

**WASHINGTON PUBLIC POWER SUPPLY SYSTEM**

**WNP-2**

**PRIMARY CONTAINMENT**

**1991 INTEGRATED LEAKAGE RATE TEST**

**FINAL REPORT**

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Washington Public Power Supply System  
WNP-2 Primary Containment Building  
1991 Integrated Leakage Rate Test Final Report

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## 1.0 INTRODUCTION

The containment integrated leakage rate test (ILRT) is performed as required by 10CFR50/Appendix J (Reference 1) to demonstrate that leakage across the containment boundary at design basis accident pressure does not exceed the Technical Specification limit. Test methods and procedures are specified in ANSI N45.4-1972 (Reference 2) which is cited by Appendix J, and in BN-TOP-1 (Reference 3) which defines an alternative methodology acceptable to the Nuclear Regulatory Commission. The conduct of the ILRT follows a plant surveillance procedure (Reference 4) which contains detailed instructions for all test phases.

References 1 and 3 provide two distinct options for the performance of the ILRT. The WNP-2 licensing documents provide a third option. If the Type A test (that part of the ILRT during which data used to calculate the basic leakage rate is gathered) has a duration of at least 24 hours, Ref. 1 allows leakage rate calculations to be performed using the mass point method defined in ANSI/ANS 56.8 (Reference 5). If the Type A test has a duration of less than 24 hours, leakage rate calculations must be performed using the total time method described in Ref. 3. However, the foregoing requirements are modified by the WNP-2 licensing documents so that if test duration is 12 to 24 hours, leakage rate may be calculated using the total time method described in Reference 2. The Reference 3 requirements apply only if test duration is between 8 and 12 hours. The 95% upper confidence limit calculation derived in Ref. 3 provides a very conservative (relative to the mass point UCL defined in Ref. 5) upper bound on leakage rate. Since the Type A test reported herein had a duration of 8 hours, total time calculations as defined in Ref. 3 were used to determine leakage rate and UCL. Mass point calculation results are listed in Section 5, but are provided for information only. Had the test duration been between 8 and 12 hours, a less conservative total time calculation (Ref. 2) would have been used to determine leakage rate and UCL. However, since the test duration was 8 hours, the alternative total time method was not applicable.

The WNP-2 1991 ILRT is described in detail in the following sections of this report. Section 2, Summary, gives a synopsis of test activities and results. Section 3, Methodology, discusses measurements and calculations. Section 4, Procedures, describes how the test was conducted. Section 5, Results, presents the parameters calculated during the ILRT and the associated acceptance criteria. Section 6 lists references and the Appendix contains a description of the containment, a discussion of the computer program used to calculate leakage rate, a tabulation of all Type B and C local leakage rate testing results obtained since the previous ILRT and listing of all containment atmospheric condition data recorded from the start of stabilization to the end of the verification test.

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Leakage rates and UCLs presented in the text of this report are rounded off to the nearest 0.001 %/day while the tables, generated by the ILRT computer program, list rates and UCLs to the nearest 0.0001 %/day. Considering all pertinent factors, leakage rates and UCLs are probably accurate to no better than the 0.001 %/day presented in the text.

## 2.0 SUMMARY

### 2.1 Type A Test

The WNP-2 1991 ILRT was conducted on June 7-9, 1991. Pressurization commenced at 3:18 AM (all times in PDT) on June 7 following the completion of all prerequisite activities, and the containment was isolated at 7:00 PM on the same day when pressure had reached 35.2 psig. Pressurization was suspended for several hours starting at 7:30 AM for repair work on the pressurization line. Service air was used to continue pressurization during a part of the time that repairs were underway. During the latter stages of pressurization, suppression pool level was observed to be dropping at a rate of about 0.04 inches/hour. The start of the formal stabilization period and the start of the Type A test were delayed while the cause of pool level loss was investigated. Stabilization commenced at 3:00 PM on June 8 and the Type A test was started five hours later, at 8:00 PM. Stabilization criteria were met in four hours. The start of the Type A test was delayed for an additional hour to allow time for replacing the data acquisition system with a backup unit. The Type A test was successfully concluded at 4:00 AM on June 9. Test duration was 8 hours. The verification test imposed leak was initiated between 4:00 AM and 4:15 AM and the verification test commenced at 5:15 AM, following the one hour stabilization period required by Ref. 3. The verification test was successfully completed in 4 hours, at 9:15 AM. Depressurization began at 12:57 AM following evaluation of an air sample by HP/Chemistry.

Test results are listed below:

95% UCL on total time leakage rate	0.211 %/day
Acceptance limit (0.75 La)	0.375 %/day
Extrapolated total time calculated leakage rate	0.168 %/day
Acceptance limit (0.75 La)	0.375 %/day
Mean of the measured leakage rates	0.180 %/day
Acceptance limit (La)	0.500 %/day
Verification test total time calculated leakage rate	0.636 %/day
Upper acceptance limit	0.790 %/day
Lower acceptance limit	0.540 %/day

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The final as-left leakage rate (UCL) is 0.254 %/day since penalties for penetrations in non-standard alignment and water inventory increase are 0.043 %/day.

The calculated as-found leakage rate (UCL) is 0.281 %/day. This is the sum of the 0.254 %/day as-left UCL and the 0.027 %/day minimum pathway leakage improvements made during the Type B and C local leakage rate testing program.

## 2.2 Type B & C Tests

Type B & C local leak rate testing was performed during each of the four annual spring outages since the last ILRT conducted in 1987. The last test period occurred just prior to the 1991 ILRT. The leakage rates listed below represent a summation of as-left maximum pathway penetration leakages applying single failure criteria to active containment boundary valves. The allowable leakage rate for the sum of each Type B & C test sequence is 56,600 sccm (0.5 La.) as modified by Reference 6. The summation of the as-found maximum pathway leakage rates exceeded 0.6 La. An analysis and interpretation of the as-found test results is included in Appendix IV of this report. Additionally Appendix IV includes a supplement outlining the unique aspects of the WNP-2 Type B & C testing program as delineated by Reference 6.

- Spring 1988 Outage

The measured leak rate for the sum of the as-left Type B & C tests was 19,218 sccm (0.17 La).

- Spring 1989 Outage

The measured leak rate for the sum of the as-left Type B & C tests was 28,921 sccm (0.26 La).

- Spring 1990 Outage

The measured leak rate for the sum of the as-left Type B & C tests was 27,783 sccm (0.25 La).

- Spring 1991 Outage

The measured leak rate for the sum of the as-left Type B & C tests was 12,833 sccm (0.12 La).

### 3.0 METHODOLOGY

#### 3.1 Leakage Rate Calculation

Integrated leakage rate is determined by pressurizing the containment to design basis accident pressure and calculating the average rate of loss of dry air from the structure over a specified period of time. The quantity of dry air in the containment is computed using the ideal gas law and measurements of drybulb temperature, dewpoint temperature and absolute pressure. A single average drybulb temperature,  $T$ , is calculated as the sum of the products of 18 measured temperatures and their associated weighting factors (discussed below). Individual dewpoint temperatures (6) are converted to vapor pressures using the ASME Steam Tables saturation line algorithm. A single average vapor pressure is calculated in the same manner as is average temperature. Dry air partial pressure,  $P$ , is measured total pressure less average vapor pressure. The quantity of air in the containment is:

$$M = PV/RT$$

where  $M$  is quantity in mass units,  $V$  is containment free air volume,  $R$  is the gas constant for air and  $P$  and  $T$  are defined above. Containment free air volume used for ILRT calculations is 343,040 cubic feet.  $R$ , in English units, is 53.35 pounds force-feet/pounds mass-degrees Rankine.

The partial pressure of dry air is used in the calculation to eliminate pressure changes resulting from evaporation of liquid water and condensation of vapor.

If leakage rate is constant, it is best defined as the slope of a line fitted to a series of air mass/time data sets. This is the mass point determination defined in Ref. 5. Reference 3 derives a very different leakage rate calculation. The total time leakage rate described in Ref. 3 is based on the assumption that rate varies linearly with time. A so-called measured leakage rate is computed for each data set (except the first) by subtracting the mass determined for that data set from initial mass and dividing by elapsed time. A straight line is fitted to the measured rate/time data by the method of least squares.

The calculated total time leakage rate is defined as the ordinate of this line at the end of the test. Since the duration of the test was 8 hours, the total time method defined in Ref. 3 was used to calculate leakage rate and UCL. The total time calculation described in Ref. 2 was not applicable.

Since there is always some scatter of individual data points about a fitted line, there is always some uncertainty regarding the true slope of the line. The uncertainty is quantified statistically by calculating confidence limits on the slope (and, in case of the total time calculation, the intercept) of the line. The confidence limits on leakage rate are

determined at the 95 % confidence level. Typically, the mass point calculated leakage rate and the associated 95 % UCL are quite close to each other. Due to the way in which the total time UCL is formulated, it tends to be considerably greater than the mass point UCL. As a result, the total time UCL usually provides a very conservative upper bound on leakage rate.

Reference 3 specifies three acceptance criteria. First, the upper 95% UCL on the end of test calculated leakage rate must be less than the maximum acceptable as-left leakage rate. The maximum acceptable as-left leakage rate is, per Ref. 1, 75 % of  $L_a$  or, 0.375 %/day (The Technical Specification identifies  $L_a$  as 0.5 %/day). Second, the calculated leakage rate extrapolated to a 24 hour duration must be less than 0.75  $L_a$ . Finally, the mean of the measured leakage rates, determined using data accumulated during the final five hours of the test, must be less than  $L_a$ . The test may be terminated when all three criteria are met and test duration is at least 6 hours (8 hours per Ref. 4).

Following the conclusion of the Type A test, the calculational method is verified by imposing an additional leak on the containment and calculating the new rate. The new calculated rate must equal the sum of the previously calculated rate and the imposed rate plus or minus a tolerance of  $L_a/4$ . The imposed rate, vented from the containment through a flow meter, is approximately equal to  $L_a$ . This supplemental test also provides a rough check on pressure measurement, since a significant error in the measurement of pressure change will result in a calculated leakage rate which is outside the acceptance band.

### 3.2 Test Measurements

Leakage rate calculations are based on data taken from drybulb and dewpoint temperature sensors located inside the containment and absolute pressure transducers connected to the containment through a piping penetration. Eighteen drybulb temperature sensors and 6 dewpoint temperature sensors were installed in the containment at five approximately equally spaced elevations.

Sensor locations and weighting factors (volume fractions) are listed in Table 1. Fourteen drybulb sensors and 4 dewpoint sensors were installed in the drywell. The remaining 4 drybulb sensors and 2 dewpoint sensors were installed in the wetwell.

Drybulb temperatures were measured using 100 Ohm platinum resistance temperature detectors (RTD's). Dewpoint temperatures were measured by chilled mirror dew cells. These devices use a thermoelectric junction to cool a small mirror. The amount of light reflected by the mirror from a light source to a photodetector changes when the mirror cools to the dewpoint and collects condensation. A small RTD senses mirror temperature which is controlled at the dewpoint by the photodetector circuit. The RTD sensing mirror temperature provides the output (a resistance). The RTD's and dew cells were connected to

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the data acquisition system and 24 V power supply through containment electrical penetrations.

Absolute pressure was measured by a vibrating cylinder manometer. This device uses an electronic circuit to determine a modal frequency of a cylinder subjected to vacuum on one side and test pressure on the opposite side. The detected frequency varies approximately linearly with pressure. An internal microprocessor is programmed during calibration to convert frequency to true absolute pressure in engineering units. The manometer has a resolution of 0.0001 psi and a stability of 0.001 psi. The stability figure is based on recorded deviations between the indications of 2 manometers over the 8 hour test duration.

A digital data acquisition system was used to collect data at 15 minute intervals and transfer that data to the ILRT computer over a serial (bit by bit transmission) link. The data system included the conditioning circuitry for the RTD's used to sense drybulb and dewpoint temperatures. RTD resistance was converted to temperature with a 0.01 deg. C resolution. One manometer provided a six digit binary coded decimal output to the data system. The six digit manometer output was converted into a five digit decimal number (XX.XXX) and a single digit decimal number (0.000X) by the data system and passed to the computer as two separate channels of data. The two numbers were recombined into a single six digit decimal number by the computer. Splitting the manometer data into two parts was done to overcome the 80000 count limit on data system output. The data system generated a printed tape record of each data set transmitted to the computer. The second manometer was connected directly to the computer parallel (IEEE 488) port. Pressure data from the second manometer was not recorded by the data acquisition system.

The ILRT computer is a small IBM compatible running a compiled BASIC program. The program is described in the Appendix II.

Other instrumentation included a thermal mass flowmeter (connected to a containment instrument penetration) to measure imposed leakage during the supplemental test, two analog indicators used to measure containment gage pressure, a barometer used to measure reactor building pressure and an RTD used to measure reactor building temperature. All temporary instrumentation was calibrated to the requirements of Reference 4 prior to the ILRT and performed well during the test. Permanent plant instrumentation was used to measure RCS level, suppression pool level and various other parameters. Water level data are used to correct calculated leakage rate if level rises significantly during the test. Other data, such as reactor coolant temperature and suppression pool temperature are used, if at all, only for diagnostic purposes.



## 4.0 PROCEDURES

### 4.1 Plant Status

The systems were placed in the following four broad categories:

- A. Systems filled with water and not vented to the Primary Reactor Containment atmosphere.
  - Reactor Closed Cooling (RCC)
  - Control Rod Drive (CRD)
  - Reactor Recirculation (RRC), Seal Injection
- B. Systems filled with water but vented to the Primary Reactor Containment atmosphere.
  - Residual Heat Removal (RHR)
  - High Pressure Core Spray (HPCS)
  - Low Pressure Core Spray (LPCS)
  - Standby Liquid Control (SLC)
  - Reactor Water Cleanup (RWCU)
  - Reactor Feed Water (RFW)
  - Reactor Core Isolation Cooling (RCIC), Water-filled portions
  - Post Accident Sampling (PSR), Water-filled Portions
  - Fuel Pool Cooling (FPC), Supply
- C. Systems On-line
  - Control Rod Drive (CRD)
  - Reactor Recirculation (RRC), Seal Injection
  - Residual Heat Removal (RHR), A and B Loops
  - Reactor Water Cleanup (RWCU)
  - Containment Atmosphere Control (CAC)\*
  - Sampling Handling Equipment Hydrogen Oxygen Monitors
  - Reactor Closed Cooling (RCC)

\* CIV's open but air pumps not running

- D. All other systems penetrating the PRC were drained and vented to the PRC atmosphere as well as to the Reactor Building atmosphere.

Isolation valves were set in the post-LOCA positions except where the opposite positions were required to maintain the reactor in a safe shutdown condition. Piping was vented and drained to expose valve seats to containment and outside atmospheres. All sources of gas at pressure above test pressure were isolated to prevent leakage into the containment. All Type B and C local leakage rate tests, except those on penetrations used for pressurization, pressure sense and verification test outflow, were completed prior to the start of the ILRT. The containment sumps were drained down before the start of pressurization. One RHR loop was in operation throughout the test to remove core decay heat. Containment lights were turned off when the containment was closed to eliminate point sources of heat. The drywell was vented to the suppression chamber by blocking open a vacuum breaker valve. The official test copy of Ref. 4 documents plant status including all exceptions to specified conditions.

#### 4.2 Prerequisite Activities

System lineups, protecting equipment against test pressure, containment cleanup and ILRT instrument installation were performed over a period of several days prior to the start of pressurization. After instruments were connected in the containment, these were checked to verify correct response. The drybulb temperature sensors were placed, one at a time, in an ice bath and a data system response of 32 deg F (+/- a tolerance of 1 deg F) was verified.

Dewpoint temperature sensor performance was verified by an independent temperature-humidity probe. A temperature survey was conducted to confirm the containment temperature distribution assumed when RTD layout and weighting factor calculations were done. The containment examination specified in Ref. 1 was performed following the completion of the final Type C test. No adverse indications were found during this examination.

All prerequisite activities are documented in the official test copy of Reference 4.

#### 4.3 Pressurization

The containment was pressurized using diesel driven, oil free compressors having an aggregate capacity of 1800 SCFM. The compressed air was cooled and dried by an aftercooler and a refrigerated air dryer. The dryer outlet was connected by hose to a flanged opening in the nitrogen purge line which discharged into the containment purge supply just outboard of the isolation valves.



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Pressurization commenced at 3:18 AM on June 7 and was stopped at 6:50 PM on the same day when pressure had reached 35.2 PSIG. Pressurization was interrupted for several hours starting at about 7:30 AM when a crack was found in the containment purge supply line opposite the nitrogen purge inlet. Planning and execution of repair work required about 9 hours and pressurization using the diesel driven compressors resumed at 4:15 PM. Service air was used to continue pressurizing during the latter stages of repair activities.

Leak surveys were commenced when containment pressure was just over 10 psig. With the exception of the crack in the purge line, no significant air leakage paths were found. However, a steady decrease in wetwell water level was noted starting between 2:00 and 3:00 PM. Level was dropping at a rate of about 0.04 inches per hour. Locating and isolating the water leakage required about 24 hours. The leakage was eventually stopped by shutting RHR suction valve 4C. The formal temperature stabilization period commenced when suppression pool level was stabilized.

#### 4.4 Stabilization

The stabilization period mandated by Ref. 3 commenced at 3:00 PM on June 8, after the suppression pool leakage path had been identified. The numerical stabilization criteria specified in Ref. 4 were met at the end of four hours, the minimum required duration of the stabilization period. However, the stabilization period was continued for an extra hour (until 8:00 PM ) to allow time for replacing the data acquisition system with a backup unit. The data system was replaced after a number of large spurious temperature indications were observed. A damaged system component (possibly resulting from a power surge following a bus loss of power test) was presumed to be the source of the spurious indications. There were no significant spikes in temperature data following data system replacement.

The temperature data recorded during the final four hours of stabilization were used to verify acceptable rate of change of temperature. The calculated rates and acceptance limits are listed on the following page.

Average rate of change over the final 2 hours	0.036 deg F/hr
Acceptance limit	(+/-) 1.000 deg F/hr
Average rate of change over the final 4 hours	0.036 deg F/hr
Average rate of change over the final hour	0.035 deg F/hr
Difference	- 0.001 deg F/hr
Acceptance limit on difference	(+/-) 0.500 deg F/hr

Table 2 lists containment temperatures and differences over the full five hours of

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stabilization. Figure 1 illustrates temperature variation over the same period. Average temperature increased smoothly as is typical for Mark I and Mark II BWR containments. The small temperature excursions evident between 6:15 and 7:15 PM are spurious and probably result from electromagnetic interference or a cable fault (intermittent conductor or shield ground). Table 3 lists, for information, containment pressure, average vapor pressure and calculated air mass during the stabilization period.

#### 4.5 Type A Test

The Type A test commenced at 8:00 PM on June 8 and was completed without incident in eight hours, which is the minimum duration permitted by Ref. 4. Containment atmospheric condition data were recorded at 15 minute intervals during this period as well as during the pressurization, stabilization and verification phases. Reactor vessel and suppression pool levels were recorded hourly to establish the basis for the leakage rate correction required if containment water inventory increases during the type A test (initial and final sump levels are also included in the correction). The Type A test was ended at 4:00 AM on June 9.

#### 4.6 Verification Test and Depressurization

The induced leak of 3.86 SCFM (0.499 %/day) was imposed between 4:00 and 4:15 AM on June 9. The one hour stabilization period stipulated in Ref. 3 commenced at 4:15 AM and the verification test was started at 5:15 AM.

The test was completed without incident at 9:15 AM. Verification test duration was 4 hours which is the minimum required by Ref. 4.

Depressurization commenced at 12:57 PM on April 9 following evaluation of a containment air sample by HP/Chemistry. The containment was vented through the standby gas treatment system.

## 5.0 RESULTS

### 5.1 Type A Test

The acceptance criteria specified in Reference 4 were met well before the completion of the 8 hour test. The end of test leakage rate values and acceptance limits are listed below.

95 % UCL on total time leakage rate	0.211 %/day
Acceptance limit	0.375 %/day
Total time calculated leakage rate extrapolated to 24 hours	0.168 %/day
Acceptance limit	0.375 %/day
Mean of the measured leakage rates	0.180 %/day
Acceptance limit	0.500 %/day

Total time rates computed for each incremental data set are listed in Table 4 and the variation in calculated rate and UCL are plotted in Figure 2. Reference 3 specifies that the final five hours of results be used to establish the extrapolated leakage rate. The total time calculated rate initially decreased, then oscillated and finally increased at a slow, but relatively steady, rate during the last 3.75 hours of the test. The average rate of increase over the final 5 hours was used to extrapolate the calculated leakage rate to a 24 hour value of 0.168 %/day.

Acceptance limits are based on the maximum allowable leakage rate of 0.5 %/day set forth in the Technical Specification. For return to power, Ref. 1 stipulates that containment leakage rate must be less than 75 % of the maximum allowable rate. The remaining 25 % provides a margin for deterioration of the leakage boundary during the subsequent operating cycle. The 75 % criterion is applied by Ref. 3 to both the UCL and extrapolated rate values. Test acceptance is generally governed by the total time UCL which converges to the calculated value very slowly. Occasionally, calculated leakage rate increases with test duration and extrapolated rate may, in these instances, govern acceptance. The mean of the measured rates is almost always less than the UCL. Since the mean has a larger allowable limit ( $L_a$  vs.  $0.75 L_a$ ) than the UCL, it seldom, if ever, governs acceptance.

The final as-left leakage rate is equal to the above UCL rate plus additions for minimum pathway leakage through penetrations in non-standard alignment and increases in containment water inventory. The additions caused by improper valve lineup are tabulated in the following Table 1.

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Penetration Number	Function	Exception Discussion	Leakage Rate <sup>1</sup> (SCCM)
X-3	Drywell purge exhaust	Note 2	312.5
X-5	RCC inlet header	Note 3	262.5
X-11A	Drywell spray loop A	Note 4	488.69
X-11B	Drywell spray loop B	Note 4	0.0
X-13	SLC to Reactor	Note 4	0.0
X-14	RWCU from Reactor	Note 3	39.0
X-17A	RFW line A	Note 4	0.0
X-17B	RFW line B	Note 4	0.0
X-25A	Wetwell spray loop A	Note 4	0.0
X-25B	Wetwell spray loop B	Note 4	0.0
X-26	RHR loop C test line	Note 4	179.7
X-43A	RRC pump A seal water	Note 3	1.0
X-43B	RRC pump B seal water	Note 3	1.0
X-46	RCC outlet header	Note 3	4.17
X-47	RHR loop A test line	Note 4	728.48
X-48	RHR loop B test line	Note 4	411.8
X-49	HPCS test line	Note 4	51.0
X-63	LPCS test line	Note 4	856.0
X-65	RCIC pump minimum flow	Note 4	63.0
X-77Aa	RRC sample line	Note 4	12.0
X-77Ac	Post accident sample	Note 4	3.7
X-77Ad	Post accident sample	Note 4	28.3
X-82d	Post accident sample	Note 4	0.0
X-88	Post accident sample	Note 4	1.3
X-117	RHR loop A CP drain	Note 4	6.0
X-118	RHR loop B CP drain	Note 4	10.0
TOTAL			3462 SCCM

Table 1  
Valve Lineup Exceptions During ILRT





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Valve Lineup Exceptions During the PCILRT

- NOTES:
1. Obtained from LLRT Program
  2. Flanged due to maintenance
  3. Line filled with water and CIV's open during both PCILRT and LRVT
  4. Line filled with water and CIV's closed but accident fluid is a gas.

