CAROLINA POWER & LIGHT COMPANY
BRUNSWICK STEAM ELECTRIC PLANT
UNIT NO. 1

REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

SUMMARY TECHNICAL REPORT

Prepared for:
Carolina Power & Light Co.

Prepared by:
Ebasco Services, Inc.
Plant Operations &
Betterment Services Dept.

Reviewed by:

J R Bruff

Approved by:

M Tagliamonte

REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

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REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST

SUMMARY

From June 8, 1981 to June 12, 1981, an Integrated Leak Rate Test (ILRT) was performed on the primary containment of Unit No. 1 of the Brunswick Steam Electric Plant (BSEP). Results are as follows:

Acceptance Criteria (Pa = 49 psig)

La	0.5 wt%/24 hrs.
Lam	0.375 wt%/24 hrs.
Lamt (Verification Test)	Lam ± 0.125 wt%/24 hrs.

Actual Data	Mass Point
Measured Leakage	0.297 wt%/24 hrs.
95% Confidence Limit (C.L.)	0.010 wt%/24 hrs.
Required Post Test Measured Leakage	0.0446 wt%/24 hrs.
Lam	0.352 wt%/24 hrs.

Measured Possible Additional Leakage 0.0042 wt%/24 hrs.

Verification Test Leakage at 95% CL	0.680 wt%/24 hrs.
Imposed Leakage	0.375 wt%/24 hrs.
Lamt	0.305 wt%/24 hrs.

The data shows that the actual Lam of 0.352 wt%/24 hrs was within the limit of 0.375 wt%/24 hrs even Lam plus the possible additions which equaled 0.356 wt%/24 hrs was within the limit of 0.375 wt%/24 hrs. The measured value for Lamt (verification test) of 0.305 wt%/24 hrs is within 0.125 wt%/24 hrs of the measured value for Lam of 0.307 wt%/24 hrs.

Summary graphs and tables of all pertinent data are included in Appendices I & II of this report.

1.0 Introduction

This report covers the Integrated Primary Containment Leak Rate Test (IPCLRT) that was performed on Unit No. 1 of the Brunswick Steam Electric Plant (BSEP) during June 1981. This report is for compliance with the reporting requirements of 10CFR50, Appendix J, Section III. The IPCLRT was performed to comply with the requirements of the BSEP Technical Specification Sections 3.6.1.2 and 4.6.1.2. Testing was done in accordance with the instructions of BSEP PT 20.5 "Integrated Primary Containment Leak Rate Test," 10CFR50, Appendix J, and ANSI N45.4-1972. Preparation for the test was begun on June 8, 1981 and the test was completed on June 12, 1981.

2.0 Purpose and General Report Outline

The purpose of the test was to demonstrate that the leakage through the Unit No. 1 primary containment (and systems and components penetrating the primary containment) is less than the allowable leakage rates specified in the BSEP Technical Specifications. This was accomplished by pressurizing the primary containment to 50.5 psig using dry air and measuring the overall leakage rate using a form of the Perfect Gas Equation. Details of the test methods employed are included in Section 3.0. Other items covered in this report include details of the containment inspection, a sequence of events of the test, test results and evaluation, instrument error analysis and a report on all local leak rate testing (types B and C tests) done since the last Integrated Leak Test.

3.0 Test Methods and Description of Instrumentation

3.1 Calculational Methods

The test method used was the Absolute method. The Absolute method determines air losses by the means of direct pressure, temperature, and humidity observations as described by ANSI N45.4. Calculations were made using the Point-to-Point and Total Time methods described by ASNI N45.4 and also the Mass Point method as described in ANS N279, Rev 2. The Mass Point method is the main basis for this report. Calculational details are given in the Leak Rate Test Procedure (PT 20.5, Section VI, Part B), a copy of which is on file at BSEP. Please note that for simplicity the 95% confidence interval for the mass point leakage rate is calculated using the t-distribution probability curve.

3.0 Test Methods and Description of Instrumentation (continued)

3.2 Description of Test Instrumentation

Temperature and vapor pressure measuring devices were placed inside the primary containment at locations indicated on Figure 9.1. The values were read and recorded manually by plant personnel. Two temporary drywell cooling fans and two temporary fans in the torus were operated to provide some mixing of the atmosphere. The absolute pressure devices were hooked up to one of the drywell pressure sensing lines. The readout for these instruments was in the Reactor Building at the gages. A detailed description of the instrumentation follows. Calibration data sheets are on file at the BSEP site.

3.2.1 Absolute Pressure Instrumentation

The containment total pressure was measured with two TI-145 precision quartz bourdon tube pressure gages. One pressure gage was used as the primary sensor while the second indicator was available as a back-up.

3.0 Test Methods and Description of Instrumentation (continued)

3.2.1 Absolute Pressure Instrumentation (continued)

Instrument Data

Manufacturer	Texas Instruments
Model	145-02
Type	Direct readout in psia, 0.001 psia resolution
Range	0-75 psia
Accuracy	0.015% of full scale
Repeatability	0.001% of full scale

3.2.2 Vapor Pressure Instrumentation

Water vapor pressure in the primary containment was determined indirectly by the use of the ten Foxboro dewcells. These dewcells have an internal resistance temperature device which measures the equilibrium temperature that the dewcell comes to as the result of the properties of the hygroscopic salt, Lithium Chloride, which was placed on the heater windings of the dewcell. This equilibrium temperature is directly related to the partial pressure of water in the atmosphere. The equilibrium temperature was converted to vapor pressure via Foxboro and Smithsonian tables. The conversion was done by the computer program employed for all test calculations.

3.0 Test Methods and Description of Instrumentation (continued)

3.2.2 Vapor Pressure Instrumentation (continued)

Of the ten dewcells used for the test, six were placed in the drywell and four in the suppression chamber at locations designed to give a representative sampling of the containment atmosphere (see Figure 9.1). Average vapor pressure was determined by multiplying each dewcell vapor pressure by the volumetric weighting factor which was calculated for that instrument based on the size and shape of the containment that the particular instrument saw. Calibration for these instruments consisted of electronics calibration to the generic resistance versus temperature curve by substituting a precision resistor box for the instrument at the instrument location.

Instrument Data

Manufacturer	Foxboro
Model	10 Model 2781-18CHN dewcells
Range	0°F - 150°F dewpoint
Accuracy	± 1.0°F dewpoint
Repeatability	° 0.5°F dewpoint

3.0 Test Methods and Description of Instrumentation (continued)

3.2.3 Temperature Instrumentation

The containment temperature was measured using 24 resistance temperature detectors (RTD's). Of these, 18 were located in the drywell and 6 in the supression chamber at locations designed to give a representative sampling of the containment atmosphere (see Figure 9.1). Temperature readout was provided directly by two Chromalox display units. Average temperature was obtained by multiplying each temperature by the volumetric weighting factor which was calculated for that instrument based on the size and shape of the containment that the particular instrument saw. Calibration began with a three point calibration of the RTD's which yielded computer generated individual resistance versus temperature curves. Data from these curves was used to calibrate the electronic conversion and readout equipment by substituting a precision resistor box for the RTD's at the RTD locations.

3.0 Test Methods and Description of Instrumentation (continued)

3.2.3 Temperature Instrumentation (continued)

Instrument Data

Manufacturer	Rosemount
Model	24 Model 78-39-11 RTD's
Range	0-160°F
Accuracy	± 1.0°F
Repeatability	± 0.18°F

3.2.4 Flow Measuring Instrumentation

A calibrated flowmeter was used to superimpose the leak for the supplemental test that was performed. The flowmeter was calibrated prior to performance of the test which verified its accuracy to be within the quoted value.

Instrument Data

Manufacturer	Brooks Instrument
Model	1 1110 flowmeter
Range	0-5 SCFM
Accuracy	± 2% full scale

3.0 Test Methods and Description of Instrumentation (continued)

3.3 Supplemental Test Description

After completion of the main 24-hour test, a supplemental test with a superimposed leak was performed to verify the validity of the 24-hour test. The superimposed leak of known value was obtained by bleeding air from the containment through a flowmeter which was attached to the containment. The new total leakage rate was measured as before using pressure, temperature and vapor pressure measurements made at 15 minute intervals. To confirm the validity of the measurements, the difference between the leak rate and the superimposed leak rate must have been equal to the mean leak rate for the 24-hour test within ± 25% of La. Results of the supplemental test are discussed in Section 5.4.

4.4 Containment Inspection

As required by 10CFR50, Appendix J, a general inspection of the accessible interior and exterior surfaces of the containment was made just prior to the test. All areas appeared to be in excellent condition. All visible liner welds appeared to be in excellent condition. The exterior containment wall also appeared to be in good condition with no visible deterioration of the concrete. A quick post-test inspection revealed no change in pre-test conditions.

5.0 Integrated Leak Rate Test

5.1 Sequence of Events

Prior to final inspection and closure of containment a local leak rate test was performed on instrument air valves V101 and V103 to verify their integrity. The leakage rate test indicated that there was zero leakage through these valves. The results are on file at the BSEP site.

The containment was made ready for the Integrated Primary Containment Leak Rate Test (IPCLRT) with final inspection and closure completed on June 8, 1981. The initial pressurization of the primary containment was begun at 0333 on June 9, 1981. Pressurization was halted at approximately 10 psig and again at 25 psig to inspect for potential leak paths and proper valve line up. During the 10 psig hold and inspection, valve CAC-V158 was found to be positioned incorrectly for the required isolation. A clearance tag was issued and the test procedure modified to reflect the proper required valve position. During the 25 psig hold and inspection, the valve line up and test procedure was modified to take credit for the second main steam isolation valves. Pressurization was resumed until 1835 on June 9, 1981 at which time pressurization was secured with the primary containment pressure indicating 50.5 psig.

5.0 Integrated Leak Rate Test (continued)

5.1 Sequence of Events (continued)

During stabilization a number of minor packing leaks and one vent cap leak were identified and tightened as indicated in the CP&L test log with no indicated effect on leakage rate.

Following the stabilization period, trending of pressure and temperature data indicated an excessive pressure decay rate. Continued investigation by the CP&L leak survey team revealed an improper valve line up in the CAC system. CAC valves 15 and 17 were isolated prior to performing the IPCLRT due to the unavailability of needed replacement parts. In addition CAC valves 4, 5 and 6 could not be isolated from each other and the above mentioned valves were to have been isolated as a group for the test and a post repair local leak rate test performed with the results added to the IPCLRT results at the 95% confidence limit. The subject vent valve for this section of piping was found in an open position. The vent valve was closed and the test procedure corrected to reflect the proper test valve lineup.

Section 5.2 is a detailed summary of leaks found during the inspection portion of the Brunswick Unit No. 1 ILRT, along with a description and disposition where required.

5.0 Integrated Leak Rate Test (continued)

5.1 Sequence of Events (continued)

The IPCLRT was officially started at 1630 hours on June 11, 1981. Humidity sensors Hum 3 and Hum 5 were deleted prior to starting the test due to erratic readings. The appropriate humidity volume fractions were updated and the IPCLRT was completed on June 12, 1981 with a Mass Point Leak Rate (at the upper 95% confidence limit) of 0.307% per day. Upon completion of the IPCLRT, Health Physics sampled the containment air and gave permission to discharge to atmosphere. A fixed leakage rate of .375% per day (3.04 SCFM) was established for the start of the Controlled Leak Rate Test (CLRT).

The CLRT commenced at 1900 hours on June 12 1981 with stable conditions in containment and was satisfactorily completed at 0000 hours on June 13, 1981.

5.2 Summary of Leaks Found During Inspection Portion of Unit No. 1 ILRT

9 June 0629 Found valve CAC-V158 open, valve was added to clearance tag sheet. (Closed position).

5.0 Integrated Leak Rate Test (continued)

5.2 Summary of Leaks Found During Inspection Portion of Unit No. 1 ILRT (continued)

9 June 1205 Found Main Steam Vent Valves leaking; Valves B21-V35, B21-V36, B21-V37, B21-V38 and B21-V39. These valves were closed as they are located between the inner and outer main steam stops. It was decided to take credit for the main steam double isolation (NRC felt downstream volume was adequate) the test director had the turbine stop drain valves open as added insurance to prevent back pressure in event of double isolation valve leakage.

9 June 2212 Found and secured small leak on torus level calibration line located in North RHR Room.

10 June 0500 [illegible]ed pressure and flow meter connections due to leak found on pressure sensing line between the isolation valve PV 1225C and the root valve used to supply the ILRT pressure readout devices. The leak was repaired before the ILRT. Post testing conducted following the CLRT. Results were zero leakage.

5.0 Integrated Leak Rate Test (continued)

5.2 Summary of Leaks Found During Inspection Portion of Unit No. 1 ILRT (continued)

10 June 1000 Found and repaired vent cap leak on Valve E11-V190. This vent valve is located between E11-F021B and E11-F016B.

11 June 0212 Found leak on packing gland of Valve CAC-V48. This is the bypass valve around CAC-V6. (Repaired at approximately 1145, 11 June 1981.)

11 June 0220 Found small leaks on Isolation Valves PV 1209B and PV 1209F. Not repaired.

11 June 0700 Operations isolated four control rod drive units to prevent back leakage. These units are number 1443, 4243, 3439 and 2619.

11 June 1055 Found and closed valves CAC-V28 and 29. They were open approximately 1 full turn. These are test valves located between CAC-V6 and CAC-V15. Note: CAC-V15 was not in the system due to a parts problem. The system was blanked flanged.

5.0 Integrated Leak Rate Test (continued)

5.2 Summary of Leaks Found During Inspection Portion of Unit No. 1. ILRT (continued)

11 June 1130 Found and replaced leak on blank flange installed in place of CAC-V15.

11 June 1600 Found major leak path past CAC-V4 by identifying leak through vent valves CAC-V152 and CAC-V153. These valves should have been closed instead of open due to the fact that the CAC-V15 valve, when local leak rate tested, must be tested with CAC-V4, V5, V6. A decision was made to close valves CAC-V152 and CAC-V153, with CAC-V51 and CAC-V58 being the new boundary valves.

5.0 Integrated Leak Rate Test (continued)

5.3 Post-Test Checks on Identified Problem Items

The following three valve groups were isolated and excluded from the ILRT t st boundry prior to the start of the Brunswick Steam Electric Generating Plant Unit No. 1 IPCLRT. The post-test local leak rate test results are as follows:

5.3.1 Valves CAC-V15, CAC-V6, CAC-V5, CAC-V4, CAC-V55, CAC-V56. Total leakage measured was 6.70 SCFH which is equal to 0.0129 wt%/24 hrs. (Test number PT 20.3, CAC-3).

5.3.2 Valves CAC-V17, CAC-V20B. Total leakage measured was 1.72 SCFH which is equal to 0.0033 wt%/24 hrs. (Test number PT 20.3, C C-7).

5.3.3 .alve G31-F039. Total leakage measured was 14.76 SCFH which is equal to 0.0284 wt%/24 hrs. (Test Number B21-4).

In addition, two other items were a reed to be local leak rate tested and their results added to the 95% confidence limit mass point leakage rate calculated. The additional items are as follows:

5.0 Integrated Leak Rate Test (continued)

5.3 Post-Test Checks on Identified Problem Items (continued)

5.3.4 Root valves for instrument connections CAC-PT 2599 and CAC-PT 1257. Total leakage measured was 0 SCFH which equals 0 wt%/24 hrs.

5.3.5 Blank flange between valves E11-F021A and E11-F016A. Total leakage measured was 0.0 SCFH which equals 0 wt%/24 hrs.

Therefore the total leakage rate for the Brunswick Steam Electric Generating Plant Unit No. 1 Integrated Primary Containment Leakage Rate Test is equal to:

(6.7 SCFH) + (1.72 SCFH) + (14.76 SCFH) + (0 SCFH)
+ (0 SCFH) = 23.18 SCFH
which equals 0.0446 wt%/24 hrs.
The total leakage is equal to
0.307 + 0.0446 = 0.352 wt%/24 hrs.

