.)
TEMP 7 =	528.220	(6855.)
TEMP 8 =	528.310	(6864.)
TEMP 9 =	528.570	(6890.)
TEMP 10 =	528.500	(6883.)
TEMP 11 =	529.730	(7006.)
TEMP 12 =	528.660	(6899.)
TEMP 13 =	528.410	(6874.)
TEMP 14 =	528.700	(6903.)
TEMP 15 =	528.790	(6912.)
TEMP 16 =	528.930	(6926.)
TEMP 17 =	528.860	(6919.)
TEMP 18 =	528.800	(6913.)
TEMP 19 =	529.040	(6937.)
TEMP 20 =	529.250	(6958.)
TEMP 21 =	529.240	(6957.)
TEMP 22 =	529.420	(6975.)
TEMP 23 =	532.610	(7294.)
TEMP 24 =	532.290	(7262.)
PRES 1 =	18.863	(18966.)
PRES 2 =	14.418	(14444.)
VPRS 1 =	0.411	(7364.)
VPRS 2 =	0.406	(7330.)
VPRS 3 =	0.408	(7347.)
VPRS 4 =	0.398	(7273.)
VPRS 5 =	0.155	(4633.)
VPRS 6 =	0.156	(4644.)
VPRS 7 =	0.151	(4559.)
VPRS 8 =	0.155	(4622.)
VPRS 9 =	0.176	(4966.)

SUMMARY OF CORRECTED DATA

TIME = 2115
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	528.946	534.499
PRESSURE (PSIA)	18.863	14.418
VAPOR PRESSURE (PSIA)	0.156	0.406

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2130 0524

TEMP	1 =	534.490	(7482.)
TEMP	2 =	534.230	(7456.)
TEMP	3 =	534.700	(7503.)
TEMP	4 =	537.050	(7738.)
TEMP	5 =	534.360	(7469.)
TEMP	6 =	534.150	(7448.)
TEMP	7 =	528.260	(6859.)
TEMP	8 =	528.360	(6869.)
TEMP	9 =	528.610	(6894.)
TEMP	10 =	528.560	(6889.)
TEMP	11 =	529.750	(7008.)
TEMP	12 =	528.690	(6902.)
TEMP	13 =	528.440	(6877.)
TEMP	14 =	528.750	(6908.)
TEMP	15 =	528.820	(6915.)
TEMP	16 =	528.980	(6931.)
TEMP	17 =	528.900	(6923.)
TEMP	18 =	528.840	(6917.)
TEMP	19 =	529.070	(6940.)
TEMP	20 =	529.290	(6962.)
TEMP	21 =	529.270	(6960.)
TEMP	22 =	529.450	(6978.)
TEMP	23 =	532.660	(7299.)
TEMP	24 =	532.330	(7266.)
PRES	1 =	18.864	(18967.)
PRES	2 =	14.420	(14447.)
VPRS	1 =	0.411	(7369.)
VPRS	2 =	0.403	(7308.)
VPRS	3 =	0.409	(7350.)
VPRS	4 =	0.416	(7403.)
VPRS	5 =	0.156	(4646.)
VPRS	6 =	0.119	(3940.)
VPRS	7 =	0.153	(4600.)
VPRS	8 =	0.154	(4618.)
VPRS	9 =	0.174	(4937.)

SUMMARY OF CORRECTED DATA

TIME = 2130
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	528.986	534.533
PRESSURE (PSIA)	18.864	14.420
VAPOR PRESSURE (PSIA)	0.146	0.410

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2145 0524

TEMP 1 =	534.530	(7486.)
TEMP 2 =	534.250	(7458.)
TEMP 3 =	534.740	(7507.)
TEMP 4 =	537.070	(7740.)
TEMP 5 =	534.400	(7473.)
TEMP 6 =	534.210	(7454.)
TEMP 7 =	527.900	(6823.)
TEMP 8 =	528.400	(6873.)
TEMP 9 =	528.670	(6900.)
TEMP 10 =	528.610	(6894.)
TEMP 11 =	529.770	(7010.)
TEMP 12 =	528.710	(6904.)
TEMP 13 =	528.470	(6880.)
TEMP 14 =	528.770	(6910.)
TEMP 15 =	528.860	(6919.)
TEMP 16 =	529.010	(6934.)
TEMP 17 =	528.940	(6927.)
TEMP 18 =	528.880	(6921.)
TEMP 19 =	529.080	(6941.)
TEMP 20 =	529.330	(6966.)
TEMP 21 =	529.300	(6963.)
TEMP 22 =	529.460	(6979.)
TEMP 23 =	532.700	(7303.)
TEMP 24 =	532.370	(7270.)
PRES 1 =	18.865	(18968.)
PRES 2 =	14.424	(14451.)
VPRS 1 =	0.411	(7368.)
VPRS 2 =	0.403	(7309.)
VPRS 3 =	0.409	(7353.)
VPRS 4 =	0.411	(7368.)
VPRS 5 =	0.156	(4643.)
VPRS 6 =	0.117	(3905.)
VPRS 7 =	0.153	(4600.)
VPRS 8 =	0.155	(4628.)
VPRS 9 =	0.174	(4935.)

SUMMARY OF CORRECTED DATA

TIME = 2145
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	528.990	534.571
PRESSURE (PSIA)	18.865	14.424
VAPOR PRESSURE (PSIA)	0.146	0.409

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2200 0524

TEMP 1 =	534.550	(7488.)
TEMP 2 =	534.270	(7460.)
TEMP 3 =	534.790	(7512.)
TEMP 4 =	537.080	(7741.)
TEMP 5 =	534.430	(7476.)
TEMP 6 =	534.240	(7457.)
TEMP 7 =	528.310	(6864.)
TEMP 8 =	528.440	(6877.)
TEMP 9 =	528.700	(6903.)
TEMP 10 =	528.630	(6896.)
TEMP 11 =	529.800	(7013.)
TEMP 12 =	528.750	(6908.)
TEMP 13 =	528.500	(6883.)
TEMP 14 =	528.810	(6914.)
TEMP 15 =	528.890	(6922.)
TEMP 16 =	529.030	(6936.)
TEMP 17 =	528.960	(6929.)
TEMP 18 =	528.910	(6924.)
TEMP 19 =	529.110	(6944.)
TEMP 20 =	529.340	(6967.)
TEMP 21 =	529.330	(6966.)
TEMP 22 =	529.500	(6983.)
TEMP 23 =	532.730	(7306.)
TEMP 24 =	532.400	(7273.)
PRES 1 =	18.867	(18970.)
PRES 2 =	14.428	(14455.)
VPRS 1 =	0.409	(7354.)
VPRS 2 =	0.405	(7323.)
VPRS 3 =	0.410	(7356.)
VPRS 4 =	0.395	(7245.)
VPRS 5 =	0.159	(4681.)
VPRS 6 =	0.171	(4896.)
VPRS 7 =	0.153	(4600.)
VPRS 8 =	0.157	(4658.)
VPRS 9 =	0.176	(4962.)

SUMMARY OF CORRECTED DATA

TIME = 2200
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.049	534.600
PRESSURE (PSIA)	18.867	14.428
VAPOR PRESSURE (PSIA)	0.162	0.405

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2215 0524

TEMP	1 =	534.570	(7490.)
TEMP	2 =	534.290	(7462.)
TEMP	3 =	534.830	(7516.)
TEMP	4 =	537.080	(7741.)
TEMP	5 =	534.450	(7478.)
TEMP	6 =	534.270	(7460.)
TEMP	7 =	528.370	(6870.)
TEMP	8 =	528.470	(6880.)
TEMP	9 =	528.740	(6907.)
TEMP	10 =	528.680	(6901.)
TEMP	11 =	529.800	(7013.)
TEMP	12 =	528.790	(6912.)
TEMP	13 =	528.540	(6887.)
TEMP	14 =	528.850	(6918.)
TEMP	15 =	528.910	(6924.)
TEMP	16 =	529.070	(6940.)
TEMP	17 =	529.010	(6934.)
TEMP	18 =	528.970	(6930.)
TEMP	19 =	529.150	(6948.)
TEMP	20 =	529.370	(6970.)
TEMP	21 =	529.360	(6969.)
TEMP	22 =	529.510	(6984.)
TEMP	23 =	532.780	(7311.)
TEMP	24 =	532.440	(7277.)
PRES	1 =	18.869	(18972.)
PRES	2 =	14.433	(14460.)
VPRS	1 =	0.413	(7378.)
VPRS	2 =	0.405	(7325.)
VPRS	3 =	0.409	(7353.)
VPRS	4 =	0.394	(7243.)
VPRS	5 =	0.159	(4696.)
VPRS	6 =	0.165	(4802.)
VPRS	7 =	0.153	(4600.)
VPRS	8 =	0.158	(4677.)
VPRS	9 =	0.176	(4974.)

SUMMARY OF CORRECTED DATA

TIME = 2215
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.088	534.625
PRESSURE (PSIA)	18.869	14.433
VAPOR PRESSURE (PSIA)	0.161	0.405

APPENDIX E
SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2230 0524

TEMP	1 =	534.610	(7494.)
TEMP	2 =	534.310	(7464.)
TEMP	3 =	534.860	(7519.)
TEMP	4 =	537.080	(7741.)
TEMP	5 =	534.500	(7483.)
TEMP	6 =	534.320	(7465.)
TEMP	7 =	528.400	(6873.)
TEMP	8 =	528.510	(6884.)
TEMP	9 =	528.780	(6911.)
TEMP	10 =	528.710	(6904.)
TEMP	11 =	529.830	(7016.)
TEMP	12 =	528.830	(6916.)
TEMP	13 =	528.560	(6889.)
TEMP	14 =	528.870	(6920.)
TEMP	15 =	528.940	(6927.)
TEMP	16 =	529.110	(6944.)
TEMP	17 =	529.040	(6937.)
TEMP	18 =	528.990	(6932.)
TEMP	19 =	529.180	(6951.)
TEMP	20 =	529.400	(6973.)
TEMP	21 =	529.370	(6970.)
TEMP	22 =	529.530	(6986.)
TEMP	23 =	532.810	(7314.)
TEMP	24 =	532.470	(7280.)
PRES	1 =	18.870	(18973.)
PRES	2 =	14.436	(14463.)
VPRS	1 =	0.413	(7378.)
VPRS	2 =	0.405	(7325.)
VPRS	3 =	0.402	(7301.)
VPRS	4 =	0.394	(7244.)
VPRS	5 =	0.153	(4600.)
VPRS	6 =	0.153	(4600.)
VPRS	7 =	0.153	(4600.)
VPRS	8 =	0.153	(4600.)
VPRS	9 =	0.153	(4600.)