Combining all of the factors from table 1 and net increases in containment water inventory yields the following.

Minimum pathway leakage through penetrations in

non-standard alignment	3462 SCCM = 0.1223 SCFM
Equivalent to	0.016 %/day

Increase in sump content

over 72 hours	240.25 cu. ft.
Equivalent to	0.07 %/day

Total additions	0.086 %/day
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The final as-left leakage rate is calculated below.

95% UCL on total time leakage rate	0.211 %/day
Additions for penetrations in non-standard alignment and increase in water inventory	0.086 %/day
Final as-left leakage rate	0.297 %/day

Containment conditions during the Type A test were reasonably typical. Air mass, mean temperature, total pressure and mean vapor pressure are plotted on Figures 3 through 6, respectively. The air mass (Figure 3) decreased linearly as expected. The maximum scatter of the individual calculated mass points is on the order of 3 Lbm, which is reasonable for Mark I and Mark II BWR containments. The plot also shows the straight line fitted to the mass/time data sets and a straight line with a slope equivalent to 0.75 La.

Containment mean temperature (Figure 4) increased slowly, but smoothly, during the test. This increase is typical for Mark I and Mark II BWR containments. Total pressure (Figure 5) followed the same trend as temperature. Mean vapor pressure is plotted in Figure 6. Vapor pressure increased more than total pressure, reflecting evaporation of water from open surfaces (suppression pool and sumps).

All plots presented in this report represent discrete values of the plotted parameters. The time interval between discrete points is 15 minutes in all cases. The straight line segments connecting adjacent points are created by the plotting software and do not represent actual variation in the parameters plotted.

## 5.2 As-Found Leakage Rate

The leakage rate which would have been found if the test had been conducted at the beginning of the outage, and prior to isolation valve repairs, can be estimated by adding minimum pathway penetration improvements to the as-left leakage rate. The total value for minimum pathway improvements made during the Type B and C local leakage rate testing program is listed below. Individual tabulation all Type B and C As-found and As-left results obtained since the last ILRT are tabulated in Appendix IV.

Minimum pathway improvements made during the Type B and C testing program	4690 SCCM = 239 SCFD
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At the end of the Type A test, mean temperature and absolute pressure were 88.23 deg F and 49.517 PSIA, respectively (see Appendix data list). At these conditions, and for a containment volume of 343,040 cubic feet, 239 SCFD is equivalent to a leakage rate of 0.022/day. The estimated as-found leakage rate (UCL) is determined as shown below.

As-left UCL leakage rate	0.297 %/day
Minimum pathway improvements	0.022 %/day
As-found leakage rate	0.319 %/day

## 5.3 Verification Test

The verification test induced leak was imposed after the completion of the Type A test and adjusted to a flowmeter indication of 3.86 SCFM. At the initial (4:15 AM) test conditions of 88.24 deg F and 49.516 psia (see Appendix data list) 3.86 SCFM is equivalent to 0.499 %/day. Following imposition of the induced leak, conditions were allowed to stabilize for 1 hour as required by Ref. 3. A successful four hour test was performed after stabilization. Results are detailed in Table 5 and summarized below.

Upper limit on total time calculated leakage rate	0.790 %/day
Total time calculated leakage rate	0.636 %/day
Lower limit on total time calculated leakage rate	0.540 %/day

The calculated rate is within the limits. Limits are established, per Ref. 3, as the theoretical rate  $\pm 0.25$  La. The theoretical rate is the total time rate calculated for the end of the Type A test plus the induced rate. Figure 7 illustrates the verification test results graphically. The line fitted to the air mass/time data sets is essentially centered between the limits as is expected. This is consistent with the mass point calculation results discussed in the next section.

The upper and lower limits on the calculated verification leakage rate shown on Table 5 round off to 0.791 %/day and 0.541 %/day, respectively. The limits shown above differ from the table values by 0.001 %/day since rounding off of the verification flow and the total time calculated leakage rate is done prior to calculating the limits.

#### 5.4 Mass Point Results

Type A test mass point calculation results are listed in Table 6. The end of test calculated leakage rate is reasonably close to the end of test calculated total time rate -- 0.176 %/day vs. 0.166 %/day. In fact, the mass point calculated rate, the total time calculated rate and the total time measured rate (0.180 %/day) are quite close to the same value. This is expected for well ordered data. The mass point upper confidence limit of 0.178 %/day is close to the calculated rate which is consistent with the low level of air mass data scatter illustrated in Figure 3.

Table 7 lists mass point verification test results. The calculated leakage rate of 0.627 %/day is close to the total time calculated rate of 0.636 %/day. Again, the close correspondence is as expected for well ordered data.

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## 6.0 REFERENCES

1. Code of Federal Regulations, Title 10, Part 50, Appendix J, Reactor Containment Leakage Testing For Water Cooled Power Reactors.
2. ANSI N45.4-1972, Leakage Rate Testing Of Containment Structures For Nuclear Reactors.
3. Bechtel Topical Report BN-TOP-1, Testing Criteria For Integrated Leakage Rate Testing Of Primary Containment Structures For Nuclear Power Plants, Revision 1, 1972.
4. Washington Public Power Supply System, WNP-2 Surveillance Test Procedure No. 7.4.6.1.2.1, Primary Containment Integrated Leakage Rate Test, May 23, 1991.
5. ANSI/ANS 56.8-1987, Containment System Leakage Testing Requirements.
6. Exemption to Appendix J Testing, issued by the NRC with Amendment No. 41 to Operating Licence NPF-2, dated 04-29-87.

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TABLE 2  
SENSOR LOCATIONS AND WEIGHTING FACTORS

Sensor No.	Type	Elevation, Feet	Bearing, Degrees	Distance From Liner, Feet	Weighting Factor
TE-01	Drybulb	572 (1)	90	6	0.0265
TE-02	Drybulb	50	240	10	0.0402
TE-03	Drybulb	25	5	15	0.0398
TE-04	Drybulb	05	120	16	0.0563
TE-05	Drybulb	50	120	10	0.0402
TE-06	Drybulb	05	0	16	0.0563
TE-07	Drybulb	25	75	15	0.0398
TE-08	Drybulb	25	235	15	0.0398
TE-09	Drybulb	25	180	15	0.0398
TE-10	Drybulb	50	0	10	0.0402
TE-11	Drybulb	72	270	6	0.0265
TE-12	Drybulb	25	125	15	0.0398
TE-13	Drybulb	25	315	15	0.0398
TE-14	Drybulb	05	240	16	0.0563
TE-15	Drybulb (2)	85	270	5	0.1047
TE-16	Drybulb (2)	85	195	5	0.1047
TE-17	Drybulb (2)	85	0	5	0.1047
TE-18	Drybulb (2)	85	90	5	0.1046
ME-01	Dewpoint (2)	525	125	15	0.1194
ME-02	Dewpoint (2)	550	90	10	0.1737
ME-03	Dewpoint (2)	505	240	16	0.1688
ME-04	Dewpoint (2)	525	5	15	0.1194
ME-05	Dewpoint (2)	485	270	5	0.2094
ME-06	Dewpoint (2)	485	90	5	0.2093

Notes: (1) Elevation reference --  
Drywell head flange parting at El. 576.8 ft.  
Bottom of diaphragm slab at El. 497.5 ft.  
Wetwell water surface at El. 466.4 ft. (nominal)

(2) Wetwell sensors

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TABLE 3  
WNP-2 1991 ILRT STABILIZATION  
TEMPERATURE STABILIZATION REPORT

Start Time = 1500 608

\* = stabilization criterion satisfied

data set	elapsed time, hr	temperature T, deg F	dT1 avg dt (1 hr)	dT4 avg Dt (4 hr)	- ANSI - dT1-dT4	--- BN-TOP-1 ---	
						Dt avg (2 hr)	or d(Dt) avg (2 hr)
1	0.00	87.759					
2	0.25	87.771					
3	0.50	87.771					
4	0.75	87.781					
5	1.00	87.791	0.032				
6	1.25	87.796	0.025				
7	1.50	87.807	0.035				
8	1.75	87.816	0.034				
9	2.00	87.826	0.035			0.034*	-0.005*
10	2.25	87.835	0.039			0.032*	0.018*
11	2.50	87.844	0.038			0.037*	-0.001*
12	2.75	87.854	0.038			0.036*	-0.000*
13	3.00	87.863	0.037			0.036*	0.007*
14	3.25	87.845	0.010			0.025*	-0.056*
15	3.50	87.897	0.053			0.045*	0.086*
16	3.75	87.895	0.041			0.040*	-0.025*
17	4.00	87.899	0.036	0.035	0.001*	0.037*	-0.010*
18	4.25	87.888	0.043	0.029	0.014*	0.027*	-0.041*
19	4.50	87.917	0.019	0.036	-0.017*	0.036*	0.038*
20	4.75	87.926	0.032	0.036	-0.005*	0.036*	0.001*
21	5.00	87.934	0.035	0.036	-0.001*	0.036*	0.050*

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**TABLE 4**  
**WNP-2 1991 ILRT STABILIZATION**  
**DATA SUMMARY REPORT**

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	1500	608	87.7586	49.5147	0.3814	83103.93
2	1515	608	87.7714	49.5138	0.3813	83100.59
3	1530	608	87.7714	49.5131	0.3816	83098.84
4	1545	608	87.7814	49.5125	0.3819	83095.79
5	1600	608	87.7906	49.5122	0.3822	83093.41
6	1615	608	87.7960	49.5115	0.3825	83090.92
7	1630	608	87.8069	49.5104	0.3828	83086.84
8	1645	608	87.8156	49.5106	0.3831	83085.50
9	1700	608	87.8257	49.5106	0.3833	83083.61
10	1715	608	87.8348	49.5106	0.3836	83081.74
11	1730	608	87.8444	49.5109	0.3840	83079.99
12	1745	608	87.8535	49.5111	0.3840	83079.03
13	1800	608	87.8627	49.5108	0.3841	83076.87
14	1815	608	87.8453	49.5107	0.3838	83079.96
15	1830	608	87.8972	49.5114	0.3847	83071.62
16	1845	608	87.8948	49.5111	0.3850	83071.10
17	1900	608	87.8990	49.5107	0.3852	83069.43
18	1915	608	87.8882	49.5113	0.3854	83071.68
19	1930	608	87.9165	49.5115	0.3853	83067.83
20	1945	608	87.9263	49.5117	0.3854	83066.52
21	2000	608	87.9341	49.5119	0.3859	83064.94

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TABLE 4  
WNP-2 1991 ILRT TYPE A TEST  
TOTAL TIME LEAKAGE RATE REPORT

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	measured rate (%/day)	leakage rate (%/day)	ucl rate (%/day)
1	2000	608	0.00	83064.94	0.0000	0.0000	0.0000
2	2015	608	0.25	83062.36	0.2990	0.2990	0.2990
3	2030	608	0.50	83060.62	0.2497	0.2497	0.2497
4	2045	608	0.75	83060.28	0.1795	0.1830	0.2656
5	2100	608	1.00	83057.99	0.2008	0.1776	0.3316
6	2115	608	1.25	83056.47	0.1960	0.1740	0.2983
7	2130	608	1.50	83054.94	0.1928	0.1717	0.2785
8	2145	608	1.75	83053.51	0.1888	0.1694	0.2641
9	2200	608	2.00	83051.97	0.1874	0.1680	0.2546
10	2215	608	2.25	83050.94	0.1798	0.1646	0.2438
11	2230	608	2.50	83049.07	0.1834	0.1640	0.2390
12	2245	608	2.75	83046.89	0.1897	0.1659	0.2389
13	2300	608	3.00	83045.86	0.1838	0.1657	0.2356
14	2315	608	3.25	83044.54	0.1814	0.1652	0.2320
15	2330	608	3.50	83042.35	0.1865	0.1662	0.2313
16	2345	608	3.75	83041.82	0.1781	0.1652	0.2276
17	0	609	4.00	83039.55	0.1834	0.1657	0.2264
18	15	609	4.25	83040.70	0.1648	0.1622	0.2202
19	30	609	4.50	83036.30	0.1839	0.1633	0.2206
20	45	609	4.75	83035.05	0.1818	0.1639	0.2201
21	100	609	5.00	83033.91	0.1794	0.1640	0.2190
22	115	609	5.25	83032.29	0.1797	0.1643	0.2181
23	130	609	5.50	83030.69	0.1800	0.1646	0.2174
24	145	609	5.75	83029.37	0.1787	0.1647	0.2165
25	200	609	6.00	83027.95	0.1781	0.1647	0.2155
26	215	609	6.25	83026.74	0.1766	0.1645	0.2143
27	230	609	6.50	83024.51	0.1797	0.1649	0.2140
28	245	609	6.75	83023.04	0.1794	0.1652	0.2135
29	300	609	7.00	83021.38	0.1798	0.1655	0.2132
30	315	609	7.25	83020.35	0.1777	0.1656	0.2125
31	330	609	7.50	83018.19	0.1801	0.1660	0.2123
32	345	609	7.75	83017.53	0.1768	0.1659	0.2116
33	400	609	8.00	83015.19	0.1797	0.1663	0.2113

Allowable leakage rate, La = 0.5000 %/day  
75% La = 0.3750 %/day  
Total time leakage rate = 0.1663 %/day  
Total time UCL = 0.2113 %/day





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TABLE 5  
WNP-2 1991 ILRT VERIFICATION  
TOTAL TIME LEAKAGE RATE REPORT  
VERIFICATION

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	measured rate (%/day)	leakage rate (%/day)
1	515	609	0.00	82989.17	0.0000	0.0000
2	530	609	0.25	82984.48	0.5424	0.5424
3	545	609	0.50	82978.81	0.5994	0.5994
4	600	609	0.75	82972.83	0.6300	0.6344
5	615	609	1.00	82967.41	0.6294	0.6440
6	630	609	1.25	82962.64	0.6139	0.6376
7	645	609	1.50	82955.97	0.6401	0.6471
8	700	609	1.75	82951.66	0.6199	0.6426
9	715	609	2.00	82946.39	0.6186	0.6388
10	730	609	2.25	82940.62	0.6240	0.6381
11	745	609	2.50	82934.65	0.6307	0.6396
12	800	609	2.75	82930.66	0.6153	0.6356
13	815	609	3.00	82923.56	0.6325	0.6376
14	830	609	3.25	82918.37	0.6300	0.6383
15	845	609	3.50	82912.14	0.6365	0.6405
16	900	609	3.75	82907.68	0.6284	0.6401
17	915	609	4.00	82904.48	0.6123	0.6360

Upper limit on leakage rate = 0.7906 %/day  
Total time leakage rate = 0.6360 %/day  
Lower limit on leakage rate = 0.5406 %/day

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TABLE 6  
WNP-2 1991 ILRT TYPE A TEST  
MASS POINT LEAKAGE RATE REPORT

data set	time	date	elapsed time (hrs	dry air mass (lbm)	leakage rate (%/day)	ucl rate (%/day)
1	2000	608	0.00	83064.94	0.0000	0.0000
2	2015	608	0.25	83062.36	0.2990	0.2990
3	2030	608	0.50	83060.62	0.2497	0.4934
4	2045	608	0.75	83060.28	0.1816	0.3032
5	2100	608	1.00	83057.99	0.1846	0.2410
6	2115	608	1.25	83056.47	0.1843	0.2177
7	2130	608	1.50	83054.94	0.1834	0.2058
8	2145	608	1.75	83053.51	0.1815	0.1977
9	2200	608	2.00	83051.97	0.1803	0.1927
10	2215	608	2.25	83050.94	0.1764	0.1869
11	2230	608	2.50	83049.07	0.1760	0.1845
12	2245	608	2.75	83046.89	0.1788	0.1863
13	2300	608	3.00	83045.86	0.1785	0.1848
14	2315	608	3.25	83044.54	0.1775	0.1830
15	2330	608	3.50	83042.35	0.1788	0.1837
16	2345	608	3.75	83041.82	0.1771	0.1817
17	0	609	4.00	83039.55	0.1775	0.1816
18	15	609	4.25	83040.70	0.1724	0.1787
19	30	609	4.50	83036.30	0.1741	0.1799
20	45	609	4.75	83035.05	0.1749	0.1802
21	100	609	5.00	83033.91	0.1749	0.1797
22	115	609	5.25	83032.29	0.1751	0.1794
23	130	609	5.50	83030.69	0.1753	0.1792
24	145	609	5.75	83029.37	0.1752	0.1788
25	200	609	6.00	83027.95	0.1751	0.1784
26	215	609	6.25	83026.74	0.1747	0.1777
27	230	609	6.50	83024.51	0.1750	0.1779
28	245	609	6.75	83023.04	0.1752	0.1779
29	300	609	7.00	83021.38	0.1755	0.1780
30	315	609	7.25	83020.35	0.1754	0.1777
31	330	609	7.50	83018.19	0.1757	0.1780
32	345	609	7.75	83017.53	0.1755	0.1776
33	400	609	8.00	83015.19	0.1758	0.1777

Allowable leakage rate, La = 0.5000 %/day  
75% La = 0.3750 %/day  
Mass point leakage rate = 0.1758 %/day  
Mass point UCL = 0.1777 %/day

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TABLE 7  
WNP-2 1991 ILRT VERIFICATION  
MASS POINT LEAKAGE RATE REPORT

VERIFICATION

data set	time	date	elapsed time (hrs)	dry air mass (lbm)	leakage rate (%/day)
1	515	609	0.00	82989.17	0.0000
2	530	609	0.25	82984.48	0.5424
3	545	609	0.50	82978.81	0.5994
4	600	609	0.75	82972.83	0.6326
5	615	609	1.00	82967.41	0.6383
6	630	609	1.25	82962.64	0.6275
7	645	609	1.50	82955.97	0.6391
8	700	609	1.75	82951.66	0.6322
9	715	609	2.00	82946.39	0.6275
10	730	609	2.25	82940.62	0.6273
11	745	609	2.50	82934.65	0.6300
12	800	609	2.75	82930.66	0.6251
13	815	609	3.00	82923.56	0.6286
14	830	609	3.25	82918.37	0.6300
15	845	609	3.50	82912.14	0.6332
16	900	609	3.75	82907.68	0.6327
17	915	609	4.00	82904.48	0.6273

Upper limit on leakage rate = 0.8001 %/day  
Mass point leakage rate = 0.6273 %/day  
Lower limit on leakage rate = 0.5501 %/day