The total leakage rate of 0.352 wt%/24 hrs. is within the required acceptance limit of 0.375 wt%/24 hrs.

5.0 Integrated Leak Rate Test (continued)

5.4 Discussion of Results and Acceptance Criteria

The acceptance criteria for the testing is that the containment calculated leakage rate for the 24-hour test period at the 95% confidence limit be less than 0.75 La, and that the results from the verification test agree with the results of the 24-hour test within ± 0.25 La. With a La of 0.5 wt%/24 hrs, leakage at the 95% confidence limit (CL) must be less than 0.375 wt%/24 hrs.

The calculated leak rate using the mass point method at the 95% CL was 0.307 wt%/24 hrs (as described by draft ANS N274). To this must be added the post-test local leak rates of those items which were excluded from the test boundry which totaled 0.0446 wt%/24 hrs giving a total containment leakage rate of 0.352 wt%/24 hrs which is less than the acceptance limit of 0.375 wt%/24 hrs.

In addition to the above items, a number of additional items were requested by the NRC inspector to be included in this report and are listed in the conclusion section as Possible Additions which total to an additional local leakage rate of 0.0042 wt%/24 hrs which, when added to the total containment leakage rate of .352 wt%/24 hrs, equals 0.356 wt%/24 hrs which is still below 0.75 La.

5.0 Integrated Leak Rate Test (continued)

5.4 Discussion of Results and Acceptance Criteria (continued)

The measured mass point leakage rate at the 95% CL from the controlled verification test (CLRT) was 0.680 wt%/24 hrs. The imposed leak was 0.375 wt%/24 hrs. The difference between 0.680 and 0.375 is 0.305 wt%/24 hrs. This value is well within the ± 0.125 wt%/24 hrs envelop of the measured leakage rate of 0.307 wt%/24 hrs.

6.0 Error Analysis

Three types of error analyses are performed using the EBASCO ILRT computer program. These types are a priori instrument loop error, a posteriori instrument loop error and a statistical confidence interval.

The prior instrument loop error is based on the standard error approach in which individual contributions of the various sensors and display equipment are added to provide the worst probable error. The error is computed to a 95% confidence level. Prior to the test, the priori loop error determines whether the instrumentation system is capable of measuring the required leakage sufficiently accurate such that the error and nominal leakage do not exceed the maximum permissable.

6.0 Error Analysis (continued)

The a'posteriori instrument loop error also is based on the standard error approach and is computed to a 95% confidence. No simplifying assumption other than constant containment free volume is made in the derivative calculations for parameter sensitivity in the standard error formula. Instrument loop errors are computed from containment conditions once variable bias has been compensated. This error, due to instrumentation, is the maximum probable instrument loop error.

A statistical confidence interval is generated for the first order regression line of calculated mass-point leak rate. The interval provides a hyperbolic region symmetrically centered about the slope of the mean of the regression line.

7.0 Local Leak Rate Testing

As part of this report, 10CFR50, Appendix J, requires that results and analyses of all type B and C testing performed since the last type A test be included. These tests can be put into year groups - those done during the outages since the last integrated leak test and other miscellaneous tests. The type B and C tests are performed by pressurizing the test volume with either plant air or dry nitrogen to a pressure of PA (49 psig). The air

7.0 Local Leak Rate Testing (continued)

flow needed to maintain this pressure is then measured using the rotameter test rig shown as Figure 9.2. The temperature of the air is recorded to correct the rotameter reading to standard cubic feet per hour. The acceptance criteria is that the sum of all leakage from type B and C tests must not exceed 0.6 La, which is 159.78 standard cubic feet per hour (SCFH). Further, no MSIV may leak in excess of 11.5 SCFH at 25 psig (special exemption to Appendix J), and the personnel air lock leakage may not exceed .05 La (13.3 SCFH).

7.1 1977 Testing

During the Spring 1977 outage, all Unit No. 1 penetrations and isolation valves were tested in accordance with PT 20.3 and 10CFR50, Appendix J. For the type B tests, total leakage was 4.5 SCFH. All of this was from the personnel air lock. The total leakage from the type C tests was 110.96 SCFH of which 14 SCFH was from the MSIV's with a maximum < 11.5 SCFH from any one MSIV. Total for types B and C was, then 115.46.

During the testing, no valves were found to be leaking excessively. The highest value of leakage was recorded on Valves E11-F020B, RHR B Torus Suction Inboard Valve; E11-F004B/D, RHR B Torus Suction Outboard Valves. This total was 17.6 SCFH. Since these valves are normally water sealed

7.0 Local Leak Rate Testing (continued)

7.1 1977 Testing (continued)

the amount of air leakage was considered acceptable. The second highest value of leakage was from CAC-V9, Drywell Vent Inboard Valve; CAC-V10, Drywell Vent Outboard Valve; CAC-V23, Drywell Vent Bypass Valve. This test was 11.8 SCFH. This amount of leakage was considered acceptable as the drywell is vented to the Standby Gas Treatment System.

There were forty six local leak rate tests with zero leakage. The forty six tests involved a total of 79 valves. Addtionally, the limit of 159.78 SCFH was met by the total of 115.46 obtained. Copies of PT 20.3 are on record at the plant.

7.2 1978 Testing

During 1978, no type C testing was conducted on Unit No. 1.

Type B testing was conducted on the personnel air lock and found to be acceptable.

7.3 1979 Testing

Another set of type B and C tests were performed during the 1979 outage. These tests were performed per PT 20.3 which is now a consolidation of the old PT's 20.3 and 20.4. Total type B leakage was 9.52 SCFH. Total type C leakage was

7.0 Local Leak Rate Testing (continued)

7.3 1979 Testing (continued)

120.03 SCFH, of which 9.09 SCFH was MSIV leakage with a maximum < 11.5 SCFH from any one MSIV. Total for types B and C was then 129.55.

Sixteen valves were found leaking at unacceptable levels and required repairs and/or mechanical/electrical adjustments. Of major concern were feedwater inboard check valves, B21-F010A and B21-F010B; RHR Torus Suction, E11-F020B; Torus Drain and Keep Fill Suction Valves, TD-V22 and TD-V23. The feedwater inboard check valves were disassembled and checked for defects and proper seating. The RHR torus suction valve required qualified divers to replace the suction strainer in the torus with a blank flange before seat repairs could be done to the valve, thereby avoiding the need to drain the torus. The torus drain and keep fill suction valves required the vendor to add soft seats to allow valves to hold pressure.

Other valves that required repair and/or adjustments were G31-F039, E11-F011B, E11-F053B, CAC-V5, CAC-V6, CAC-V7, CAC-V8, CAC-V9, CAC-V10, CAC-X20A and CAC-X20B.

7.0 Local Leak Rate Testing (continued)

7.3 1979 Testing (continued

The leakage rates recorded for type C tests are as follows:

Main Steam Isolation Valves	9.09 SCFH
Other Containment Isolation Valves	120.03 SCFH
Total Leakage Rate for Type C Tests	129.12 SCFH

The leakage rates recorded for type B tests are as follows:

Electrical Penetrations	.42 SCFH
Hatch Seals	1.20 SCFH
Drywell Head Seal	3.90 SCFH
Personnel Air Lock	0.00 SCFH

7.4 1980-1981 Testing

All Unit No. 1 penetrations and isolation valves were tested in accordance with PT 20.3 and 10CFR50, Appendix J. The total type B leakage was 0.71 SCFH. All of this was from the electrical penetrations. The total leakage from the type C test completed in 1980 was 95.205 SCFH, of which 29.875 SCFH was from the MSIV's with a maximum < 11.5 SCFH from any one MSIV. The remaining type C tests completed during 1981, prior to and following the integrated leak rate test brought the type C test total to 126.755 SCFH. The total of 127.465 SCFH was the combined total for type B and type C tests, excluding MSIV's. The MSIV's were tested again in 1981 with a total leakage of 7.33 SCFH.

.0 Local Leak Rate Testing (continued)

7.4 1980-1981 Testing (continued)

Three valves were found leaking during 1980 testing at unacceptable levels and required repairs and/or mechanical/electrical adjustments. Of major concern were Core Spray B Full Flow Test Valve, E21-F015B; HPCI Steam Exhaust Check Valve E41-F049; and RCIC Steam Exhaust Valve E51-F040. The Core Spray B Full Flow Test Valve was reseated and its torque switch reset. The HPCI Steam Exhaust Check Valve was lapped. The RCIC Steam Exhaust Check Valve was disassembled; its seat and joint cleaned, the hinge, hinge pin and bushings replaced; disc on lapping plate and seat ring lapped to a smooth flat surface.

The type C testing conducted prior to the Integrated Leak Rate Test indicated fourteen valves leaking at unacceptable levels and required repair and/or mechanical/electrical adjustments. Four valves repaired prior to the ILRT excluding adjustments were: CAC-V16, Reactor Building to Torus Vacuum Breaker Isolation Valve; E11-F004D, RHR B Torus Suction Outboard Valve; B21-F016, B21-F019, Main Steam Line Drain Valves. The remaining six valves that required mechanical/electrical adjustment were CAC-V7, CAC-V9, CAC-V10, CAC-V22, CAC-V23 and CAC-V8. The above valves were repaired and/or adjusted and retested prior to the ILRT.

7.0 Local Leak Rate Testing (continued)

7.4 1980-1981 Testing (continued)

There were four valves that could not be repaired prior to the ILRT, due to parts availability and were isolated from the system by blanks or other isolation valves during the ILRT. They are CAC-V17, Reactor Building to Torus Vacuum Breaker Isolation Valve; CAC-V15, Drywell Purge Air Valve; CAC-V4, Nitrogen Inboard Shutoff Valve; G31-F039, Reactor Water Cleanup Check Valve. These four valves were repaired and retested to acceptable limits.

The leakage rates recorded for type C tests are as follows:

Main Steam Isolation Valves	7.330 SCFH
Other Containment Isolation Valves	126.755 SCFH
Total Leakage Rate for Type C Tests	134.085 SCFH

The leakage rates recorded for type B tests are as follows:

Electrical Penetrations	0.71 SCFH
Hatch Seals	0.00 SCFH
Drywell Head Seal	0.00 SCFH
Personnel Air Lock	0.00 SCFH

8.0 Conclusions

A. The IPCLRT was satisfactorily completed based on the following results:

1.	ILRT Test Results	0.297 wt%/24 hrs.
2.	95% Confidence Limit	0.010 wt%/24 hrs.
3.	Total Test Measured Results	0.307 wt%/24 hrs.
4.	Required Post-Test Total Local Leak Rate Tests	0.0446 wt%/24 hrs.
	Total IPCLRT Leakage Item 3 plus Item 4	0.352 wt%/24 hrs.

B. Due to additional discussions with the NRC, i.e., Inspector, the following possible additions are being listed in this section for information. They are as follows:

1. Containment Air Monitoring Return Check Valves (5). Total measured leakage was 1.5 SCFH which is equal to 0.0028 wt%/24 hrs.
2. Reactor Building Closed Cooling Water Isolation Valves. Total measured leakage was 0.279 SCFH which is equal to 0.0005 wt%/24 hrs.
3. "A" Feedwater Isolation Valves. Total measured leakage was 0.479 SCFH which is equal to 0.0009 wt%/24 hrs.

Total from above Item 1, 2 and 3.

Possible additions = 0.0042 wt%/24 hrs.

Combined Integrated Leak Rate + Possible Additions

(0.352)+(0.0042) = 0.356 wt%/24 hrs < 0.375 wt%/24 hrs.

8.0 Conclusions (continued)

C. Verification Test Results

1. Controlled Leakage Rate Test at 95% CL 0.680 wt%/24 hrs

   Imposed Leakage Rate 0.375 wt%/24 hrs

   Difference 0.305 wt%/24 hrs

2. 0.307 - 0.305 = 0.002 wt%/24 hrs which is within the limit of 0.125 wt%/24 hrs.

Based on the above results, it is concluded that the IPCLRT is acceptable.