SUMMARY OF CORRECTED DATA

TIME = 2230
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.118	534.661
PRESSURE (PSIA)	18.870	14.436
VAPOR PRESSURE (PSIA)	0.153	0.404

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2245 0524

TEMP	1 =	534.630	(7496.)
TEMP	2 =	534.350	(7468.)
TEMP	3 =	534.900	(7523.)
TEMP	4 =	537.070	(7740.)
TEMP	5 =	534.540	(7487.)
TEMP	6 =	534.350	(7468.)
TEMP	7 =	528.440	(6877.)
TEMP	8 =	528.550	(6888.)
TEMP	9 =	528.800	(6913.)
TEMP	10 =	528.760	(6909.)
TEMP	11 =	529.830	(7016.)
TEMP	12 =	528.850	(6918.)
TEMP	13 =	528.590	(6892.)
TEMP	14 =	528.910	(6924.)
TEMP	15 =	528.980	(6931.)
TEMP	16 =	529.130	(6946.)
TEMP	17 =	529.070	(6940.)
TEMP	18 =	529.040	(6937.)
TEMP	19 =	529.210	(6954.)
TEMP	20 =	529.450	(6978.)
TEMP	21 =	529.400	(6973.)
TEMP	22 =	529.570	(6990.)
TEMP	23 =	532.850	(7318.)
TEMP	24 =	532.510	(7284.)
PRES	1 =	18.871	(18974.)
PRES	2 =	14.439	(14466.)
VPRS	1 =	0.409	(7352.)
VPRS	2 =	0.409	(7352.)
VPRS	3 =	0.409	(7352.)
VPRS	4 =	0.409	(7352.)
VPRS	5 =	0.153	(4600.)
VPRS	6 =	0.153	(4600.)
VPRS	7 =	0.153	(4600.)
VPRS	8 =	0.153	(4600.)
VPRS	9 =	0.153	(4600.)

SUMMARY OF CORRECTED DATA

TIME = 2245
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.152	534.692
PRESSURE (PSIA)	18.871	14.439
VAPOR PRESSURE (PSIA)	0.153	0.409

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2300 0524

TEMP	1 =	534.640	(7497.)
TEMP	2 =	534.360	(7469.)
TEMP	3 =	534.930	(7526.)
TEMP	4 =	537.090	(7742.)
TEMP	5 =	534.540	(7487.)
TEMP	6 =	534.360	(7469.)
TEMP	7 =	528.460	(6879.)
TEMP	8 =	528.580	(6891.)
TEMP	9 =	528.830	(6916.)
TEMP	10 =	528.770	(6910.)
TEMP	11 =	529.860	(7019.)
TEMP	12 =	528.890	(6922.)
TEMP	13 =	528.620	(6895.)
TEMP	14 =	528.950	(6928.)
TEMP	15 =	529.000	(6933.)
TEMP	16 =	529.150	(6948.)
TEMP	17 =	529.090	(6942.)
TEMP	18 =	529.050	(6938.)
TEMP	19 =	529.230	(6956.)
TEMP	20 =	529.460	(6979.)
TEMP	21 =	529.420	(6975.)
TEMP	22 =	529.590	(6991.)
TEMP	23 =	532.890	(7322.)
TEMP	24 =	532.540	(7287.)
PRES	1 =	18.872	(18975.)
PRES	2 =	14.444	(14471.)
VPRS	1 =	0.409	(7350.)
VPRS	2 =	0.409	(7350.)
VPRS	3 =	0.409	(7350.)
VPRS	4 =	0.409	(7350.)
VPRS	5 =	0.153	(4600.)
VPRS	6 =	0.153	(4600.)
VPRS	7 =	0.153	(4600.)
VPRS	8 =	0.153	(4600.)
VPRS	9 =	0.153	(4600.)

SUMMARY OF CORRECTED DATA

TIME = 2300
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.176	534.705
PRESSURE (PSIA)	18.872	14.444
VAPOR PRESSURE (PSIA)	0.153	0.409

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2315 0524

TEMP 1 =	534.660	(7499.)
TEMP 2 =	534.370	(7470.)
TEMP 3 =	534.950	(7528.)
TEMP 4 =	537.100	(7743.)
TEMP 5 =	534.570	(7490.)
TEMP 6 =	534.370	(7470.)
TEMP 7 =	528.490	(6882.)
TEMP 8 =	528.620	(6895.)
TEMP 9 =	528.860	(6919.)
TEMP 10 =	528.840	(6917.)
TEMP 11 =	529.880	(7021.)
TEMP 12 =	528.910	(6924.)
TEMP 13 =	528.660	(6899.)
TEMP 14 =	528.970	(6930.)
TEMP 15 =	529.020	(6935.)
TEMP 16 =	529.190	(6952.)
TEMP 17 =	529.120	(6945.)
TEMP 18 =	529.090	(6942.)
TEMP 19 =	529.260	(6959.)
TEMP 20 =	529.490	(6982.)
TEMP 21 =	529.450	(6978.)
TEMP 22 =	529.600	(6993.)
TEMP 23 =	532.930	(7326.)
TEMP 24 =	532.570	(7290.)
PRES 1 =	18.873	(18976.)
PRES 2 =	14.446	(14473.)
VPRS 1 =	0.409	(7354.)
VPRS 2 =	0.409	(7354.)
VPRS 3 =	0.409	(7354.)
VPRS 4 =	0.409	(7354.)
VPRS 5 =	0.153	(4600.)
VPRS 6 =	0.153	(4600.)
VPRS 7 =	0.153	(4600.)
VPRS 8 =	0.153	(4600.)
VPRS 9 =	0.153	(4600.)

SUMMARY OF CORRECTED DATA

TIME = 2315
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.210	534.722
PRESSURE (PSIA)	18.873	14.446
VAPOR PRESSURE (PSIA)	0.153	0.409

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2330 0524

TEMP 1 =	534.700	(7503.)
TEMP 2 =	534.400	(7473.)
TEMP 3 =	534.970	(7530.)
TEMP 4 =	537.110	(7744.)
TEMP 5 =	534.590	(7492.)
TEMP 6 =	534.420	(7475.)
TEMP 7 =	528.520	(6885.)
TEMP 8 =	528.650	(6898.)
TEMP 9 =	528.900	(6923.)
TEMP 10 =	528.890	(6922.)
TEMP 11 =	529.880	(7021.)
TEMP 12 =	528.940	(6927.)
TEMP 13 =	528.680	(6901.)
TEMP 14 =	529.010	(6934.)
TEMP 15 =	529.060	(6939.)
TEMP 16 =	529.200	(6953.)
TEMP 17 =	529.150	(6948.)
TEMP 18 =	529.120	(6945.)
TEMP 19 =	529.270	(6960.)
TEMP 20 =	529.530	(6986.)
TEMP 21 =	529.460	(6979.)
TEMP 22 =	529.620	(6995.)
TEMP 23 =	532.960	(7329.)
TEMP 24 =	532.610	(7294.)
PRES 1 =	18.874	(18977.)
PRES 2 =	14.449	(14476.)
VPRS 1 =	0.413	(7383.)
VPRS 2 =	0.411	(7369.)
VPRS 3 =	0.413	(7384.)
VPRS 4 =	0.413	(7379.)
VPRS 5 =	0.162	(4750.)
VPRS 6 =	0.164	(4780.)
VPRS 7 =	0.158	(4689.)
VPRS 8 =	0.162	(4741.)
VPRS 9 =	0.178	(4995.)

SUMMARY OF CORRECTED DATA

TIME = 2330
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.239	534.753
PRESSURE (PSIA)	18.874	14.449
VAPOR PRESSURE (PSIA)	0.163	0.413

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 2345 0524

TEMP	1 =	534.710	(7504.)
TEMP	2 =	534.430	(7476.)
TEMP	3 =	535.010	(7534.)
TEMP	4 =	537.090	(7742.)
TEMP	5 =	534.610	(7494.)
TEMP	6 =	534.440	(7477.)
TEMP	7 =	528.550	(6888.)
TEMP	8 =	528.690	(6902.)
TEMP	9 =	528.930	(6926.)
TEMP	10 =	528.930	(6926.)
TEMP	11 =	529.900	(7023.)
TEMP	12 =	528.980	(6931.)
TEMP	13 =	528.710	(6904.)
TEMP	14 =	529.040	(6937.)
TEMP	15 =	529.090	(6942.)
TEMP	16 =	529.230	(6956.)
TEMP	17 =	529.190	(6952.)
TEMP	18 =	529.120	(6945.)
TEMP	19 =	529.300	(6963.)
TEMP	20 =	529.580	(6991.)
TEMP	21 =	529.510	(6984.)
TEMP	22 =	529.630	(6996.)
TEMP	23 =	533.000	(7333.)
TEMP	24 =	532.650	(7298.)
PRES	1 =	18.875	(18978.)
PRES	2 =	14.453	(14480.)
VPRS	1 =	0.414	(7389.)
VPRS	2 =	0.410	(7361.)
VPRS	3 =	0.409	(7352.)
VPRS	4 =	0.402	(7297.)
VPRS	5 =	0.163	(4768.)
VPRS	6 =	0.164	(4785.)
VPRS	7 =	0.159	(4702.)
VPRS	8 =	0.163	(4763.)
VPRS	9 =	0.178	(4996.)

SUMMARY OF CORRECTED DATA

TIME = 2345
DATE = 0524

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.272	534.775
PRESSURE (PSIA)	18.875	14.453
VAPOR PRESSURE (PSIA)	0.164	0.409

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 0 0525

TEMP	1 =	534.740	(7507.)
TEMP	2 =	534.440	(7477.)
TEMP	3 =	535.010	(7534.)
TEMP	4 =	537.090	(7742.)
TEMP	5 =	534.620	(7495.)
TEMP	6 =	534.450	(7478.)
TEMP	7 =	528.590	(6892.)
TEMP	8 =	528.720	(6905.)
TEMP	9 =	528.970	(6930.)
TEMP	10 =	528.980	(6931.)
TEMP	11 =	529.920	(7025.)
TEMP	12 =	529.020	(6935.)
TEMP	13 =	528.750	(6908.)
TEMP	14 =	529.060	(6939.)
TEMP	15 =	529.120	(6945.)
TEMP	16 =	529.240	(6957.)
TEMP	17 =	529.200	(6953.)
TEMP	18 =	529.150	(6948.)
TEMP	19 =	529.320	(6965.)
TEMP	20 =	529.590	(6992.)
TEMP	21 =	529.550	(6988.)
TEMP	22 =	529.650	(6998.)
TEMP	23 =	533.030	(7336.)
TEMP	24 =	532.680	(7301.)
PRES	1 =	18.876	(18979.)
PRES	2 =	14.456	(14483.)
VPRS	1 =	0.415	(7393.)
VPRS	2 =	0.411	(7366.)
VPRS	3 =	0.413	(7379.)
VPRS	4 =	0.395	(7248.)
VPRS	5 =	0.165	(4798.)
VPRS	6 =	0.165	(4800.)
VPRS	7 =	0.160	(4722.)
VPRS	8 =	0.164	(4785.)
VPRS	9 =	0.180	(5022.)