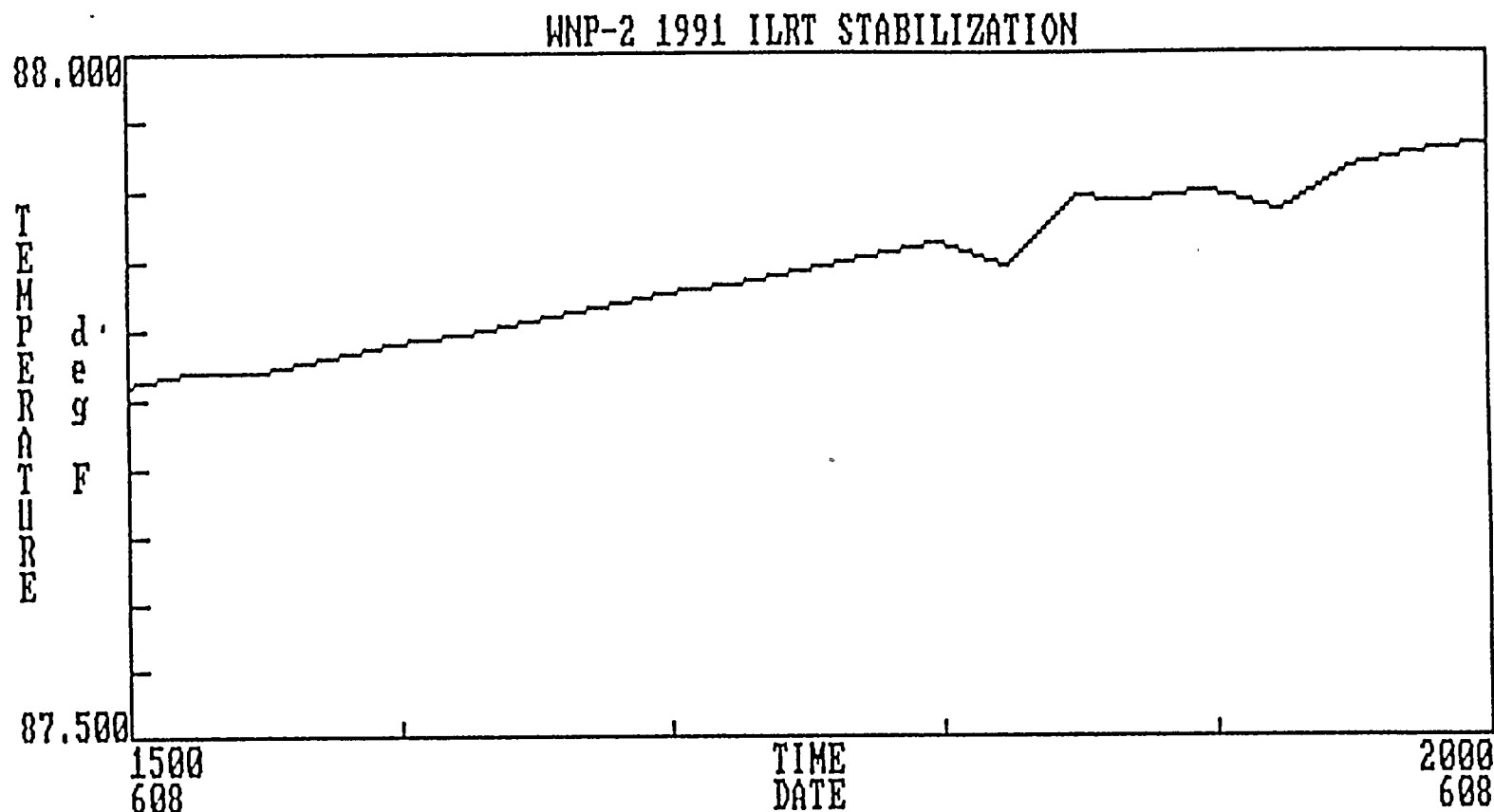


FIGURE 1  
CONTAINMENT AVERAGE TEMPERATURE VARIATION DURING STABILIZATION

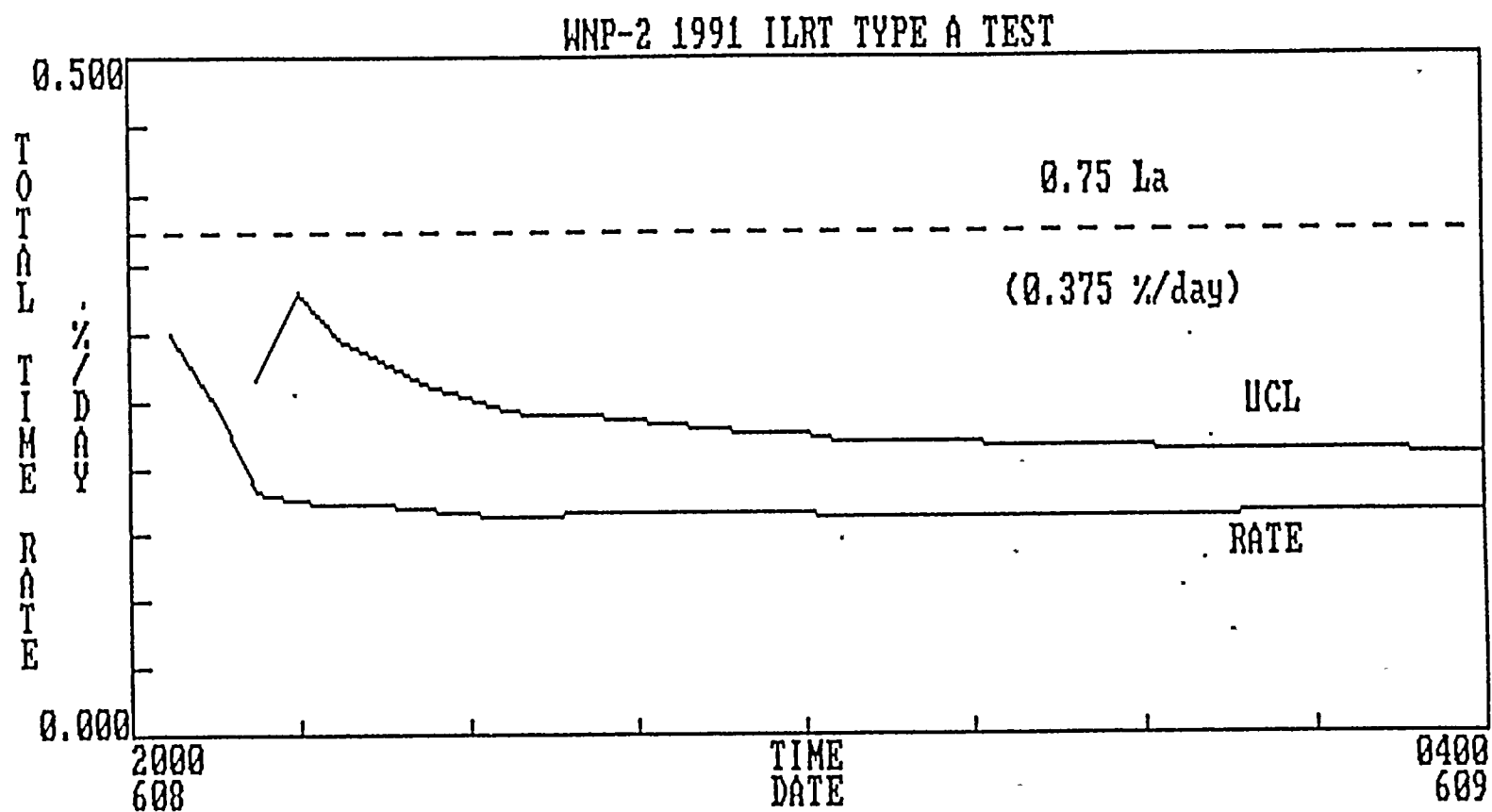


FIGURE 2  
VARIATION IN TOTAL TIME LEAKAGE RATE AND UCL

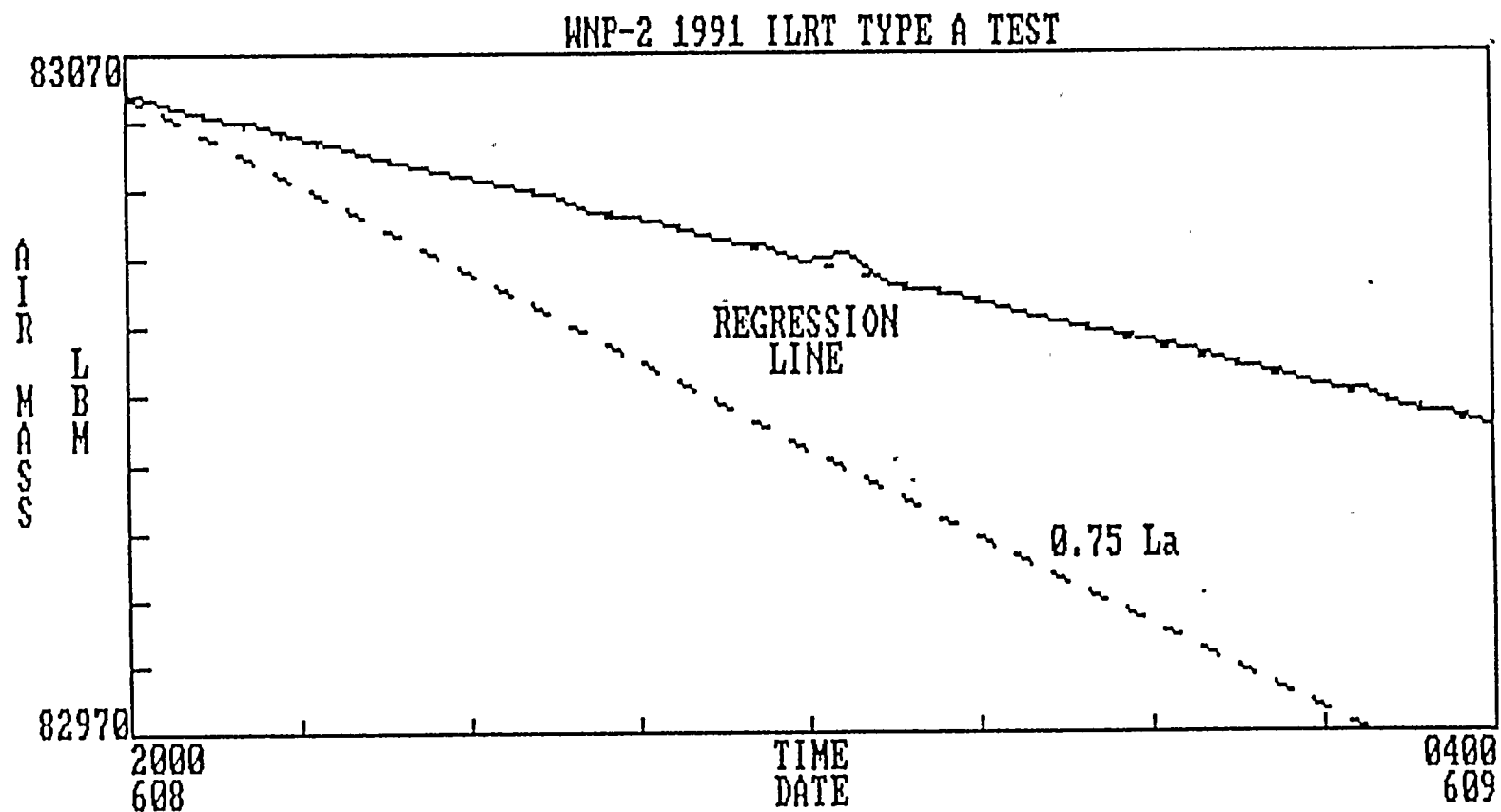


FIGURE 3  
AIR MASS vs. TIME -- TYPE A TEST





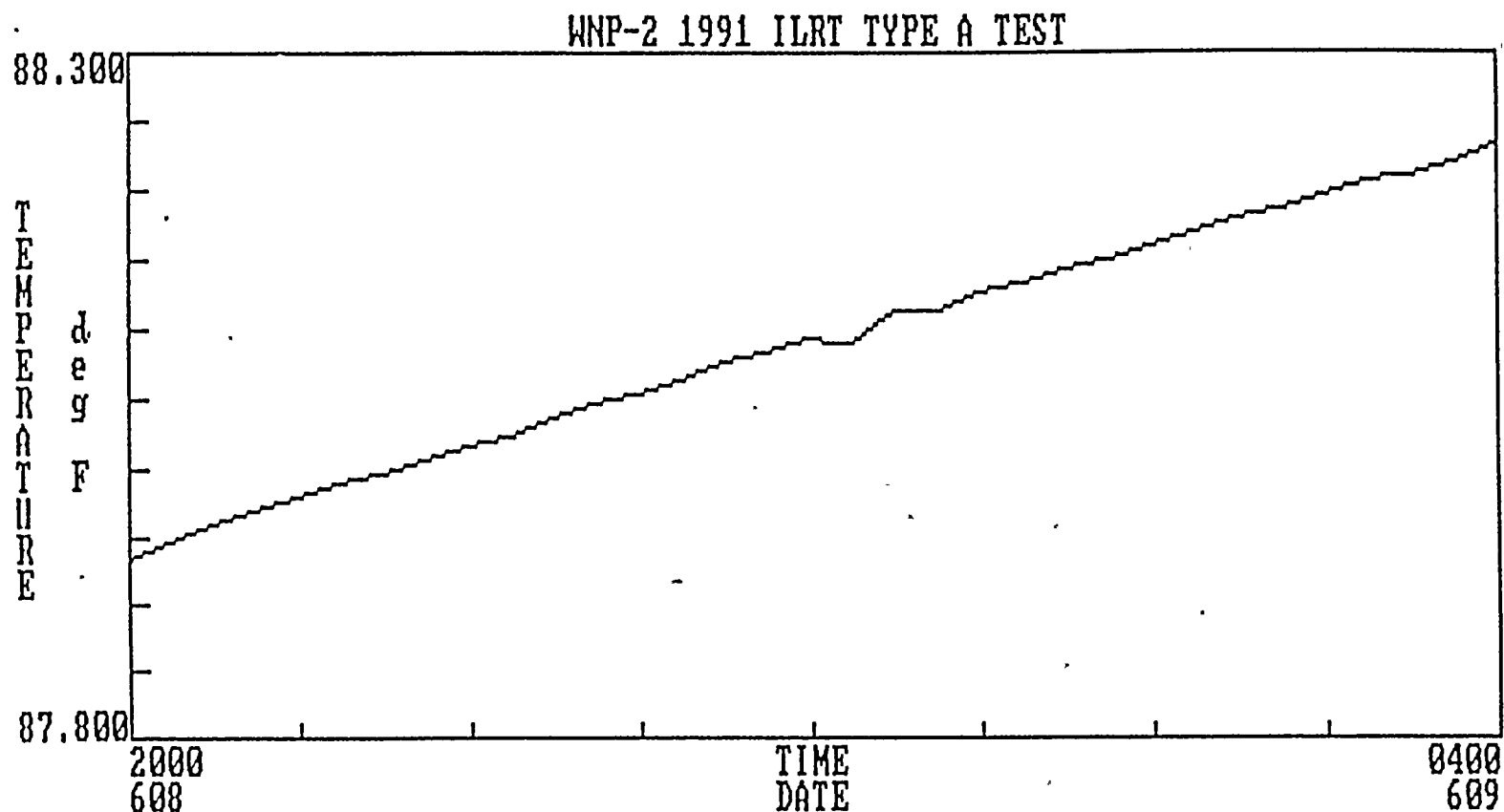


FIGURE 4  
AVERAGE TEMPERATURE vs. TIME -- TYPE A TEST

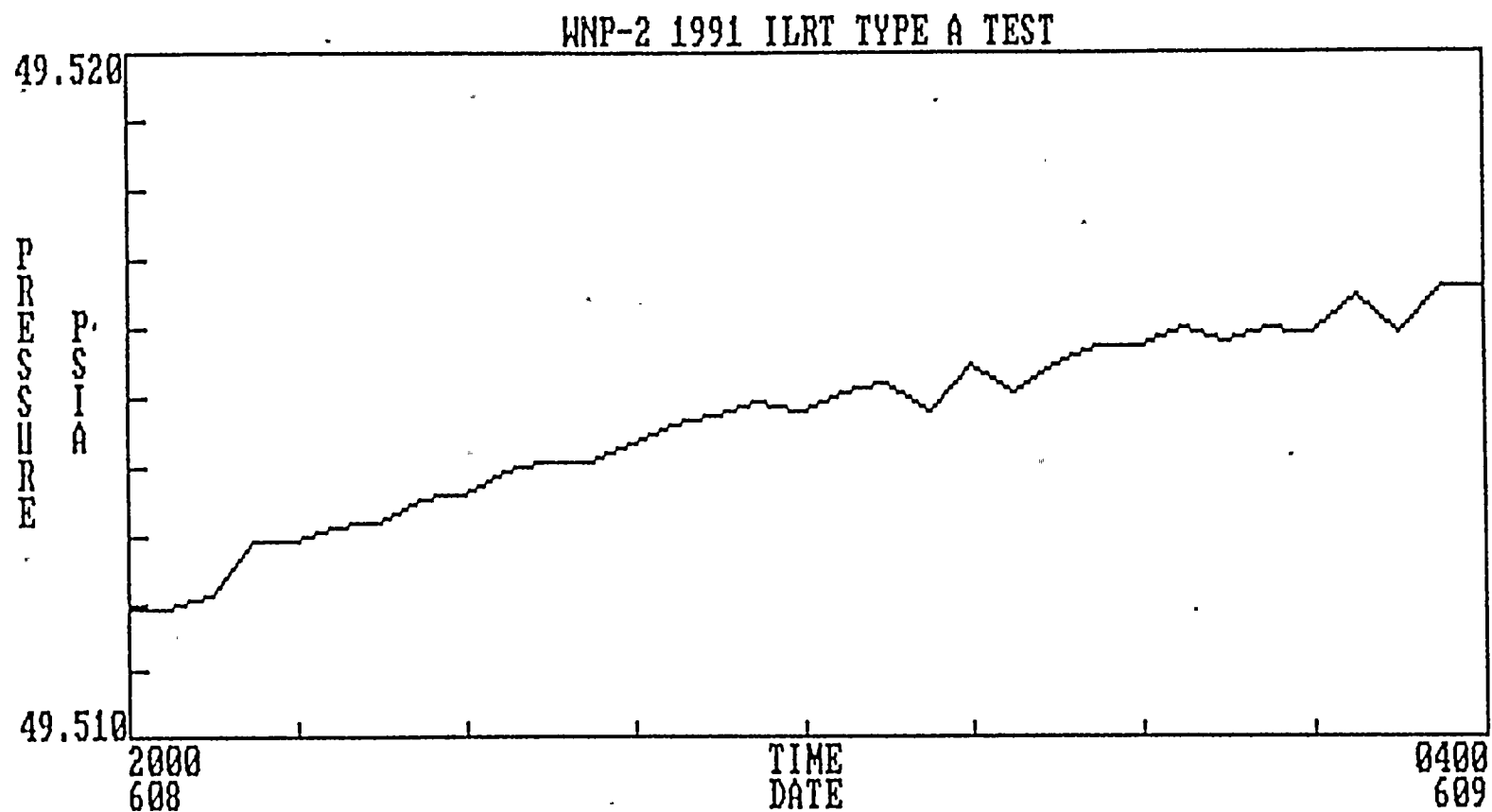


FIGURE 5  
TOTAL PRESSURE vs. TIME -- TYPE A TEST

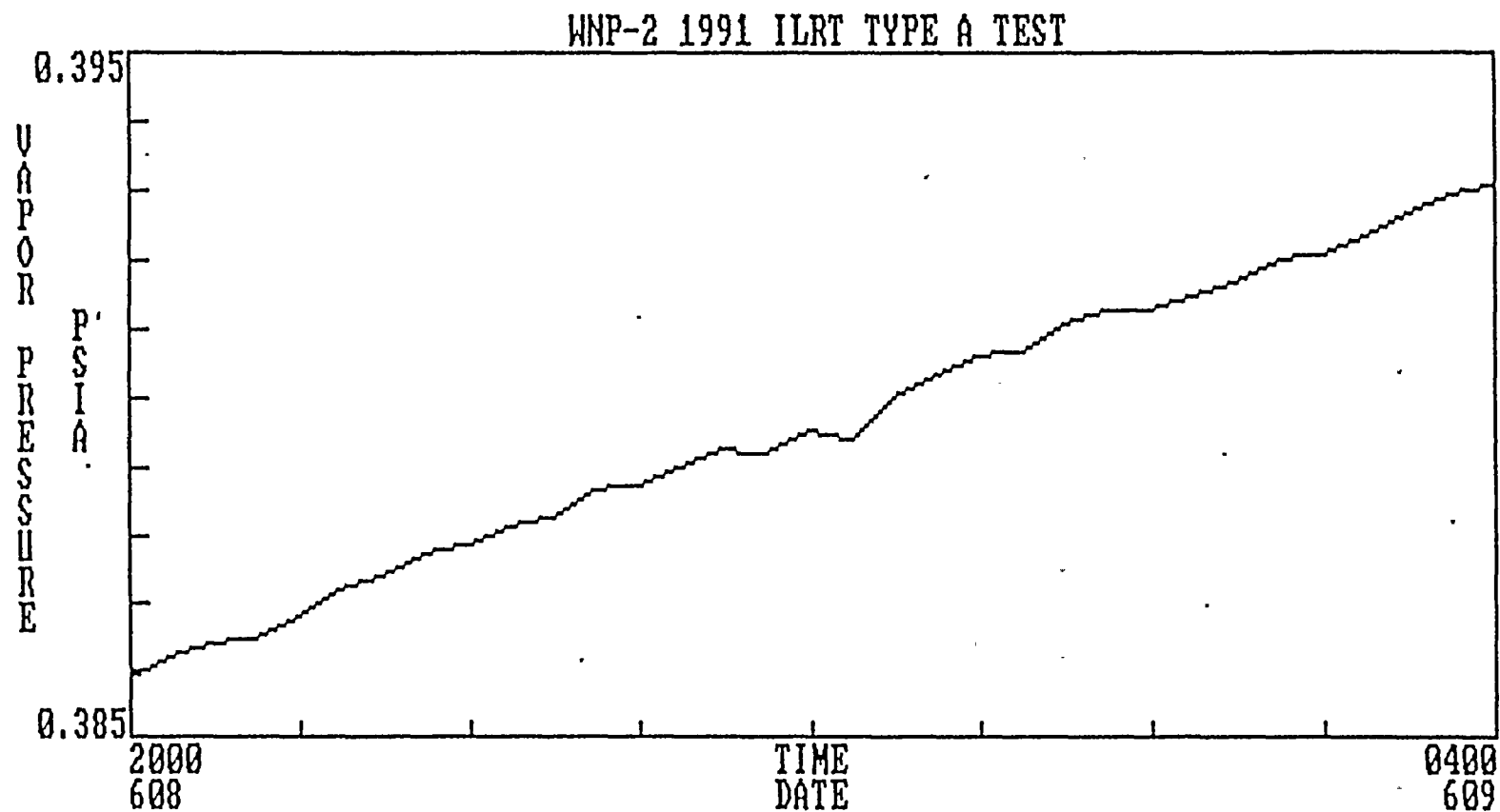


FIGURE 6  
MEAN VAPOR PRESSURE vs. TIME TYPE -- A TEST

**APPENDIX I**  
**CONTAINMENT DESCRIPTION**

## CONTAINMENT DESCRIPTION

The WNP-2 containment is a steel Mark II with a conical drywell above a cylindrical suppression chamber. The upper end of the drywell consists of a flanged head which is removed for refueling the reactor. The drywell and suppression chamber are separated by a concrete diaphragm slab which is supported off the chamber bottom by the reactor pedestal and a number of columns. The reactor pedestal is a concrete cylinder, concentric with the containment, which extends through the diaphragm slab and supports both the reactor and the primary shield. The suppression is approximately half filled with water which is used to quench steam released by the main steam safety valves and which would be released by the primary system in the event of a LOCA. The safety valve discharge lines and a number of open ended vertical vent pipes penetrate the diaphragm slab. Principal dimensions of the containment are listed below.

Drywell height from top of diaphragm slab to refueling head flange parting line	77.3 ft.
Drywell inside diameter at top of diaphragm slab	85.8 ft.
Drywell inside diameter at refueling head flange	31.7 ft.
Diaphragm slab thickness	2.0 ft.
Suppression chamber height from center invert (1)	66.2 ft.
Suppression chamber inside diameter	85.8 ft.
Normal suppression chamber water depth	31.1 ft.
Drywell/suppression chamber free air volume at normal water level	343,040 cu. ft.

(1) The bottom head of the suppression chamber is elliptical.

The steel containment is surrounded by a concrete shield. There is an air gap between the shield and the containment wall.

There are a number of openings in the containment wall. The drywell wall is penetrated by an equipment hatch with a flanged head, a personnel air lock and many piping and electrical feed-throughs. In addition the drywell wall has flanged openings for CEDM replacement and stabilizer truss (a steel structure which laterally braces the upper end of the containment) inspection. The suppression chamber wall is penetrated by a flanged personnel access port, air space ventilation piping, electrical feed-throughs and numerous pipes which take suction from, or discharge to, the suppression pool.

**APPENDIX II**

**COMPUTER PROGRAM DESCRIPTION**

## COMPUTER HARDWARE AND SOFTWARE

BCP's Leakage Rate BASIC Program, developed by Robert E. Blum, runs on an IBM PC or compatible computer that interfaces with the data acquisition system (DAS) via an RS-232C or IEEE-488 serial data bus. BCP provides two computers, with the second serving as a backup unit.

The program calculates both mass point (ANSI 56.8) and total time (BN-TOP-1) leakage rates. A 97.5% upper confidence limit (UCL) for the measured total-time leakage rate is determined using the BN-TOP-1 if the test duration is less than 24 hours. This procedure is generally required by the NRC if test duration is less than the 24-hour minimum established in ANSI 45.4. However, if the test is 24 hours or longer, then a 95% UCL is determined using a procedure similar to that described in ANSI 56.8.

Raw data from the DAS are automatically stored on disk. The ILRT program converts raw data to engineering units and calculates the volume-weighted mean drybulb temperature, vapor pressures from individual dew point temperatures, and volume-weighted mean vapor pressure.

The program then computes containment air mass using these weighted mean atmospheric conditions. Air mass and time data are used as input for the routines that calculate mass point and total time leakage rates. Manual data entry and correction options are included in the program so that failure of the DAS serial output will not delay the test.

Job-specific predata loaded into the program include pressure transducer calibration constants, sensor volume fractions, and containment free-air volume. The volume fraction and free-air volume data can be changed during the test to compensate for sensor failure and changes in containment water inventory.

Program output includes printed reports and plots. Printed reports listing raw data, engineering unit conversions, weighted mean conditions, and air mass are generated for each data set immediately following data input. Diagnostic reports and plots are generated on command during the test. These include listings of leakage rates and UCLs calculated for each incremental data set, plots of this information, plots of weighted mean atmospheric conditions and air mass, and plots of individual sensor data. These lists and plots, when generated after the test, provide final documentation of leakage rate.

The program is validated prior to each use by loading a standard test data set and verifying that the calculation results agree with those obtained by a manual calculation.