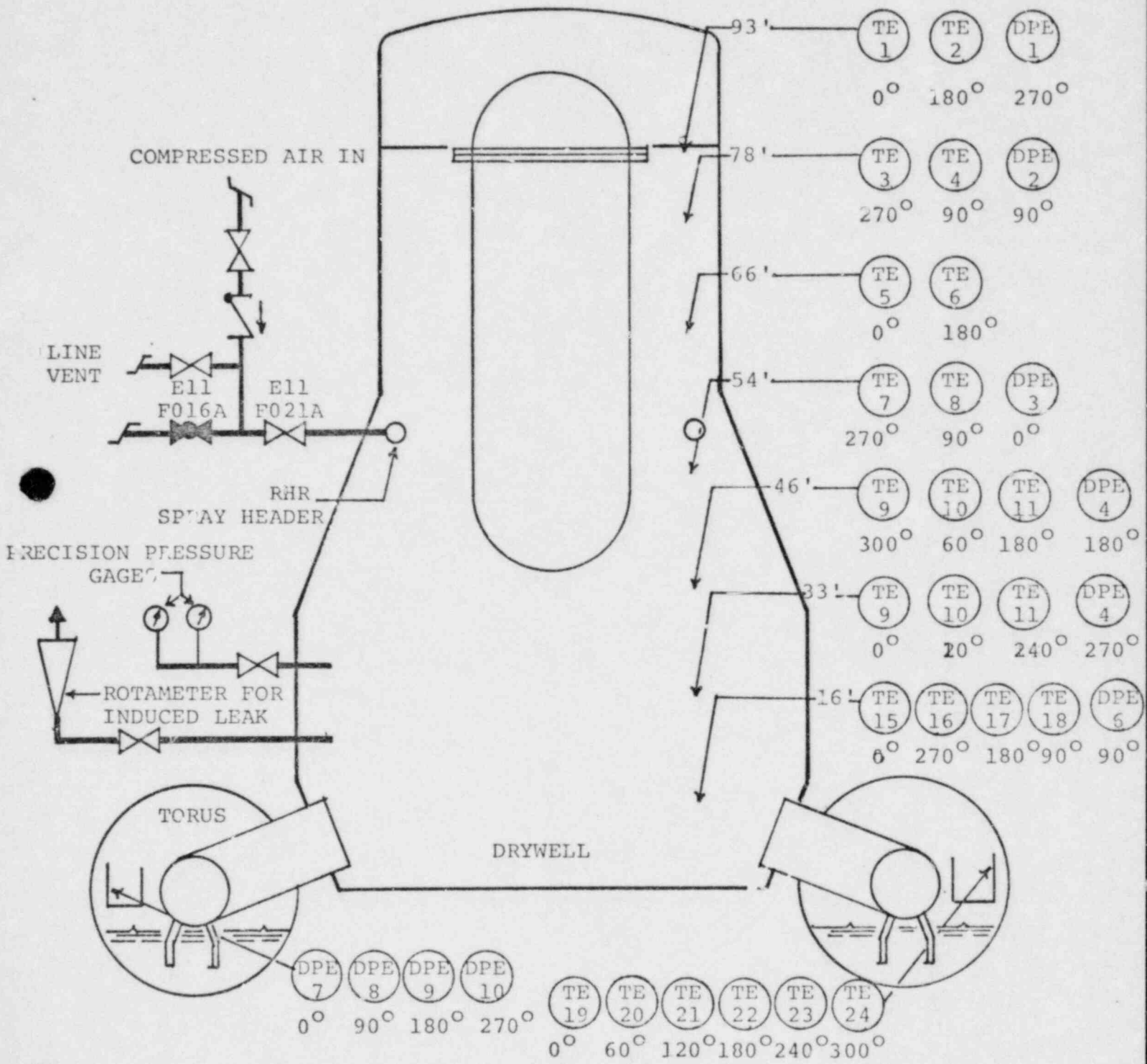
9.0 Figures

9.1 IPCLRT Schematic Arrangement

9.2 Local Leak Rate Test Rig

FIGURE 9.1

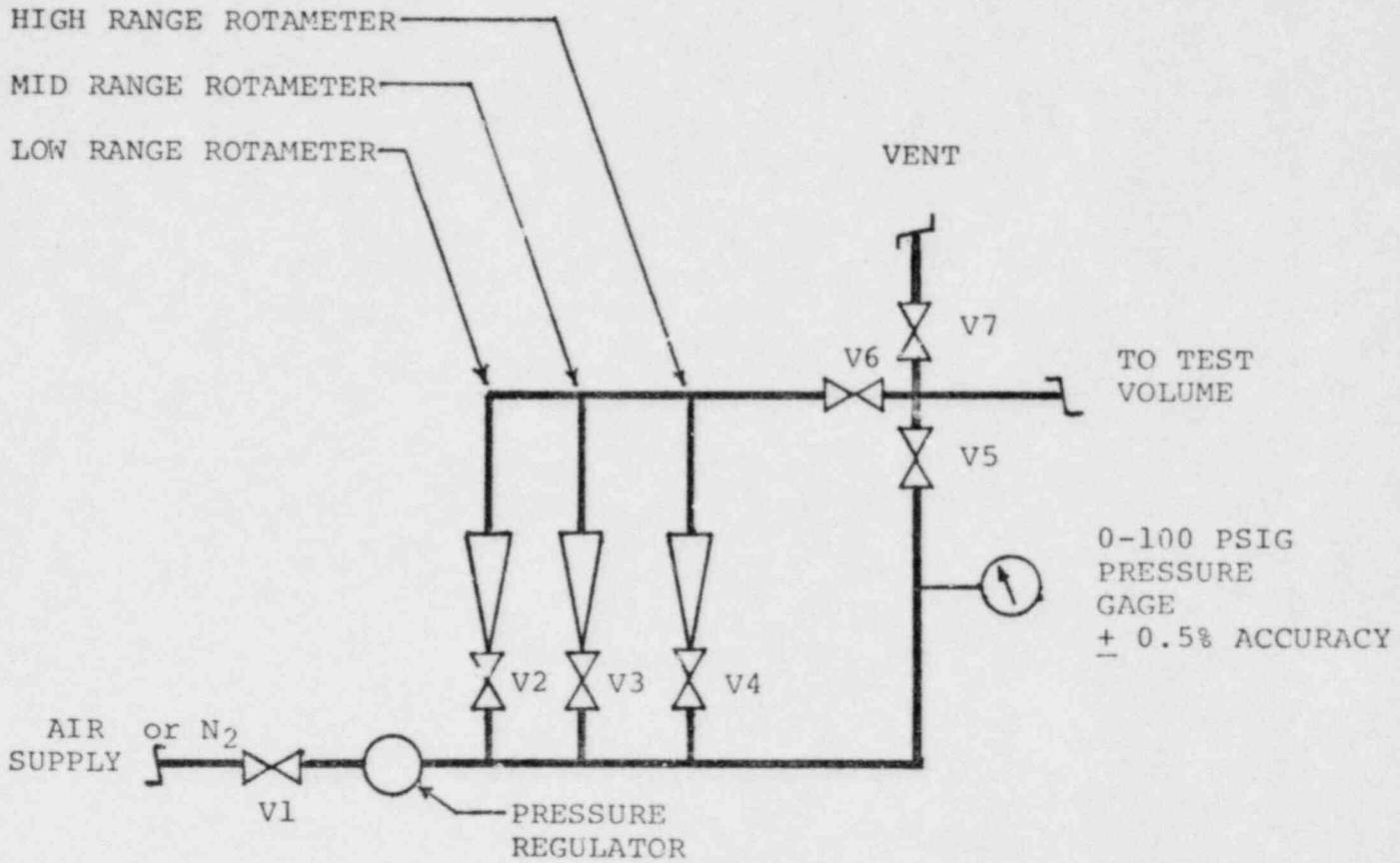
IPCLRT SCHEMATIC ARRANGEMENT
(Not to Scale)



TE = TEMPERATURE ELEMENT (RTD)

DPE = DEWPOINT ELEMENT (DEWCELL)

FIGURE 9.2



LOCAL LEAK RATE TEST RIG

REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST

APPENDIX I

COMPUTER GENERATED ILRT REPORT

BRUNSWICK STEAM ELECTRIC PLANT UNIT NO. 1

CAROLINA POWER & LIGHT COMPANY

ILRT

LEAK RATE COMPUTED USING MASS POINT METHOD
AS RECOMMENDED BY ANS N274 REVISION 2
(CONTAINMENT SYSTEM LEAKAGE TESTING REQUIREMENTS)

TEST PERIOD STARTED AT 1630 HOURS ON JUNE 11, 1981

A LEAST SQUARES FIRST ORDER FIT OF LEAK RATE TO TIME
SHOULD YIELD A SLOPE OF ZERO AND AN INTERCEPT EQUAL
TO THE LEAK RATE AS COMPUTED AT THE INITIAL START TIME
THE EQUATION HAS THE FORM - L=ST+R
WHERE L - CORRELATED LEAK RATE
S - SLOPE OF CORRELATION
T - TIME IN HOURS
R - INTERCEPT LEAK RATE

LEAK RATE = 0.005 HOURS + 0.173 PER CENT
MEAN = 0.230 PER CENT

INITIAL CONTAINMENT AIR WEIGHT = 87875 LBS.
FINAL CONTAINMENT AIR WEIGHT = 87645 .
FITTED MASS POINT LEAK RATE IS 0.299 PER CENT PER DAY
MASS POINT LEAK RATE AT UPPER 95% CONFIDENCE LIMIT
IS 0.307 PERCENT PER DAY

MAXIMUM MEC LEAK RATE OF 0.375 PER CENT PER DAY
GIVEN FOR HIGH PRESSURE TEST AT 63.70 PSIA

DESCRIPTION OF VARIABLES

AVG. TEM - VOLUMETRICALLY WEIGHTED TEMPERATURE.
AVG. PRE - AVERAGE PRESSURE.
VAP. PRE - VOLUMETRICALLY WEIGHTED VAPOUR PRESSURE.
LEAK COM - LEAK RATE COMPUTED FROM FIRST ORDER REGRESSION.
LEAK SIM - LEAK RATE BASED ON TOTAL TIME CALCULATIONS.
LEAK MAS - LEAK RATE FROM MASS POINT FIRST ORDER REGRESSION.
AIR MASS - AIR MASS DATA.

NOTE FOR TABULAR DATA -
TABLE VALUES OF ZERO SIGNIFY EITHER
1. DATA IS NOT APPLICABLE TO THE CALCULATION OR
2. SENSOR HAS BEEN DELETED FROM THE SCAN.

NOTE FOR CURVES-
1. TOP ABCISSA SCALE REPRESENTS SAMPLE NUMBERS.
2. ALL LEAKAGE RATE CURVES ARE BASED ON "TOTAL TIME" METHOD ANALYSIS.

VARIABLE TABLE S MMARY

SAM NUM	DELT MINS	AVG. TEM DEG. F	AVG. PRE PSIA	VAP. PRE PSIA	LEAK COM PER CENT	LEAK SIM PER CENT	LEAK MAS PER CENT	AIR MASS 1000 LBS
1	0	99.271	63.909	0.741	0.173	0.000	0.000	87.875
2	15	99.335	63.909	0.739	0.174	0.871	0.000	87.867
3	30	99.372	63.909	0.736	0.176	0.545	0.545	87.865
4	45	99.288	63.909	0.736	0.177	-0.153	-0.116	87.879
5	60	99.342	63.909	0.739	0.178	0.248	0.066	87.866
6	75	99.368	63.909	0.738	0.179	0.263	0.154	87.863
7	90	99.408	63.909	0.739	0.180	0.351	0.254	87.855
8	105	99.442	63.909	0.736	0.181	0.329	0.291	87.854
9	120	99.398	63.908	0.734	0.183	0.174	0.228	87.862
10	135	99.416	63.908	0.744	0.184	0.350	0.279	87.846
11	150	99.314	63.909	0.731	0.185	-0.074	0.118	87.882
12	165	99.166	63.909	0.738	0.186	-0.205	-0.038	87.895
13	180	99.292	63.908	0.739	0.187	0.029	-0.045	87.872
14	195	99.287	63.906	0.742	0.189	0.070	-0.033	87.866
15	210	99.293	63.906	0.741	0.190	0.068	-0.022	87.866
16	225	99.416	63.907	0.742	0.191	0.198	0.030	87.848
17	240	99.372	63.907	0.736	0.192	0.082	0.032	87.863
18	255	99.380	63.907	0.740	0.193	0.126	0.048	87.855
19	270	99.383	63.906	0.737	0.194	0.100	0.053	87.858
20	285	99.350	63.904	0.742	0.196	0.120	0.063	87.854
21	300	99.382	63.903	0.743	0.197	0.161	0.081	87.845
22	315	99.389	63.903	0.742	0.198	0.148	0.093	87.846
23	330	99.396	63.901	0.744	0.199	0.177	0.110	87.839
24	345	99.479	63.899	0.743	0.200	0.238	0.137	87.825
25	360	99.443	63.898	0.740	0.201	0.190	0.149	87.833
26	375	99.497	63.898	0.743	0.203	0.238	0.168	87.820
27	390	99.456	63.896	0.737	0.204	0.175	0.171	87.818
28	405	99.458	63.896	0.741	0.205	0.196	0.178	87.826
29	420	99.446	63.895	0.743	0.206	0.194	0.184	87.825
30	435	99.440	63.894	0.741	0.207	0.180	0.185	87.827
31	450	99.452	63.893	0.739	0.209	0.174	0.186	87.827
32	465	99.435	63.891	0.739	0.210	0.173	0.186	87.826
33	480	99.483	63.889	0.736	0.211	0.187	0.188	87.820
34	495	99.510	63.888	0.741	0.212	0.222	0.196	87.808
35	510	99.495	63.887	0.737	0.213	0.196	0.198	87.814
36	525	99.560	63.886	0.738	0.214	0.230	0.205	87.801
37	540	99.495	63.885	0.741	0.216	0.209	0.208	87.806
38	555	99.502	63.884	0.739	0.217	0.205	0.211	87.805
39	570	99.490	63.883	0.740	0.218	0.202	0.212	87.804
40	585	99.502	63.881	0.740	0.219	0.210	0.214	87.800
41	600	99.491	63.880	0.736	0.220	0.188	0.213	87.806
42	615	99.495	63.878	0.738	0.222	0.197	0.213	87.801
43	630	99.502	63.876	0.732	0.223	0.185	0.211	87.804
44	645	99.510	63.874	0.736	0.224	0.202	0.212	87.795
45	660	99.544	63.873	0.737	0.225	0.218	0.215	87.787
46	675	99.519	63.870	0.737	0.226	0.216	0.217	87.786
47	690	99.523	63.869	0.738	0.227	0.219	0.219	87.782
48	705	99.544	63.867	0.735	0.229	0.217	0.221	87.781
49	720	99.566	63.865	0.733	0.230	0.222	0.223	87.777
50	735	99.610	63.864	0.738	0.231	0.250	0.228	87.763

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	AVG. TEM DEG. F	AVG. PRE PSIA	VAP. PRE PSIA	LEAK COM PER CENT	LEAK SIM PER CENT	LEAK MAS PER CENT	AIR MASS 1000 LBS
51	750	99.598	63.861	0.738	0.232	0.250	0.233	87.760
52	765	99.551	63.859	0.734	0.233	0.223	0.234	87.771
53	780	99.574	63.858	0.735	0.235	0.234	0.236	87.764
54	795	99.586	63.857	0.740	0.236	0.249	0.240	87.754
55	810	99.639	63.856	0.732	0.237	0.243	0.242	87.755
56	825	99.571	63.853	0.734	0.238	0.230	0.243	87.759
57	840	99.573	63.852	0.732	0.239	0.223	0.243	87.760
58	855	99.713	63.851	0.735	0.240	0.272	0.248	87.733
59	870	99.709	63.851	0.732	0.242	0.259	0.251	87.737
60	885	99.744	63.848	0.736	0.243	0.282	0.256	87.722
61	900	99.750	63.846	0.733	0.244	0.279	0.261	87.722
62	915	99.735	63.843	0.733	0.245	0.277	0.265	87.720
63	930	99.719	63.841	0.733	0.246	0.272	0.268	87.720
64	945	99.739	63.839	0.735	0.247	0.283	0.272	87.711
65	960	99.720	63.836	0.731	0.249	0.270	0.274	87.717
66	975	99.693	63.834	0.725	0.250	0.251	0.274	87.725
67	990	99.711	63.831	0.733	0.251	0.278	0.277	87.707
68	1005	99.716	63.827	0.726	0.252	0.268	0.278	87.711
69	1020	99.729	63.825	0.734	0.253	0.289	0.282	87.695
70	1035	99.681	63.822	0.726	0.255	0.261	0.282	87.710
71	1050	99.704	63.821	0.731	0.256	0.276	0.284	87.698
72	1065	99.695	63.819	0.728	0.257	0.268	0.285	87.701
73	1080	99.685	63.816	0.729	0.258	0.271	0.286	87.696
74	1095	99.692	63.816	0.732	0.259	0.274	0.287	87.692
75	1110	99.717	63.813	0.727	0.260	0.273	0.289	87.690
76	1125	99.682	63.811	0.726	0.262	0.263	0.289	87.694
77	1140	99.697	63.809	0.723	0.263	0.265	0.289	87.690
78	1155	99.702	63.807	0.730	0.264	0.276	0.290	87.680
79	1170	99.675	63.806	0.721	0.265	0.251	0.289	87.696
80	1185	99.726	63.806	0.731	0.266	0.279	0.291	87.673
81	1200	99.719	63.803	0.729	0.268	0.276	0.291	87.673
82	1215	99.751	63.801	0.727	0.269	0.279	0.292	87.668
83	1230	99.687	63.799	0.731	0.270	0.273	0.293	87.670
84	1245	99.764	63.797	0.730	0.271	0.287	0.295	87.657
85	1260	99.824	63.796	0.729	0.272	0.297	0.297	87.646
86	1275	99.793	63.794	0.729	0.273	0.290	0.298	87.649
87	1290	99.656	63.792	0.726	0.275	0.259	0.297	87.671
88	1305	99.751	63.791	0.729	0.276	0.280	0.298	87.652
89	1320	99.711	63.790	0.728	0.277	0.270	0.298	87.657
90	1335	99.705	63.786	0.728	0.278	0.272	0.298	87.653
91	1350	99.701	63.786	0.726	0.279	0.266	0.298	87.656
92	1365	99.816	63.786	0.729	0.280	0.289	0.299	87.634
93	1380	99.798	63.785	0.729	0.282	0.284	0.299	87.635
94	1395	99.816	63.785	0.728	0.283	0.283	0.300	87.634
95	1410	99.792	63.783	0.729	0.284	0.280	0.300	87.634
96	1425	99.733	63.783	0.731	0.285	0.270	0.300	87.640
97	1440	99.749	63.782	0.725	0.286	0.261	0.299	87.645