SUMMARY OF CORRECTED DATA

TIME = 0
DATE = 0525

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.301	534.786
PRESSURE (PSIA)	18.876	14.456
VAPOR PRESSURE (PSIA)	0.165	0.408

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 15 0525

TEMP 1 =	534.760	(7509.)
TEMP 2 =	534.450	(7478.)
TEMP 3 =	535.010	(7534.)
TEMP 4 =	537.110	(7744.)
TEMP 5 =	534.620	(7495.)
TEMP 6 =	534.470	(7480.)
TEMP 7 =	528.610	(6894.)
TEMP 8 =	528.750	(6908.)
TEMP 9 =	529.000	(6933.)
TEMP 10 =	529.000	(6933.)
TEMP 11 =	529.930	(7026.)
TEMP 12 =	529.040	(6937.)
TEMP 13 =	528.770	(6910.)
TEMP 14 =	529.070	(6940.)
TEMP 15 =	529.150	(6948.)
TEMP 16 =	529.260	(6959.)
TEMP 17 =	529.240	(6957.)
TEMP 18 =	529.170	(6950.)
TEMP 19 =	529.350	(6968.)
TEMP 20 =	529.610	(6994.)
TEMP 21 =	529.570	(6990.)
TEMP 22 =	529.660	(6999.)
TEMP 23 =	533.060	(7339.)
TEMP 24 =	532.710	(7304.)
PRES 1 =	18.877	(18980.)
PRES 2 =	14.459	(14486.)
VPRS 1 =	0.415	(7396.)
VPRS 2 =	0.410	(7360.)
VPRS 3 =	0.413	(7381.)
VPRS 4 =	0.401	(7293.)
VPRS 5 =	0.166	(4811.)
VPRS 6 =	0.166	(4812.)
VPRS 7 =	0.162	(4748.)
VPRS 8 =	0.165	(4795.)
VPRS 9 =	0.180	(5026.)

SUMMARY OF CORRECTED DATA

TIME = 15
DATE = 0525

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.324	534.797
PRESSURE (PSIA)	18.877	14.459
VAPOR PRESSURE (PSIA)	0.166	0.410

APPENDIX E

SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)

SUMMARY OF MEASURED DATA AT 30 0525

TEMP 1 =	534.770	(7510.)
TEMP 2 =	534.480	(7481.)
TEMP 3 =	535.050	(7538.)
TEMP 4 =	537.100	(7743.)
TEMP 5 =	534.660	(7499.)
TEMP 6 =	534.470	(7480.)
TEMP 7 =	528.640	(6897.)
TEMP 8 =	528.770	(6910.)
TEMP 9 =	529.020	(6935.)
TEMP 10 =	529.020	(6935.)
TEMP 11 =	529.940	(7027.)
TEMP 12 =	529.070	(6940.)
TEMP 13 =	528.800	(6913.)
TEMP 14 =	529.110	(6944.)
TEMP 15 =	529.160	(6949.)
TEMP 16 =	529.280	(6961.)
TEMP 17 =	529.260	(6959.)
TEMP 18 =	529.200	(6953.)
TEMP 19 =	529.380	(6971.)
TEMP 20 =	529.640	(6997.)
TEMP 21 =	529.590	(6992.)
TEMP 22 =	529.690	(7002.)
TEMP 23 =	533.100	(7343.)
TEMP 24 =	532.740	(7307.)
PRES 1 =	18.878	(18981.)
PRES 2 =	14.462	(14489.)
VPRS 1 =	0.415	(7399.)
VPRS 2 =	0.411	(7370.)
VPRS 3 =	0.414	(7386.)
VPRS 4 =	0.400	(7287.)
VPRS 5 =	0.167	(4834.)
VPRS 6 =	0.167	(4830.)
VPRS 7 =	0.162	(4754.)
VPRS 8 =	0.166	(4817.)
VPRS 9 =	0.181	(5038.)

SUMMARY OF CORRECTED DATA

TIME = 30
DATE = 0525

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.350	534.819
PRESSURE (PSIA)	18.878	14.462
VAPOR PRESSURE (PSIA)	0.167	0.410

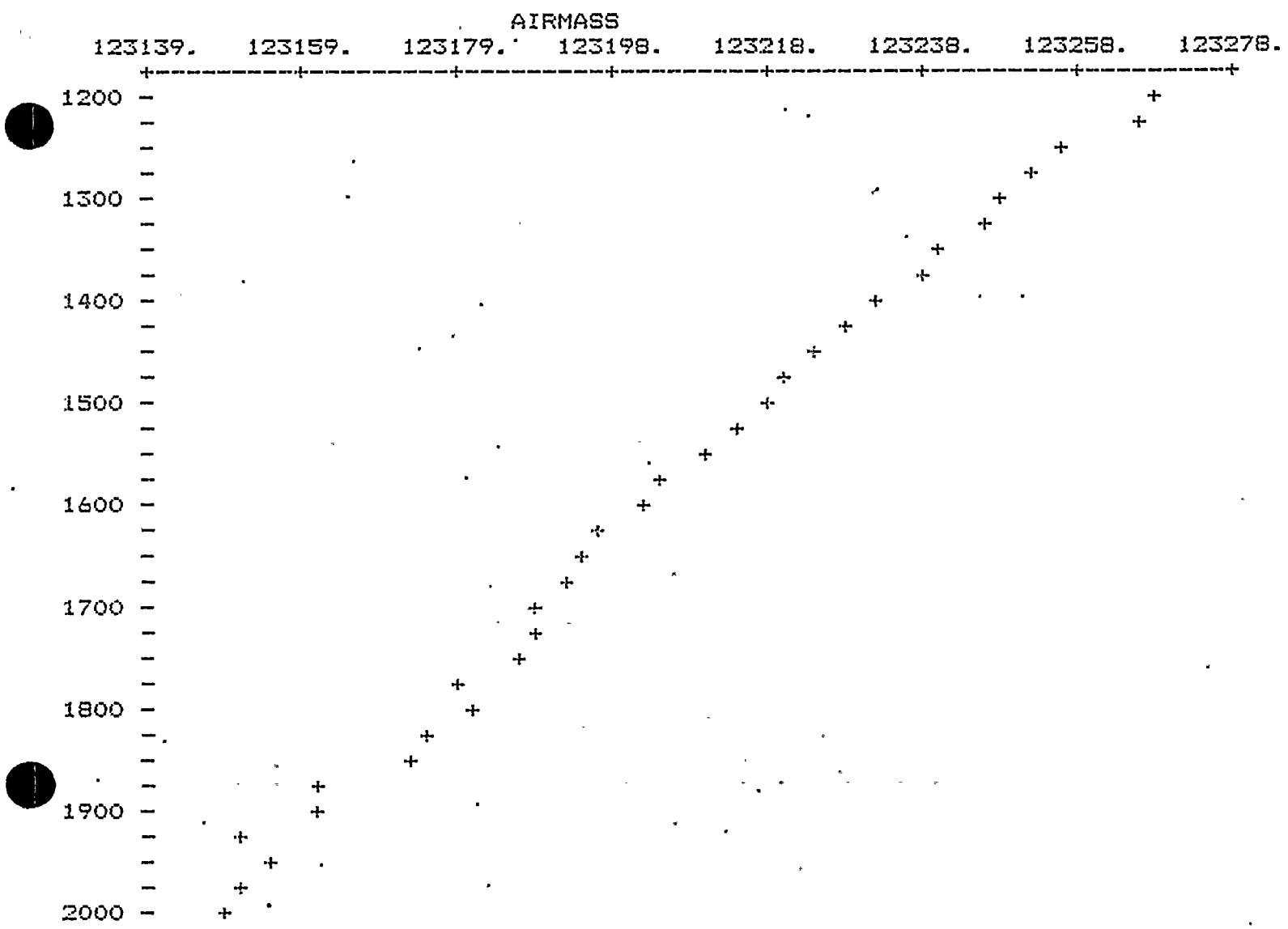
SUSQUEHANNA BYPASS TEST RAW DATA (CONT'D)
SUMMARY OF MEASURED DATA AT 45 0525

TEMP	1 =	534.790	(7512.)
TEMP	2 =	534.480	(7481.)
TEMP	3 =	535.070	(7540.)
TEMP	4 =	537.110	(7744.)
TEMP	5 =	534.650	(7498.)
TEMP	6 =	534.510	(7484.)
TEMP	7 =	528.680	(6901.)
TEMP	8 =	528.820	(6915.)
TEMP	9 =	529.080	(6941.)
TEMP	10 =	529.050	(6938.)
TEMP	11 =	529.980	(7031.)
TEMP	12 =	529.100	(6943.)
TEMP	13 =	528.830	(6916.)
TEMP	14 =	529.150	(6948.)
TEMP	15 =	529.190	(6952.)
TEMP	16 =	529.320	(6965.)
TEMP	17 =	529.290	(6962.)
TEMP	18 =	529.240	(6957.)
TEMP	19 =	529.400	(6973.)
TEMP	20 =	529.640	(6997.)
TEMP	21 =	529.590	(6992.)
TEMP	22 =	529.720	(7005.)
TEMP	23 =	533.140	(7347.)
TEMP	24 =	532.770	(7310.)
PRES	1 =	18.879	(18982.)
PRES	2 =	14.465	(14492.)
VPRS	1 =	0.418	(7415.)
VPRS	2 =	0.412	(7375.)
VPRS	3 =	0.413	(7384.)
VPRS	4 =	0.388	(7196.)
VPRS	5 =	0.169	(4857.)
VPRS	6 =	0.170	(4870.)
VPRS	7 =	0.164	(4780.)
VPRS	8 =	0.168	(4843.)
VPRS	9 =	0.181	(5045.)