**APPENDIX III**  
**TYPE A TEST DATA**



PRE-DATA REPORT

title = WNP-2 1991 ILRT STABILIZATION

volume = 343040

La = 0.5000

leap year : no

temperature volume fractions ( sum = 1.0000 )

t( 1)=0.0265	t( 2)=0.0402	t( 3)=0.0398	t( 4)=0.0563	t( 5)=0.0402
t( 6)=0.0563	t( 7)=0.0398	t( 8)=0.0398	t( 9)=0.0398	t(10)=0.0402
t(11)=0.0265	t(12)=0.0398	t(13)=0.0398	t(14)=0.0563	t(15)=0.1047
t(16)=0.1047	t(17)=0.1047	t(18)=0.1046		

dewpoint volume fractions ( sum = 1.0000 )

dp( 1)=0.1194	dp( 2)=0.1737	dp( 3)=0.1688	dp( 4)=0.1194	dp( 5)=0.2094
dp( 6)=0.2093				

pressure volume fractions ( sum = 1.0000 )

p( 1)=1.0000 p( 2)=0.0000

## WNP-2 1991 ILRT STABILIZATION

## DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	1500	608	87.7586	49.5147	0.3814	83103.93
2	1515	608	87.7714	49.5138	0.3813	83100.59
3	1530	608	87.7714	49.5131	0.3816	83098.84
4	1545	608	87.7814	49.5125	0.3819	83095.79
5	1600	608	87.7906	49.5122	0.3822	83093.41
6	1615	608	87.7960	49.5115	0.3825	83090.92
7	1630	608	87.8069	49.5104	0.3828	83086.84
8	1645	608	87.8156	49.5106	0.3831	83085.50
9	1700	608	87.8257	49.5106	0.3833	83083.61
10	1715	608	87.8348	49.5106	0.3836	83081.74
11	1730	608	87.8444	49.5109	0.3840	83079.99
12	1745	608	87.8535	49.5111	0.3840	83079.03
13	1800	608	87.8627	49.5108	0.3841	83076.87
14	1815	608	87.8453	49.5107	0.3838	83079.96
15	1830	608	87.8972	49.5114	0.3847	83071.62
16	1845	608	87.8948	49.5111	0.3850	83071.10
17	1900	608	87.8990	49.5107	0.3852	83069.43
18	1915	608	87.8882	49.5113	0.3854	83071.68
19	1930	608	87.9165	49.5115	0.3853	83067.83
20	1945	608	87.9263	49.5117	0.3854	83066.52
21	2000	608	87.9341	49.5119	0.3859	83064.94

## WNP-2 1991 ILRT STABILIZATION

data set 1

time = 1500 date = 608

sensor	raw data	value
temperature 1	( 109.450 )	= 109.450 deg. F
temperature 2	( 99.510 )	= 99.510 deg. F
temperature 3	( 92.910 )	= 92.910 deg. F
temperature 4	( 88.250 )	= 88.250 deg. F
temperature 5	( 101.370 )	= 101.370 deg. F
temperature 6	( 89.190 )	= 89.190 deg. F
temperature 7	( 92.680 )	= 92.680 deg. F
temperature 8	( 92.750 )	= 92.750 deg. F
temperature 9	( 92.920 )	= 92.920 deg. F
temperature 10	( 100.800 )	= 100.800 deg. F
temperature 11	( 108.990 )	= 108.990 deg. F
temperature 12	( 92.540 )	= 92.540 deg. F
temperature 13	( 92.840 )	= 92.840 deg. F
temperature 14	( 89.050 )	= 89.050 deg. F
temperature 15	( 78.140 )	= 78.140 deg. F
temperature 16	( 78.000 )	= 78.000 deg. F
temperature 17	( 78.040 )	= 78.040 deg. F
temperature 18	( 78.070 )	= 78.070 deg. F
dewpoint 1	( 67.750 )	= 67.750 deg. F , 0.3360 psia
dewpoint 2	( 67.030 )	= 67.030 deg. F , 0.3277 psia
dewpoint 3	( 66.930 )	= 66.930 deg. F , 0.3266 psia
dewpoint 4	( 67.200 )	= 67.200 deg. F , 0.3297 psia
dewpoint 5	( 76.810 )	= 76.810 deg. F , 0.4563 psia
dewpoint 6	( 76.420 )	= 76.420 deg. F , 0.4504 psia
pressure 1	( 49.5147 )	= 49.5147 psia
pressure 2	( 49.5201 )	= 49.5201 psia

weighted averages, volume and air mass

temperature	=	87.75864 deg. F
pressure	=	49.51470 psia
vapor pressure	=	0.38137 psia
volume	=	343040 cu. ft.
dry air mass	=	83103.93 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 2

time = 1515 date = 608

sensor	raw data	value
temperature 1	( 109.500 )	= 109.500 deg. F
temperature 2	( 99.570 )	= 99.570 deg. F
temperature 3	( 92.910 )	= 92.910 deg. F
temperature 4	( 88.250 )	= 88.250 deg. F
temperature 5	( 101.420 )	= 101.420 deg. F
temperature 6	( 89.190 )	= 89.190 deg. F
temperature 7	( 92.720 )	= 92.720 deg. F
temperature 8	( 92.790 )	= 92.790 deg. F
temperature 9	( 92.940 )	= 92.940 deg. F
temperature 10	( 100.850 )	= 100.850 deg. F
temperature 11	( 109.090 )	= 109.090 deg. F
temperature 12	( 92.560 )	= 92.560 deg. F
temperature 13	( 92.870 )	= 92.870 deg. F
temperature 14	( 89.060 )	= 89.060 deg. F
temperature 15	( 78.120 )	= 78.120 deg. F
temperature 16	( 77.990 )	= 77.990 deg. F
temperature 17	( 78.030 )	= 78.030 deg. F
temperature 18	( 78.070 )	= 78.070 deg. F
dewpoint 1	( 67.840 )	= 67.840 deg. F , 0.3370 psia
dewpoint 2	( 67.030 )	= 67.030 deg. F , 0.3277 psia
dewpoint 3	( 67.010 )	= 67.010 deg. F , 0.3275 psia
dewpoint 4	( 67.240 )	= 67.240 deg. F , 0.3301 psia
dewpoint 5	( 76.790 )	= 76.790 deg. F , 0.4560 psia
dewpoint 6	( 76.310 )	= 76.310 deg. F , 0.4488 psia
pressure 1	( 49.5138 )	= 49.5138 psia
pressure 2	( 49.5202 )	= 49.5202 psia

weighted averages, volume and air mass

temperature	=	87.77139 deg. F
pressure	=	49.51380 psia
vapor pressure	=	0.38129 psia
volume	=	343040 cu. ft.
dry air mass	=	83100.59 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 3

time = 1530 date = 608

sensor	raw data	value
temperature 1	( 109.520 )	= 109.520 deg. F
temperature 2	( 99.620 )	= 99.620 deg. F
temperature 3	( 92.910 )	= 92.910 deg. F
temperature 4	( 88.250 )	= 88.250 deg. F
temperature 5	( 101.460 )	= 101.460 deg. F
temperature 6	( 89.190 )	= 89.190 deg. F
temperature 7	( 92.720 )	= 92.720 deg. F
temperature 8	( 92.790 )	= 92.790 deg. F
temperature 9	( 92.940 )	= 92.940 deg. F
temperature 10	( 100.890 )	= 100.890 deg. F
temperature 11	( 109.080 )	= 109.080 deg. F
temperature 12	( 92.570 )	= 92.570 deg. F
temperature 13	( 92.880 )	= 92.880 deg. F
temperature 14	( 89.060 )	= 89.060 deg. F
temperature 15	( 78.090 )	= 78.090 deg. F
temperature 16	( 77.970 )	= 77.970 deg. F
temperature 17	( 78.020 )	= 78.020 deg. F
temperature 18	( 78.070 )	= 78.070 deg. F
dewpoint 1	( 67.880 )	= 67.880 deg. F , 0.3375 psia
dewpoint 2	( 67.080 )	= 67.080 deg. F , 0.3283 psia
dewpoint 3	( 67.070 )	= 67.070 deg. F , 0.3282 psia
dewpoint 4	( 67.290 )	= 67.290 deg. F , 0.3307 psia
dewpoint 5	( 76.780 )	= 76.780 deg. F , 0.4559 psia
dewpoint 6	( 76.320 )	= 76.320 deg. F , 0.4490 psia
pressure 1	( 49.5131 )	= 49.5131 psia
pressure 2	( 49.5192 )	= 49.5192 psia

weighted averages, volume and air mass

temperature	=	87.77139 deg. F
pressure	=	49.51310 psia
vapor pressure	=	0.38163 psia
volume	=	343040 cu. ft.
dry air mass	=	83098.84 lbm





## WNP-2 1991 ILRT STABILIZATION

data set 4

time = 1545 date = 608

sensor	raw data	value
temperature 1	( 109.560 )	= 109.560 deg. F
temperature 2	( 99.670 )	= 99.670 deg. F
temperature 3	( 92.930 )	= 92.930 deg. F
temperature 4	( 88.250 )	= 88.250 deg. F
temperature 5	( 101.520 )	= 101.520 deg. F
temperature 6	( 89.200 )	= 89.200 deg. F
temperature 7	( 92.740 )	= 92.740 deg. F
temperature 8	( 92.800 )	= 92.800 deg. F
temperature 9	( 92.940 )	= 92.940 deg. F
temperature 10	( 100.930 )	= 100.930 deg. F
temperature 11	( 109.110 )	= 109.110 deg. F
temperature 12	( 92.590 )	= 92.590 deg. F
temperature 13	( 92.900 )	= 92.900 deg. F
temperature 14	( 89.080 )	= 89.080 deg. F
temperature 15	( 78.090 )	= 78.090 deg. F
temperature 16	( 77.960 )	= 77.960 deg. F
temperature 17	( 78.010 )	= 78.010 deg. F
temperature 18	( 78.060 )	= 78.060 deg. F
dewpoint 1	( 67.920 )	= 67.920 deg. F , 0.3380 psia
dewpoint 2	( 67.120 )	= 67.120 deg. F , 0.3288 psia
dewpoint 3	( 67.100 )	= 67.100 deg. F , 0.3285 psia
dewpoint 4	( 67.350 )	= 67.350 deg. F , 0.3314 psia
dewpoint 5	( 76.770 )	= 76.770 deg. F , 0.4557 psia
dewpoint 6	( 76.340 )	= 76.340 deg. F , 0.4492 psia
pressure 1	( 49.5125 )	= 49.5125 psia
pressure 2	( 49.5186 )	= 49.5186 psia

weighted averages, volume and air mass

temperature	=	87.78141 deg. F
pressure	=	49.51250 psia
vapor pressure	=	0.38193 psia
volume	=	343040 cu. ft.
dry air mass	=	83095.79 lbm

# WNP-2 1991 ILRT STABILIZATION

data set 5

time = 1600 date = 608

sensor	raw data	value
temperature 1	( 109.580 )	= 109.580 deg. F
temperature 2	( 99.700 )	= 99.700 deg. F
temperature 3	( 92.960 )	= 92.960 deg. F
temperature 4	( 88.260 )	= 88.260 deg. F
temperature 5	( 101.560 )	= 101.560 deg. F
temperature 6	( 89.220 )	= 89.220 deg. F
temperature 7	( 92.760 )	= 92.760 deg. F
temperature 8	( 92.820 )	= 92.820 deg. F
temperature 9	( 92.970 )	= 92.970 deg. F
temperature 10	( 100.980 )	= 100.980 deg. F
temperature 11	( 109.170 )	= 109.170 deg. F
temperature 12	( 92.600 )	= 92.600 deg. F
temperature 13	( 92.920 )	= 92.920 deg. F
temperature 14	( 89.090 )	= 89.090 deg. F
temperature 15	( 78.070 )	= 78.070 deg. F
temperature 16	( 77.950 )	= 77.950 deg. F
temperature 17	( 78.000 )	= 78.000 deg. F
temperature 18	( 78.050 )	= 78.050 deg. F
dewpoint 1	( 67.980 )	= 67.980 deg. F , 0.3387 psia
dewpoint 2	( 67.170 )	= 67.170 deg. F , 0.3293 psia
dewpoint 3	( 67.170 )	= 67.170 deg. F , 0.3293 psia
dewpoint 4	( 67.370 )	= 67.370 deg. F , 0.3316 psia
dewpoint 5	( 76.800 )	= 76.800 deg. F , 0.4562 psia
dewpoint 6	( 76.290 )	= 76.290 deg. F , 0.4485 psia
pressure 1	( 49.5122 )	= 49.5122 psia
pressure 2	( 49.5175 )	= 49.5175 psia

weighted averages, volume and air mass

temperature	=	87.79055 deg. F
pressure	=	49.51220 psia
vapor pressure	=	0.38222 psia
volume	=	343040 cu. ft.
dry air mass	=	83093.41 lbm

## WNP-2 1991 ILRT STABILIZATION

data set 6

time = 1615 date = 608

sensor	raw data	value
temperature 1	( 109.630 )	= 109.630 deg. F
temperature 2	( 99.760 )	= 99.760 deg. F
temperature 3	( 92.970 )	= 92.970 deg. F
temperature 4	( 88.270 )	= 88.270 deg. F
temperature 5	( 101.600 )	= 101.600 deg. F
temperature 6	( 89.230 )	= 89.230 deg. F
temperature 7	( 92.780 )	= 92.780 deg. F
temperature 8	( 92.830 )	= 92.830 deg. F
temperature 9	( 92.990 )	= 92.990 deg. F
temperature 10	( 101.020 )	= 101.020 deg. F
temperature 11	( 109.180 )	= 109.180 deg. F
temperature 12	( 92.610 )	= 92.610 deg. F
temperature 13	( 92.940 )	= 92.940 deg. F
temperature 14	( 89.050 )	= 89.050 deg. F
temperature 15	( 78.060 )	= 78.060 deg. F
temperature 16	( 77.940 )	= 77.940 deg. F
temperature 17	( 77.990 )	= 77.990 deg. F
temperature 18	( 78.040 )	= 78.040 deg. F
dewpoint 1	( 68.010 )	= 68.010 deg. F , 0.3390 psia
dewpoint 2	( 67.220 )	= 67.220 deg. F , 0.3299 psia
dewpoint 3	( 67.200 )	= 67.200 deg. F , 0.3297 psia
dewpoint 4	( 67.410 )	= 67.410 deg. F , 0.3321 psia
dewpoint 5	( 76.790 )	= 76.790 deg. F , 0.4560 psia
dewpoint 6	( 76.310 )	= 76.310 deg. F , 0.4488 psia
pressure 1	( 49.5115 )	= 49.5115 psia
pressure 2	( 49.5171 )	= 49.5171 psia

weighted averages, volume and air mass

temperature	=	87.79604 deg. F
pressure	=	49.51150 psia
vapor pressure	=	0.38250 psia
volume	=	343040 cu. ft.
dry air mass	=	83090.92 lbm

## WNP-2 1991 ILRT STABILIZATION

data set 7

time = 1630 date = 608

sensor	raw data	value
temperature 1	( 109.660 )	= 109.660 deg. F
temperature 2	( 99.790 )	= 99.790 deg. F
temperature 3	( 92.980 )	= 92.980 deg. F
temperature 4	( 88.280 )	= 88.280 deg. F
temperature 5	( 101.650 )	= 101.650 deg. F
temperature 6	( 89.240 )	= 89.240 deg. F
temperature 7	( 92.770 )	= 92.770 deg. F
temperature 8	( 92.830 )	= 92.830 deg. F
temperature 9	( 93.010 )	= 93.010 deg. F
temperature 10	( 101.080 )	= 101.080 deg. F
temperature 11	( 109.220 )	= 109.220 deg. F
temperature 12	( 92.640 )	= 92.640 deg. F
temperature 13	( 92.950 )	= 92.950 deg. F
temperature 14	( 89.140 )	= 89.140 deg. F
temperature 15	( 78.050 )	= 78.050 deg. F
temperature 16	( 77.920 )	= 77.920 deg. F
temperature 17	( 77.980 )	= 77.980 deg. F
temperature 18	( 78.030 )	= 78.030 deg. F
dewpoint 1	( 68.050 )	= 68.050 deg. F , 0.3395 psia
dewpoint 2	( 67.310 )	= 67.310 deg. F , 0.3309 psia
dewpoint 3	( 67.220 )	= 67.220 deg. F , 0.3299 psia
dewpoint 4	( 67.460 )	= 67.460 deg. F , 0.3326 psia
dewpoint 5	( 76.770 )	= 76.770 deg. F , 0.4557 psia
dewpoint 6	( 76.330 )	= 76.330 deg. F , 0.4491 psia
pressure 1	( 49.5104 )	= 49.5104 psia
pressure 2	( 49.5165 )	= 49.5165 psia

weighted averages, volume and air mass

temperature	=	87.80686 deg. F
pressure	=	49.51040 psia
vapor pressure	=	0.38284 psia
volume	=	343040 cu. ft.
dry air mass	=	83086.84 lbm



# WNP-2 1991 ILRT STABILIZATION

data set 8

time = 1645 date = 608

sensor	raw data	value
temperature 1	( 109.700 )	= 109.700 deg. F
temperature 2	( 99.840 )	= 99.840 deg. F
temperature 3	( 92.990 )	= 92.990 deg. F
temperature 4	( 88.280 )	= 88.280 deg. F
temperature 5	( 101.700 )	= 101.700 deg. F
temperature 6	( 89.250 )	= 89.250 deg. F
temperature 7	( 92.820 )	= 92.820 deg. F
temperature 8	( 92.880 )	= 92.880 deg. F
temperature 9	( 93.030 )	= 93.030 deg. F
temperature 10	( 101.120 )	= 101.120 deg. F
temperature 11	( 109.250 )	= 109.250 deg. F
temperature 12	( 92.640 )	= 92.640 deg. F
temperature 13	( 92.960 )	= 92.960 deg. F
temperature 14	( 89.090 )	= 89.090 deg. F
temperature 15	( 78.040 )	= 78.040 deg. F
temperature 16	( 77.920 )	= 77.920 deg. F
temperature 17	( 77.980 )	= 77.980 deg. F
temperature 18	( 78.020 )	= 78.020 deg. F
dewpoint 1	( 68.110 )	= 68.110 deg. F , 0.3402 psia
dewpoint 2	( 67.310 )	= 67.310 deg. F , 0.3309 psia
dewpoint 3	( 67.300 )	= 67.300 deg. F , 0.3308 psia
dewpoint 4	( 67.510 )	= 67.510 deg. F , 0.3332 psia
dewpoint 5	( 76.780 )	= 76.780 deg. F , 0.4559 psia
dewpoint 6	( 76.290 )	= 76.290 deg. F , 0.4485 psia
pressure 1	( 49.5106 )	= 49.5106 psia
pressure 2	( 49.5166 )	= 49.5166 psia

weighted averages, volume and air mass

temperature	=	87.81557 deg. F
pressure	=	49.51060 psia
vapor pressure	=	0.38305 psia
volume	=	343040 cu. ft.
dry air mass	=	83085.50 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 9

time = 1700 date = 608

sensor	raw data	value
temperature 1	( 109.710 )	= 109.710 deg. F
temperature 2	( 99.890 )	= 99.890 deg. F
temperature 3	( 93.010 )	= 93.010 deg. F
temperature 4	( 88.290 )	= 88.290 deg. F
temperature 5	( 101.750 )	= 101.750 deg. F
temperature 6	( 89.260 )	= 89.260 deg. F
temperature 7	( 92.840 )	= 92.840 deg. F
temperature 8	( 92.880 )	= 92.880 deg. F
temperature 9	( 93.040 )	= 93.040 deg. F
temperature 10	( 101.170 )	= 101.170 deg. F
temperature 11	( 109.290 )	= 109.290 deg. F
temperature 12	( 92.660 )	= 92.660 deg. F
temperature 13	( 92.980 )	= 92.980 deg. F
temperature 14	( 89.130 )	= 89.130 deg. F
temperature 15	( 78.040 )	= 78.040 deg. F
temperature 16	( 77.910 )	= 77.910 deg. F
temperature 17	( 77.960 )	= 77.960 deg. F
temperature 18	( 78.010 )	= 78.010 deg. F
dewpoint 1	( 68.140 )	= 68.140 deg. F , 0.3402 psia
dewpoint 2	( 67.360 )	= 67.360 deg. F , 0.3309 psia
dewpoint 3	( 67.300 )	= 67.300 deg. F , 0.3408 psia
dewpoint 4	( 67.560 )	= 67.560 deg. F , 0.3332 psia
dewpoint 5	( 76.780 )	= 76.780 deg. F , 0.4559 psia
dewpoint 6	( 76.290 )	= 76.290 deg. F , 0.4485 psia
pressure 1	( 49.5106 )	= 49.5106 psia
pressure 2	( 49.5167 )	= 49.5167 psia

weighted averages, volume and air mass

temperature	=	87.82571 deg. F
pressure	=	49.51060 psia
vapor pressure	=	0.38326 psia
volume	=	343040 cu. ft.
dry air mass	=	83083.61 lbm





## WNP-2 1991 ILRT STABILIZATION

data set 10

time = 1715 date = 608

sensor	raw data	value
temperature 1	( 109.790 )	= 109.790 deg. F
temperature 2	( 99.940 )	= 99.940 deg. F
temperature 3	( 93.030 )	= 93.030 deg. F
temperature 4	( 88.300 )	= 88.300 deg. F
temperature 5	( 101.790 )	= 101.790 deg. F
temperature 6	( 89.270 )	= 89.270 deg. F
temperature 7	( 92.850 )	= 92.850 deg. F
temperature 8	( 92.900 )	= 92.900 deg. F
temperature 9	( 93.040 )	= 93.040 deg. F
temperature 10	( 101.220 )	= 101.220 deg. F
temperature 11	( 109.270 )	= 109.270 deg. F
temperature 12	( 92.670 )	= 92.670 deg. F
temperature 13	( 92.990 )	= 92.990 deg. F
temperature 14	( 89.150 )	= 89.150 deg. F
temperature 15	( 78.020 )	= 78.020 deg. F
temperature 16	( 77.910 )	= 77.910 deg. F
temperature 17	( 77.960 )	= 77.960 deg. F
temperature 18	( 78.000 )	= 78.000 deg. F
dewpoint 1	( 68.170 )	= 68.170 deg. F , 0.3409 psia
dewpoint 2	( 67.390 )	= 67.390 deg. F , 0.3318 psia
dewpoint 3	( 67.350 )	= 67.350 deg. F , 0.3314 psia
dewpoint 4	( 67.580 )	= 67.580 deg. F , 0.3340 psia
dewpoint 5	( 76.770 )	= 76.770 deg. F , 0.4557 psia
dewpoint 6	( 76.320 )	= 76.320 deg. F , 0.4490 psia
pressure 1	( 49.5106 )	= 49.5106 psia
pressure 2	( 49.5168 )	= 49.5168 psia

weighted averages, volume and air mass

temperature	=	87.83482 deg. F
pressure	=	49.51060 psia
vapor pressure	=	0.38355 psia
volume	=	343040 cu. ft.
dry air mass	=	83081.74 lbm