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 1 DEG. F	TEMP 2 DEG. F	TEMP 3 DEG. F	TEMP 4 DEG. F	TEMP 5 DEG. F	TEMP 6 DEG. F
1	0	111.900	111.000	112.700	111.800	108.600	110.800
2	15	111.900	110.900	112.700	111.700	108.500	110.800
3	30	111.900	111.000	112.700	111.800	108.500	110.800
4	45	111.900	110.900	112.600	111.700	108.400	110.700
5	60	112.000	110.900	112.600	111.800	108.600	110.700
6	75	112.000	111.000	112.600	111.700	108.600	110.800
7	90	112.100	111.100	112.700	111.700	108.700	110.900
8	105	112.000	111.000	112.700	111.800	108.700	110.900
9	120	112.100	111.100	112.800	111.900	108.800	110.900
10	135	112.100	111.200	112.900	111.900	108.900	111.100
11	150	112.100	111.000	112.700	111.800	108.800	110.800
12	165	112.200	111.100	700	111.900	108.800	110.900
13	180	112.200	111.100	800	111.800	108.800	110.900
14	195	112.200	111.000	112.800	111.800	108.800	111.000
15	210	112.200	111.100	112.800	111.800	108.800	111.000
16	225	112.300	111.200	112.800	111.900	109.000	111.000
17	240	112.300	111.200	113.000	112.000	108.900	111.000
18	255	112.400	111.300	113.000	112.000	109.000	111.100
19	270	112.300	111.200	112.900	111.900	109.000	111.000
20	285	112.300	111.200	112.900	112.000	108.900	111.000
21	300	112.300	111.100	112.900	112.000	108.900	111.000
22	315	112.300	111.200	112.900	112.000	108.900	111.000
23	330	112.300	111.200	112.900	112.000	108.900	111.000
24	345	112.400	111.200	113.100	112.000	109.000	111.100
25	360	112.400	111.200	112.900	112.000	108.900	111.200
26	375	112.400	111.300	113.000	112.100	109.000	111.200
27	390	112.500	111.300	113.100	112.100	109.000	111.200
28	405	112.500	111.400	113.100	112.100	109.000	111.200
29	420	112.500	111.400	113.100	112.100	109.100	111.200
30	435	112.500	111.400	113.200	112.200	109.100	111.300
31	450	112.500	111.400	113.200	112.200	109.100	111.300
32	465	112.500	111.400	113.100	112.100	109.100	111.300
33	480	112.600	111.400	113.100	112.200	109.100	111.300
34	495	112.600	111.400	113.200	112.300	109.100	111.300
35	510	112.600	111.400	113.200	112.300	109.200	111.400
36	525	112.600	111.400	113.200	112.400	109.200	111.300
37	540	112.600	111.400	113.200	112.300	109.300	111.400
38	555	112.600	111.400	113.200	112.300	109.300	111.400
39	570	112.600	111.400	113.200	112.300	109.200	111.400
40	585	112.600	111.400	113.200	112.300	109.200	111.400
41	600	112.600	111.400	113.200	112.300	109.200	111.400
42	615	112.600	111.500	113.200	112.400	109.200	111.400
43	630	112.700	111.500	113.300	112.400	109.200	111.500
44	645	112.600	111.500	113.300	112.400	109.300	111.500
45	660	112.700	111.600	113.300	112.400	109.300	111.500
46	675	112.700	111.500	113.300	112.400	109.300	111.500
47	690	112.600	111.500	113.200	112.400	109.300	111.500
48	705	112.700	111.500	113.300	112.400	109.300	111.500
49	720	112.700	111.500	113.300	112.400	109.300	111.600
50	735	112.700	111.600	113.400	112.400	109.400	111.600

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	TEMP 1 DEG. F	TEMP 2 DEG. F	TEMP 3 DEG. F	TEMP 4 DEG. F	TEMP 5 DEG. F	TEMP 6 DEG. F
51	750	112.700	111.600	113.300	112.500	109.400	111.600
52	765	112.800	111.600	113.400	112.400	109.300	111.500
53	780	112.800	111.600	113.400	112.400	109.400	111.600
54	795	112.800	111.500	113.400	112.500	109.400	111.600
55	810	112.800	111.600	113.400	112.500	109.400	111.500
56	825	112.700	111.500	113.400	112.500	109.400	111.600
57	840	112.800	111.500	113.400	112.500	109.400	111.600
58	855	112.800	111.600	113.400	112.500	109.500	111.600
59	870	112.800	111.800	113.600	112.600	109.600	111.700
60	885	112.800	111.800	113.600	112.700	109.700	111.800
61	900	112.800	111.700	113.600	112.600	109.700	111.900
62	915	112.900	111.600	113.600	112.600	109.500	111.800
63	930	112.800	111.700	113.600	112.700	109.700	111.800
64	945	112.800	111.600	113.500	112.600	109.700	111.800
65	960	112.800	111.700	113.500	112.700	109.600	111.800
66	975	112.900	111.700	113.600	112.700	109.600	111.900
67	990	112.800	111.700	113.600	112.600	109.600	111.900
68	1005	112.700	111.700	113.600	112.600	109.700	111.800
69	1020	112.800	111.700	113.600	112.700	109.500	111.800
70	1035	112.700	111.700	113.500	112.600	109.600	111.800
71	1050	112.700	111.600	113.500	112.600	109.500	111.800
72	1065	112.700	111.600	113.500	112.600	109.600	111.800
73	1080	112.700	111.600	113.500	112.600	109.600	111.800
74	1095	112.700	111.700	113.500	112.600	109.600	111.800
75	1110	112.700	111.600	113.400	112.600	109.600	111.800
76	1125	112.700	111.500	113.500	112.500	109.600	111.800
77	1140	112.700	111.600	113.500	112.500	109.600	111.800
78	1155	112.700	111.600	113.400	112.600	109.700	111.700
79	1170	112.700	111.600	113.500	112.500	109.600	111.800
80	1185	112.700	111.600	113.500	112.500	109.700	111.800
81	1200	112.700	111.600	113.500	112.500	109.600	111.800
82	1215	112.600	111.500	113.500	112.500	109.600	111.800
83	1230	112.600	111.600	113.400	112.400	109.600	111.800
84	1245	112.600	111.500	113.300	112.400	109.600	111.600
85	1260	112.600	111.500	113.400	112.500	109.600	111.800
86	1275	112.600	111.500	113.500	112.600	109.700	111.800
87	1290	112.600	111.600	113.500	112.500	109.700	111.900
88	1305	112.600	111.500	113.400	112.500	109.600	111.700
89	1320	112.600	111.500	113.400	112.500	109.500	111.700
90	1335	112.700	111.600	113.500	112.500	109.700	111.900
91	1350	112.600	111.600	113.500	112.500	109.600	111.800
92	1365	112.700	111.600	113.500	112.500	109.700	111.800
93	1380	112.700	111.600	113.500	112.200	109.700	111.800
94	1395	112.700	111.600	113.400	112.600	109.600	111.800
95	1410	112.700	111.600	113.500	112.600	109.700	111.800
96	1425	112.800	111.900	113.600	112.600	109.800	112.000
97	1440	112.800	111.800	113.600	112.600	109.800	112.000

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 7 DEG. F	TEMP 8 DEG. F	TEMP 9 DEG. F	TEMP 10 DEG. F	TEMP 11 DEG. F	TEMP 12 DEG. F
1	0	109.300	111.400	106.300	106.100	104.800	108.700
2	15	109.300	111.400	106.200	106.300	104.900	108.900
3	30	109.300	111.400	106.200	106.300	104.900	108.900
4	45	109.300	111.400	106.200	106.200	104.800	108.700
5	60	109.400	111.500	106.300	106.200	104.800	108.800
6	75	109.400	111.400	106.300	106.300	105.000	109.000
7	90	109.400	111.500	106.200	106.400	105.000	109.000
8	105	109.500	111.500	106.300	106.400	105.000	109.100
9	120	109.500	111.500	106.400	106.300	104.900	108.900
10	135	109.500	111.500	106.400	106.300	104.900	109.000
11	150	109.500	111.500	106.300	106.400	104.900	109.000
12	165	109.500	111.500	106.300	106.300	104.900	108.800
13	180	109.500	111.500	106.400	106.300	104.900	108.900
14	195	109.500	111.500	106.300	106.400	104.900	108.900
15	210	109.500	111.600	106.400	106.400	104.900	108.900
16	225	109.600	111.600	106.500	106.600	105.100	109.100
17	240	109.600	111.600	106.500	106.500	104.900	109.000
18	255	109.600	111.800	106.500	106.500	105.100	109.000
19	270	109.600	111.800	106.500	106.600	105.000	109.000
20	285	109.600	111.600	106.500	106.500	105.100	109.000
21	300	109.500	111.600	106.500	106.700	105.200	109.200
22	315	109.500	111.700	106.400	106.600	105.300	109.100
23	330	109.600	111.700	106.400	106.600	105.300	109.200
24	345	109.600	111.700	106.500	106.800	105.300	109.400
25	360	109.700	111.700	106.500	106.700	105.200	109.200
26	375	109.700	111.900	106.600	106.800	105.300	109.300
27	390	109.700	111.900	106.700	106.700	105.200	109.200
28	405	109.800	111.800	106.600	106.700	105.300	109.200
29	420	109.700	111.900	106.600	106.800	105.400	109.400
30	435	109.800	111.800	106.600	106.700	105.300	109.300
31	450	109.800	111.900	106.700	106.800	105.300	109.300
32	465	109.800	111.900	106.600	106.800	105.300	109.300
33	480	109.800	111.900	106.700	106.900	105.400	109.400
34	495	109.900	112.000	106.800	106.900	105.500	109.400
35	510	109.900	112.000	106.700	106.900	105.400	109.400
36	525	110.000	112.100	106.700	107.000	105.500	109.500
37	540	109.900	112.000	106.700	106.900	105.400	109.400
38	555	109.900	112.000	106.800	107.000	105.500	109.500
39	570	110.000	112.000	106.800	106.900	105.500	109.400
40	585	110.000	112.000	106.800	106.900	105.500	109.400
41	600	110.000	112.000	106.800	106.900	105.500	109.400
42	615	110.000	112.000	106.800	107.000	105.500	109.400
43	630	110.000	112.000	106.800	107.000	105.400	109.400
44	645	110.000	112.100	106.900	107.100	105.600	109.500
45	660	110.100	112.100	106.900	107.000	105.500	109.500
46	675	110.000	112.100	106.800	107.000	105.500	109.500
47	690	110.000	112.100	106.800	107.000	105.500	109.500
48	705	110.000	112.100	106.900	107.200	105.600	109.500
49	720	110.000	112.100	106.900	107.200	105.600	109.600
50	735	110.100	112.200	106.900	107.200	105.600	109.700

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	TEMP 7 DEG. F	TEMP 8 DEG. F	TEMP 9 DEG. F	TEMP 10 DEG. F	TEMP 11 DEG. F	TEMP 12 DEG. F
51	750	110.100	112.100	107.000	107.100	105.600	109.700
52	765	110.100	112.200	107.000	107.100	105.500	109.600
53	780	110.100	112.300	107.000	107.100	105.600	109.600
54	795	110.200	112.300	107.000	107.100	105.600	109.600
55	810	110.200	112.200	107.000	107.300	105.800	109.700
56	825	110.200	112.200	107.000	107.200	105. 0	109.60
57	840	110.200	112.300	107.000	107.200	105. 0	109.600
58	855	110.100	112.200	107.000	107.300	105. 00	109.800
59	870	110.200	112.300	107.200	107.200	105. 0	109
60	885	110.400	112.500	107.200	107.300	105.900	109.
61	900	110.300	112.400	107.300	107.300	105.900	110.0
62	915	110.400	112.500	107.200	107.200	05.800	109.800
63	930	110.400	112.400	107.300	107.200	105.700	109.800
64	945	110.400	112.400	107.300	107.300	105.900	109.900
65	960	110.300	112.400	107.300	107.300	106.000	110.0
66	975	110.300	112.400	107.300	107.200	105.800	109.900
67	990	110.400	112.500	107.200	107.200	105.800	109.800
68	1005	110.400	112.400	107.200	107.200	105.800	109.900
69	1020	110.300	112.400	107.300	107.200	105.800	109.900
70	1035	110.300	112.300	107.300	107.200	105.800	109.800
71	1050	110.300	112.300	107.300	107.200	105.800	109.800
72	1065	110.400	112.300	107.300	107.200	105.800	109.900
73	1080	110.300	112.300	107.200	107.200	105.800	109.900
74	1095	110.400	112.300	107.300	107.200	105.800	109.900
75	1110	110.400	112.300	107.300	107.200	105.800	109.900
76	1125	110.400	112.400	107.300	107.300	105.800	109.900
77	1140	110.400	112.400	107.300	107.300	105.800	109.900
78	1155	110.400	112.400	107.400	107.200	105.900	109.900
79	1170	110.300	112.400	107.300	107.200	105.900	109.900
80	1185	110.400	112.400	107.400	107.300	105.900	110.000
81	1200	110.300	112.300	107.400	107.200	105.900	109.900
82	1215	110.400	112.400	107.300	107.400	106.000	110.000
83	1230	110.300	112.300	107.300	107.300	105.900	109.900
84	1245	110.300	112.400	107.300	107.400	106.000	110.100
85	1260	110.400	112.400	107.300	107.400	106.100	110.100
86	1275	110.400	112.400	107.500	107.300	106.000	110.100
87	1290	110.500	112.500	107.500	107.300	106.000	110.100
88	1305	110.300	112.300	107.300	107.400	106.000	110.000
89	1320	110.300	112.300	107.400	107.400	106.000	110.000
90	1335	110.400	112.500	107.400	107.300	105.900	109.800
91	1350	110.300	112.300	107.400	107.300	105.900	109.900
92	1365	110.400	112.400	107.500	107.400	105.900	110.100
93	1380	110.400	112.500	107.400	107.600	106.000	110.100
94	1395	110.300	112.400	107.400	107.500	106.000	110.100
95	1410	110.500	112.500	107.400	107.400	106.000	110.000
96	1425	110.600	112.500	107.500	107.400	106.000	110.100
97	1440	110.500	112.500	107.500	107.500	106.000	110.000

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 13 DEG. F	TEMP 14 DEG. F	TEMP 15 DEG. F	TEMP 16 DEG. F	TEMP 17 DEG. F	TEMP 18 DEG. F
1	0	105.300	105.200	101.500	98.900	100.600	99.600
2	15	105.400	105.400	101.600	98.900	100.700	99.700
3	30	105.500	105.500	101.700	99.100	100.700	99.800
4	45	105.300	105.300	101.600	98.900	100.600	99.600
5	60	105.300	105.400	101.600	99.000	100.700	99.600
6	75	105.300	105.400	101.600	99.100	100.800	99.800
7	90	105.500	105.400	101.700	99.100	100.800	99.800
8	105	105.600	105.500	101.700	99.200	100.900	99.800
9	120	105.500	105.400	101.600	99.000	100.800	99.700
10	135	105.500	105.500	101.600	99.000	100.800	99.700
11	150	105.500	105.400	101.500	99.000	100.700	99.700
12	165	105.300	105.400	101.400	98.900	100.600	99.700
13	180	105.400	105.400	101.500	98.900	100.600	99.700
14	195	105.400	105.500	101.600	98.900	100.600	99.700
15	210	105.400	105.500	101.600	98.900	100.600	99.700
16	225	105.600	105.600	101.700	99.100	100.800	99.800
17	240	105.600	105.500	101.600	99.000	100.700	99.700
18	255	105.500	105.500	101.600	99.000	100.700	99.700
19	270	105.500	105.600	101.700	99.000	100.700	99.700
20	285	105.600	105.600	101.600	99.000	100.700	99.800
21	300	105.700	105.600	101.600	99.000	100.700	99.800
22	315	105.700	105.700	101.600	99.100	100.700	99.800
23	330	105.700	105.700	101.600	99.000	100.800	99.800
24	345	105.800	105.900	101.700	99.200	100.900	99.900
25	360	105.700	105.700	101.700	99.100	100.800	99.900
26	375	105.800	105.900	101.700	99.200	100.900	99.900
27	390	105.800	105.800	101.700	99.100	100.800	99.800
28	405	105.800	105.700	101.600	99.200	100.900	99.900
29	420	106.000	105.700	101.600	99.000	100.800	99.800
30	435	105.900	105.800	101.600	99.000	100.800	99.800
31	450	105.900	105.800	101.700	99.000	100.800	99.800
32	465	105.900	105.800	101.600	99.000	100.700	99.800
33	480	106.100	105.900	101.800	99.000	100.800	99.800
34	495	106.200	106.000	101.800	99.100	100.700	99.800
35	510	105.900	105.900	101.700	99.100	100.800	99.800
36	525	106.100	106.000	101.800	99.200	100.900	99.900
37	540	106.000	105.900	101.700	99.000	100.800	99.800
38	555	106.100	106.000	101.800	99.000	100.700	99.800
39	570	106.100	105.900	101.800	99.000	100.700	99.800
40	585	106.100	106.000	101.700	99.000	100.800	99.800
41	600	106.100	106.000	101.600	99.000	100.700	99.800
42	615	106.100	106.000	101.700	99.000	100.700	99.800
43	630	106.200	106.000	101.700	99.000	100.700	99.800
44	645	106.200	106.000	101.600	99.000	100.700	99.800
45	660	106.200	106.000	101.600	99.000	100.900	99.900
46	675	106.200	106.000	101.700	99.000	100.700	99.800
47	690	106.200	106.000	101.700	99.000	100.700	99.800
48	705	106.300	106.000	101.700	99.000	100.800	99.900
49	720	106.400	106.200	101.700	99.000	100.800	99.900
50	735	106.400	106.200	101.800	99.100	100.900	99.900