SUMMARY OF CORRECTED DATA

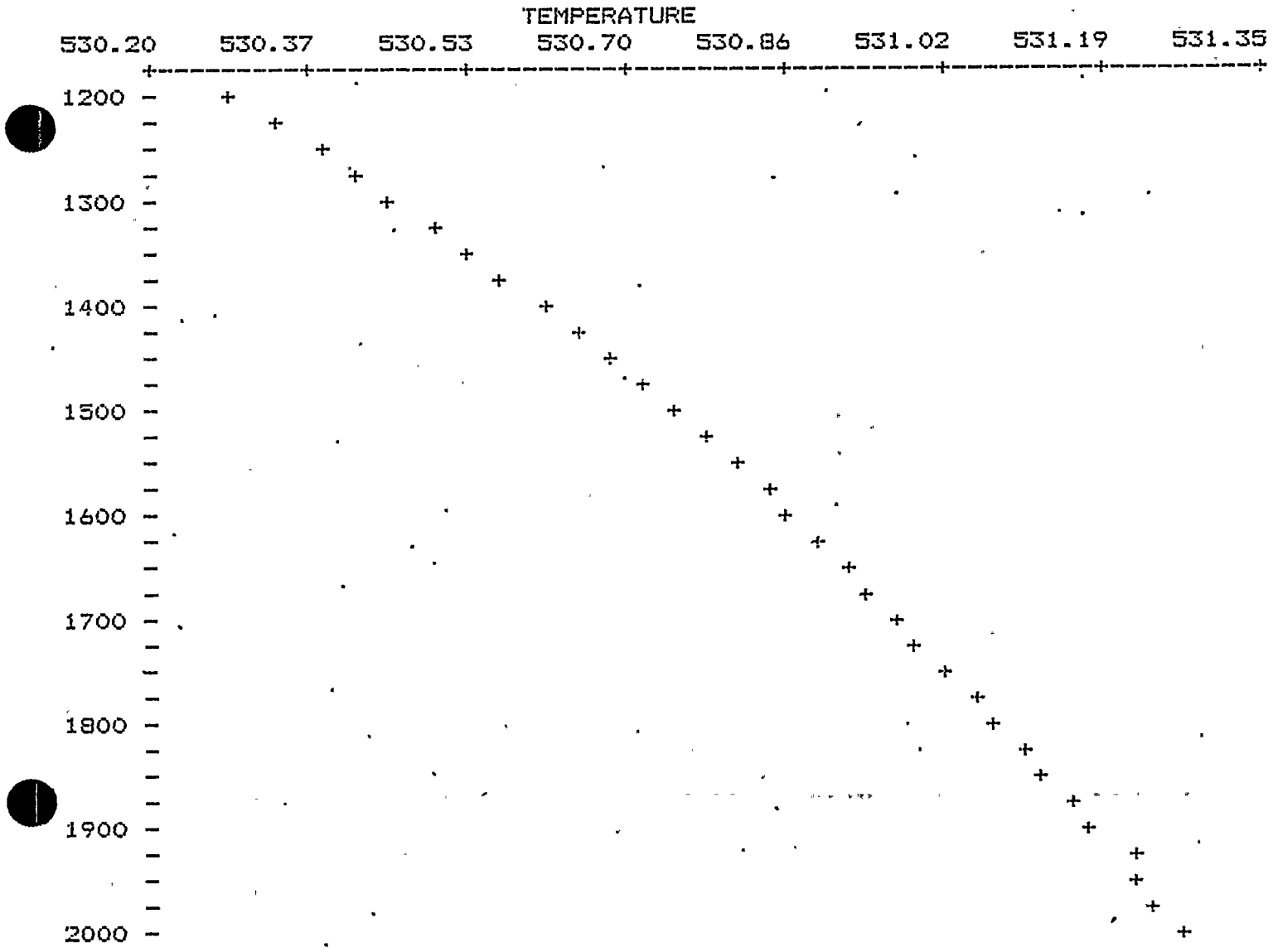
TIME = 45
DATE = 0525

	DRYWELL	S. P.
TEMPERATURE (DEGREES R.)	529.384	534.833
PRESSURE (PSIA)	18.879	14.465
VAPOR PRESSURE (PSIA)	0.169	0.408



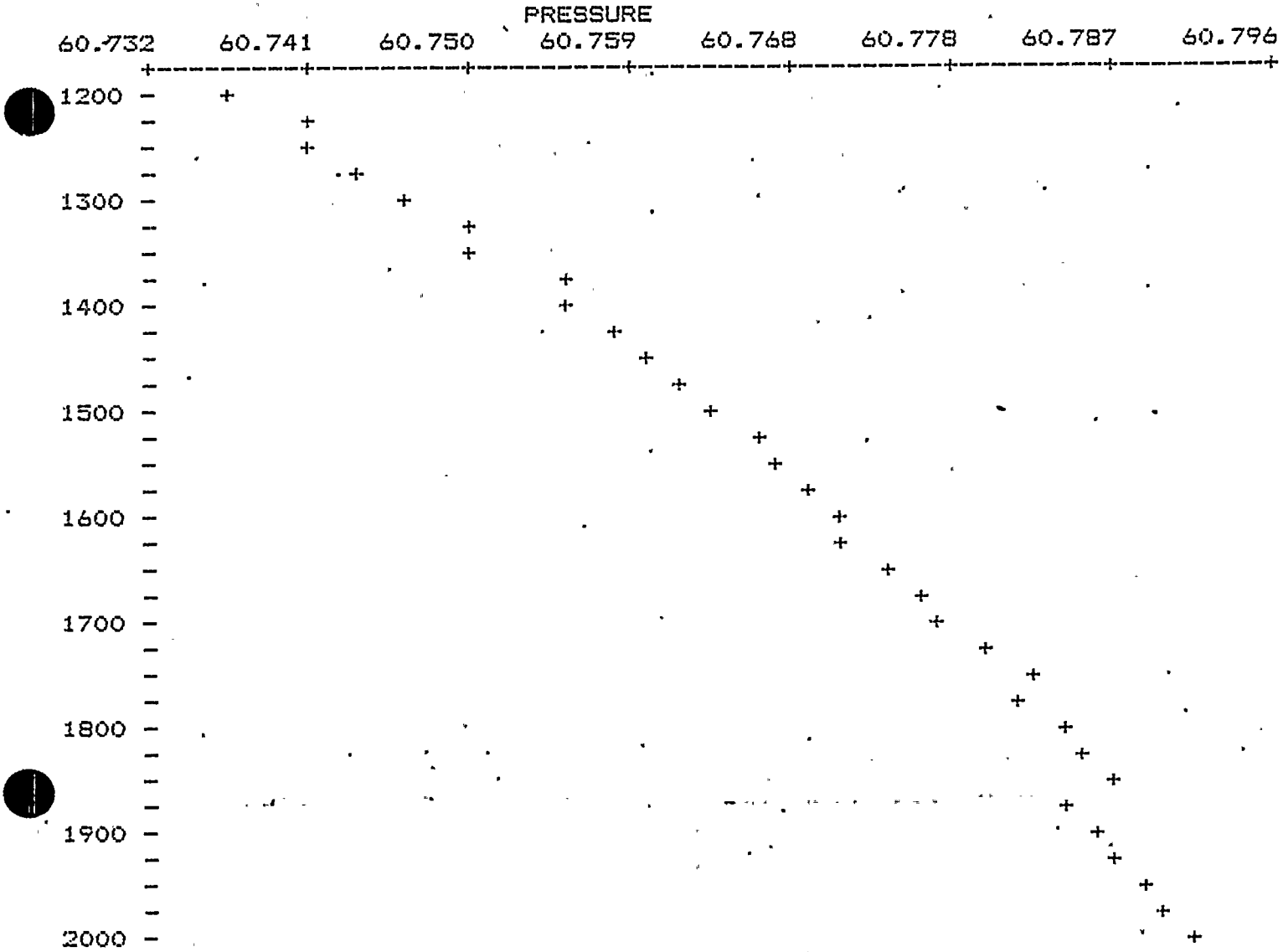
APPENDIX F

ILRT AIRMASS VS. TIME PLOT



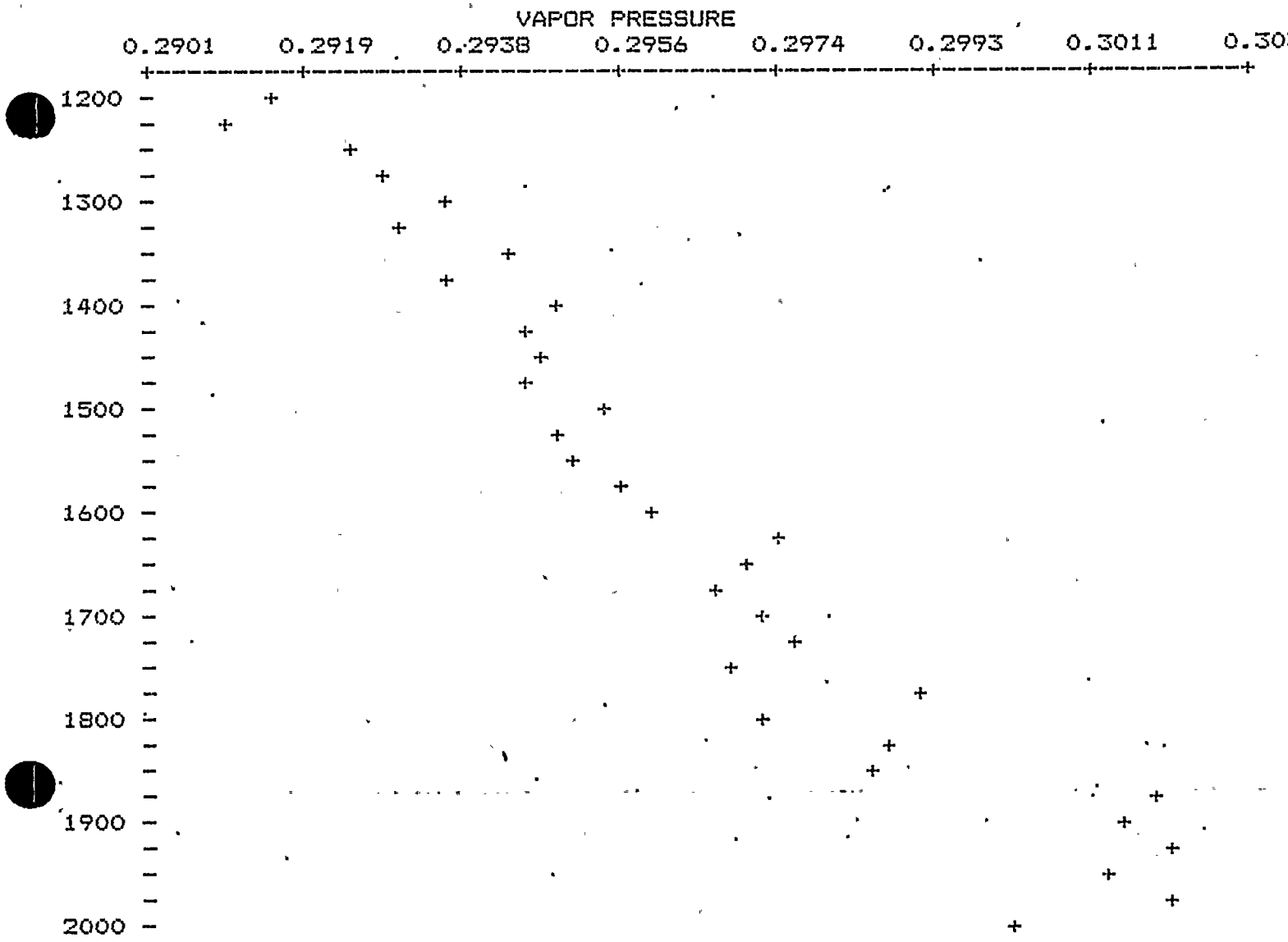
APPENDIX F

ILRT TEMPERATURE VS. TIME PLOT



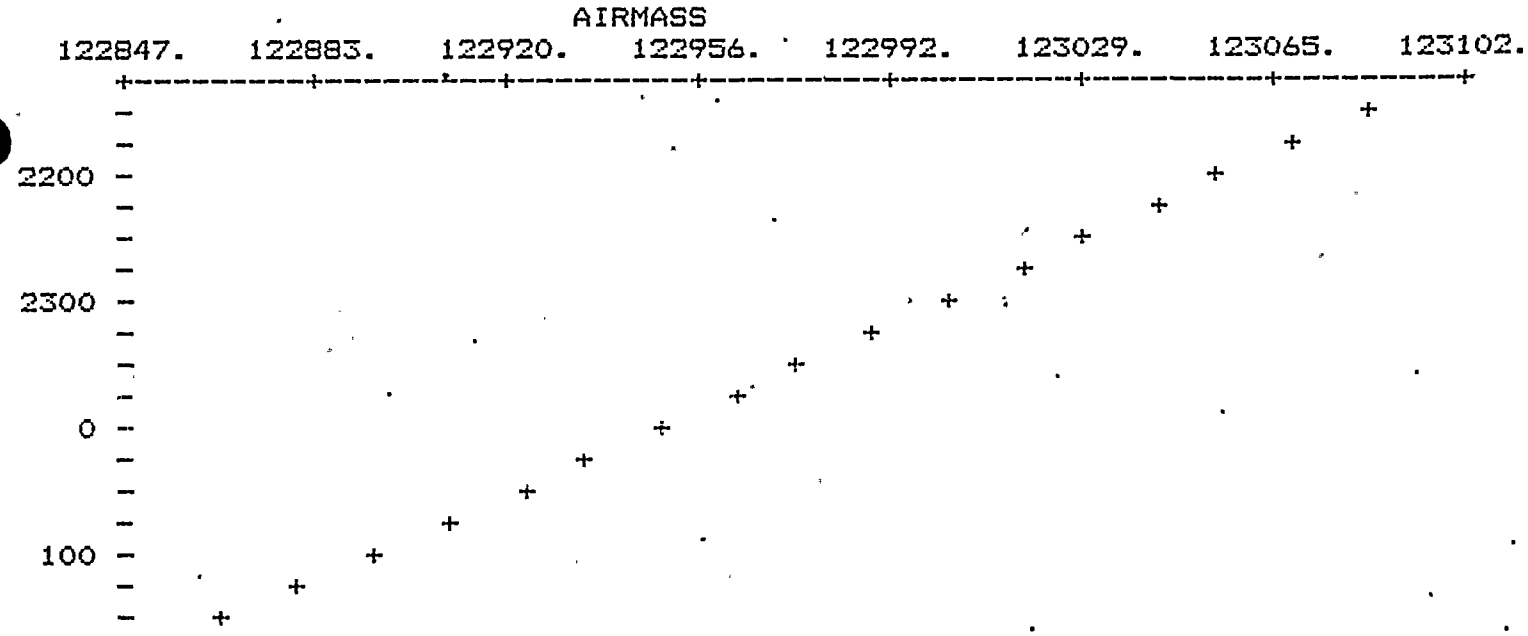
APPENDIX F

ILRT PRESSURE VS. TIME PLOT



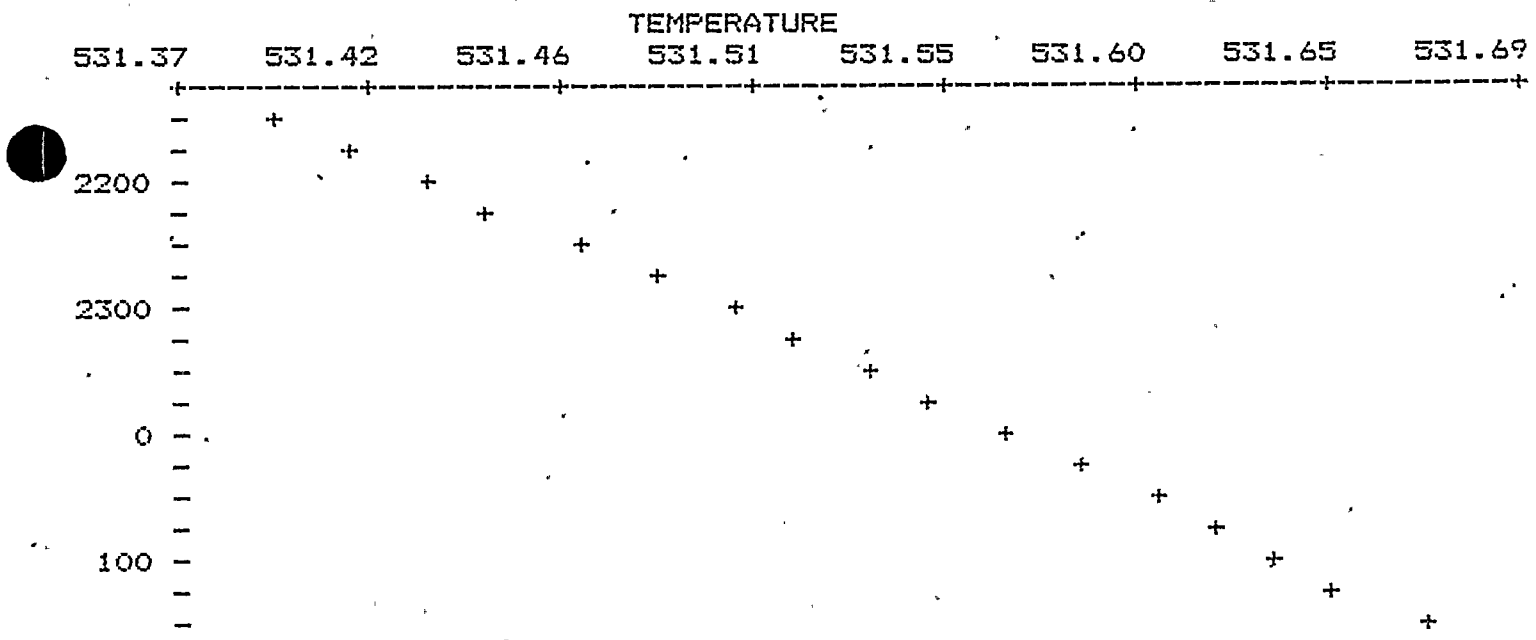
APPENDIX F

ILRT VAPOR PRESSURE VS. TIME PLOT



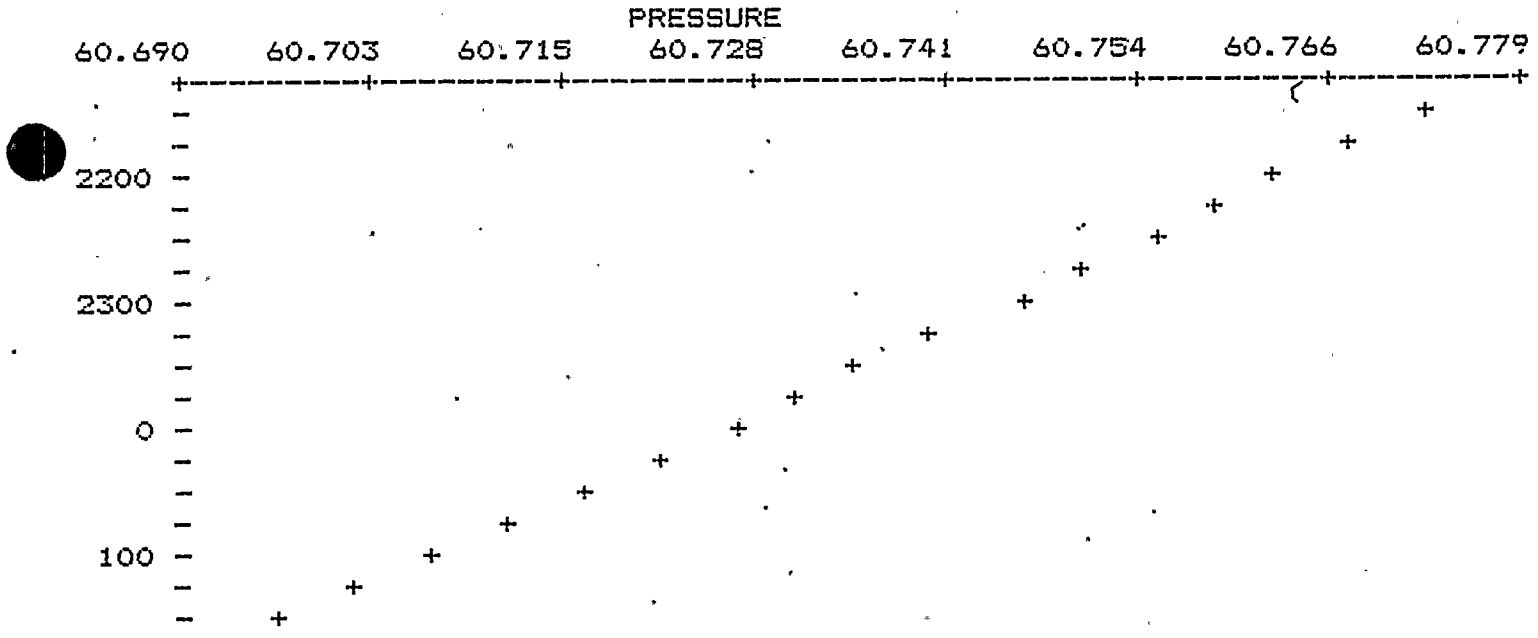
APPENDIX F

VERIFICATION TEST PLOTS AIRMASS VS. TIME



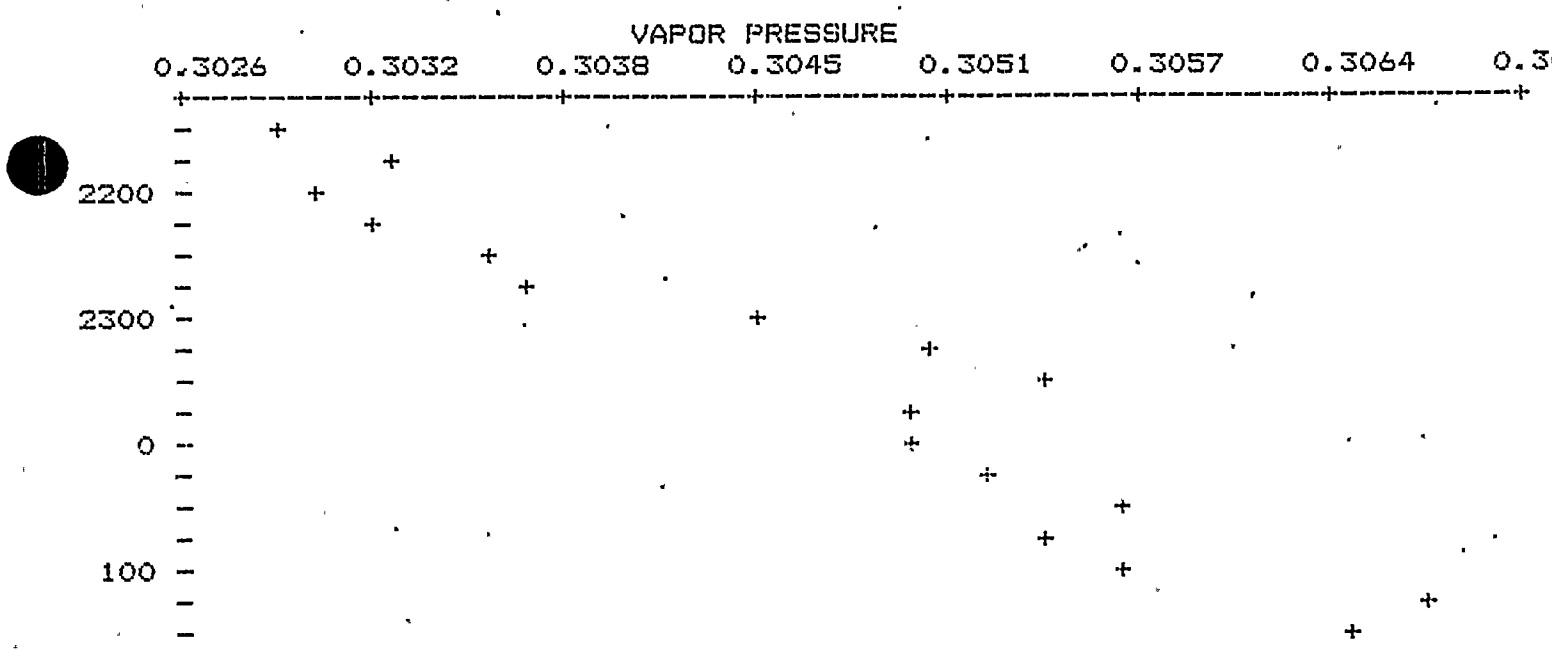
APPENDIX F

VERIFICATION TEST PLOTS TEMPERATURE VS. TIME



APPENDIX F

VERIFICATION TEST PLOTS PRESSURE VS. TIME



APPENDIX F

VERIFICATION TEST PLOTS VAPOR PRESSURE VS. TIME

APPENDIX G

ILRT INSTRUMENTATION

Type (No.) Sensor	Instrument Number	Make and Model	Serial Number	Range (Calibrated)	Card Slot or Circuit Board
RTD 1	TE05901A	Rosemont 786517	55339	60°F - 120°F	1
RTD 2	TE05901B	Rosemont 786517	64112	60°F - 120°F	2
RTD 3	TE05901C	Rosemont 786517	55397	60°F - 120°F	3
RTD 4	TE05901D	Rosemont 786517	55423	60°F - 120°F	4
RTD 5	TE05901E	Rosemont 786517	64471	60°F - 120°F	5
RTD 6	TE05901F	Rosemont 786517	62415	60°F - 120°F	6
RTD 7	TE05902A	Rosemont 786517	64223	60°F - 120°F	7
RTD 8	TE05902B	Rosemont 786517	59834	60°F - 120°F	8
RTD 9	TE05902C	Rosemont 786517	55354	60°F - 120°F	9
RTD 10	TE05902D	Rosemont 786517	55449	60°F - 120°F	10
RTD 11	TE05902E	Rosemont 786517	56926	60°F - 120°F	11
RTD 12	TE05903A	Rosemont 786517	56885	60°F - 120°F	12
RTD 13	TE05903B	Rosemont 786517	62586	60°F - 120°F	13
RTD 14	TE05903C	Rosemont 786517	59812	60°F - 120°F	14
RTD 15	TE05903D	Rosemont 786517	50993	60°F - 120°F	15
RTD 16	TE05904A	Rosemont 786517	55349	60°F - 120°F	16
RTD 17	TE05904B	Rosemont 786517	64284	60°F - 120°F	17
RTD 18	TE05904C	Rosemont 786517	55447	60°F - 120°F	18
RTD 19	TE05905A	Rosemont 786517	59693	60°F - 120°F	19
RTD 20	TE05905B	Rosemont 786517	55372	60°F - 120°F	20
RTD 21	TE05906A	Rosemont 786517	55388	60°F - 120°F	21
RTD 22	TE05906B	Rosemont 786517	55367	60°F - 120°F	22
RTD 23	TE05907A	Rosemont 786517	55365	60°F - 120°F	23
RTD 24	TE05907B	Rosemont 786517	55341	60°F - 120°F	24
Dew Cell 1	ME05901A	EG&G 660	1071	40 - 100	375
Dew Cell 2	ME05901B	EG&G 660	1084	40 - 100	400