## WNP-2 1991 ILRT STABILIZATION

data set 11

time = 1730      date = 608

sensor		raw data	=	value	
temperature	1	( 109.790 )	=	109.790	deg. F
temperature	2	( 99.980 )	=	99.980	deg. F
temperature	3	( 93.030 )	=	93.030	deg. F
temperature	4	( 88.300 )	=	88.300	deg. F
temperature	5	( 101.840 )	=	101.840	deg. F
temperature	6	( 89.270 )	=	89.270	deg. F
temperature	7	( 92.860 )	=	92.860	deg. F
temperature	8	( 92.910 )	=	92.910	deg. F
temperature	9	( 93.070 )	=	93.070	deg. F
temperature	10	( 101.260 )	=	101.260	deg. F
temperature	11	( 109.360 )	=	109.360	deg. F
temperature	12	( 92.680 )	=	92.680	deg. F
temperature	13	( 93.020 )	=	93.020	deg. F
temperature	14	( 89.140 )	=	89.140	deg. F
temperature	15	( 78.020 )	=	78.020	deg. F
temperature	16	( 77.900 )	=	77.900	deg. F
temperature	17	( 77.960 )	=	77.960	deg. F
temperature	18	( 78.000 )	=	78.000	deg. F
dewpoint	1	( 68.240 )	=	68.240	deg. F , 0.3417 psia
dewpoint	2	( 67.430 )	=	67.430	deg. F , 0.3323 psia
dewpoint	3	( 67.450 )	=	67.450	deg. F , 0.3325 psia
dewpoint	4	( 67.630 )	=	67.630	deg. F , 0.3346 psia
dewpoint	5	( 76.790 )	=	76.790	deg. F , 0.4560 psia
dewpoint	6	( 76.310 )	=	76.310	deg. F , 0.4488 psia
pressure	1	( 49.5109 )	=	49.5109	psia
pressure	2	( 49.5170 )	=	49.5170	psia

weighted averages, volume and air mass

temperature	=	87.84440	deg. F
pressure	=	49.51090	psia
vapor pressure	=	0.38402	psia
volume	=	343040	cu. ft.
dry air mass	=	83079.99	lbm



## WNP-2 1991 ILRT STABILIZATION

data set 12

time = 1745 date = 608

sensor	raw data	value
temperature 1	( 109.820 )	= 109.820 deg. F
temperature 2	( 100.020 )	= 100.020 deg. F
temperature 3	( 93.060 )	= 93.060 deg. F
temperature 4	( 88.320 )	= 88.320 deg. F
temperature 5	( 101.880 )	= 101.880 deg. F
temperature 6	( 89.280 )	= 89.280 deg. F
temperature 7	( 92.900 )	= 92.900 deg. F
temperature 8	( 92.910 )	= 92.910 deg. F
temperature 9	( 93.100 )	= 93.100 deg. F
temperature 10	( 101.310 )	= 101.310 deg. F
temperature 11	( 109.340 )	= 109.340 deg. F
temperature 12	( 92.710 )	= 92.710 deg. F
temperature 13	( 93.030 )	= 93.030 deg. F
temperature 14	( 89.150 )	= 89.150 deg. F
temperature 15	( 78.010 )	= 78.010 deg. F
temperature 16	( 77.890 )	= 77.890 deg. F
temperature 17	( 77.950 )	= 77.950 deg. F
temperature 18	( 77.990 )	= 77.990 deg. F
dewpoint 1	( 68.270 )	= 68.270 deg. F , 0.3421 psia
dewpoint 2	( 67.470 )	= 67.470 deg. F , 0.3328 psia
dewpoint 3	( 67.430 )	= 67.430 deg. F , 0.3323 psia
dewpoint 4	( 67.670 )	= 67.670 deg. F , 0.3351 psia
dewpoint 5	( 76.770 )	= 76.770 deg. F , 0.4557 psia
dewpoint 6	( 76.270 )	= 76.270 deg. F , 0.4482 psia
pressure 1	( 49.5111 )	= 49.5111 psia
pressure 2	( 49.5170 )	= 49.5170 psia

weighted averages, volume and air mass

temperature	=	87.85353 deg. F
pressure	=	49.51110 psia
vapor pressure	=	0.38397 psia
volume	=	343040 cu. ft.
dry air mass	=	83079.03 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 13

time = 1800 date = 608

sensor	raw data	value
temperature 1	( 109.870 )	= 109.870 deg. F
temperature 2	( 100.070 )	= 100.070 deg. F
temperature 3	( 93.070 )	= 93.070 deg. F
temperature 4	( 88.330 )	= 88.330 deg. F
temperature 5	( 101.920 )	= 101.920 deg. F
temperature 6	( 89.290 )	= 89.290 deg. F
temperature 7	( 92.890 )	= 92.890 deg. F
temperature 8	( 92.930 )	= 92.930 deg. F
temperature 9	( 93.100 )	= 93.100 deg. F
temperature 10	( 101.350 )	= 101.350 deg. F
temperature 11	( 109.390 )	= 109.390 deg. F
temperature 12	( 92.710 )	= 92.710 deg. F
temperature 13	( 93.050 )	= 93.050 deg. F
temperature 14	( 89.180 )	= 89.180 deg. F
temperature 15	( 78.000 )	= 78.000 deg. F
temperature 16	( 77.890 )	= 77.890 deg. F
temperature 17	( 77.940 )	= 77.940 deg. F
temperature 18	( 77.980 )	= 77.980 deg. F
dewpoint 1	( 68.300 )	= 68.300 deg. F , 0.3424 psia
dewpoint 2	( 67.530 )	= 67.530 deg. F , 0.3334 psia
dewpoint 3	( 67.480 )	= 67.480 deg. F , 0.3329 psia
dewpoint 4	( 67.710 )	= 67.710 deg. F , 0.3355 psia
dewpoint 5	( 76.740 )	= 76.740 deg. F , 0.4552 psia
dewpoint 6	( 76.250 )	= 76.250 deg. F , 0.4479 psia
pressure 1	( 49.5108 )	= 49.5108 psia
pressure 2	( 49.5172 )	= 49.5172 psia

weighted averages, volume and air mass

temperature	=	87.86266 deg. F
pressure	=	49.51080 psia
vapor pressure	=	0.38413 psia
volume	=	343040 cu. ft.
dry air mass	=	83076.87 lbm





## WNP-2 1991 ILRT STABILIZATION

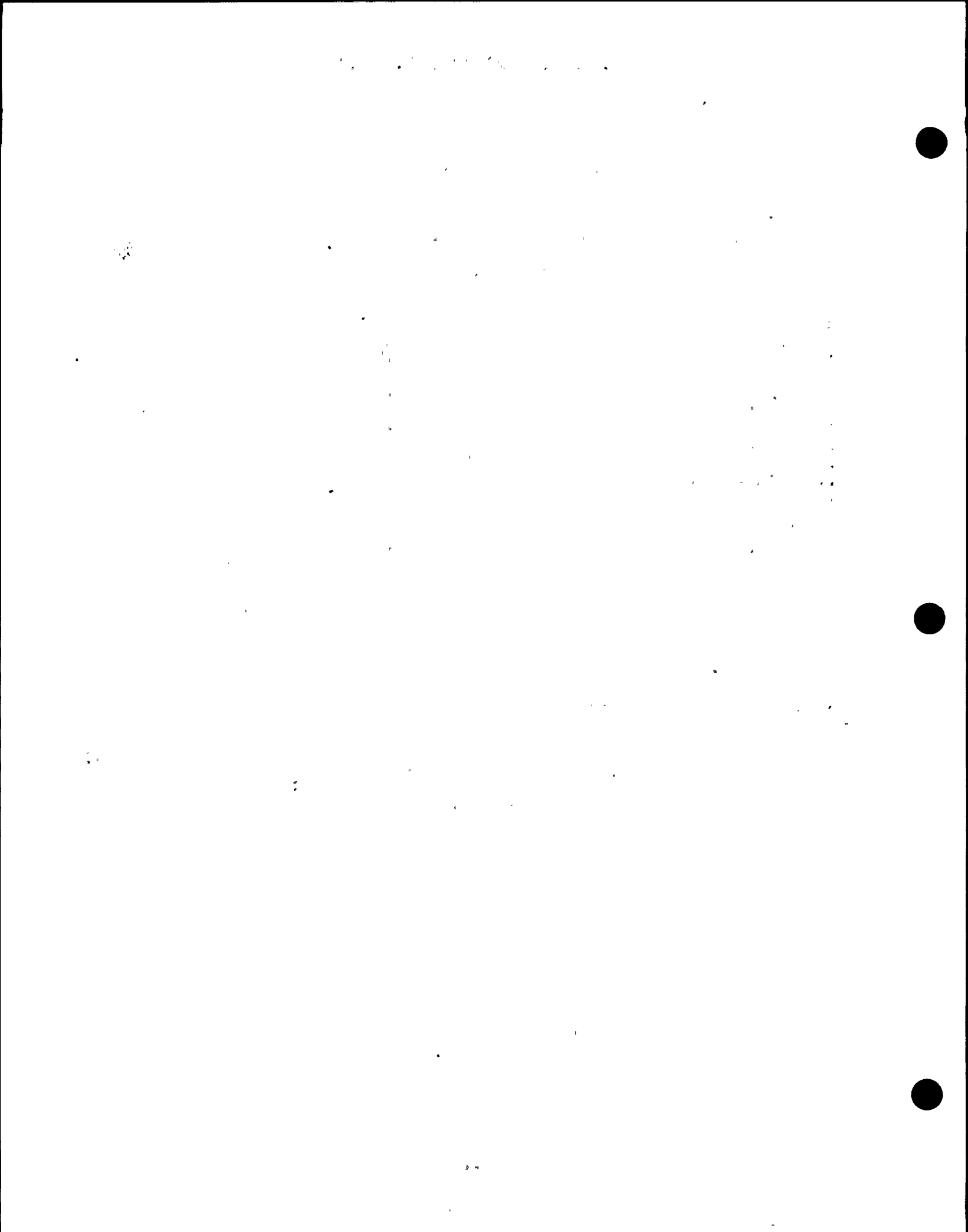
data set 14

time = 1815 date = 608

sensor	raw data	value
temperature 1	( 109.870 )	= 109.870 deg. F
temperature 2	( 100.080 )	= 100.080 deg. F
temperature 3	( 93.060 )	= 93.060 deg. F
temperature 4	( 88.310 )	= 88.310 deg. F
temperature 5	( 101.940 )	= 101.940 deg. F
temperature 6	( 89.280 )	= 89.280 deg. F
temperature 7	( 92.880 )	= 92.880 deg. F
temperature 8	( 92.940 )	= 92.940 deg. F
temperature 9	( 93.070 )	= 93.070 deg. F
temperature 10	( 101.360 )	= 101.360 deg. F
temperature 11	( 109.430 )	= 109.430 deg. F
temperature 12	( 92.690 )	= 92.690 deg. F
temperature 13	( 93.030 )	= 93.030 deg. F
temperature 14	( 89.170 )	= 89.170 deg. F
temperature 15	( 77.970 )	= 77.970 deg. F
temperature 16	( 77.840 )	= 77.840 deg. F
temperature 17	( 77.910 )	= 77.910 deg. F
temperature 18	( 77.950 )	= 77.950 deg. F
dewpoint 1	( 68.280 )	= 68.280 deg. F , 0.3422 psia
dewpoint 2	( 67.500 )	= 67.500 deg. F , 0.3331 psia
dewpoint 3	( 67.480 )	= 67.480 deg. F , 0.3329 psia
dewpoint 4	( 67.690 )	= 67.690 deg. F , 0.3353 psia
dewpoint 5	( 76.700 )	= 76.700 deg. F , 0.4546 psia
dewpoint 6	( 76.210 )	= 76.210 deg. F , 0.4473 psia
pressure 1	( 49.5107 )	= 49.5107 psia
pressure 2	( 49.5174 )	= 49.5174 psia

weighted averages, volume and air mass

temperature	=	87.84525 deg. F
pressure	=	49.51070 psia
vapor pressure	=	0.38376 psia
volume	=	343040 cu. ft.
dry air mass	=	83079.96 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 15

time = 1830 date = 608

sensor	raw data	value
temperature 1	( 109.920 )	= 109.920 deg. F
temperature 2	( 100.170 )	= 100.170 deg. F
temperature 3	( 93.130 )	= 93.130 deg. F
temperature 4	( 88.360 )	= 88.360 deg. F
temperature 5	( 102.020 )	= 102.020 deg. F
temperature 6	( 89.330 )	= 89.330 deg. F
temperature 7	( 92.930 )	= 92.930 deg. F
temperature 8	( 92.980 )	= 92.980 deg. F
temperature 9	( 93.150 )	= 93.150 deg. F
temperature 10	( 101.460 )	= 101.460 deg. F
temperature 11	( 109.500 )	= 109.500 deg. F
temperature 12	( 92.780 )	= 92.780 deg. F
temperature 13	( 93.100 )	= 93.100 deg. F
temperature 14	( 89.200 )	= 89.200 deg. F
temperature 15	( 78.000 )	= 78.000 deg. F
temperature 16	( 77.890 )	= 77.890 deg. F
temperature 17	( 77.940 )	= 77.940 deg. F
temperature 18	( 77.980 )	= 77.980 deg. F
dewpoint 1	( 68.380 )	= 68.380 deg. F , 0.3433 psia
dewpoint 2	( 67.650 )	= 67.650 deg. F , 0.3348 psia
dewpoint 3	( 67.610 )	= 67.610 deg. F , 0.3344 psia
dewpoint 4	( 67.800 )	= 67.800 deg. F , 0.3366 psia
dewpoint 5	( 76.740 )	= 76.740 deg. F , 0.4552 psia
dewpoint 6	( 76.210 )	= 76.210 deg. F , 0.4473 psia
pressure 1	( 49.5114 )	= 49.5114 psia
pressure 2	( 49.5168 )	= 49.5168 psia

weighted averages, volume and air mass

temperature	=	87.89718 deg. F
pressure	=	49.51140 psia
vapor pressure	=	0.38473 psia
volume	=	343040 cu. ft.
dry air mass	=	83071.62 lbm



# WNP-2 1991 ILRT STABILIZATION

data set 16

time = 1845 date = 608

sensor		raw data		value
temperature	1	( 109.950 )	=	109.950 deg. F
temperature	2	( 100.210 )	=	100.210 deg. F
temperature	3	( 93.130 )	=	93.130 deg. F
temperature	4	( 88.350 )	=	88.350 deg. F
temperature	5	( 102.050 )	=	102.050 deg. F
temperature	6	( 89.330 )	=	89.330 deg. F
temperature	7	( 92.940 )	=	92.940 deg. F
temperature	8	( 93.000 )	=	93.000 deg. F
temperature	9	( 93.150 )	=	93.150 deg. F
temperature	10	( 101.500 )	=	101.500 deg. F
temperature	11	( 109.510 )	=	109.510 deg. F
temperature	12	( 92.780 )	=	92.780 deg. F
temperature	13	( 93.110 )	=	93.110 deg. F
temperature	14	( 89.190 )	=	89.190 deg. F
temperature	15	( 77.990 )	=	77.990 deg. F
temperature	16	( 77.860 )	=	77.860 deg. F
temperature	17	( 77.920 )	=	77.920 deg. F
temperature	18	( 77.960 )	=	77.960 deg. F
dewpoint	1	( 68.420 )	=	68.420 deg. F , 0.3438 psia
dewpoint	2	( 67.670 )	=	67.670 deg. F , 0.3351 psia
dewpoint	3	( 67.610 )	=	67.610 deg. F , 0.3344 psia
dewpoint	4	( 67.850 )	=	67.850 deg. F , 0.3371 psia
dewpoint	5	( 76.740 )	=	76.740 deg. F , 0.4552 psia
dewpoint	6	( 76.230 )	=	76.230 deg. F , 0.4476 psia
pressure	1	( 49.5111 )	=	49.5111 psia
pressure	2	( 49.5195 )	=	49.5195 psia

weighted averages, volume and air mass

temperature	=	87.89475 deg. F
pressure	=	49.51110 psia
vapor pressure	=	0.38496 psia
volume	=	343040 cu. ft.
dry air mass	=	83071.10 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 17

time = 1900 date = 608

sensor	raw data	value
temperature 1	( 109.990 )	= 109.990 deg. F
temperature 2	( 100.240 )	= 100.240 deg. F
temperature 3	( 93.140 )	= 93.140 deg. F
temperature 4	( 88.350 )	= 88.350 deg. F
temperature 5	( 102.110 )	= 102.110 deg. F
temperature 6	( 89.340 )	= 89.340 deg. F
temperature 7	( 92.940 )	= 92.940 deg. F
temperature 8	( 93.010 )	= 93.010 deg. F
temperature 9	( 93.170 )	= 93.170 deg. F
temperature 10	( 101.520 )	= 101.520 deg. F
temperature 11	( 109.520 )	= 109.520 deg. F
temperature 12	( 92.790 )	= 92.790 deg. F
temperature 13	( 93.110 )	= 93.110 deg. F
temperature 14	( 89.230 )	= 89.230 deg. F
temperature 15	( 77.980 )	= 77.980 deg. F
temperature 16	( 77.850 )	= 77.850 deg. F
temperature 17	( 77.900 )	= 77.900 deg. F
temperature 18	( 77.940 )	= 77.940 deg. F
dewpoint 1	( 68.480 )	= 68.480 deg. F , 0.3445 psia
dewpoint 2	( 67.700 )	= 67.700 deg. F , 0.3354 psia
dewpoint 3	( 67.650 )	= 67.650 deg. F , 0.3348 psia
dewpoint 4	( 67.880 )	= 67.880 deg. F , 0.3375 psia
dewpoint 5	( 76.750 )	= 76.750 deg. F , 0.4554 psia
dewpoint 6	( 76.200 )	= 76.200 deg. F , 0.4472 psia
pressure 1	( 49.5107 )	= 49.5107 psia
pressure 2	( 49.5209 )	= 49.5209 psia

weighted averages, volume and air mass

temperature	=	87.89902 deg. F
pressure	=	49.51070 psia
vapor pressure	=	0.38517 psia
volume	=	343040 cu. ft.
dry air mass	=	83069.43 lbm





## WNP-2 1991 ILRT STABILIZATION

data set 18

time = 1915 date = 608

sensor	raw data	value
temperature 1	( 109.960 )	= 109.960 deg. F
temperature 2	( 100.270 )	= 100.270 deg. F
temperature 3	( 93.110 )	= 93.110 deg. F
temperature 4	( 88.330 )	= 88.330 deg. F
temperature 5	( 102.130 )	= 102.130 deg. F
temperature 6	( 89.340 )	= 89.340 deg. F
temperature 7	( 92.960 )	= 92.960 deg. F
temperature 8	( 93.010 )	= 93.010 deg. F
temperature 9	( 93.170 )	= 93.170 deg. F
temperature 10	( 101.560 )	= 101.560 deg. F
temperature 11	( 109.540 )	= 109.540 deg. F
temperature 12	( 92.780 )	= 92.780 deg. F
temperature 13	( 93.110 )	= 93.110 deg. F
temperature 14	( 89.180 )	= 89.180 deg. F
temperature 15	( 77.950 )	= 77.950 deg. F
temperature 16	( 77.820 )	= 77.820 deg. F
temperature 17	( 77.880 )	= 77.880 deg. F
temperature 18	( 77.930 )	= 77.930 deg. F
dewpoint 1	( 68.510 )	= 68.510 deg. F , 0.3449 psia
dewpoint 2	( 67.790 )	= 67.790 deg. F , 0.3364 psia
dewpoint 3	( 67.710 )	= 67.710 deg. F , 0.3355 psia
dewpoint 4	( 67.920 )	= 67.920 deg. F , 0.3380 psia
dewpoint 5	( 76.720 )	= 76.720 deg. F , 0.4549 psia
dewpoint 6	( 76.180 )	= 76.180 deg. F , 0.4469 psia
pressure 1	( 49.5113 )	= 49.5113 psia
pressure 2	( 49.5192 )	= 49.5192 psia

weighted averages, volume and air mass

temperature	=	87.88821 deg. F
pressure	=	49.51130 psia
vapor pressure	=	0.38540 psia
volume	=	343040 cu. ft.
dry air mass	=	83071.68 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 19

time = 1930    date = 608

sensor		raw data		value	
temperature	1	( 110.030 )	=	110.030	deg. F
temperature	2	( 100.330 )	=	100.330	deg. F
temperature	3	( 93.160 )	=	93.160	deg. F
temperature	4	( 88.370 )	=	88.370	deg. F
temperature	5	( 102.180 )	=	102.180	deg. F
temperature	6	( 89.370 )	=	89.370	deg. F
temperature	7	( 92.980 )	=	92.980	deg. F
temperature	8	( 93.030 )	=	93.030	deg. F
temperature	9	( 93.190 )	=	93.190	deg. F
temperature	10	( 101.610 )	=	101.610	deg. F
temperature	11	( 109.590 )	=	109.590	deg. F
temperature	12	( 92.820 )	=	92.820	deg. F
temperature	13	( 93.140 )	=	93.140	deg. F
temperature	14	( 89.240 )	=	89.240	deg. F
temperature	15	( 77.970 )	=	77.970	deg. F
temperature	16	( 77.830 )	=	77.830	deg. F
temperature	17	( 77.890 )	=	77.890	deg. F
temperature	18	( 77.930 )	=	77.930	deg. F
dewpoint	1	( 68.550 )	=	68.550	deg. F , 0.3454 psia
dewpoint	2	( 67.770 )	=	67.770	deg. F , 0.3362 psia
dewpoint	3	( 67.700 )	=	67.700	deg. F , 0.3354 psia
dewpoint	4	( 67.970 )	=	67.970	deg. F , 0.3385 psia
dewpoint	5	( 76.700 )	=	76.700	deg. F , 0.4546 psia
dewpoint	6	( 76.160 )	=	76.160	deg. F , 0.4466 psia
pressure	1	( 49.5115 )	=	49.5115	psia
pressure	2	( 49.5188 )	=	49.5188	psia

weighted averages, volume and air mass

temperature	=	87.91650	deg. F
pressure	=	49.51150	psia
vapor pressure	=	0.38535	psia
volume	=	343040	cu. ft.
dry air mass	=	83067.83	lbm