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	TEMP 13 DE F	TEMP 14 DEG. F	TEMP 15 DEG. F	TEMP 16 DEG. F	TEMP 17 DEG. F	TEMP 18 DEG. F
51	750	106.4[illegible]	106.200	101.800	99.100	100.800	99.700
52	765	106.300	106.100	101.600	99.000	100.700	99.700
53	78[illegible]	106.100	106.100	101.700	99.000	100.700	99.700
54	[illegible]	106.200	106.100	101.700	99.000	100.700	99.300
55	810	106.300	106.300	101.800	99.100	100.800	99.900
56	825	106.200	106.100	101.700	99.000	100.700	99.700
57	840	106.300	106.100	101.700	99.000	100.700	99.700
58	855	106.300	106.300	101.700	99.200	101.000	99.900
59	870	106.300	106.300	101.800	99.100	100.900	99.800
60	885	106.400	106.400	101.900	99.100	100.800	99.900
61	900	106.500	106.300	101.900	99.200	100.900	99.900
62	915	106.400	106.400	101.800	99.100	100.900	99.900
63	930	106.400	106.400	101.800	99.100	100.800	99.800
64	945	106.600	106.500	101.900	99.000	100.900	99.900
65	960	106.500	106.400	101.800	99.000	100.800	99.700
66	975	106.500	106.400	101.700	99.000	100.800	99.700
67	990	106.500	106.400	101.800	99.100	100.800	99.700
68	1005	106.500	106.400	101.700	99.000	100.800	99.700
69	1020	106.500	106.400	101.800	99.000	100.800	99.800
70	1035	106.500	106.400	101.600	99.000	100.700	99.700
71	1050	106.500	106.400	101.700	99.000	100.700	99.800
72	1065	106.400	106.400	101.700	98.900	100.700	99.700
73	1080	106.400	106.400	101.700	98.900	100.700	99.600
74	1095	106.500	106.400	101.700	98.900	100.800	99.800
75	1110	106.500	106.400	101.700	98.900	100.800	99.800
76	1125	106.400	106.400	101.600	98.900	100.700	99.700
77	1140	106.400	106.400	101.700	98.900	100.700	99.700
78	1155	106.500	106.500	101.600	98.900	100.700	99.800
79	1170	106.400	106.400	101.700	98.800	100.700	99.700
80	1185	106.600	106.500	101.700	99.000	100.800	99.800
81	1200	106.500	106.500	101.700	98.900	100.700	99.800
82	1215	106.600	106.500	101.800	98.900	100.800	99.800
83	1230	106.500	106.500	101.700	98.900	100.700	99.700
84	1245	106.800	106.600	101.800	99.000	100.700	99.800
85	1260	106.600	106.700	101.900	99.000	100.900	100.100
86	1275	106.500	106.400	101.800	99.000	100.800	99.700
87	1290	106.500	106.400	101.800	99.000	100.800	99.600
88	1305	106.400	106.400	101.700	99.000	100.700	100.000
89	1320	106.500	106.400	101.700	99.000	100.700	99.600
90	1335	106.500	106.500	101.600	98.900	100.700	99.600
91	1350	106.500	106.500	101.600	98.900	100.700	99.600
92	1365	106.900	106.500	101.800	99.000	100.700	99.700
93	1380	106.700	106.600	101.800	99.000	100.800	99.600
94	1395	106.700	106.600	101.800	99.100	101.000	100.000
95	1410	106.600	106.500	101.700	99.000	100.800	99.700
96	1425	106.600	106.400	101.800	98.900	100.700	99.600
97	1440	106.500	106.500	101.700	98.900	100.700	99.600

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 19 DEG. F	TEMP 20 DEG. F	TEMP 21 DEG. F	TEMP 22 DEG. F	TEMP 23 DEG. F	TEMP 24 DEG. F
1	0	93.200	87.100	92.700	91.500	96.200	91.700
2	15	93.400	87.100	92.700	91.600	96.100	91.800
3	30	93.200	87.100	92.700	91.600	96.300	91.800
4	45	93.300	87.100	92.700	91.500	96.300	91.700
5	60	93.300	87.100	92.700	91.600	96.400	91.800
6	75	93.300	87.200	92.700	91.500	96.300	91.700
7	90	93.300	87.200	92.700	91.500	96.400	91.800
8	105	93.300	87.200	92.800	91.600	96.200	91.900
9	120	93.300	87.300	92.700	91.600	96.300	91.800
10	135	93.500	87.100	92.700	91.600	96.300	91.800
11	150	93.200	87.000	92.600	91.400	96.200	91.600
12	165	91.600	87.000	92.600	91.400	96.100	91.700
13	180	93.200	87.000	92.600	91.400	96.100	91.600
14	195	93.200	86.900	92.500	91.400	96.100	91.600
15	210	93.200	86.900	92.500	91.400	96.100	91.600
16	225	93.400	87.000	92.600	91.400	96.200	91.700
17	240	93.300	87.100	92.600	91.400	96.100	91.700
18	255	93.300	87.000	92.600	91.500	96.100	91.700
19	270	93.200	87.000	92.600	91.500	96.100	91.700
20	285	93.200	86.900	92.500	91.400	96.100	91.600
21	300	93.200	87.000	92.600	91.400	96.100	91.600
22	315	93.300	87.000	92.500	91.400	96.100	91.600
23	330	93.200	87.000	92.600	91.400	96.100	91.600
24	345	93.200	87.000	92.700	91.400	96.100	91.700
25	360	93.300	87.000	92.600	91.500	96.100	91.700
26	375	93.300	87.000	92.600	91.500	96.200	91.700
27	390	93.200	87.000	92.600	91.500	96.100	91.700
28	405	93.300	87.000	92.600	91.400	96.100	91.600
29	420	93.200	87.000	92.600	91.400	96.000	91.600
30	435	93.200	87.000	92.600	91.400	96.000	91.600
31	450	93.200	87.000	92.600	91.400	96.000	91.600
32	465	93.300	87.000	92.500	91.400	96.000	91.600
33	480	93.200	87.000	92.600	91.400	96.000	91.600
34	495	93.200	87.000	92.600	91.400	96.000	91.700
35	510	93.300	87.000	92.600	91.400	96.000	91.700
36	525	93.300	87.100	92.600	91.500	96.000	91.700
37	540	93.200	87.000	92.600	91.400	96.100	91.700
38	555	93.200	87.000	92.500	91.400	96.000	91.700
39	570	93.200	87.000	92.500	91.400	96.000	91.700
40	585	93.200	87.000	92.600	91.400	96.100	91.600
41	600	93.200	87.000	92.600	91.400	96.100	91.600
42	615	93.200	87.000	92.600	91.400	96.000	91.600
43	630	93.200	87.000	92.600	91.400	96.000	91.600
44	645	93.200	87.000	92.500	91.400	96.100	91.600
45	660	93.200	87.000	92.600	91.400	96.100	91.700
46	675	93.200	87.000	92.600	91.400	96.100	91.600
47	690	93.300	87.000	92.600	91.400	96.100	91.600
48	705	93.200	87.000	92.600	91.400	96.100	91.600
49	720	93.200	87.000	92.600	91.400	96.100	91.600
50	735	93.200	87.000	92.600	91.400	96.200	91.700

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	TEMP 19 DEG. F	TEMP 20 DEG. F	TEMP 21 DEG. F	TEMP 22 DEG. F	TEMP 23 DEG. F	TEMP 24 DEG. F
51	750	93.300	87.100	92.600	91.400	96.100	91.700
52	765	93.200	87.000	92.600	91.500	96.100	91.700
53	780	93.300	87.000	92.700	91.500	96.200	91.700
54	795	93.200	87.100	92.700	91.500	96.200	91.700
55	810	93.300	87.000	92.700	91.500	96.200	91.700
56	825	93.300	87.000	92.600	91.500	96.200	91.700
57	840	93.300	87.000	92.600	91.400	96.200	91.700
58	855	93.300	87.200	92.700	91.700	96.400	91.900
59	870	93.300	87.200	92.700	91.700	96.400	91.800
60	885	93.300	87.200	92.800	91.600	96.400	91.800
61	900	93.200	87.200	92.800	91.600	96.400	91.800
62	915	93.300	87.200	92.900	91.600	96.300	91.900
63	930	93.300	87.200	92.800	91.600	96.300	91.900
64	945	93.200	87.200	92.700	91.600	96.300	91.900
65	960	93.300	87.200	92.700	91.600	96.300	91.900
66	975	93.300	87.100	92.700	91.600	96.300	91.800
67	990	93.300	87.200	92.700	91.700	96.200	91.900
68	1005	93.300	87.200	92.800	91.600	96.400	91.900
69	1020	93.300	87.200	92.800	91.600	96.400	91.900
70	1035	93.300	87.200	92.700	91.600	96.300	91.900
71	1050	93.300	87.200	92.800	91.700	96.300	91.900
72	1065	93.300	87.200	92.800	91.700	96.300	91.900
73	1080	93.300	87.200	92.800	91.700	96.400	91.800
74	1095	93.300	87.200	92.800	91.600	96.200	91.800
75	1110	93.300	87.300	92.800	91.700	96.400	91.800
76	1125	93.300	87.200	92.800	91.600	96.300	91.900
77	1140	93.300	87.300	92.800	91.600	96.300	91.900
78	1155	93.400	87.200	92.800	91.600	96.200	91.900
79	1170	93.300	87.200	92.700	91.600	96.300	91.900
80	1185	93.300	87.300	92.700	91.500	96.300	91.900
81	1200	93.300	87.300	92.800	91.600	96.400	91.900
82	1215	93.400	87.200	92.800	91.700	96.400	91.900
83	1230	93.300	87.200	92.800	91.600	96.300	91.800
84	1245	93.300	87.300	92.800	91.700	96.400	91.900
85	1260	93.400	87.300	92.900	91.700	96.500	91.900
86	1275	93.300	87.300	93.000	91.800	96.500	92.100
87	1290	91.700	87.300	92.900	91.700	96.500	92.000
88	1305	93.400	87.300	92.800	91.700	96.400	92.000
89	1320	93.400	87.200	92.800	91.600	96.300	92.000
90	1335	93.300	87.200	92.900	91.600	96.400	91.900
91	1350	93.300	87.300	92.800	91.600	96.400	91.900
92	1365	93.600	87.300	92.900	91.800	96.400	92.000
93	1380	93.300	87.200	93.100	91.700	96.500	92.000
94	1395	93.400	87.200	92.800	91.600	96.500	92.000
95	1410	93.400	87.400	92.800	91.700	96.600	92.000
96	1425	93.300	87.200	92.800	91.600	96.400	91.700
97	1440	93.400	87.200	92.800	91.600	96.400	92.000

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	PRES 1 PSIA	HUM 1 FRACTION	HUM 2 FRACTION	HUM 3 FRACTION	HUM 4 FRACTION	HUM 5 FRACTION
1	0	63.909	0.952	0.958	0.000	0.853	0.000
2	15	63.909	0.945	0.933	0.000	0.846	0.000
3	30	63.909	0.937	0.955	0.000	0.835	0.000
4	45	63.909	0.940	0.940	0.000	0.837	0.000
5	60	63.909	0.950	0.932	0.000	0.846	0.000
6	75	63.909	0.938	0.932	0.000	0.835	0.000
7	90	63.909	0.942	0.936	0.000	0.834	0.000
8	105	63.909	0.941	0.936	0.000	0.839	0.000
9	120	63.908	0.931	0.925	0.000	0.835	0.000
10	135	63.908	0.942	0.936	0.000	0.839	0.000
11	150	63.909	0.945	0.939	0.000	0.832	0.000
12	165	63.909	0.943	0.943	0.000	0.846	0.000
13	180	63.908	0.946	0.940	0.000	0.852	0.000
14	195	63.906	0.940	0.940	0.000	0.853	0.000
15	210	63.906	0.952	0.940	0.000	0.852	0.000
16	225	63.907	0.948	0.936	0.000	0.844	0.000
17	240	63.907	0.943	0.920	0.000	0.840	0.000
18	255	63.907	0.943	0.937	0.000	0.845	0.000
19	270	63.906	0.943	0.931	0.000	0.845	0.000
20	285	63.904	0.950	0.938	0.000	0.846	0.000
21	300	63.903	0.949	0.937	0.000	0.850	0.000
22	315	63.903	0.943	0.937	0.000	0.845	0.000
23	330	63.901	0.949	0.937	0.000	0.855	0.000
24	345	63.899	0.946	0.934	0.000	0.858	0.000
25	360	63.898	0.941	0.941	0.000	0.844	0.000
26	375	63.898	0.946	0.940	0.000	0.847	0.000
27	390	63.896	0.941	0.935	0.000	0.828	0.000
28	405	63.896	0.947	0.935	0.000	0.843	0.000
29	420	63.895	0.941	0.941	0.000	0.849	0.000
30	435	63.894	0.947	0.936	0.000	0.849	0.000
31	450	63.893	0.947	0.929	0.000	0.848	0.000
32	465	63.891	0.936	0.930	0.000	0.849	0.000
33	480	63.889	0.911	0.928	0.000	0.842	0.000
34	495	63.888	0.951	0.934	0.000	0.842	0.000
35	510	63.887	0.940	0.934	0.000	0.842	0.000
36	525	63.886	0.944	0.926	0.000	0.826	0.000
37	540	63.885	0.922	0.928	0.000	0.847	0.000
38	555	63.884	0.934	0.934	0.000	0.847	0.000
39	570	63.883	0.946	0.928	0.000	0.847	0.000
40	585	63.881	0.946	0.928	0.000	0.842	0.000
41	600	63.880	0.946	0.922	0.000	0.847	0.000
42	615	63.878	0.946	0.928	0.000	0.837	0.000
43	630	63.876	0.946	0.934	0.000	0.847	0.000
44	645	63.874	0.934	0.940	0.000	0.837	0.000
45	660	63.873	0.933	0.927	0.000	0.826	0.000
46	675	63.870	0.939	0.939	0.000	0.827	0.000
47	690	63.869	0.939	0.933	0.000	0.831	0.000
48	705	63.867	0.927	0.921	0.000	0.836	0.000
49	720	63.865	0.920	0.926	0.000	0.825	0.000
50	735	63.864	0.937	0.931	0.000	0.824	0.000