Dew Cell 3	ME05901C	EG&G 660	994	40 - 100	405
Dew Cell 4	ME05901D	EG&G 660	1000	40 - 100	467
Dew Cell 5	ME05902	EG&G 660	1075	40 - 100	423
Dew Cell 6	ME05903	EG&G 660	1069	40 - 100	451
Dew Cell 7	ME05904	EG&G 660	1008	40 - 100	437
Dew Cell 8	ME05905	EG&G 660	1043	40 - 100	439
Dew Cell 9	ME05907	EG&G 660	953	40 - 100	442
Pressure Sensor 1	PIT 05913	Mensor	2699	0 - 100 psia	N/A
Pressure Sensor 2	PIT 05914	Mensor	1920	0 - 100 psia	N/A
Mass Flow Meter	VMC-508	TSI-2013	1578	0 - 10 ft^3/min	N/A
Rotameter	FT-05911	Brooks	663	0 - 10 ft^3/min	N/A

APPENDIX H

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS)

Introduction

During the period of April 13, 1982 through April 30, 1982, the vendor was on site at the Susquehanna Steam Electric Station in Berwick, Pennslyvania, to provide technical assistance and supervision in the calibration of the Integrated Leakage Rate Test System (ILRTS) Model 14629 (plant equipment Nos. OC-223 and OC-224). The three week effort involved servicing of the consoles, alignment of electronics and instruction to Pennsylvania Power and Light personnel in methods of calibration and operation.

This report outlines specific details of what was done and with what results. It also includes vendor's comments on the procedures used by PP&L and the vendor to perform various calibrations.

Reference

All required test specifications are derived from the technical standard ANSI/ ANS-56.8, 1981.

Test Requirements

The following tests are required to certify an operational ILRTS prior to commencement of containment pressurization.

TEST	ANSI/ANS-56.8 REQUIREMENT
1. Drybulb (RTD)	
(a) Sensor accuracy	$\pm$ 0.5°F
(b) Sensor sensitivity	$\pm$ 0.1°F
(c) Display repeatability	$\pm$ 0.01°F
(d) Display resolution	0.01°F
(e) Calibration check (In-Situ)	$\pm$ 1.0°F
2. Dewpoint	
(a) Sensor accuracy	$\pm$ 2.0°F
(b) Sensor sensitivity	$\pm$ 0.5°F
(c) Display repeatability	$\pm$ 0.1°F
(d) Display resolution	0.1°F
(e) Calibration check (In-Situ)	$\pm$ 5.0°F

APPENDIX H

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

TEST	ANSI/ANS-56.8 REQUIREMENT
3. Pressure	
(a) Sensor accuracy	± 0.02% reading
(b) Sensor sensitivity	± 0.001% full scale
(c) Display repeatability	± 0.001% full scale
(d) Display resolution	0.001 psia
(e) Calibration check (In-Situ)	± 0.05% reading
4. Verification Flow	
(a) Sensor accuracy	± 2.0% full scale