## WNP-2 1991 ILRT STABILIZATION

data set 20

time = 1945      date = 608

sensor		raw data		value	
temperature	1	( 110.060 )	=	110.060 deg. F	
temperature	2	( 100.370 )	=	100.370 deg. F	
temperature	3	( 93.180 )	=	93.180 deg. F	
temperature	4	( 88.380 )	=	88.380 deg. F	
temperature	5	( 102.230 )	=	102.230 deg. F	
temperature	6	( 89.370 )	=	89.370 deg. F	
temperature	7	( 93.020 )	=	93.020 deg. F	
temperature	8	( 93.050 )	=	93.050 deg. F	
temperature	9	( 93.220 )	=	93.220 deg. F	
temperature	10	( 101.660 )	=	101.660 deg. F	
temperature	11	( 109.610 )	=	109.610 deg. F	
temperature	12	( 92.840 )	=	92.840 deg. F	
temperature	13	( 93.160 )	=	93.160 deg. F	
temperature	14	( 89.230 )	=	89.230 deg. F	
temperature	15	( 77.960 )	=	77.960 deg. F	
temperature	16	( 77.830 )	=	77.830 deg. F	
temperature	17	( 77.880 )	=	77.880 deg. F	
temperature	18	( 77.920 )	=	77.920 deg. F	
dewpoint	1	( 68.600 )	=	68.600 deg. F	, 0.3459 psia
dewpoint	2	( 67.780 )	=	67.780 deg. F	, 0.3363 psia
dewpoint	3	( 67.810 )	=	67.810 deg. F	, 0.3367 psia
dewpoint	4	( 68.000 )	=	68.000 deg. F	, 0.3389 psia
dewpoint	5	( 76.670 )	=	76.670 deg. F	, 0.4542 psia
dewpoint	6	( 76.110 )	=	76.110 deg. F	, 0.4458 psia
pressure	1	( 49.5117 )	=	49.5117 psia	
pressure	2	( 49.5187 )	=	49.5187 psia	

weighted averages, volume and air mass

temperature	=	87.92627 deg. F
pressure	=	49.51170 psia
vapor pressure	=	0.38544 psia
volume	=	343040 cu. ft.
dry air mass	=	83066.52 lbm



## WNP-2 1991 ILRT STABILIZATION

data set 21

time = 2000 date = 608

sensor	raw data	value
temperature 1	( 110.080 )	= 110.080 deg. F
temperature 2	( 100.420 )	= 100.420 deg. F
temperature 3	( 93.210 )	= 93.210 deg. F
temperature 4	( 88.390 )	= 88.390 deg. F
temperature 5	( 102.270 )	= 102.270 deg. F
temperature 6	( 89.390 )	= 89.390 deg. F
temperature 7	( 93.000 )	= 93.000 deg. F
temperature 8	( 93.080 )	= 93.080 deg. F
temperature 9	( 93.230 )	= 93.230 deg. F
temperature 10	( 101.700 )	= 101.700 deg. F
temperature 11	( 109.630 )	= 109.630 deg. F
temperature 12	( 92.840 )	= 92.840 deg. F
temperature 13	( 93.160 )	= 93.160 deg. F
temperature 14	( 89.210 )	= 89.210 deg. F
temperature 15	( 77.960 )	= 77.960 deg. F
temperature 16	( 77.820 )	= 77.820 deg. F
temperature 17	( 77.880 )	= 77.880 deg. F
temperature 18	( 77.920 )	= 77.920 deg. F
dewpoint 1	( 68.630 )	= 68.630 deg. F , 0.3463 psia
dewpoint 2	( 67.850 )	= 67.850 deg. F , 0.3371 psia
dewpoint 3	( 67.870 )	= 67.870 deg. F , 0.3374 psia
dewpoint 4	( 68.030 )	= 68.030 deg. F , 0.3392 psia
dewpoint 5	( 76.670 )	= 76.670 deg. F , 0.4542 psia
dewpoint 6	( 76.140 )	= 76.140 deg. F , 0.4463 psia
pressure 1	( 49.5119 )	= 49.5119 psia
pressure 2	( 49.5187 )	= 49.5187 psia

weighted averages, volume and air mass

temperature	=	87.93407 deg. F
pressure	=	49.51190 psia
vapor pressure	=	0.38588 psia
volume	=	343040 cu. ft.
dry air mass	=	83064.94 lbm





PRE-DATA REPORT

title = WNP-2 1991 ILRT TYPE A TEST

volume = 343040      La = 0.5000  
leap year : no

temperature volume fractions ( sum = 1.0000 )

t( 1)=0.0265	t( 2)=0.0402	t( 3)=0.0398	t( 4)=0.0563	t( 5)=0.0402
t( 6)=0.0563	t( 7)=0.0398	t( 8)=0.0398	t( 9)=0.0398	t(10)=0.0402
t(11)=0.0265	t(12)=0.0398	t(13)=0.0398	t(14)=0.0563	t(15)=0.1047
t(16)=0.1047	t(17)=0.1047	t(18)=0.1046		

dewpoint volume fractions ( sum = 1.0000 )

dp( 1)=0.1194 dp( 2)=0.1737 dp( 3)=0.1688 dp( 4)=0.1194 dp( 5)=0.2094  
dp( 6)=0.2093

pressure volume fractions ( sum = 1.0000 )

p( 1)=1.0000 p( 2)=0.0000



## WNP-2 1991 ILRT TYPE A TEST

## DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	2000	608	87.9341	49.5119	0.3859	83064.94
2	2015	608	87.9478	49.5119	0.3862	83062.36
3	2030	608	87.9590	49.5121	0.3864	83060.62
4	2045	608	87.9693	49.5129	0.3865	83060.28
5	2100	608	87.9807	49.5129	0.3868	83057.99
6	2115	608	87.9885	49.5131	0.3872	83056.47
7	2130	608	87.9979	49.5132	0.3874	83054.94
8	2145	608	88.0070	49.5135	0.3877	83053.51
9	2200	608	88.0163	49.5136	0.3879	83051.97
10	2215	608	88.0234	49.5139	0.3881	83050.94
11	2230	608	88.0363	49.5141	0.3883	83049.07
12	2245	608	88.0469	49.5141	0.3886	83046.89
13	2300	608	88.0546	49.5143	0.3888	83045.86
14	2315	608	88.0642	49.5146	0.3890	83044.54
15	2330	608	88.0761	49.5147	0.3893	83042.35
16	2345	608	88.0827	49.5149	0.3892	83041.82
17	0	609	88.0934	49.5148	0.3895	83039.55
18	15	609	88.0903	49.5151	0.3894	83040.70
19	30	609	88.1140	49.5152	0.3900	83036.30
20	45	609	88.1136	49.5148	0.3904	83035.05
21	100	609	88.1260	49.5155	0.3906	83033.91
22	115	609	88.1319	49.5151	0.3907	83032.29
23	130	609	88.1424	49.5155	0.3911	83030.69
24	145	609	88.1513	49.5157	0.3912	83029.37
25	200	609	88.1605	49.5157	0.3913	83027.95
26	215	609	88.1691	49.5160	0.3915	83026.74
27	230	609	88.1795	49.5158	0.3917	83024.51
28	245	609	88.1879	49.5160	0.3920	83023.04
29	300	609	88.1971	49.5159	0.3921	83021.38
30	315	609	88.2077	49.5165	0.3923	83020.35
31	330	609	88.2115	49.5159	0.3927	83018.19
32	345	609	88.2207	49.5166	0.3929	83017.53
33	400	609	88.2348	49.5166	0.3930	83015.19

## WNP-2 1991 ILRT TYPE A TEST

data set 1

time = 2000 date = 608

sensor	raw data	value
temperature 1	( 110.080 )	= 110.080 deg. F
temperature 2	( 100.420 )	= 100.420 deg. F
temperature 3	( 93.210 )	= 93.210 deg. F
temperature 4	( 88.390 )	= 88.390 deg. F
temperature 5	( 102.270 )	= 102.270 deg. F
temperature 6	( 89.390 )	= 89.390 deg. F
temperature 7	( 93.000 )	= 93.000 deg. F
temperature 8	( 93.080 )	= 93.080 deg. F
temperature 9	( 93.230 )	= 93.230 deg. F
temperature 10	( 101.700 )	= 101.700 deg. F
temperature 11	( 109.630 )	= 109.630 deg. F
temperature 12	( 92.840 )	= 92.840 deg. F
temperature 13	( 93.160 )	= 93.160 deg. F
temperature 14	( 89.210 )	= 89.210 deg. F
temperature 15	( 77.960 )	= 77.960 deg. F
temperature 16	( 77.820 )	= 77.820 deg. F
temperature 17	( 77.880 )	= 77.880 deg. F
temperature 18	( 77.920 )	= 77.920 deg. F
dewpoint 1	( 68.630 )	= 68.630 deg. F , 0.3463 psia
dewpoint 2	( 67.850 )	= 67.850 deg. F , 0.3371 psia
dewpoint 3	( 67.870 )	= 67.870 deg. F , 0.3374 psia
dewpoint 4	( 68.030 )	= 68.030 deg. F , 0.3392 psia
dewpoint 5	( 76.670 )	= 76.670 deg. F , 0.4542 psia
dewpoint 6	( 76.140 )	= 76.140 deg. F , 0.4463 psia
pressure 1	( 49.5119 )	= 49.5119 psia
pressure 2	( 49.5187 )	= 49.5187 psia

weighted averages, volume and air mass

temperature	=	87.93407 deg. F
pressure	=	49.51190 psia
vapor pressure	=	0.38588 psia
volume	=	343040 cu. ft.
dry air mass	=	83064.94 lbm

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## WNP-2 1991 ILRT TYPE A TEST

data set 2

time = 2015 date = 608

sensor	raw data	value
temperature 1	( 110.110 )	= 110.110 deg. F
temperature 2	( 100.460 )	= 100.460 deg. F
temperature 3	( 93.210 )	= 93.210 deg. F
temperature 4	( 88.410 )	= 88.410 deg. F
temperature 5	( 102.310 )	= 102.310 deg. F
temperature 6	( 89.400 )	= 89.400 deg. F
temperature 7	( 93.040 )	= 93.040 deg. F
temperature 8	( 93.080 )	= 93.080 deg. F
temperature 9	( 93.250 )	= 93.250 deg. F
temperature 10	( 101.740 )	= 101.740 deg. F
temperature 11	( 109.690 )	= 109.690 deg. F
temperature 12	( 92.880 )	= 92.880 deg. F
temperature 13	( 93.190 )	= 93.190 deg. F
temperature 14	( 89.260 )	= 89.260 deg. F
temperature 15	( 77.950 )	= 77.950 deg. F
temperature 16	( 77.820 )	= 77.820 deg. F
temperature 17	( 77.870 )	= 77.870 deg. F
temperature 18	( 77.910 )	= 77.910 deg. F
dewpoint 1	( 68.700 )	= 68.700 deg. F , 0.3471 psia
dewpoint 2	( 67.890 )	= 67.890 deg. F , 0.3376 psia
dewpoint 3	( 67.880 )	= 67.880 deg. F , 0.3375 psia
dewpoint 4	( 68.100 )	= 68.100 deg. F , 0.3401 psia
dewpoint 5	( 76.660 )	= 76.660 deg. F , 0.4540 psia
dewpoint 6	( 76.150 )	= 76.150 deg. F , 0.4464 psia
pressure 1	( 49.5119 )	= 49.5119 psia
pressure 2	( 49.5189 )	= 49.5189 psia

weighted averages, volume and air mass

temperature	=	87.94781 deg. F
pressure	=	49.51190 psia
vapor pressure	=	0.38618 psia
volume	=	343040 cu. ft.
dry air mass	=	83062.36 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 3

time = 2030 date = 608

sensor		raw data	value	
temperature	1	( 110.140 )	=	110.140 deg. F
temperature	2	( 100.510 )	=	100.510 deg. F
temperature	3	( 93.240 )	=	93.240 deg. F
temperature	4	( 88.420 )	=	88.420 deg. F
temperature	5	( 102.370 )	=	102.370 deg. F
temperature	6	( 89.410 )	=	89.410 deg. F
temperature	7	( 93.040 )	=	93.040 deg. F
temperature	8	( 93.090 )	=	93.090 deg. F
temperature	9	( 93.260 )	=	93.260 deg. F
temperature	10	( 101.800 )	=	101.800 deg. F
temperature	11	( 109.690 )	=	109.690 deg. F
temperature	12	( 92.890 )	=	92.890 deg. F
temperature	13	( 93.190 )	=	93.190 deg. F
temperature	14	( 89.280 )	=	89.280 deg. F
temperature	15	( 77.950 )	=	77.950 deg. F
temperature	16	( 77.810 )	=	77.810 deg. F
temperature	17	( 77.870 )	=	77.870 deg. F
temperature	18	( 77.910 )	=	77.910 deg. F
dewpoint	1	( 68.720 )	=	68.720 deg. F , 0.3474 psia
dewpoint	2	( 67.940 )	=	67.940 deg. F , 0.3382 psia
dewpoint	3	( 67.910 )	=	67.910 deg. F , 0.3378 psia
dewpoint	4	( 68.120 )	=	68.120 deg. F , 0.3403 psia
dewpoint	5	( 76.680 )	=	76.680 deg. F , 0.4543 psia
dewpoint	6	( 76.130 )	=	76.130 deg. F , 0.4461 psia
pressure	1	( 49.5121 )	=	49.5121 psia
pressure	2	( 49.5190 )	=	49.5190 psia

weighted averages, volume and air mass

temperature	=	87.95904 deg. F
pressure	=	49.51210 psia
vapor pressure	=	0.38639 psia
volume	=	343040 cu. ft.
dry air mass	=	83060.62 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 4

time = 2045 date = 608

sensor	raw data	value
temperature 1	( 110.170 )	= 110.170 deg. F
temperature 2	( 100.540 )	= 100.540 deg. F
temperature 3	( 93.260 )	= 93.260 deg. F
temperature 4	( 88.430 )	= 88.430 deg. F
temperature 5	( 102.410 )	= 102.410 deg. F
temperature 6	( 89.420 )	= 89.420 deg. F
temperature 7	( 93.080 )	= 93.080 deg. F
temperature 8	( 93.110 )	= 93.110 deg. F
temperature 9	( 93.300 )	= 93.300 deg. F
temperature 10	( 101.830 )	= 101.830 deg. F
temperature 11	( 109.750 )	= 109.750 deg. F
temperature 12	( 92.890 )	= 92.890 deg. F
temperature 13	( 93.220 )	= 93.220 deg. F
temperature 14	( 89.260 )	= 89.260 deg. F
temperature 15	( 77.940 )	= 77.940 deg. F
temperature 16	( 77.810 )	= 77.810 deg. F
temperature 17	( 77.870 )	= 77.870 deg. F
temperature 18	( 77.900 )	= 77.900 deg. F
dewpoint 1	( 68.760 )	= 68.760 deg. F , 0.3479 psia
dewpoint 2	( 67.940 )	= 67.940 deg. F , 0.3382 psia
dewpoint 3	( 67.940 )	= 67.940 deg. F , 0.3382 psia
dewpoint 4	( 68.160 )	= 68.160 deg. F , 0.3408 psia
dewpoint 5	( 76.670 )	= 76.670 deg. F , 0.4542 psia
dewpoint 6	( 76.110 )	= 76.110 deg. F , 0.4458 psia
pressure 1	( 49.5129 )	= 49.5129 psia
pressure 2	( 49.5190 )	= 49.5190 psia

weighted averages, volume and air mass

temperature	=	87.96932 deg. F
pressure	=	49.51290 psia
vapor pressure	=	0.38647 psia
volume	=	343040 cu. ft.
dry air mass	=	83060.28 lbm



# WNP-2 1991 ILRT TYPE A TEST

data set 5

time = 2100 date = 608

sensor	raw data	value
temperature 1	( 110.190 )	= 110.190 deg. F
temperature 2	( 100.590 )	= 100.590 deg. F
temperature 3	( 93.270 )	= 93.270 deg. F
temperature 4	( 88.440 )	= 88.440 deg. F
temperature 5	( 102.440 )	= 102.440 deg. F
temperature 6	( 89.430 )	= 89.430 deg. F
temperature 7	( 93.100 )	= 93.100 deg. F
temperature 8	( 93.140 )	= 93.140 deg. F
temperature 9	( 93.310 )	= 93.310 deg. F
temperature 10	( 101.870 )	= 101.870 deg. F
temperature 11	( 109.750 )	= 109.750 deg. F
temperature 12	( 92.890 )	= 92.890 deg. F
temperature 13	( 93.230 )	= 93.230 deg. F
temperature 14	( 89.310 )	= 89.310 deg. F
temperature 15	( 77.940 )	= 77.940 deg. F
temperature 16	( 77.810 )	= 77.810 deg. F
temperature 17	( 77.860 )	= 77.860 deg. F
temperature 18	( 77.900 )	= 77.900 deg. F
dewpoint 1	( 68.780 )	= 68.780 deg. F , 0.3481 psia
dewpoint 2	( 68.040 )	= 68.040 deg. F , 0.3394 psia
dewpoint 3	( 67.970 )	= 67.970 deg. F , 0.3385 psia
dewpoint 4	( 68.190 )	= 68.190 deg. F , 0.3411 psia
dewpoint 5	( 76.660 )	= 76.660 deg. F , 0.4540 psia
dewpoint 6	( 76.120 )	= 76.120 deg. F , 0.4460 psia
pressure 1	( 49.5129 )	= 49.5129 psia
pressure 2	( 49.5187 )	= 49.5187 psia

weighted averages, volume and air mass

temperature	=	87.98074 deg. F
pressure	=	49.51290 psia
vapor pressure	=	0.38680 psia
volume	=	343040 cu. ft.
dry air mass	=	83057.99 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 6

time = 2115 date = 608

sensor	raw data	value
temperature 1	( 110.240 )	= 110.240 deg. F
temperature 2	( 100.630 )	= 100.630 deg. F
temperature 3	( 93.280 )	= 93.280 deg. F
temperature 4	( 88.450 )	= 88.450 deg. F
temperature 5	( 102.490 )	= 102.490 deg. F
temperature 6	( 89.440 )	= 89.440 deg. F
temperature 7	( 93.100 )	= 93.100 deg. F
temperature 8	( 93.150 )	= 93.150 deg. F
temperature 9	( 93.330 )	= 93.330 deg. F
temperature 10	( 101.920 )	= 101.920 deg. F
temperature 11	( 109.780 )	= 109.780 deg. F
temperature 12	( 92.920 )	= 92.920 deg. F
temperature 13	( 93.240 )	= 93.240 deg. F
temperature 14	( 89.270 )	= 89.270 deg. F
temperature 15	( 77.920 )	= 77.920 deg. F
temperature 16	( 77.810 )	= 77.810 deg. F
temperature 17	( 77.860 )	= 77.860 deg. F
temperature 18	( 77.900 )	= 77.900 deg. F
dewpoint 1	( 68.840 )	= 68.840 deg. F , 0.3488 psia
dewpoint 2	( 68.050 )	= 68.050 deg. F , 0.3395 psia
dewpoint 3	( 68.040 )	= 68.040 deg. F , 0.3394 psia
dewpoint 4	( 68.240 )	= 68.240 deg. F , 0.3417 psia
dewpoint 5	( 76.690 )	= 76.690 deg. F , 0.4545 psia
dewpoint 6	( 76.120 )	= 76.120 deg. F , 0.4460 psia
pressure 1	( 49.5131 )	= 49.5131 psia
pressure 2	( 49.5194 )	= 49.5194 psia

weighted averages, volume and air mass

temperature	=	87.98846 deg. F
pressure	=	49.51310 psia
vapor pressure	=	0.38721 psia
volume	=	343040 cu. ft.
dry air mass	=	83056.47 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 7

time = 2130 date = 608

sensor		raw data		value	
temperature	1	( 110.260 )	=	110.260 deg. F	
temperature	2	( 100.670 )	=	100.670 deg. F	
temperature	3	( 93.290 )	=	93.290 deg. F	
temperature	4	( 88.460 )	=	88.460 deg. F	
temperature	5	( 102.530 )	=	102.530 deg. F	
temperature	6	( 89.450 )	=	89.450 deg. F	
temperature	7	( 93.130 )	=	93.130 deg. F	
temperature	8	( 93.170 )	=	93.170 deg. F	
temperature	9	( 93.340 )	=	93.340 deg. F	
temperature	10	( 101.960 )	=	101.960 deg. F	
temperature	11	( 109.830 )	=	109.830 deg. F	
temperature	12	( 92.950 )	=	92.950 deg. F	
temperature	13	( 93.260 )	=	93.260 deg. F	
temperature	14	( 89.270 )	=	89.270 deg. F	
temperature	15	( 77.920 )	=	77.920 deg. F	
temperature	16	( 77.800 )	=	77.800 deg. F	
temperature	17	( 77.850 )	=	77.850 deg. F	
temperature	18	( 77.890 )	=	77.890 deg. F	
dewpoint	1	( 68.880 )	=	68.880 deg. F	, 0.3493 psia
dewpoint	2	( 68.070 )	=	68.070 deg. F	, 0.3397 psia
dewpoint	3	( 68.090 )	=	68.090 deg. F	, 0.3399 psia
dewpoint	4	( 68.280 )	=	68.280 deg. F	, 0.3422 psia
dewpoint	5	( 76.660 )	=	76.660 deg. F	, 0.4540 psia
dewpoint	6	( 76.120 )	=	76.120 deg. F	, 0.4460 psia
pressure	1	( 49.5132 )	=	49.5132 psia	
pressure	2	( 49.5197 )	=	49.5197 psia	

weighted averages, volume and air mass

temperature	=	87.99790 deg. F
pressure	=	49.51320 psia
vapor pressure	=	0.38737 psia
volume	=	343040 cu. ft.
dry air mass	=	83054.94 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 8

time = 2145 date = 608

sensor		raw data		value	
temperature	1	( 110.300 )	=	110.300 deg.	F
temperature	2	( 100.720 )	=	100.720 deg.	F
temperature	3	( 93.310 )	=	93.310 deg.	F
temperature	4	( 88.460 )	=	88.460 deg.	F
temperature	5	( 102.580 )	=	102.580 deg.	F
temperature	6	( 89.450 )	=	89.450 deg.	F
temperature	7	( 93.140 )	=	93.140 deg.	F
temperature	8	( 93.170 )	=	93.170 deg.	F
temperature	9	( 93.350 )	=	93.350 deg.	F
temperature	10	( 102.000 )	=	102.000 deg.	F
temperature	11	( 109.860 )	=	109.860 deg.	F
temperature	12	( 92.980 )	=	92.980 deg.	F
temperature	13	( 93.280 )	=	93.280 deg.	F
temperature	14	( 89.290 )	=	89.290 deg.	F
temperature	15	( 77.910 )	=	77.910 deg.	F
temperature	16	( 77.790 )	=	77.790 deg.	F
temperature	17	( 77.850 )	=	77.850 deg.	F
temperature	18	( 77.880 )	=	77.880 deg.	F
dewpoint	1	( 68.920 )	=	68.920 deg.	F , 0.3498 psia
dewpoint	2	( 68.160 )	=	68.160 deg.	F , 0.3408 psia
dewpoint	3	( 68.100 )	=	68.100 deg.	F , 0.3401 psia
dewpoint	4	( 68.310 )	=	68.310 deg.	F , 0.3425 psia
dewpoint	5	( 76.670 )	=	76.670 deg.	F , 0.4542 psia
dewpoint	6	( 76.120 )	=	76.120 deg.	F , 0.4460 psia
pressure	1	( 49.5135 )	=	49.5135	psia
pressure	2	( 49.5198 )	=	49.5198	psia