VARIABLE TABLE SUMMARY (CONTINUED)

SAM NUM	DELT MINS	PRES 1 PSIA	HUM 1 FRACTION	HUM 2 FRACTION	HUM 3 FRACTION	HUM 4 FRACTION	HUM 5 FRACTION
51	750	63.861	0.931	0.919	0.000	0.830	0.000
52	765	63.859	0.932	0.927	0.000	0.826	0.000
53	780	63.858	0.938	0.926	0.000	0.825	0.000
54	795	63.857	0.931	0.937	0.000	0.830	0.000
55	810	63.856	0.890	0.918	0.000	0.829	0.000
56	825	63.853	0.932	0.932	0.000	0.815	0.000
57	840	63.852	0.926	0.920	0.000	0.825	0.000
58	855	63.851	0.905	0.928	0.000	0.827	0.000
59	870	63.851	0.922	0.922	0.000	0.822	0.000
60	885	63.848	0.933	0.921	0.000	0.826	0.000
61	900	63.846	0.927	0.927	0.000	0.816	0.000
62	915	63.843	0.933	0.927	0.000	0.821	0.000
63	930	63.841	0.922	0.922	0.000	0.807	0.000
64	945	63.839	0.933	0.927	0.000	0.821	0.000
65	960	63.836	0.928	0.916	0.000	0.817	0.000
66	975	63.834	0.917	0.911	0.000	0.774	0.000
67	990	63.831	0.934	0.922	0.000	0.822	0.000
68	1005	63.827	0.928	0.910	0.000	0.802	0.000
69	1020	63.825	0.927	0.922	0.000	0.821	0.000
70	1035	63.822	0.929	0.929	0.000	0.808	0.000
71	1050	63.821	0.922	0.928	0.000	0.812	0.000
72	1065	63.819	0.905	0.917	0.000	0.817	0.000
73	1080	63.816	0.917	0.889	0.000	0.817	0.000
74	1095	63.816	0.928	0.900	0.000	0.827	0.000
75	1110	63.813	0.910	0.910	0.000	0.817	0.000
76	1125	63.811	0.917	0.923	0.000	0.818	0.000
77	1140	63.809	0.873	0.899	0.000	0.817	0.000
78	1155	63.807	0.917	0.911	0.000	0.817	0.000
79	1170	63.806	0.923	0.900	0.000	0.813	0.000
80	1185	63.806	0.922	0.916	0.000	0.812	0.000
81	1200	63.803	0.922	0.922	0.000	0.817	0.000
82	1215	63.801	0.921	0.915	0.000	0.811	0.000
83	1230	63.799	0.923	0.911	0.000	0.812	0.000
84	1245	63.797	0.921	0.909	0.000	0.811	0.000
85	1260	63.796	0.919	0.913	0.000	0.809	0.000
86	1275	63.794	0.914	0.903	0.000	0.820	0.000
87	1290	63.792	0.918	0.912	0.000	0.808	0.000
88	1305	63.791	0.915	0.915	0.000	0.811	0.000
89	1320	63.790	0.916	0.911	0.000	0.817	0.000
90	1335	63.786	0.916	0.905	0.000	0.812	0.000
91	1350	63.786	0.911	0.905	0.000	0.822	0.000
92	1365	63.786	0.908	0.913	0.000	0.800	0.000
93	1380	63.785	0.914	0.891	0.000	0.805	0.000
94	1395	63.785	0.919	0.902	0.000	0.809	0.000
95	1410	63.783	0.914	0.914	0.000	0.810	0.000
96	1425	63.783	0.921	0.910	0.000	0.811	0.000
97	1440	63.782	0.915	0.910	0.000	0.806	0.000

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	HUM 6 FRACTION	HUM 7 FRACTION	HUM 8 FRACTION	HUM 9 FRACTION	HUM 10 FRACTION
1	0	0.813	0.704	0.750	0.690	0.690
2	15	0.811	0.707	0.754	0.689	0.693
3	30	0.805	0.706	0.748	0.683	0.683
4	45	0.817	0.699	0.750	0.681	0.681
5	60	0.811	0.711	0.749	0.684	0.693
6	75	0.811	0.715	0.748	0.688	0.697
7	[illegible]	0.810	0.719	0.747	0.683	0.692
8	105	0.804	0.700	0.742	0.691	0.687
9	120	0.810	0.692	0.743	0.692	0.687
10	135	0.819	0.714	0.752	0.701	0.692
11	150	0.802	0.698	0.745	0.671	0.685
12	165	0.815	0.715	0.753	0.688	0.692
13	180	0.817	0.712	0.740	0.690	0.685
14	195	0.822	0.717	0.740	0.694	0.690
15	210	0.817	0.712	0.745	0.694	0.690
16	225	0.819	0.719	0.738	0.687	0.682
17	240	0.810	0.706	0.748	0.683	0.683
18	255	0.820	0.711	0.738	0.688	0.683
19	270	0.810	0.701	0.743	0.683	0.688
20	285	0.821	0.716	0.734	0.693	0.688
21	300	0.820	0.720	0.738	0.692	0.688
22	315	0.820	0.715	0.738	0.692	0.688
23	330	0.825	0.710	0.733	0.697	0.688
24	345	0.823	0.708	0.736	0.686	0.677
25	360	0.818	0.714	0.737	0.687	0.687
26	375	0.817	0.717	0.736	0.681	0.690
27	390	0.813	0.704	0.741	0.677	0.682
28	405	0.818	0.709	0.737	0.691	0.682
29	420	0.818	0.686	0.728	0.686	0.728
30	435	0.819	0.714	0.737	0.677	0.682
31	450	0.813	0.709	0.732	0.682	0.682
32	465	0.819	0.709	0.732	0.687	0.682
33	480	0.817	0.717	0.722	0.681	0.677
34	495	0.812	0.717	0.731	0.685	0.685
35	510	0.807	0.699	0.731	0.690	0.685
36	525	0.816	0.711	0.725	0.679	0.679
37	540	0.817	0.717	0.736	0.685	0.690
38	555	0.817	0.703	0.731	0.685	0.681
39	570	0.817	0.708	0.731	0.686	0.681
40	585	0.817	0.712	0.731	0.685	0.681
41	600	0.812	0.699	0.741	0.663	0.681
42	615	0.812	0.708	0.726	0.685	0.681
43	630	0.797	0.708	0.731	0.685	0.649
44	645	0.812	0.703	0.736	0.685	0.658
45	660	0.811	0.712	0.730	0.684	0.684
46	675	0.812	0.708	0.740	0.676	0.680
47	690	0.812	0.712	0.731	0.689	0.680
48	705	0.806	0.702	0.730	0.689	0.680
49	720	0.801	0.697	0.734	0.693	0.684
50	735	0.809	0.710	0.733	0.683	0.678

VARIABLE TABLE SUMMARY (CONTINUED)

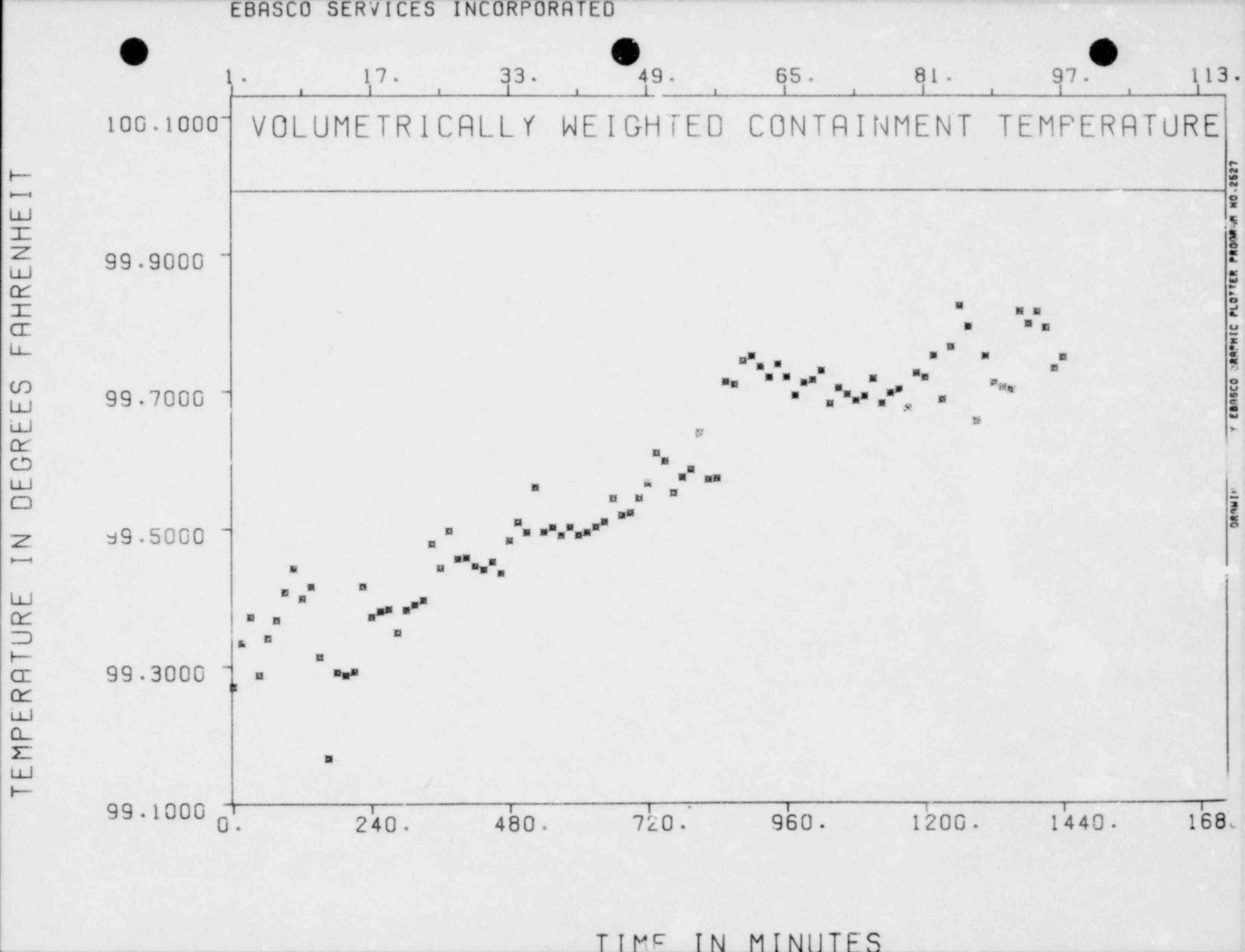
SAM NUM	DELT MINS	HUM 6 FRACTION	HUM 7 FRACTION	HUM 8 FRACTION	HUM 9 FRACTION	HUM 10 FRACTION
51	750	0.815	0.706	0.729	0.688	0.679
52	765	0.806	0.707	0.735	0.675	0.675
53	780	0.805	0.706	0.729	0.684	0.679
54	795	0.810	0.720	0.743	0.679	0.679
55	810	0.809	0.700	0.728	0.682	0.678
56	825	0.806	0.702	0.739	0.670	0.684
57	840	0.796	0.697	0.739	0.688	0.679
58	855	0.802	0.708	0.731	0.681	0.676
59	870	0.802	0.690	0.722	0.672	0.681
60	885	0.801	0.703	0.726	0.671	0.685
61	900	0.791	0.703	0.735	0.680	0.680
62	915	0.802	0.689	0.721	0.671	0.681
63	930	0.792	0.703	0.740	0.690	0.681
64	945	0.806	0.694	0.730	0.671	0.671
65	960	0.797	0.708	0.726	0.672	0.663
66	975	0.793	0.704	0.731	0.672	0.681
67	990	0.797	0.708	0.722	0.681	0.672
68	1005	0.797	0.699	0.731	0.650	0.667
69	1020	0.797	0.708	0.745	0.676	0.663
70	1035	0.784	0.695	0.746	0.668	0.655
71	1050	0.788	0.713	0.736	0.668	0.681
72	1065	0.793	0.708	0.713	0.677	0.677
73	1080	0.793	0.709	0.727	0.691	0.677
74	1095	0.798	0.708	0.727	0.681	0.668
75	1110	0.783	0.703	0.736	0.672	0.681
76	1125	0.788	0.695	0.722	0.672	0.668
77	1140	0.798	0.704	0.731	0.663	0.677
78	1155	0.788	0.708	0.731	0.686	0.677
79	1170	0.769	0.704	0.741	0.664	0.664
80	1185	0.792	0.699	0.745	0.672	0.681
81	1200	0.792	0.699	0.726	0.667	0.676
82	1215	0.777	0.698	0.740	0.676	0.680
83	1230	0.798	0.709	0.727	0.682	0.672
84	1245	0.791	0.693	0.735	0.675	0.680
85	1260	0.785	0.701	0.719	0.688	0.674
86	1275	0.786	0.706	0.725	0.679	0.675
87	1290	0.789	0.700	0.732	0.673	0.678
88	1305	0.791	0.707	0.726	0.676	0.667
89	1320	0.788	0.703	0.726	0.681	0.676
90	1335	0.793	0.699	0.731	0.677	0.672
91	1350	0.788	0.704	0.722	0.672	0.677
92	1365	0.780	0.706	0.733	0.688	0.674
93	1380	0.786	0.720	0.725	0.693	0.675
94	1395	0.785	0.706	0.724	0.679	0.674
95	1410	0.781	0.702	0.729	0.688	0.679
96	1425	0.792	0.708	0.731	0.694	0.671
97	1440	0.782	0.698	0.730	0.671	0.671

END OF TABLE

EBASCO SERVICES INCORPORATED

EBASCO SERVICES INCORPORATED

EBASCO SERVICES INCORPORATED



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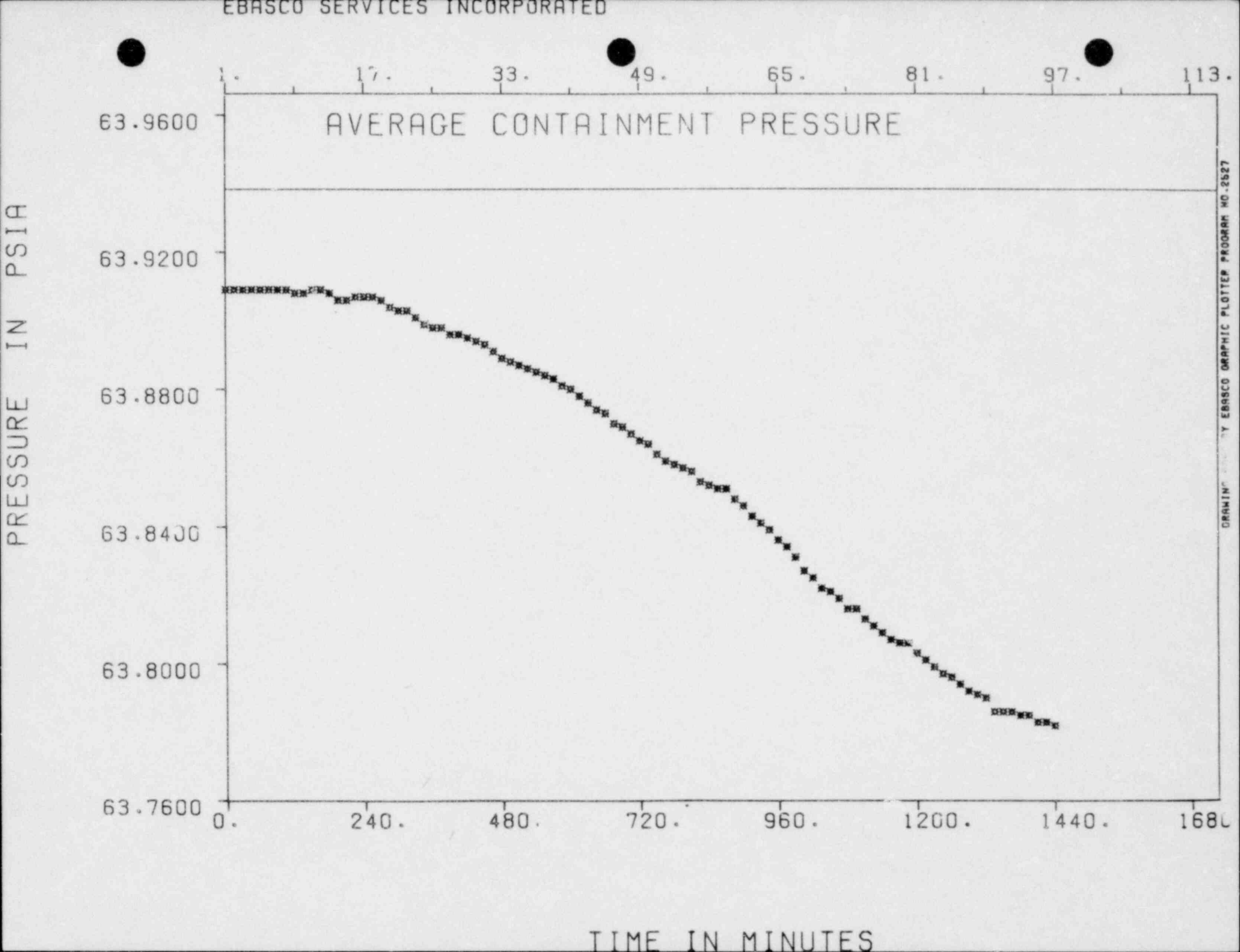