(b) Sensor sensitivity	± 1.0% full scale
(c) Display repeatability	± 0.1 scfm
(d) Display resolution	0.2 scfm
(e) Calibration check (In-Situ)	± 5% full scale
5. Time	
(a) Accuracy	± 1 min/24 hours
(b) Resolution	1 second

In addition, the following adjustments are required to ensure proper performance of the ILRTS.

TEST	OBJECTIVE
6. Drybulb (RTD) Signal Conditioning Alignment	Accuracy
7. Dewpoint Signal Conditioning Alignment	Accuracy
8. Dewpoint Control Loop Alignment (chilled mirror systems only)	Operation and Stability
9. Data Acquisition System Calibration	Accuracy
10. Rotameter Pressure Sensor Calibration	Accuracy

Test Performed On-Site

The following tests were performed on-site with the indicated worst-case results.

APPENDIX H

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

1.A	Test:	Drybulb (RTD) Sensor Accuracy
	Performed by:	PP&L Calibration Lab
	Procedure used:	PP&L Generic with w/a
	Witnessed by Volumetrics:	No
	Calibration error:	± 0.5°F
	ANSI/ANS-56.8 requirement:	± 0.5°F
	Acceptance evaluation:	Meets ANSI requirements
1.B	Test:	Drybulb (RTD) Sensor Accuracy
	Performed by:	PP&L Calibration Lab
	Procedure used:	PP&L Generic with w/a
	Witnessed by Volumetrics:	No
	Worst-case error encountered:	± 0.02°F
	ANSI/ANS-56.8 requirement:	± 0.1°F
	Acceptance evaluation:	Exceeds ANSI requirements
1.C	Test:	Drybulb (RTD) Display Repeatability
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-59-001, Rev 0
	Witnessed by Volumetrics:	No
	Worst-case error encountered:	± 0.001°F
	ANSI/ANS-56.8 requirement:	± 0.01°F
	Acceptance evaluation:	Exceeds ANSI requirements
1.D	Test:	Drybulb (RTD) Display Resolution
	Performed by:	Vendor
	Procedure used:	Observation
	Witnessed by Volumetrics:	Yes
	Observed results:	0.001°F from 32°F to 120°F
	ANSI/ANS-56.8 requirement:	0.01°F
	Acceptance evaluation:	Exceeds ANSI requirements
2.A	Test:	Dewpoint Sensor Accuracy
	Performed by:	Vendor/PP&L I&C
	Procedure used:	Vendor/QAP #2021, Rev 3
	Witnessed by Volumetrics:	Yes
	Calibration error:	± 0.76°F
	ANSI/ANS-56.8 requirement:	± 2.0°F
	Acceptance evaluation:	Exceeds ANSI requirements
2.B	Test:	Dewpoint Sensor Sensitivity
	Performed by:	Vendor/PP&L I&C
	Procedure used:	Vendor QAP #2021, Rev 3
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	± 0.2°F
	ANSI/ANS-56.8 requirement:	± 0.5°F
	Acceptance evaluation:	Exceeds ANSI requirements