weighted averages, volume and air mass

temperature	=	88.00696 deg.	F
pressure	=	49.51350	psia
vapor pressure	=	0.38770	psia
volume	=	343040	cu. ft.
dry air mass	=	83053.51	lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 9

time = 2200 date = 608

sensor	raw data	value
temperature 1	( 110.340 )	= 110.340 deg. F
temperature 2	( 100.760 )	= 100.760 deg. F
temperature 3	( 93.330 )	= 93.330 deg. F
temperature 4	( 88.470 )	= 88.470 deg. F
temperature 5	( 102.610 )	= 102.610 deg. F
temperature 6	( 89.470 )	= 89.470 deg. F
temperature 7	( 93.130 )	= 93.130 deg. F
temperature 8	( 93.190 )	= 93.190 deg. F
temperature 9	( 93.370 )	= 93.370 deg. F
temperature 10	( 102.050 )	= 102.050 deg. F
temperature 11	( 109.880 )	= 109.880 deg. F
temperature 12	( 92.980 )	= 92.980 deg. F
temperature 13	( 93.300 )	= 93.300 deg. F
temperature 14	( 89.300 )	= 89.300 deg. F
temperature 15	( 77.900 )	= 77.900 deg. F
temperature 16	( 77.790 )	= 77.790 deg. F
temperature 17	( 77.840 )	= 77.840 deg. F
temperature 18	( 77.880 )	= 77.880 deg. F
dewpoint 1	( 68.950 )	= 68.950 deg. F , 0.3501 psia
dewpoint 2	( 68.190 )	= 68.190 deg. F , 0.3411 psia
dewpoint 3	( 68.160 )	= 68.160 deg. F , 0.3408 psia
dewpoint 4	( 68.360 )	= 68.360 deg. F , 0.3431 psia
dewpoint 5	( 76.660 )	= 76.660 deg. F , 0.4540 psia
dewpoint 6	( 76.090 )	= 76.090 deg. F , 0.4455 psia
pressure 1	( 49.5136 )	= 49.5136 psia
pressure 2	( 49.5200 )	= 49.5200 psia

weighted averages, volume and air mass

temperature	=	88.01632 deg. F
pressure	=	49.51360 psia
vapor pressure	=	0.38787 psia
volume	=	343040 cu. ft.
dry air mass	=	83051.97 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 10

time = 2215 date = 608

sensor	raw data	value
temperature 1	( 110.370 )	= 110.370 deg. F
temperature 2	( 100.810 )	= 100.810 deg. F
temperature 3	( 93.320 )	= 93.320 deg. F
temperature 4	( 88.480 )	= 88.480 deg. F
temperature 5	( 102.650 )	= 102.650 deg. F
temperature 6	( 89.470 )	= 89.470 deg. F
temperature 7	( 93.150 )	= 93.150 deg. F
temperature 8	( 93.220 )	= 93.220 deg. F
temperature 9	( 93.400 )	= 93.400 deg. F
temperature 10	( 102.090 )	= 102.090 deg. F
temperature 11	( 109.890 )	= 109.890 deg. F
temperature 12	( 93.000 )	= 93.000 deg. F
temperature 13	( 93.320 )	= 93.320 deg. F
temperature 14	( 89.300 )	= 89.300 deg. F
temperature 15	( 77.900 )	= 77.900 deg. F
temperature 16	( 77.770 )	= 77.770 deg. F
temperature 17	( 77.830 )	= 77.830 deg. F
temperature 18	( 77.870 )	= 77.870 deg. F
dewpoint 1	( 69.010 )	= 69.010 deg. F , 0.3508 psia
dewpoint 2	( 68.220 )	= 68.220 deg. F , 0.3415 psia
dewpoint 3	( 68.190 )	= 68.190 deg. F , 0.3411 psia
dewpoint 4	( 68.410 )	= 68.410 deg. F , 0.3437 psia
dewpoint 5	( 76.650 )	= 76.650 deg. F , 0.4539 psia
dewpoint 6	( 76.100 )	= 76.100 deg. F , 0.4457 psia
pressure 1	( 49.5139 )	= 49.5139 psia
pressure 2	( 49.5203 )	= 49.5203 psia

weighted averages, volume and air mass

temperature	=	88.02337 deg. F
pressure	=	49.51390 psia
vapor pressure	=	0.38815 psia
volume	=	343040 cu. ft.
dry air mass	=	83050.94 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 11

time = 2230 date = 608

sensor	raw data	value
temperature 1	( 110.380 )	= 110.380 deg. F
temperature 2	( 100.850 )	= 100.850 deg. F
temperature 3	( 93.360 )	= 93.360 deg. F
temperature 4	( 88.490 )	= 88.490 deg. F
temperature 5	( 102.700 )	= 102.700 deg. F
temperature 6	( 89.480 )	= 89.480 deg. F
temperature 7	( 93.200 )	= 93.200 deg. F
temperature 8	( 93.220 )	= 93.220 deg. F
temperature 9	( 93.420 )	= 93.420 deg. F
temperature 10	( 102.130 )	= 102.130 deg. F
temperature 11	( 109.950 )	= 109.950 deg. F
temperature 12	( 93.000 )	= 93.000 deg. F
temperature 13	( 93.330 )	= 93.330 deg. F
temperature 14	( 89.300 )	= 89.300 deg. F
temperature 15	( 77.900 )	= 77.900 deg. F
temperature 16	( 77.770 )	= 77.770 deg. F
temperature 17	( 77.830 )	= 77.830 deg. F
temperature 18	( 77.870 )	= 77.870 deg. F
dewpoint 1	( 69.040 )	= 69.040 deg. F , 0.3512 psia
dewpoint 2	( 68.230 )	= 68.230 deg. F , 0.3416 psia
dewpoint 3	( 68.230 )	= 68.230 deg. F , 0.3416 psia
dewpoint 4	( 68.430 )	= 68.430 deg. F , 0.3439 psia
dewpoint 5	( 76.650 )	= 76.650 deg. F , 0.4539 psia
dewpoint 6	( 76.090 )	= 76.090 deg. F , 0.4455 psia
pressure 1	( 49.5141 )	= 49.5141 psia
pressure 2	( 49.5203 )	= 49.5203 psia

weighted averages, volume and air mass

temperature	=	88.03635 deg. F
pressure	=	49.51410 psia
vapor pressure	=	0.38829 psia
volume	=	343040 cu. ft.
dry air mass	=	83049.07 lbm





# WNP-2 1991 ILRT TYPE A TEST

data set 12

time = 2245 date = 608

sensor		raw data		value	
temperature	1	( 110.430 )	=	110.430 deg. F	
temperature	2	( 100.880 )	=	100.880 deg. F	
temperature	3	( 93.370 )	=	93.370 deg. F	
temperature	4	( 88.490 )	=	88.490 deg. F	
temperature	5	( 102.740 )	=	102.740 deg. F	
temperature	6	( 89.490 )	=	89.490 deg. F	
temperature	7	( 93.240 )	=	93.240 deg. F	
temperature	8	( 93.250 )	=	93.250 deg. F	
temperature	9	( 93.420 )	=	93.420 deg. F	
temperature	10	( 102.170 )	=	102.170 deg. F	
temperature	11	( 110.000 )	=	110.000 deg. F	
temperature	12	( 93.010 )	=	93.010 deg. F	
temperature	13	( 93.350 )	=	93.350 deg. F	
temperature	14	( 89.330 )	=	89.330 deg. F	
temperature	15	( 77.890 )	=	77.890 deg. F	
temperature	16	( 77.770 )	=	77.770 deg. F	
temperature	17	( 77.820 )	=	77.820 deg. F	
temperature	18	( 77.860 )	=	77.860 deg. F	
dewpoint	1	( 69.070 )	=	69.070 deg. F	, 0.3516 psia
dewpoint	2	( 68.310 )	=	68.310 deg. F	, 0.3425 psia
dewpoint	3	( 68.250 )	=	68.250 deg. F	, 0.3418 psia
dewpoint	4	( 68.480 )	=	68.480 deg. F	, 0.3445 psia
dewpoint	5	( 76.650 )	=	76.650 deg. F	, 0.4539 psia
dewpoint	6	( 76.100 )	=	76.100 deg. F	, 0.4457 psia
pressure	1	( 49.5141 )	=	49.5141 psia	
pressure	2	( 49.5204 )	=	49.5204 psia	

weighted averages, volume and air mass

temperature	=	88.04691 deg. F
pressure	=	49.51410 psia
vapor pressure	=	0.38863 psia
volume	=	343040 cu. ft.
dry air mass	=	83046.89 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 13

time = 2300 date = 608

sensor	raw data	value
temperature 1	( 110.450 )	= 110.450 deg. F
temperature 2	( 100.920 )	= 100.920 deg. F
temperature 3	( 93.400 )	= 93.400 deg. F
temperature 4	( 88.520 )	= 88.520 deg. F
temperature 5	( 102.770 )	= 102.770 deg. F
temperature 6	( 89.510 )	= 89.510 deg. F
temperature 7	( 93.220 )	= 93.220 deg. F
temperature 8	( 93.260 )	= 93.260 deg. F
temperature 9	( 93.420 )	= 93.420 deg. F
temperature 10	( 102.210 )	= 102.210 deg. F
temperature 11	( 110.010 )	= 110.010 deg. F
temperature 12	( 93.030 )	= 93.030 deg. F
temperature 13	( 93.350 )	= 93.350 deg. F
temperature 14	( 89.370 )	= 89.370 deg. F
temperature 15	( 77.880 )	= 77.880 deg. F
temperature 16	( 77.750 )	= 77.750 deg. F
temperature 17	( 77.820 )	= 77.820 deg. F
temperature 18	( 77.850 )	= 77.850 deg. F
dewpoint 1	( 69.100 )	= 69.100 deg. F , 0.3519 psia
dewpoint 2	( 68.330 )	= 68.330 deg. F , 0.3428 psia
dewpoint 3	( 68.310 )	= 68.310 deg. F , 0.3425 psia
dewpoint 4	( 68.510 )	= 68.510 deg. F , 0.3449 psia
dewpoint 5	( 76.630 )	= 76.630 deg. F , 0.4536 psia
dewpoint 6	( 76.080 )	= 76.080 deg. F , 0.4454 psia
pressure 1	( 49.5143 )	= 49.5143 psia
pressure 2	( 49.5205 )	= 49.5205 psia

weighted averages, volume and air mass

temperature	=	88.05460 deg. F
pressure	=	49.51430 psia
vapor pressure	=	0.38876 psia
volume	=	343040 cu. ft.
dry air mass	=	83045.86 lbm

## WNP-2 1991 ILRT TYPE A TEST

data set 14

time = 2315 date = 608

sensor	raw data	value
temperature 1	( 110.470 )	= 110.470 deg. F
temperature 2	( 100.970 )	= 100.970 deg. F
temperature 3	( 93.400 )	= 93.400 deg. F
temperature 4	( 88.530 )	= 88.530 deg. F
temperature 5	( 102.820 )	= 102.820 deg. F
temperature 6	( 89.520 )	= 89.520 deg. F
temperature 7	( 93.220 )	= 93.220 deg. F
temperature 8	( 93.270 )	= 93.270 deg. F
temperature 9	( 93.450 )	= 93.450 deg. F
temperature 10	( 102.250 )	= 102.250 deg. F
temperature 11	( 110.040 )	= 110.040 deg. F
temperature 12	( 93.060 )	= 93.060 deg. F
temperature 13	( 93.370 )	= 93.370 deg. F
temperature 14	( 89.370 )	= 89.370 deg. F
temperature 15	( 77.880 )	= 77.880 deg. F
temperature 16	( 77.750 )	= 77.750 deg. F
temperature 17	( 77.800 )	= 77.800 deg. F
temperature 18	( 77.850 )	= 77.850 deg. F
dewpoint 1	( 69.150 )	= 69.150 deg. F , 0.3525 psia
dewpoint 2	( 68.330 )	= 68.330 deg. F , 0.3428 psia
dewpoint 3	( 68.370 )	= 68.370 deg. F , 0.3432 psia
dewpoint 4	( 68.550 )	= 68.550 deg. F , 0.3454 psia
dewpoint 5	( 76.630 )	= 76.630 deg. F , 0.4536 psia
dewpoint 6	( 76.070 )	= 76.070 deg. F , 0.4452 psia
pressure 1	( 49.5146 )	= 49.5146 psia
pressure 2	( 49.5202 )	= 49.5202 psia

weighted averages, volume and air mass

temperature	=	88.06417 deg. F
pressure	=	49.51460 psia
vapor pressure	=	0.38897 psia
volume	=	343040 cu. ft.
dry air mass	=	83044.54 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 15

time = 2330 date = 608

sensor	raw data	value
temperature 1	( 110.500 )	= 110.500 deg. F
temperature 2	( 101.000 )	= 101.000 deg. F
temperature 3	( 93.420 )	= 93.420 deg. F
temperature 4	( 88.530 )	= 88.530 deg. F
temperature 5	( 102.860 )	= 102.860 deg. F
temperature 6	( 89.530 )	= 89.530 deg. F
temperature 7	( 93.250 )	= 93.250 deg. F
temperature 8	( 93.280 )	= 93.280 deg. F
temperature 9	( 93.470 )	= 93.470 deg. F
temperature 10	( 102.300 )	= 102.300 deg. F
temperature 11	( 110.050 )	= 110.050 deg. F
temperature 12	( 93.070 )	= 93.070 deg. F
temperature 13	( 93.390 )	= 93.390 deg. F
temperature 14	( 89.390 )	= 89.390 deg. F
temperature 15	( 77.880 )	= 77.880 deg. F
temperature 16	( 77.750 )	= 77.750 deg. F
temperature 17	( 77.800 )	= 77.800 deg. F
temperature 18	( 77.850 )	= 77.850 deg. F
dewpoint 1	( 69.180 )	= 69.180 deg. F , 0.3529 psia
dewpoint 2	( 68.470 )	= 68.470 deg. F , 0.3444 psia
dewpoint 3	( 68.380 )	= 68.380 deg. F , 0.3433 psia
dewpoint 4	( 68.600 )	= 68.600 deg. F , 0.3459 psia
dewpoint 5	( 76.610 )	= 76.610 deg. F , 0.4533 psia
dewpoint 6	( 76.060 )	= 76.060 deg. F , 0.4451 psia
pressure 1	( 49.5147 )	= 49.5147 psia
pressure 2	( 49.5209 )	= 49.5209 psia

weighted averages, volume and air mass

temperature	=	88.07612 deg. F
pressure	=	49.51470 psia
vapor pressure	=	0.38930 psia
volume	=	343040 cu. ft.
dry air mass	=	83042.35 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 16

time = 2345      date = 608

sensor	raw data	value
temperature 1	( 110.530 )	= 110.530 deg. F
temperature 2	( 101.050 )	= 101.050 deg. F
temperature 3	( 93.420 )	= 93.420 deg. F
temperature 4	( 88.540 )	= 88.540 deg. F
temperature 5	( 102.890 )	= 102.890 deg. F
temperature 6	( 89.530 )	= 89.530 deg. F
temperature 7	( 93.250 )	= 93.250 deg. F
temperature 8	( 93.300 )	= 93.300 deg. F
temperature 9	( 93.480 )	= 93.480 deg. F
temperature 10	( 102.330 )	= 102.330 deg. F
temperature 11	( 110.070 )	= 110.070 deg. F
temperature 12	( 93.090 )	= 93.090 deg. F
temperature 13	( 93.400 )	= 93.400 deg. F
temperature 14	( 89.390 )	= 89.390 deg. F
temperature 15	( 77.870 )	= 77.870 deg. F
temperature 16	( 77.750 )	= 77.750 deg. F
temperature 17	( 77.800 )	= 77.800 deg. F
temperature 18	( 77.840 )	= 77.840 deg. F
dewpoint 1	( 69.220 )	= 69.220 deg. F , 0.3534 psia
dewpoint 2	( 68.420 )	= 68.420 deg. F , 0.3438 psia
dewpoint 3	( 68.420 )	= 68.420 deg. F , 0.3438 psia
dewpoint 4	( 68.630 )	= 68.630 deg. F , 0.3463 psia
dewpoint 5	( 76.580 )	= 76.580 deg. F , 0.4528 psia
dewpoint 6	( 76.040 )	= 76.040 deg. F , 0.4448 psia
pressure 1	( 49.5149 )	= 49.5149 psia
pressure 2	( 49.5210 )	= 49.5210 psia

weighted averages, volume and air mass

temperature	=	88.08272 deg. F
pressure	=	49.51490 psia
vapor pressure	=	0.38922 psia
volume	=	343040 cu. ft.
dry air mass	=	83041.82 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 17

time = 0 date = 609

sensor	raw data	value
temperature 1	( 110.550 )	= 110.550 deg. F
temperature 2	( 101.090 )	= 101.090 deg. F
temperature 3	( 93.440 )	= 93.440 deg. F
temperature 4	( 88.560 )	= 88.560 deg. F
temperature 5	( 102.940 )	= 102.940 deg. F
temperature 6	( 89.540 )	= 89.540 deg. F
temperature 7	( 93.270 )	= 93.270 deg. F
temperature 8	( 93.320 )	= 93.320 deg. F
temperature 9	( 93.500 )	= 93.500 deg. F
temperature 10	( 102.370 )	= 102.370 deg. F
temperature 11	( 110.120 )	= 110.120 deg. F
temperature 12	( 93.090 )	= 93.090 deg. F
temperature 13	( 93.420 )	= 93.420 deg. F
temperature 14	( 89.390 )	= 89.390 deg. F
temperature 15	( 77.870 )	= 77.870 deg. F
temperature 16	( 77.740 )	= 77.740 deg. F
temperature 17	( 77.790 )	= 77.790 deg. F
temperature 18	( 77.840 )	= 77.840 deg. F
dewpoint 1	( 69.270 )	= 69.270 deg. F , 0.3540 psia
dewpoint 2	( 68.480 )	= 68.480 deg. F , 0.3445 psia
dewpoint 3	( 68.470 )	= 68.470 deg. F , 0.3444 psia
dewpoint 4	( 68.670 )	= 68.670 deg. F , 0.3468 psia
dewpoint 5	( 76.570 )	= 76.570 deg. F , 0.4527 psia
dewpoint 6	( 76.030 )	= 76.030 deg. F , 0.4446 psia
pressure 1	( 49.5148 )	= 49.5148 psia
pressure 2	( 49.5210 )	= 49.5210 psia

weighted averages, volume and air mass

temperature	=	88.09338 deg. F
pressure	=	49.51480 psia
vapor pressure	=	0.38951 psia
volume	=	343040 cu. ft.
dry air mass	=	83039.55 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 18

time = 15 date = 609

sensor	raw data	value
temperature 1	( 110.560 )	= 110.560 deg. F
temperature 2	( 101.110 )	= 101.110 deg. F
temperature 3	( 93.440 )	= 93.440 deg. F
temperature 4	( 88.550 )	= 88.550 deg. F
temperature 5	( 102.970 )	= 102.970 deg. F
temperature 6	( 89.540 )	= 89.540 deg. F
temperature 7	( 93.300 )	= 93.300 deg. F
temperature 8	( 93.310 )	= 93.310 deg. F
temperature 9	( 93.500 )	= 93.500 deg. F
temperature 10	( 102.410 )	= 102.410 deg. F
temperature 11	( 110.160 )	= 110.160 deg. F
temperature 12	( 93.090 )	= 93.090 deg. F
temperature 13	( 93.410 )	= 93.410 deg. F
temperature 14	( 89.400 )	= 89.400 deg. F
temperature 15	( 77.850 )	= 77.850 deg. F
temperature 16	( 77.730 )	= 77.730 deg. F
temperature 17	( 77.770 )	= 77.770 deg. F
temperature 18	( 77.810 )	= 77.810 deg. F
dewpoint 1	( 69.260 )	= 69.260 deg. F , 0.3539 psia
dewpoint 2	( 68.500 )	= 68.500 deg. F , 0.3448 psia
dewpoint 3	( 68.480 )	= 68.480 deg. F , 0.3445 psia
dewpoint 4	( 68.670 )	= 68.670 deg. F , 0.3468 psia
dewpoint 5	( 76.560 )	= 76.560 deg. F , 0.4525 psia
dewpoint 6	( 75.990 )	= 75.990 deg. F , 0.4441 psia
pressure 1	( 49.5151 )	= 49.5151 psia
pressure 2	( 49.5210 )	= 49.5210 psia

weighted averages, volume and air mass

temperature	=	88.09033 deg. F
pressure	=	49.51510 psia
vapor pressure	=	0.38940 psia
volume	=	343040 cu. ft.
dry air mass	=	83040.70 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 19

time = 30 date = 609

sensor	raw data	value
temperature 1	( 110.590 )	= 110.590 deg. F
temperature 2	( 101.160 )	= 101.160 deg. F
temperature 3	( 93.470 )	= 93.470 deg. F
temperature 4	( 88.550 )	= 88.550 deg. F
temperature 5	( 103.010 )	= 103.010 deg. F
temperature 6	( 89.560 )	= 89.560 deg. F
temperature 7	( 93.320 )	= 93.320 deg. F
temperature 8	( 93.330 )	= 93.330 deg. F
temperature 9	( 93.510 )	= 93.510 deg. F
temperature 10	( 102.470 )	= 102.470 deg. F
temperature 11	( 110.170 )	= 110.170 deg. F
temperature 12	( 93.130 )	= 93.130 deg. F
temperature 13	( 93.450 )	= 93.450 deg. F
temperature 14	( 89.430 )	= 89.430 deg. F
temperature 15	( 77.870 )	= 77.870 deg. F
temperature 16	( 77.740 )	= 77.740 deg. F
temperature 17	( 77.790 )	= 77.790 deg. F
temperature 18	( 77.830 )	= 77.830 deg. F
dewpoint 1	( 69.330 )	= 69.330 deg. F , 0.3547 psia
dewpoint 2	( 68.560 )	= 68.560 deg. F , 0.3455 psia
dewpoint 3	( 68.510 )	= 68.510 deg. F , 0.3449 psia
dewpoint 4	( 68.750 )	= 68.750 deg. F , 0.3477 psia
dewpoint 5	( 76.600 )	= 76.600 deg. F , 0.4531 psia
dewpoint 6	( 76.010 )	= 76.010 deg. F , 0.4443 psia
pressure 1	( 49.5152 )	= 49.5152 psia
pressure 2	( 49.5211 )	= 49.5211 psia

weighted averages, volume and air mass

temperature	=	88.11395 deg. F
pressure	=	49.51520 psia
vapor pressure	=	0.38999 psia
volume	=	343040 cu. ft.
dry air mass	=	83036.30 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 20