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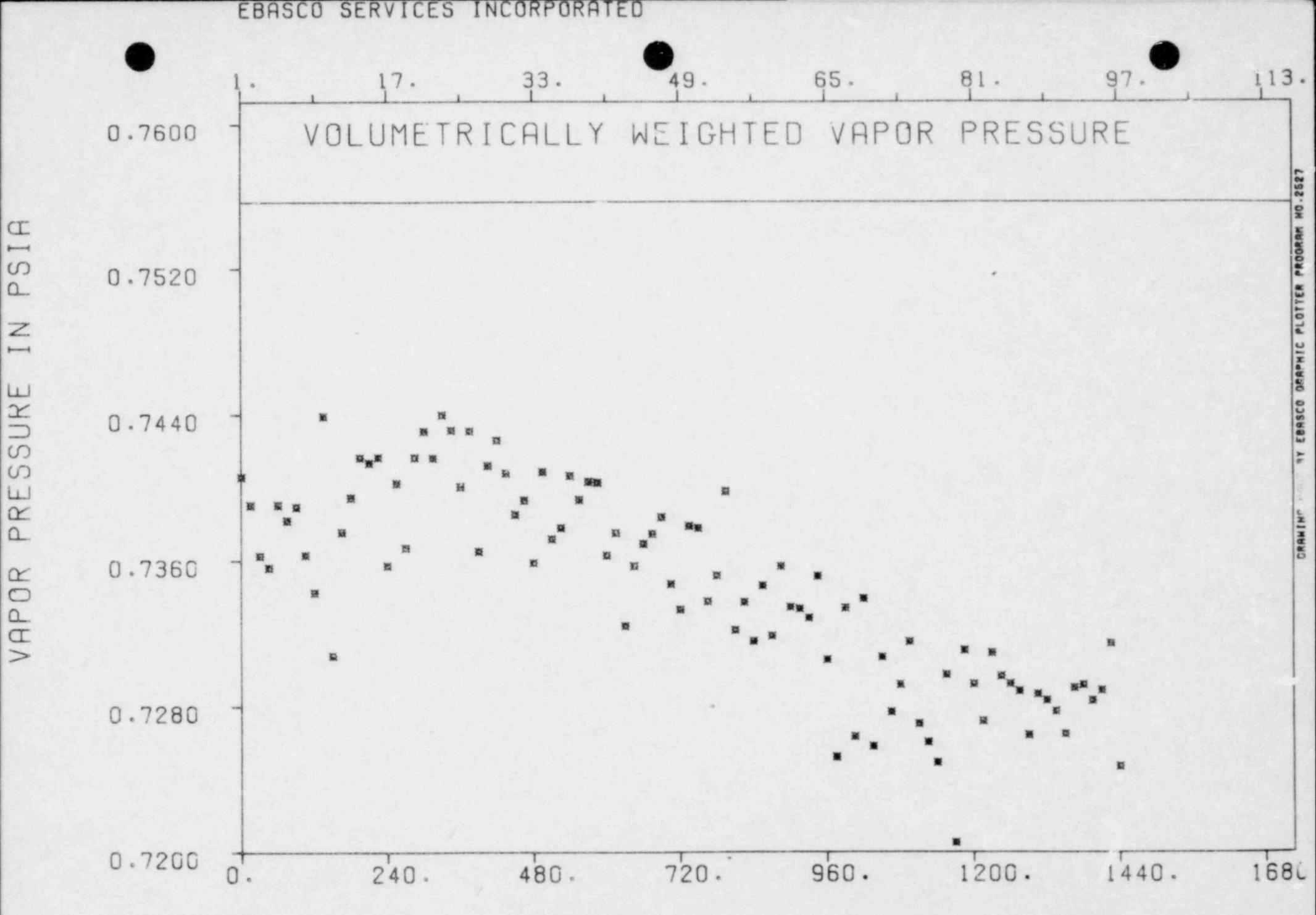

REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST

APPENDIX II

COMPUTER GENERATED ILRT REPORT
(Verification Test)

BRUNSWICK STEAM ELECTRIC PLANT UNIT NO. 1

CAROLINA POWER & LIGHT COMPANY

CLRT

LEAK RATE COMPUTED USING MASS POINT METHOD
AS RECOMMENDED BY ANS N274 REVISION 2
(CONTAINMENT SYSTEM LEAKAGE TESTING REQUIREMENTS)

TEST PERIOD STARTED AT 1900 HOURS ON JUNE 12, 1981

A LEAST SQUARES FIRST ORDER FIT OF LEAK RATE TO TIME
SHOULD YIELD A SLOPE OF ZERO AND AN INTERCEPT EQUAL
TO THE LEAK RATE AS COMPUTED AT THE INITIAL START TIME
THE EQUATION HAS THE FORM - L=ST+R
WHERE L - CORRELATED LEAK RATE
S - SLOPE OF CORRELATION
T - TIME IN HOURS
R - INTERCEPT LEAK RATE

LEAK RATE = 0.132 HOURS + 0.047 PER CENT
MEAN = 0.393 PER CENT

INITIAL CONTAINMENT AIR WEIGHT = 87613 LBS.
FINAL CONTAINMENT AIR WEIGHT = 87519 LBS.
FITTED MASS POINT LEAK RATE IS 0.606 PER CENT PER DAY
MASS POINT LEAK RATE AT UPPER 95% CONFIDENCE LIMIT
IS 0.680 PERCENT PER DAY

MAXIMUM NRC LEAK RATE OF 0.375 PER CENT PER DAY
GIVEN FOR HIGH PRESSURE TEST AT 63.70 PSIA

LEAKAGE OF .375 % PER DAY AT 63.70 PSIA IS EQUIVALENT TO 3.04 SCFM.

SUPPLEMENTAL TEST (CLRT) DATA AND PREVIOUS ILRT RESULTS PLUS INJECTED LEAKAGE
MUST BE WITHIN 25% OF LA (1.01 SCFM) FOR VERIFICATION

DESCRIPTION OF VARIABLES

AVG. TEM - VOLUMETRICALLY WEIGHTED TEMPERATURE.
AVG. PRE - AVERAGE PRESSURE.
VAP. PRE - VOLUMETRICALLY WEIGHTED VAPOUR PRESSURE.
LEAK COM - LEAK RATE COMPUTED FROM FIRST ORDER REGRESSION.
LEAK SIM - LEAK RATE BASED ON TOTAL TIME CALCULATIONS.
LEAK MAS - LEAK RATE FROM MASS POINT FIRST ORDER REGRESSION.
AIR MASS - AIR MASS DATA.

NOTE FOR TABULAR DATA -
TABLE VALUES OF ZERO SIGNIFY EITHER
1. DATA IS NOT APPLICABLE TO THE CALCULATION OR
2. SENSOR HAS BEEN DELETED FROM THE SCAN.

NOTE FOR CURVES-
1. TOP ABCISSA SCALE REPRESENTS SAMPLE NUMBERS.
2. ALL LEAKAGE RATE CURVES ARE BASED ON "TOTAL TIME" METHOD ANALYSIS.

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	AVG. TEM DEG. F	AVG. PRE PSIA	VAP. PRE PSIA	LEAK COM PER CENT	LEAK SIM PER CENT	LEAK MAS PER CENT	AIR MASS 1000 LBS
1	0	99.833	63.772	0.728	0.047	0.000	0.000	87.513
2	15	99.790	63.768	0.728	0.080	-0.236	0.000	87.615
3	30	99.744	63.765	0.729	0.113	-0.158	-0.158	87.616
4	45	99.807	63.761	0.728	0.146	0.415	0.366	87.602
5	60	99.622	63.759	0.729	0.179	-0.385	-0.160	87.627
6	75	99.816	63.756	0.731	0.212	0.516	0.302	87.590
7	90	99.792	63.752	0.729	0.244	0.421	0.428	87.590
8	105	99.703	63.750	0.731	0.277	0.218	0.360	87.599
9	120	99.785	63.736	0.730	0.310	0.612	0.534	87.568
10	135	99.795	63.732	0.728	0.343	0.605	0.620	87.553
11	150	99.777	63.740	0.727	0.376	0.368	0.559	87.580
12	165	99.869	63.736	0.727	0.409	0.531	0.585	87.560
13	180	99.818	63.721	0.729	0.442	0.639	0.642	87.543
14	195	99.813	63.728	0.725	0.475	0.449	0.607	87.560
15	210	99.826	63.725	0.730	0.508	0.525	0.607	87.546
16	225	99.852	63.709	0.729	0.541	0.672	0.654	87.521
17	240	99.851	63.719	0.734	0.574	0.578	0.657	87.529
18	255	99.819	63.715	0.728	0.607	0.495	0.633	87.536
19	270	99.816	63.711	0.735	0.640	0.557	0.631	87.522
20	285	99.849	63.707	0.726	0.673	0.516	0.618	87.524
21	300	99.835	63.704	0.727	0.706	0.514	0.606	87.519

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 1 DEG. F	TEMP 2 DEG. F	TEMP 3 DEG. F	TEMP 4 DEG. F	TEMP 5 DEG. F	TEMP 6 DEG. F
1	0	113.000	111.800	113.800	112.900	109.900	112.000
2	15	113.000	111.900	113.700	112.800	110.000	112.000
3	30	113.000	112.000	113.700	112.800	110.000	112.100
4	45	113.100	111.800	113.800	112.900	110.000	112.100
5	60	113.100	111.900	113.800	112.800	110.000	112.100
6	75	113.100	111.900	113.800	112.900	110.000	112.100
7	90	113.100	111.900	113.800	112.900	110.000	112.100
8	105	113.200	111.900	113.800	112.800	109.900	112.000
9	120	113.200	111.900	113.900	112.900	109.900	112.100
10	135	113.200	112.000	113.900	112.800	110.000	112.000
11	150	113.200	111.900	113.900	112.900	110.000	112.100
12	165	113.200	112.000	113.900	112.800	110.000	112.200
13	180	113.200	111.900	113.900	112.900	110.100	112.100
14	195	113.300	112.100	113.900	113.000	110.100	112.200
15	210	113.200	112.000	113.900	113.000	110.100	112.200
16	225	113.200	112.000	114.000	112.900	110.000	112.200
17	240	113.200	112.000	114.000	113.000	110.100	112.200
18	255	113.300	112.100	114.000	113.100	110.200	112.300
19	270	113.300	112.000	114.000	113.100	110.100	112.200
20	285	113.300	112.100	114.000	113.000	110.100	112.200
21	300	113.300	112.100	114.000	113.000	110.100	112.200

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 7 DEG. F	TEMP 8 DEG. F	TEMP 9 DEG. F	TEMP 10 DEG. F	TEMP 11 DEG. F	TEMP 12 DEG. F
1	0	110.600	112.600	107.600	107.600	106.100	110.100
2	15	110.600	112.600	107.600	107.800	106.200	110.200
3	30	110.600	112.600	107.600	107.700	106.100	110.200
4	45	110.700	112.700	107.700	107.700	106.200	110.200
5	60	110.700	112.700	107.700	107.800	106.200	106.900
6	75	110.700	112.700	107.700	107.700	106.100	110.200
7	90	110.700	112.700	107.700	107.700	106.100	110.200
8	105	110.600	112.600	107.600	107.700	106.100	110.100
9	120	110.700	112.700	107.700	107.900	106.300	110.300
10	135	110.700	112.700	107.700	107.900	106.200	110.200
11	150	110.700	112.800	107.600	107.700	106.200	110.200
12	165	110.800	112.800	107.700	107.900	106.400	110.500
13	180	110.700	112.700	107.700	107.900	106.300	110.300
14	195	110.800	112.800	107.700	107.900	106.300	110.300
15	210	110.800	112.900	107.800	107.900	106.300	110.300
16	225	110.800	112.900	107.700	108.000	106.300	110.400
17	240	110.800	112.900	107.800	107.900	106.300	110.300
18	255	110.800	112.800	107.800	107.900	106.300	110.300
19	270	110.800	112.800	107.800	107.900	106.300	110.300
20	285	110.900	112.800	107.800	107.900	106.300	110.300
21	300	110.900	112.800	107.800	107.900	106.300	110.300

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 13 DEG. F	TEMP 14 DEG. F	TEMP 15 DEG. F	TEMP 16 DEG. F	TEMP 17 DEG. F	TEMP 18 DEG. F
1	0	106.800	106.800	101.900	99.000	100.900	99.800
2	15	107.200	106.700	101.700	98.900	100.700	99.600
3	30	106.800	106.800	101.700	98.900	100.800	99.000
4	45	106.900	106.700	101.700	98.900	100.800	99.700
5	60	106.800	106.800	101.800	98.900	100.600	99.600
6	75	106.900	106.800	101.800	99.000	100.800	99.800
7	90	106.800	106.700	101.700	98.900	100.900	99.800
8	105	106.700	106.700	101.700	98.800	100.700	99.600
9	120	106.900	106.800	101.800	98.900	100.700	99.700
10	135	106.800	106.800	101.700	98.900	100.800	99.700
11	150	106.800	106.800	101.700	98.900	100.700	99.700
12	165	107.000	106.900	102.000	99.100	100.900	99.800
13	180	107.000	106.800	101.800	99.000	100.800	99.700
14	195	106.900	106.800	101.700	98.900	100.800	99.700
15	210	106.900	106.800	101.700	98.900	100.800	99.700
16	225	107.300	106.900	101.800	99.000	100.800	99.800
17	240	107.300	106.900	101.800	99.000	100.800	99.700
18	255	107.300	106.800	101.700	98.900	100.800	99.700
19	270	107.200	106.800	101.700	98.900	100.800	99.700
20	285	107.300	106.800	101.700	99.000	100.900	99.800
21	300	107.400	106.800	101.700	99.000	100.800	99.700