APPENDIX H

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

2.C	Test:	Dewpoint Display Repeatability
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-59-001, Rev 0
	Witnessed by Volumetrics:	No
	Worst-case error encountered:	± 0.008°F
	ANSI/ANS-56.8 requirement:	± 0.1°F
	Acceptance evaluation:	Exceeds ANSI requirements
2.D	Test:	Dewpoint Display Resolution
	Performed by:	Vendor
	Procedure used:	Observation
	Witnessed by Volumetrics:	Yes
	Observed results:	0.001°F from 32°F to 120°F
	ANSI/ANS-56.8 requirement:	0.1°F
	Acceptance evaluation:	Exceeds ANSI requirements
3.A	Test:	Pressure Sensor Accuracy
	Performed by:	NBS
	Procedure used:	Not Available
	Witnessed by Volumetrics:	No
	Calibration accuracy:	± 0.015% of reading
	ANSI/ANS-56.8 requirement:	± 0.02% of reading
	Acceptance evaluation:	Exceeds ANSI requirements
3.B	Test:	Pressure Sensor Sensitivity
	Performed by:	PP&L I&C
	Procedure used:	PP&L w/a #U27498
	Witnessed by Volumetrics:	No
	Worst-case error encountered:	± 0.001% full scale
	ANSI/ANS-56.8 requirement:	± 0.001% full scale
	Acceptance evaluation:	Meet ANSI requirements
3.C	Test:	Pressure Display Repeatability
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-59-001, Rev 0
	Witnessed by Volumetrics:	No
	Worst-case error encountered:	± 0.0005% full scale
	ANSI/ANS-56.8 requirement:	± 0.001% full scale
	Acceptance evaluation:	Meets ANSI requirements
3.D	Test:	Pressure Display Resolution
	Performed by:	Vendor
	Procedure used:	Observation
	Witnessed by Volumetrics:	Yes
	Observed results:	0.001 psia
	ANSI/ANS-56.8 requirement:	0.001 psia
	Acceptance evaluation:	Meets ANSI requirements

APPENDIX H

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

5.A	Test:	Time Accuracy
	Performed by:	Vendor/PP&L
	Procedure used:	Vendor QAP #2023, Rev 2
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	3 seconds/48 hours
	ANSI/ANS-56.8 requirement:	1 minute/24 hours
	Acceptance evaluation:	Exceeds ANSI requirements
5.B	Test:	Time Resolution
	Performed by:	Vendor
	Procedure used:	Observation
	Witnessed by Volumetrics:	Yes
	Observed results:	1 second
	ANSI/ANS-56.8 requirement:	1 second
	Acceptance evaluation:	Exceeds ANSI requirements
6.	Test:	Drybulb Signal Conditioning
	Performed by:	Vendor/PP&L I&C
	Procedure used:	Vendor QAP #2004, Rev 1*
	Witnessed by Volumetrics:	Yes
7.	Test:	Dewpoint Signal Conditioning
	Performed by:	PP&L I&C
	Procedure used:	Volumetrics QAP #2022, Rev 3*
	Witnessed by Volumetrics:	Yes
8.	Test:	Dewpoint Control Loop
	Performed by:	Volumetrics/PP&L I&C
	Procedure used:	Volumetrics QAP #2002, Rev 2
	Witnessed by Volumetrics:	Yes
9.	Test:	Data Acquisition Calibration
	Performed by:	PP&L I&C
	Procedure used:	Manufacturer Operation Manual
	Witnessed by Volumetrics:	Yes

* PP&L procedures IC-DC-100, IC-DC-200, and IC-LC-001 apply to all system loop calibrations.

Test Performed at Vendor's Laboratory

The following tests were performed at the vendor's calibration laboratory in Paso Robles, California, with the indicated worst-case results. These tests were witnessed by a representative from PP&L Quality Assurance.

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

4.A	Test:	Flow Sensor Accuracy (Mass Flowmeter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2005, Rev 4
	Calibration error:	± 1.0% full scale
	ANSI/ANS-56.8 requirement:	± 2.0% full scale
	Acceptance evaluation:	Exceeds ANSI requirements
4.A	Test:	Flow Sensor Accuracy (Rotameter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2034, Rev 0
	Calibration error:	± 1.0% full scale
	ANSI/ANS-56.8 requirement:	± 2.0% full scale
	Acceptance evaluation:	Exceeds ANSI requirements
4.B	Test:	Flow Sensor Accuracy (Mass Flowmeter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2005, Rev 4
	Worst-case error encountered:	± 0.4% full scale
	ANSI/ANS-56.8 requirement:	± 1.0% full scale
	Acceptance evaluation:	Exceeds ANSI requirements
4.B	Test:	Flow Sensor Accuracy (Rotameter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2034, Rev 0
	Worst-case error encountered:	± 1.0% full scale
	ANSI/ANS-56.8 requirement:	± 1.0% full scale
	Acceptance evaluation:	Exceeds ANSI requirements
4.C	Test:	Flow Display Repeatability (Mass Flowmeter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2026, Rev 4
	Worst-case error encountered:	± 0.01 scfm
	ANSI/ANS-56.8 requirement:	± 0.1 scfm
	Acceptance evaluation:	Exceeds ANSI requirements
4.C	Test:	Flow Display Repeatability (Rotameter)
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2026, Rev 4
	Worst-case error encountered:	± 0.04 scfm
	ANSI/ANS-56.8 requirement:	± 0.1 scfm
	Acceptance evaluation:	Exceeds ANSI requirements
4.D	Test:	Flow Display Resolution (Mass Flowmeter)
	Performed by:	Vendor
	Procedure used:	Observation
	Observed results:	0.01 scfm
	ANSI/ANS-56.8 requirement:	0.2 scfm
	Acceptance evaluation:	Exceeds ANSI requirements

REPORT ON SERVICING AND CALIBRATION OF THE INTEGRATED LEAKAGE RATE TEST SYSTEM (ILRTS) (CONT'D)

4.D	Test:	Flow Display Resolution (Rotameter)
	Performed by:	Vendor
	Procedure used:	Observation
	Observed results:	0.13 scfm (between markings)
	ANSI/ANS-56.8 requirement:	0.2 scfm
	Acceptance evaluation:	Exceeds ANSI requirements
10.	Test:	Rotameter Pressure Sensor Accuracy
	Performed by:	Vendor
	Procedure used:	Vendor QAP #2032, Rev 4
	Calibration error:	± 0.25% full scale

Calibration Check Performed On-Site

The following tests were performed on-site by either the vendor or PP&L personnel with the indicated worst-case results. These tests were performed after the initial three week visit by the vendor, during a subsequent visit prior to the ILRT.

1.E	Test:	Drybulb (RTD) Calibration Check
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-59-002, Rev 0
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	± 0.70°F
	ANSI/ANS-56.8 requirement:	± 1.0°F
	Acceptance evaluation:	Exceeds ANSI requirements
2.E	Test:	Dewpoint Calibration Check
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-59-002, Rev 0
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	± 2.30°F
	ANSI/ANS-56.8 requirement:	± 5.0°F
	Acceptance evaluation:	Exceeds ANSI requirements
3.E	Test:	Pressure Calibration Check
	Performed by:	Vendor
	Procedure used:	PP&L IC-59-002, Rev 0
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	± 0.016 psia @ 62 psia (± 0.026% reading)
	ANSI/ANS-56.8 requirement:	± 0.05% reading
	Acceptance evaluation:	Exceeds ANSI requirements
4.E	Test:	Flow Calibration Check
	Performed by:	PP&L I&C
	Procedure used:	PP&L IC-559-002, Rev 0
	Witnessed by Volumetrics:	Yes
	Worst-case error encountered:	± 3.5% full scale
	ANSI/ANS-56.8 requirement:	± 5.0% full scale
	Acceptance evaluation:	Exceeds ANSI requirements

Pressure Gauge Analysis

In performing ILRTs, the vendor uses a quartz manometer (QM) manufactured by Mensor Corporation. Mensor has supplied the vendor with data supporting the use of the QM as a transfer standard, thereby providing a means of adapting deadweight tester accuracy to absolute pressure calibrations and measurements in field test situations. Refer to the vendor's QAP #1002 for further discussion of this topic.

The manufacturer's stated measurement accuracy for the QM at the cardinal calibration points is:

$\pm$ 0.010% reading; $\pm$ 0.002% full scale; $\pm$ 5 microns

The first term represents the uncertainty of the primary standard normally used by the vendor, and by Mensor, which is a deadweight tester directly traceable to NBS. The certified accuracy of this device is $\pm$ 0.010% of reading. The second component ($\pm$ 0.002% of full scale) encompasses the nonrepeatability ($\pm$ 0.0005% of full scale) of any transfer standard QM and the QM in question, and allows for operator-related errors induced by misreading the QM. The final term ($\pm$ 5 microns) is attributable to the uncertainty of the vacuum measurement when adjusting zero on an absolute QM. For full scale ranges greater than 20 psia, this error is insignificant.

For this specific case, the accuracy derivation is altered to reflect the test results as reported here:

1. The primary standard used by NBS to calibrate the QM has an uncertainty of $\pm$ 0.006% of reading.

2. The worst-case repeatability of the QM was found to equal the manufacturer's specification of $\pm$ 0.0005% full scale (see test 3.C results).

3. The digital ambiguity of the LED display/transmitter is $\pm$ digit, which equates to $\pm$ 0.001% full scale (assuming this value replaces the operator error associated with misreading the instrument).

Items 1, 2, and 3 combine to form the accuracy statement:

$\pm$ 0.006% reading $\pm$ $(0.0005)^2 + (0.001)^2$% full scale

which equates to:

$\pm$ 0.006% reading $\pm$ 0.0011% full scale

As before, the 5 micron vacuum error is assumed to be negligible for this range (100 psia). The above result demonstrates the adherence of the QMs to the manufacturer's specifications. For atmospheric pressure (15 psia) the derived error statement translates to:

$\pm$ (((0.00006) (15) + (.000011) (100)) (100) 15)% reading,

or $\pm$ 0.013% of reading.

Since ILRTs are always run above atmospheric pressure and the percentage of reading uncertainty improves as pressure increases (due to the inclusion of a full scale error term), the pressure reading can be said to be accurate to better than $\pm$ 0.013% of reading for pressures above atmospheric (Volumetrics standard specification is $\pm$ 0.015% of reading).

General Evaluation

Vendor procedures were used at the vendor's laboratory in Paso Robles, California, for all of the flow calibrations (except "in-situ" testing). Vendor procedures were also used for much of the time and dewpoint testing, since PP&L did not have procedures specific to the alignment of ILRT circuit boards or operation of the vendor's dewpoint generator. Vendor standards were used in all flow testing and in the pressure "in-situ" test. All other standards belonged to the PP&L I&C division.

Two of the PP&L procedures (IC-59-001 and IC-59-002) were drawn to a large extent from vendor procedures QAP #2026, 2400, 2401, 2402, and 2403. These cover the repeatability and "in-situ" calibration checks. PP&L work authorization #U27498 demonstrates a preferred method for pressure sensitivity testing. The vendor finds all of these procedures acceptable.

Some notable deficiencies surfaced in the calibration of the pressure gauges by NBS. The most major of these was the taking of pressure reading at 10% full scale increments rather than the 5% full scale increments recommended by the vendor and Mensor. Also, NBS did not record the capsule temperature of each gauge (a problem that was alleviated by the foresight of the PP&L I&C department in measuring the temperature before and after the unit was shipped and received). Other deficiencies (not recording points below 15 psia except zero, not setting zero) were inconsequential.

Conclusion

In general, the cooperative calibration effort by PP&L and the vendor was successful. All collected data either met or exceeded ANSI/ANS-56.8, 1981 specifications.

APPENDIX I

BECHTEL ILRT COMPUTER PROGRAM

A. Program and Report Description

1. The Bechtel ILRT computer program is used to determine the integrated leakage rate of a nuclear primary containment structure. The program is used to compute leakage rate based on input values of time, free air volume containment atmosphere total pressure, drybulb temperature, and dewpoint temperature (water vapor pressure). Leakage rate is computed using the Absolute Method as defined in ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements" and BN-TOP-1, Rev 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants". The program is designed to allow the user to evaluate containment leakage rate test results at the jobsite during containment leakage testing. Current leakage rate values may be obtained at any time during the testing period using one of two computational methods, yielding three different report printouts.

2. In the first printout, the Total Time Report, leakage rate is computed from initial values of free air volume, containment atmosphere drybulb temperature and partial pressure of dry air, the latest values of the same parameters, and elapsed time. These individually computed leakage rates are statistically averaged using linear regression by the method of least squares. The Total-Time Method is the computational technique upon which the short duration test criteria of BN-TOP-1, Rev 1, "Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plant," are based.

3. The second printout is the Mass Point Report and is based on the Mass-Point Analysis Technique described in ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements." The mass of dry air in the containment is computed at each data point (time) using the Equation of State, from current values of containment atmosphere drybulb temperature and partial pressure of dry air. Contained mass is "plotted" versus time and a regression line is fit to the data using the method of least squares. Leakage rate is determined from the statistically derived slope and intercept of the regression line.

4. The third printout, the Trend Report, is a summary of leakage rate values based on Total Time and Mass Point computations presented as a fuction of number of data points and elapsed time (test duration). The Trend Report provides all leakage rate values required for comparision to the acceptance criteria of BN-TOP-1 for conduct of a short duration test.

5. The program is written in a high level language and is designed for use on a mini-computer with direct data input from the data acquisition system, or on a mainframe via a remote data terminal. Brief descriptions of program use, formulae used for leakage rate computations, and program logic are provided in the following paragraphs.

B. Explanation of Program

1. The Bechtel ILRT computer program is written, for use by experienced ILRT personnel, to determine containment integrated leakage rates based on the Absolute Method described in ANSI/ANS 56.8-1981 and BN-TOP-1.

2. Information loaded into the program prior to the start of the test:

   a. Number of containment atmosphere drybulb temperature sensors and dewpoint temperature (water vapor pressure) sensors to be used in leakage rate computations for the specific test

   b. Volume fractions assigned to each of the above sensors

   c. Calibration data for above sensor, if required

   d. Calibration data for pressure sensor.

3. Information entered into the program at the start of the test:

   a. Test title

   b. Current test pressure and peak test pressure

   c. Maximum allowable leakage rate at peak test pressure

   d. If the test is a verification test:

      (1) Imposed leakage rate

      (2) Leakage rates determined using the two computational methods described in Paragraph A above during the ILRT.

4. Data received from the data acquistion system during the test, and used to compute leakage rates:

   a. Time and date

   b. Containment atmosphere drybulb temperatures

   c. Containment atmosphere pressure

   d. Containment atmosphere dewpoint temperatures

5. After all data at a given time are received , a Summary of Measured Data report (refer to "Program Logic," Paragraph D, "Data" option command) is printed on the data terminal. The date, containment atmosphere weighted average drybulb temperature, partial pressure of the dry air and water vapor pressure are stored on a data file.

6. If drybulb and dewpoint temperature sensors should fail during the test, the data from the sensor(s) are not used. The volume fractions for the remaining sensors are recomputed and reloaded into the program for use in ensuing leakage rate computations.

C. Leakage Rate Formulae

1. Computation using the Total Time Method:

a. Measured leakage rate, from data:

$$P_1V_i = W_1RT_1 \quad (1)$$

$$P_iV_i = W_iRT_i \quad (2)$$

$$L_i = \frac{2400\ (W_1 - W_i)}{\Delta t_i\ W_1} \quad (3)$$

Solving for W_1 and W_i and substituting equations (1) and (2) into (3) yields:

$$L_i = 2400/\Delta t_i(1-T_1P_i/T_iP_1) \quad (4)$$

where:

W_1, W_i = Weight of contained mass of dry air at times t_1 and t_i respectively, lbm.

T_1, T_i = Containment atmosphere drybulb temperature at times t_1 and t_i respectively, °R.

P_1, P_i = Partial pressure of the dry air component of the containment atmosphere at times t_1 and t_i respectively, psia.

V_i = Containment free air volume (constant or variable during the test), ft^3.

t_1, t_i = Time at 1^{st} and i^{th} data points respectively, hours.

Δt_i = Elapsed time from t_1 to t_i, hours.

R = Specific gas constant for air = 53.35 ft.lbf/lbm.°R.

L_i = Measured leakage rate computed during time interval t_1 to t_i, %/day.

b. Calculated leakage rate from regression analysis:

$$\overline{L} = a + b\Delta t_N \tag{5}$$

where:

$\overline{L}$ = Calculated leakage rate, %/day, as determined from the regression line.

$$a = \frac{\Sigma L_i(\Sigma \Delta t_i^2) - \Sigma \Delta t_i(\Sigma L_i \Delta t_i)}{N(\Sigma \Delta t_i^2) - (\Sigma \Delta t_i)^2} \tag{6}$$

$$b = \frac{N(\Sigma L_i \Delta t_i) - \Sigma L_i(\Sigma \Delta t_i)}{N(\Sigma \Delta t_i^2) - (\Sigma \Delta t_i)^2} \tag{7}$$

N = Number of data points

$$\Sigma = \sum_{i=1}^{N}$$

c. Calculated leakage rate at the 95% confidence level.

$$\overline{L}_{95} = a + b\Delta t_N + S_{\overline{L}} \tag{8}$$

where:

$\overline{L}_{95}$ = Calculated leakage rate at the 95% confidence level, %/day, at elapsed time Δt_N.

For $\Delta t_N < 24$

$$S_{\overline{L}} = t_{0.025;N-2}\,[\Sigma(L_i-\overline{L}_i)^2/(N-2)]^{1/2} \times [1 + \frac{1}{N} + (\Delta t_N-\overline{\Delta t})^2/\,(\Delta t_i-\overline{\Delta t})^2]^{1/2} \tag{9a}$$

where, $t_{0.025;N-2} = 1.95996 + \frac{2.37226}{N-2} + \frac{2.82250}{(N-2)^2}$;

For $\Delta t_N \geq 24$

$$S_{\overline{L}} = t_{0.025;N-2}\,[\Sigma(L_i - \overline{L}_i)^2/(N-2)]^{1/2} \times [\frac{1}{N} + (\Delta t_N - \overline{\Delta t})^2/\Sigma(\Delta t_i - \overline{\Delta t})^2]^{1/2} \tag{9b}$$

where, $t_{0.025;N-2} = \dfrac{1.6449(N-2)^2 + 3.5283(N-2) + 0.85602}{(N-2)^2 + 1.2209(N-2) - 1.5162}$

$\overline{L_i}$ = Calculated leakage rate computed using equation (5) at total elapsed time t_i, %/day.

$$\overline{\Delta t} = \frac{\Sigma \Delta t_i}{N}$$

2. Computation using the Mass Point Method

a. Contained mass of dry air from data:

$$W_i = 144 \frac{P_i V_i}{R T_i} \qquad (10)$$

where:

All symbols as previously defined.

b. Calculated leakage rate from regression analysis:

$$\overline{L} = -2400 \frac{b}{a} \qquad (11)$$

where:

$\overline{L}$ = Calculated leakage rate, %/day, as determined from the regression line.

$$a = \frac{\Sigma W_i - b \Sigma \Delta t_i}{N} \qquad (12)$$

$$b = \frac{\Sigma[(W_i - \Sigma W_i/N)\ (\Delta t_i - \overline{\Delta t})]}{\Sigma(\Delta t_i - \overline{\Delta t})^2} \qquad (13)$$

Δt_i = Total elapsed time at time of i^{th} data point, hours

N = Number of data points

W_i = Contained mass of dry air at i^{th} data point, lbm, as computed from equation (10).

$$\Sigma = \sum_{i=1}^{N}$$

$\overline{\Delta t} = \Sigma \Delta t_i / N$

c. Calculated leakage rate at the 95% confidence level.

$$\overline{L}_{95} = \frac{-2400}{a}(b + S_b) \qquad (14)$$

where:

$\overline{L}_{95}$ = Calculated leakage rate at the 95% confidence level, %/day.

$$S_b = t_{0.025;N-2} \left[\frac{\Sigma(W_i - \overline{W_i})^2}{(N-2)\Sigma(\Delta t_i - \overline{\Delta t})^2}\right]^{1/2} \qquad (15)$$

where, $t_{0.025;N-2} = \dfrac{1.6449(N-2)^2 + 3.5283\ (N-2)^2 + 0.85602}{(N-2)^2 + 1.2209\ (N-2) - 1.5162}$

$\overline{W}_i$ = Contained mass of dry air, lbm, computed at the i^{th} data point from the regression equation (16)

$= a + b\Delta t_i$

All other symbols are previously defined.

D. Program Logic

1. A flow chart of Bechtel ILRT computer program usage is presented in Figure 1, following. The various user options and a brief description of their associated function are presented below:

OPTION COMMAND	FUNCTION
DATA	Enables operator to enter raw data. When the system requests values of time, volume temperature, pressure and vapor pressure, the user enters the appropriate data. After completing the data entry, a summary is printed out. The user then verifies that the data were entered correctly. If errors are detected, the user will then be given the opportunity to correct the errors. After the user verifies that the data were entered correctly, a Corrected Data Summary Report of time, data, average temperature, partial pressure of dry air, and water vapor pressure is printed.
TREND	Terminal will print out a Trend Report.
TOTAL	Terminal will print out a Total Time Report.
MASS	Terminal will print out a Mass Point Report.
TERM	Enables operator to sign-off temporarily or permanently.
SAVE	Enables operator to store the Data Summary on a file.
PREV	Enables operator to call up an old, previously stored, file.
CORR	Enables operator to correct data stored on a file.
LIST	When used with a given file name, the printer will print out a list of the Summary Data stored on the file.
READ	Enable the computer to receive the next set of raw data from the data acquisition system directly.

BECHTEL CONTAINMENT INTEGRATED LEAKAGE RATE TEST COMPUTER PROGRAM FLOW CHART