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	TEMP 19 DEG. F	TEMP 20 DEG. F	TEMP 21 DEG. F	TEMP 22 DEG. F	TEMP 23 DEG. F	TEMP 24 DEG. F
1	0	93.300	87.300	92.800	91.600	96.300	91.900
2	15	93.400	87.100	92.700	91.500	96.200	91.900
3	30	93.400	87.000	92.700	91.600	96.300	91.800
4	45	93.400	87.200	92.800	91.600	96.200	91.800
5	60	93.400	87.100	92.700	91.600	96.300	91.800
6	75	93.300	87.200	92.700	91.500	96.300	91.800
7	90	93.400	87.100	92.700	91.500	96.300	91.700
8	105	93.300	87.000	92.600	91.400	96.100	91.700
9	120	93.400	87.000	92.600	91.500	96.200	91.700
10	135	93.400	87.100	92.800	91.500	96.200	91.700
11	150	93.300	87.100	92.700	91.600	96.200	91.700
12	165	93.300	87.100	92.700	91.500	96.200	91.800
13	180	93.400	87.100	92.700	91.500	96.200	91.700
14	195	93.300	87.100	92.700	91.500	96.200	91.800
15	210	93.400	87.100	92.700	91.500	96.300	91.800
16	225	93.300	87.000	92.700	91.500	96.300	91.700
17	240	93.300	87.100	92.700	91.500	96.300	91.700
18	255	93.300	87.000	92.600	91.500	96.200	91.700
19	270	93.300	87.000	92.600	91.500	96.300	91.700
20	285	93.300	87.000	92.600	91.600	96.300	91.700
21	300	93.300	87.000	92.600	91.600	96.200	91.700

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	PRES 1 PSIA	HUM 1 FRACTION	HUM 2 FRACTION	HUM 3 FRACTION	HUM 4 FRACTION	HUM 5 FRACTION
1	0	63.772	0.896	0.902	0.000	0.824	0.000
2	15	63.768	0.914	0.914	0.000	0.815	0.000
3	30	63.765	0.915	0.910	0.000	0.811	0.000
4	45	63.761	0.919	0.908	0.000	0.814	0.000
5	60	63.759	0.919	0.919	0.000	0.824	0.000
6	75	63.756	0.919	0.908	0.000	0.819	0.000
7	90	63.752	0.920	0.903	0.000	0.820	0.000
8	105	63.750	0.922	0.917	0.000	0.822	0.000
9	120	63.736	0.914	0.909	0.000	0.820	0.000
10	135	63.732	0.914	0.908	0.000	0.815	0.000
11	150	63.740	0.926	0.892	0.000	0.810	0.000
12	165	63.736	0.912	0.912	0.000	0.813	0.000
13	180	63.721	0.913	0.908	0.000	0.809	0.000
14	195	63.728	0.914	0.914	0.000	0.814	0.000
15	210	63.725	0.919	0.907	0.000	0.819	0.000
16	225	63.709	0.912	0.907	0.000	0.823	0.000
17	240	63.719	0.901	0.901	0.000	0.818	0.000
18	255	63.715	0.919	0.913	0.000	0.814	0.000
19	270	63.711	0.913	0.908	0.000	0.819	0.000
20	285	63.707	0.918	0.907	0.000	0.823	0.000
21	300	63.704	0.913	0.907	0.000	0.819	0.000

END OF TABLE

VARIABLE TABLE SUMMARY

SAM NUM	DELT MINS	HUM 6 FRACTION	HUM 7 FRACTION	HUM 8 FRACTION	HUM 9 FRACTION	HUM 10 FRACTION
1	0	0.790	0.701	0.724	0.674	0.674
2	15	0.781	0.711	0.720	0.670	0.679
3	30	0.792	0.707	0.730	0.676	0.671
4	45	0.790	0.692	0.724	0.665	0.679
5	60	0.790	0.701	0.728	0.683	0.678
6	75	0.790	0.706	0.724	0.679	0.674
	90	0.786	0.706	0.725	0.679	0.675
8	105	0.793	0.695	0.736	0.672	0.681
9	120	0.791	0.702	0.720	0.675	0.684
10	135	0.790	0.697	0.720	0.675	0.675
11	150	0.786	0.693	0.725	0.680	0.680
12	165	0.784	0.696	0.723	0.664	0.669
13	180	0.790	0.7[illegible]5	0.733	0.665	0.674
14	195	0.780	0.[illegible]92	0.724	0.665	0.670
15	210	0.790	0.706	0.729	0.665	0.674
16	225	0.789	0.696	0.723	0.669	0.674
17	240	0.809	0.705	0.723	0.678	0.669
18	255	0.780	0.706	0.724	0.679	0.670
19	270	0.809	0.701	0.724	0.679	0.670
20	285	0.780	0.696	0.710	0.674	0.669
21	300	0.785	0.696	0.719	0.674	0.674

END OF TABLE

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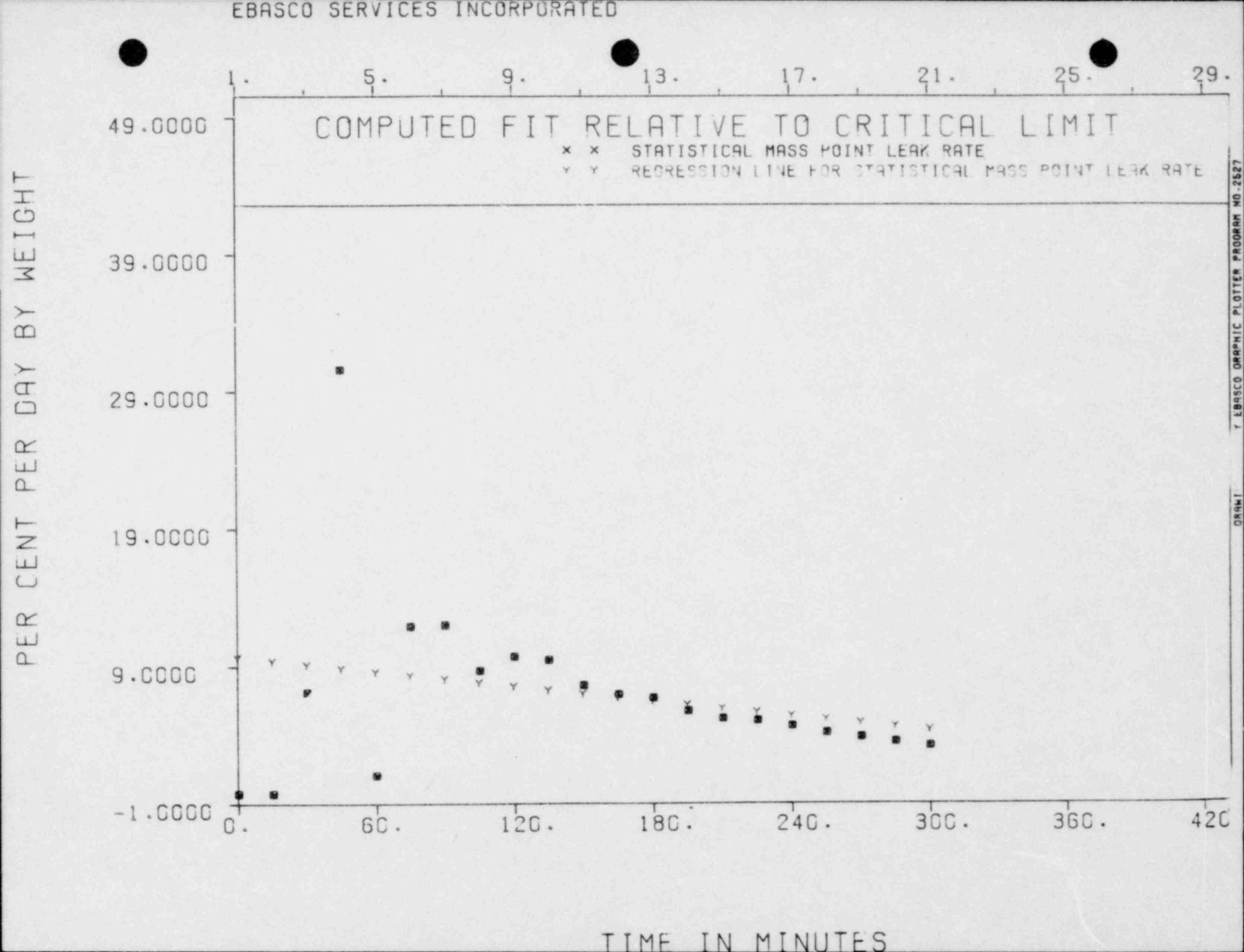

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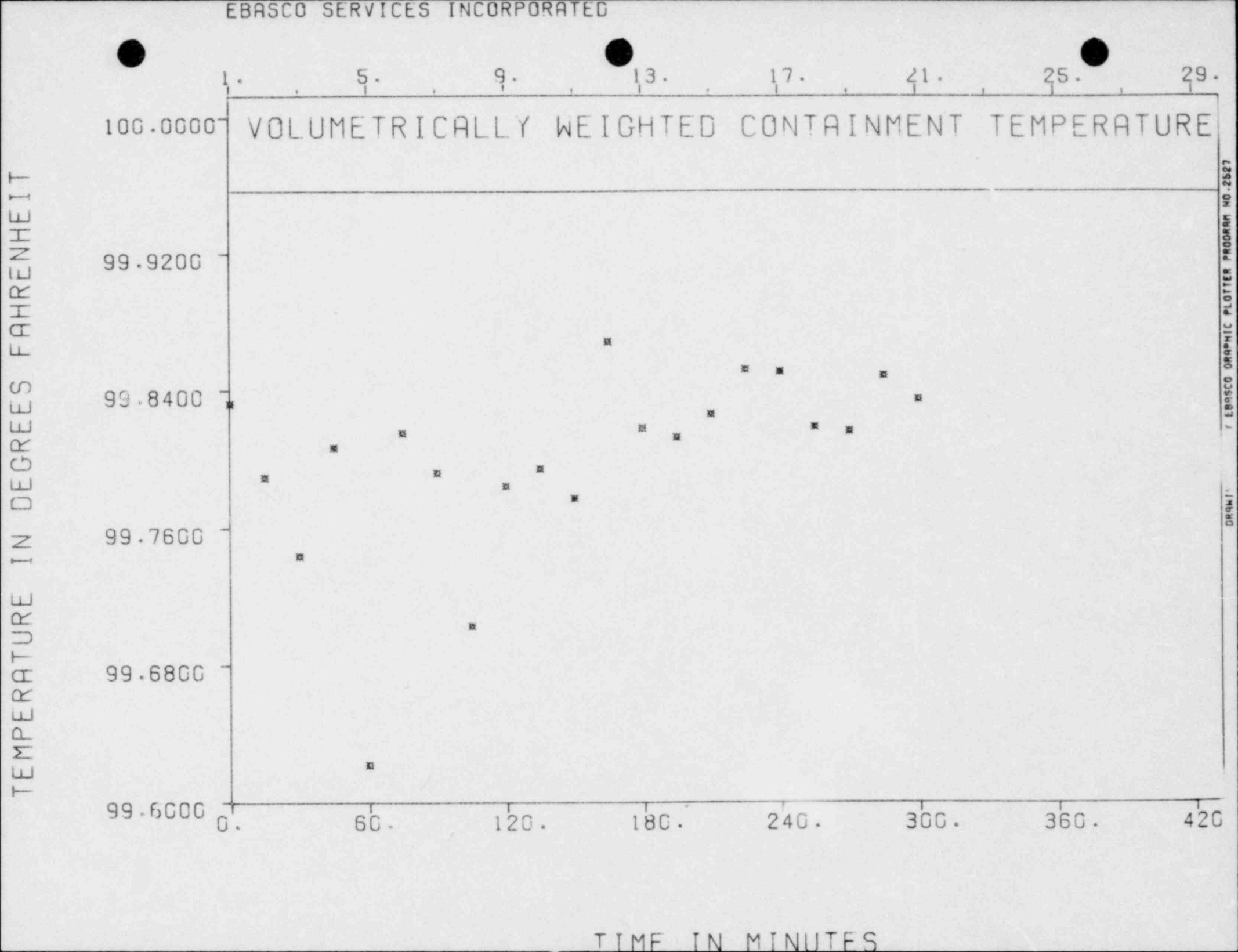

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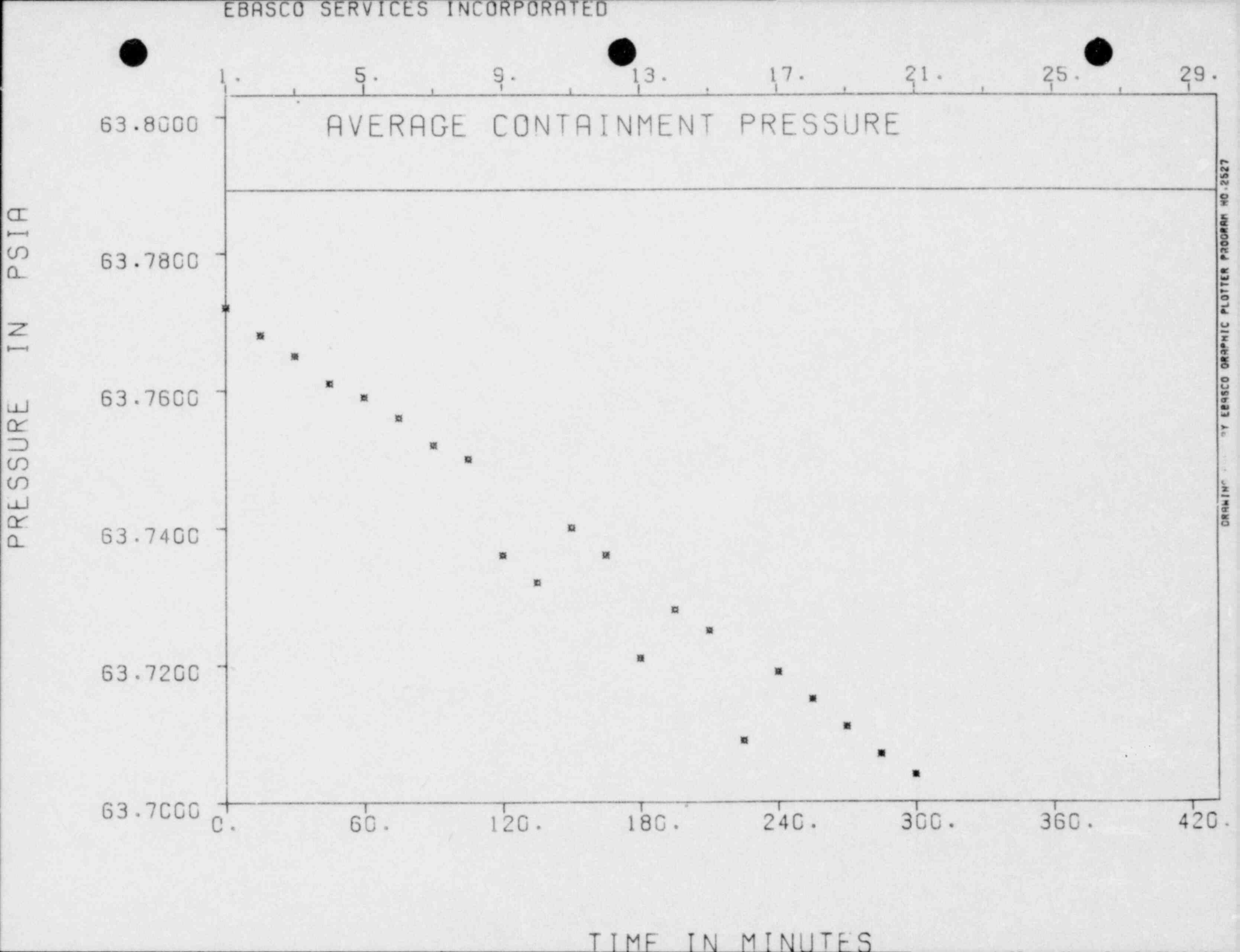

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