time = 45 date = 609

sensor	raw data	value
temperature 1	( 110.610 )	= 110.610 deg. F
temperature 2	( 101.210 )	= 101.210 deg. F
temperature 3	( 93.490 )	= 93.490 deg. F
temperature 4	( 88.570 )	= 88.570 deg. F
temperature 5	( 103.040 )	= 103.040 deg. F
temperature 6	( 89.560 )	= 89.560 deg. F
temperature 7	( 93.290 )	= 93.290 deg. F
temperature 8	( 93.340 )	= 93.340 deg. F
temperature 9	( 93.550 )	= 93.550 deg. F
temperature 10	( 102.490 )	= 102.490 deg. F
temperature 11	( 110.190 )	= 110.190 deg. F
temperature 12	( 93.130 )	= 93.130 deg. F
temperature 13	( 93.460 )	= 93.460 deg. F
temperature 14	( 89.390 )	= 89.390 deg. F
temperature 15	( 77.850 )	= 77.850 deg. F
temperature 16	( 77.730 )	= 77.730 deg. F
temperature 17	( 77.770 )	= 77.770 deg. F
temperature 18	( 77.820 )	= 77.820 deg. F
dewpoint 1	( 69.370 )	= 69.370 deg. F , 0.3552 psia
dewpoint 2	( 68.630 )	= 68.630 deg. F , 0.3463 psia
dewpoint 3	( 68.580 )	= 68.580 deg. F , 0.3457 psia
dewpoint 4	( 68.770 )	= 68.770 deg. F , 0.3480 psia
dewpoint 5	( 76.590 )	= 76.590 deg. F , 0.4530 psia
dewpoint 6	( 76.020 )	= 76.020 deg. F , 0.4445 psia
pressure 1	( 49.5148 )	= 49.5148 psia
pressure 2	( 49.5206 )	= 49.5206 psia

weighted averages, volume and air mass

temperature	=	88.11360 deg. F
pressure	=	49.51480 psia
vapor pressure	=	0.39036 psia
volume	=	343040 cu. ft.
dry air mass	=	83035.05 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 21

time = 100 date = 609

sensor	raw data	value
temperature 1	( 110.660 )	= 110.660 deg. F
temperature 2	( 101.240 )	= 101.240 deg. F
temperature 3	( 93.510 )	= 93.510 deg. F
temperature 4	( 88.580 )	= 88.580 deg. F
temperature 5	( 103.090 )	= 103.090 deg. F
temperature 6	( 89.570 )	= 89.570 deg. F
temperature 7	( 93.350 )	= 93.350 deg. F
temperature 8	( 93.370 )	= 93.370 deg. F
temperature 9	( 93.550 )	= 93.550 deg. F
temperature 10	( 102.530 )	= 102.530 deg. F
temperature 11	( 110.200 )	= 110.200 deg. F
temperature 12	( 93.140 )	= 93.140 deg. F
temperature 13	( 93.470 )	= 93.470 deg. F
temperature 14	( 89.440 )	= 89.440 deg. F
temperature 15	( 77.840 )	= 77.840 deg. F
temperature 16	( 77.720 )	= 77.720 deg. F
temperature 17	( 77.770 )	= 77.770 deg. F
temperature 18	( 77.810 )	= 77.810 deg. F
dewpoint 1	( 69.420 )	= 69.420 deg. F , 0.3558 psia
dewpoint 2	( 68.670 )	= 68.670 deg. F , 0.3468 psia
dewpoint 3	( 68.630 )	= 68.630 deg. F , 0.3463 psia
dewpoint 4	( 68.820 )	= 68.820 deg. F , 0.3486 psia
dewpoint 5	( 76.580 )	= 76.580 deg. F , 0.4528 psia
dewpoint 6	( 76.010 )	= 76.010 deg. F , 0.4443 psia
pressure 1	( 49.5155 )	= 49.5155 psia
pressure 2	( 49.5214 )	= 49.5214 psia

weighted averages, volume and air mass

temperature	=	88.12598 deg. F
pressure	=	49.51550 psia
vapor pressure	=	0.39062 psia
volume	=	343040 cu. ft.
dry air mass	=	83033.91 lbm



# WNP-2 1991 ILRT TYPE A TEST

data set 22

time = 115 date = 609

sensor		raw data		value	
temperature	1	( 110.670 )	=	110.670 deg. F	
temperature	2	( 101.290 )	=	101.290 deg. F	
temperature	3	( 93.520 )	=	93.520 deg. F	
temperature	4	( 88.590 )	=	88.590 deg. F	
temperature	5	( 103.130 )	=	103.130 deg. F	
temperature	6	( 89.580 )	=	89.580 deg. F	
temperature	7	( 93.330 )	=	93.330 deg. F	
temperature	8	( 93.370 )	=	93.370 deg. F	
temperature	9	( 93.570 )	=	93.570 deg. F	
temperature	10	( 102.570 )	=	102.570 deg. F	
temperature	11	( 110.190 )	=	110.190 deg. F	
temperature	12	( 93.150 )	=	93.150 deg. F	
temperature	13	( 93.480 )	=	93.480 deg. F	
temperature	14	( 89.410 )	=	89.410 deg. F	
temperature	15	( 77.840 )	=	77.840 deg. F	
temperature	16	( 77.720 )	=	77.720 deg. F	
temperature	17	( 77.770 )	=	77.770 deg. F	
temperature	18	( 77.810 )	=	77.810 deg. F	
dewpoint	1	( 69.450 )	=	69.450 deg. F	, 0.3562 psia
dewpoint	2	( 68.690 )	=	68.690 deg. F	, 0.3470 psia
dewpoint	3	( 68.650 )	=	68.650 deg. F	, 0.3465 psia
dewpoint	4	( 68.840 )	=	68.840 deg. F	, 0.3488 psia
dewpoint	5	( 76.570 )	=	76.570 deg. F	, 0.4527 psia
dewpoint	6	( 75.980 )	=	75.980 deg. F	, 0.4439 psia
pressure	1	( 49.5151 )	=	49.5151 psia	
pressure	2	( 49.5216 )	=	49.5216 psia	

weighted averages, volume and air mass

temperature	=	88.13185 deg. F
pressure	=	49.51510 psia
vapor pressure	=	0.39065 psia
volume	=	343040 cu. ft.
dry air mass	=	83032.29 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 23

time = 130 date = 609

sensor		raw data	value	
temperature	1	( 110.700 )	=	110.700 deg. F
temperature	2	( 101.320 )	=	101.320 deg. F
temperature	3	( 93.530 )	=	93.530 deg. F
temperature	4	( 88.590 )	=	88.590 deg. F
temperature	5	( 103.170 )	=	103.170 deg. F
temperature	6	( 89.580 )	=	89.580 deg. F
temperature	7	( 93.360 )	=	93.360 deg. F
temperature	8	( 93.390 )	=	93.390 deg. F
temperature	9	( 93.580 )	=	93.580 deg. F
temperature	10	( 102.610 )	=	102.610 deg. F
temperature	11	( 110.240 )	=	110.240 deg. F
temperature	12	( 93.170 )	=	93.170 deg. F
temperature	13	( 93.500 )	=	93.500 deg. F
temperature	14	( 89.440 )	=	89.440 deg. F
temperature	15	( 77.840 )	=	77.840 deg. F
temperature	16	( 77.720 )	=	77.720 deg. F
temperature	17	( 77.760 )	=	77.760 deg. F
temperature	18	( 77.800 )	=	77.800 deg. F
dewpoint	1	( 69.500 )	=	69.500 deg. F , 0.3568 psia
dewpoint	2	( 68.740 )	=	68.740 deg. F , 0.3476 psia
dewpoint	3	( 68.690 )	=	68.690 deg. F , 0.3470 psia
dewpoint	4	( 68.900 )	=	68.900 deg. F , 0.3495 psia
dewpoint	5	( 76.590 )	=	76.590 deg. F , 0.4530 psia
dewpoint	6	( 75.980 )	=	75.980 deg. F , 0.4439 psia
pressure	1	( 49.5155 )	=	49.5155 psia
pressure	2	( 49.5219 )	=	49.5219 psia

weighted averages, volume and air mass

temperature	=	88.14236 deg. F
pressure	=	49.51550 psia
vapor pressure	=	0.39106 psia
volume	=	343040 cu. ft.
dry air mass	=	83030.69 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 24

time = 145 date = 609

sensor	raw data	value
temperature 1	( 110.710 )	= 110.710 deg. F
temperature 2	( 101.360 )	= 101.360 deg. F
temperature 3	( 93.540 )	= 93.540 deg. F
temperature 4	( 88.600 )	= 88.600 deg. F
temperature 5	( 103.210 )	= 103.210 deg. F
temperature 6	( 89.590 )	= 89.590 deg. F
temperature 7	( 93.370 )	= 93.370 deg. F
temperature 8	( 93.410 )	= 93.410 deg. F
temperature 9	( 93.600 )	= 93.600 deg. F
temperature 10	( 102.660 )	= 102.660 deg. F
temperature 11	( 110.300 )	= 110.300 deg. F
temperature 12	( 93.170 )	= 93.170 deg. F
temperature 13	( 93.510 )	= 93.510 deg. F
temperature 14	( 89.440 )	= 89.440 deg. F
temperature 15	( 77.830 )	= 77.830 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.760 )	= 77.760 deg. F
temperature 18	( 77.800 )	= 77.800 deg. F
dewpoint 1	( 69.530 )	= 69.530 deg. F , 0.3571 psia
dewpoint 2	( 68.780 )	= 68.780 deg. F , 0.3481 psia
dewpoint 3	( 68.750 )	= 68.750 deg. F , 0.3477 psia
dewpoint 4	( 68.920 )	= 68.920 deg. F , 0.3498 psia
dewpoint 5	( 76.570 )	= 76.570 deg. F , 0.4527 psia
dewpoint 6	( 75.970 )	= 75.970 deg. F , 0.4438 psia
pressure 1	( 49.5157 )	= 49.5157 psia
pressure 2	( 49.5220 )	= 49.5220 psia

weighted averages, volume and air mass

temperature	=	88.15126 deg. F
pressure	=	49.51570 psia
vapor pressure	=	0.39124 psia
volume	=	343040 cu. ft.
dry air mass	=	83029.37 lbm

1944

1. The first part of the report deals with the general situation of the country and the progress of the war. It is a very interesting and informative account of the events of the year.

2. The second part of the report deals with the economic situation of the country. It is a very detailed and thorough analysis of the economic conditions and the measures taken to improve them.

3. The third part of the report deals with the social situation of the country. It is a very comprehensive and up-to-date survey of the social conditions and the efforts to improve them.

4. The fourth part of the report deals with the cultural situation of the country. It is a very thorough and detailed account of the cultural life and the efforts to promote it.

5. The fifth part of the report deals with the political situation of the country. It is a very comprehensive and up-to-date survey of the political conditions and the efforts to improve them.

## WNP-2 1991 ILRT TYPE A TEST

data set 25

time = 200 date = 609

sensor	raw data	value
temperature 1	( 110.730 )	= 110.730 deg. F
temperature 2	( 101.390 )	= 101.390 deg. F
temperature 3	( 93.560 )	= 93.560 deg. F
temperature 4	( 88.610 )	= 88.610 deg. F
temperature 5	( 103.240 )	= 103.240 deg. F
temperature 6	( 89.590 )	= 89.590 deg. F
temperature 7	( 93.380 )	= 93.380 deg. F
temperature 8	( 93.420 )	= 93.420 deg. F
temperature 9	( 93.610 )	= 93.610 deg. F
temperature 10	( 102.690 )	= 102.690 deg. F
temperature 11	( 110.330 )	= 110.330 deg. F
temperature 12	( 93.200 )	= 93.200 deg. F
temperature 13	( 93.520 )	= 93.520 deg. F
temperature 14	( 89.480 )	= 89.480 deg. F
temperature 15	( 77.830 )	= 77.830 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.750 )	= 77.750 deg. F
temperature 18	( 77.790 )	= 77.790 deg. F
dewpoint 1	( 69.570 )	= 69.570 deg. F , 0.3576 psia
dewpoint 2	( 68.780 )	= 68.780 deg. F , 0.3481 psia
dewpoint 3	( 68.760 )	= 68.760 deg. F , 0.3479 psia
dewpoint 4	( 68.960 )	= 68.960 deg. F , 0.3502 psia
dewpoint 5	( 76.560 )	= 76.560 deg. F , 0.4525 psia
dewpoint 6	( 75.940 )	= 75.940 deg. F , 0.4433 psia
pressure 1	( 49.5157 )	= 49.5157 psia
pressure 2	( 49.5220 )	= 49.5220 psia

weighted averages, volume and air mass

temperature	=	88.16051 deg. F
pressure	=	49.51570 psia
vapor pressure	=	0.39125 psia
volume	=	343040 cu. ft.
dry air mass	=	83027.95 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 26

time = 215 date = 609

sensor	raw data	value
temperature 1	( 110.740 )	= 110.740 deg. F
temperature 2	( 101.440 )	= 101.440 deg. F
temperature 3	( 93.580 )	= 93.580 deg. F
temperature 4	( 88.610 )	= 88.610 deg. F
temperature 5	( 103.270 )	= 103.270 deg. F
temperature 6	( 89.600 )	= 89.600 deg. F
temperature 7	( 93.390 )	= 93.390 deg. F
temperature 8	( 93.430 )	= 93.430 deg. F
temperature 9	( 93.630 )	= 93.630 deg. F
temperature 10	( 102.730 )	= 102.730 deg. F
temperature 11	( 110.320 )	= 110.320 deg. F
temperature 12	( 93.210 )	= 93.210 deg. F
temperature 13	( 93.530 )	= 93.530 deg. F
temperature 14	( 89.480 )	= 89.480 deg. F
temperature 15	( 77.830 )	= 77.830 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.750 )	= 77.750 deg. F
temperature 18	( 77.790 )	= 77.790 deg. F
dewpoint 1	( 69.590 )	= 69.590 deg. F , 0.3579 psia
dewpoint 2	( 68.810 )	= 68.810 deg. F , 0.3485 psia
dewpoint 3	( 68.800 )	= 68.800 deg. F , 0.3483 psia
dewpoint 4	( 69.010 )	= 69.010 deg. F , 0.3508 psia
dewpoint 5	( 76.560 )	= 76.560 deg. F , 0.4525 psia
dewpoint 6	( 75.940 )	= 75.940 deg. F , 0.4433 psia
pressure 1	( 49.5160 )	= 49.5160 psia
pressure 2	( 49.5222 )	= 49.5222 psia

weighted averages, volume and air mass

temperature	=	88.16908 deg. F
pressure	=	49.51600 psia
vapor pressure	=	0.39149 psia
volume	=	343040 cu. ft.
dry air mass	=	83026.74 lbm

## WNP-2 1991 ILRT TYPE A TEST

data set 27

time = 230 date = 609

sensor	raw data	value
temperature 1	( 110.770 )	= 110.770 deg. F
temperature 2	( 101.470 )	= 101.470 deg. F
temperature 3	( 93.580 )	= 93.580 deg. F
temperature 4	( 88.640 )	= 88.640 deg. F
temperature 5	( 103.320 )	= 103.320 deg. F
temperature 6	( 89.620 )	= 89.620 deg. F
temperature 7	( 93.400 )	= 93.400 deg. F
temperature 8	( 93.440 )	= 93.440 deg. F
temperature 9	( 93.650 )	= 93.650 deg. F
temperature 10	( 102.770 )	= 102.770 deg. F
temperature 11	( 110.330 )	= 110.330 deg. F
temperature 12	( 93.220 )	= 93.220 deg. F
temperature 13	( 93.550 )	= 93.550 deg. F
temperature 14	( 89.480 )	= 89.480 deg. F
temperature 15	( 77.820 )	= 77.820 deg. F
temperature 16	( 77.720 )	= 77.720 deg. F
temperature 17	( 77.740 )	= 77.740 deg. F
temperature 18	( 77.790 )	= 77.790 deg. F
dewpoint 1	( 69.640 )	= 69.640 deg. F , 0.3585 psia
dewpoint 2	( 68.860 )	= 68.860 deg. F , 0.3490 psia
dewpoint 3	( 68.830 )	= 68.830 deg. F , 0.3487 psia
dewpoint 4	( 69.040 )	= 69.040 deg. F , 0.3512 psia
dewpoint 5	( 76.530 )	= 76.530 deg. F , 0.4521 psia
dewpoint 6	( 75.940 )	= 75.940 deg. F , 0.4433 psia
pressure 1	( 49.5158 )	= 49.5158 psia
pressure 2	( 49.5223 )	= 49.5223 psia

weighted averages, volume and air mass

temperature	=	88.17952 deg. F
pressure	=	49.51580 psia
vapor pressure	=	0.39168 psia
volume	=	343040 cu. ft.
dry air mass	=	83024.51 lbm

## WNP-2 1991 ILRT TYPE A TEST

data set. 28

time = 245      date = 609

sensor	raw data	value
temperature 1	( 110.810 )	= 110.810 deg. F
temperature 2	( 101.500 )	= 101.500 deg. F
temperature 3	( 93.580 )	= 93.580 deg. F
temperature 4	( 88.640 )	= 88.640 deg. F
temperature 5	( 103.350 )	= 103.350 deg. F
temperature 6	( 89.630 )	= 89.630 deg. F
temperature 7	( 93.420 )	= 93.420 deg. F
temperature 8	( 93.460 )	= 93.460 deg. F
temperature 9	( 93.650 )	= 93.650 deg. F
temperature 10	( 102.800 )	= 102.800 deg. F
temperature 11	( 110.360 )	= 110.360 deg. F
temperature 12	( 93.230 )	= 93.230 deg. F
temperature 13	( 93.570 )	= 93.570 deg. F
temperature 14	( 89.510 )	= 89.510 deg. F
temperature 15	( 77.820 )	= 77.820 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.740 )	= 77.740 deg. F
temperature 18	( 77.780 )	= 77.780 deg. F
dewpoint 1	( 69.680 )	= 69.680 deg. F , 0.3590 psia
dewpoint 2	( 68.870 )	= 68.870 deg. F , 0.3492 psia
dewpoint 3	( 68.910 )	= 68.910 deg. F , 0.3496 psia
dewpoint 4	( 69.090 )	= 69.090 deg. F , 0.3518 psia
dewpoint 5	( 76.530 )	= 76.530 deg. F , 0.4521 psia
dewpoint 6	( 75.940 )	= 75.940 deg. F , 0.4433 psia
pressure 1	( 49.5160 )	= 49.5160 psia
pressure 2	( 49.5224 )	= 49.5224 psia

weighted averages, volume and air mass

temperature	=	88.18794 deg. F
pressure	=	49.51600 psia
vapor pressure	=	0.39199 psia
volume	=	343040 cu. ft.
dry air mass	=	83023.04 lbm





## WNP-2 1991 ILRT TYPE A TEST

data set 29

time = 300 date = 609

sensor	raw data	value
temperature 1	( 110.840 )	= 110.840 deg. F
temperature 2	( 101.550 )	= 101.550 deg. F
temperature 3	( 93.620 )	= 93.620 deg. F
temperature 4	( 88.640 )	= 88.640 deg. F
temperature 5	( 103.390 )	= 103.390 deg. F
temperature 6	( 89.620 )	= 89.620 deg. F
temperature 7	( 93.440 )	= 93.440 deg. F
temperature 8	( 93.460 )	= 93.460 deg. F
temperature 9	( 93.660 )	= 93.660 deg. F
temperature 10	( 102.840 )	= 102.840 deg. F
temperature 11	( 110.430 )	= 110.430 deg. F
temperature 12	( 93.250 )	= 93.250 deg. F
temperature 13	( 93.580 )	= 93.580 deg. F
temperature 14	( 89.510 )	= 89.510 deg. F
temperature 15	( 77.800 )	= 77.800 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.740 )	= 77.740 deg. F
temperature 18	( 77.780 )	= 77.780 deg. F
dewpoint 1	( 69.720 )	= 69.720 deg. F , 0.3595 psia
dewpoint 2	( 68.950 )	= 68.950 deg. F , 0.3501 psia
dewpoint 3	( 68.930 )	= 68.930 deg. F , 0.3499 psia
dewpoint 4	( 69.120 )	= 69.120 deg. F , 0.3522 psia
dewpoint 5	( 76.480 )	= 76.480 deg. F , 0.4513 psia
dewpoint 6	( 75.910 )	= 75.910 deg. F , 0.4429 psia
pressure 1	( 49.5159 )	= 49.5159 psia
pressure 2	( 49.5225 )	= 49.5225 psia

weighted averages, volume and air mass

temperature	=	88.19714 deg. F
pressure	=	49.51590 psia
vapor pressure	=	0.39205 psia
volume	=	343040 cu. ft.
dry air mass	=	83021.38 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 30

time = 315 date = 609

sensor	raw data	value
temperature 1	( 110.850 )	= 110.850 deg. F
temperature 2	( 101.590 )	= 101.590 deg. F
temperature 3	( 93.630 )	= 93.630 deg. F
temperature 4	( 88.660 )	= 88.660 deg. F
temperature 5	( 103.430 )	= 103.430 deg. F
temperature 6	( 89.630 )	= 89.630 deg. F
temperature 7	( 93.470 )	= 93.470 deg. F
temperature 8	( 93.480 )	= 93.480 deg. F
temperature 9	( 93.690 )	= 93.690 deg. F
temperature 10	( 102.890 )	= 102.890 deg. F
temperature 11	( 110.430 )	= 110.430 deg. F
temperature 12	( 93.250 )	= 93.250 deg. F
temperature 13	( 93.600 )	= 93.600 deg. F
temperature 14	( 89.530 )	= 89.530 deg. F
temperature 15	( 77.800 )	= 77.800 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.730 )	= 77.730 deg. F
temperature 18	( 77.770 )	= 77.770 deg. F
dewpoint 1	( 69.760 )	= 69.760 deg. F , 0.3600 psia
dewpoint 2	( 68.990 )	= 68.990 deg. F , 0.3506 psia
dewpoint 3	( 68.930 )	= 68.930 deg. F , 0.3499 psia
dewpoint 4	( 69.160 )	= 69.160 deg. F , 0.3527 psia
dewpoint 5	( 76.500 )	= 76.500 deg. F , 0.4516 psia
dewpoint 6	( 75.910 )	= 75.910 deg. F , 0.4429 psia
pressure 1	( 49.5165 )	= 49.5165 psia
pressure 2	( 49.5226 )	= 49.5226 psia

weighted averages, volume and air mass

temperature	=	88.20773 deg. F
pressure	=	49.51650 psia
vapor pressure	=	0.39231 psia
volume	=	343040 cu. ft.
dry air mass	=	83020.35 lbm



# WNP-2 1991 ILRT TYPE A TEST

data set 31

time = 330 date = 609

sensor	raw data	value
temperature 1	( 110.870 )	= 110.870 deg. F
temperature 2	( 101.620 )	= 101.620 deg. F
temperature 3	( 93.640 )	= 93.640 deg. F
temperature 4	( 88.660 )	= 88.660 deg. F
temperature 5	( 103.460 )	= 103.460 deg. F
temperature 6	( 89.640 )	= 89.640 deg. F
temperature 7	( 93.450 )	= 93.450 deg. F
temperature 8	( 93.510 )	= 93.510 deg. F
temperature 9	( 93.690 )	= 93.690 deg. F
temperature 10	( 102.920 )	= 102.920 deg. F
temperature 11	( 110.430 )	= 110.430 deg. F
temperature 12	( 93.270 )	= 93.270 deg. F
temperature 13	( 93.590 )	= 93.590 deg. F
temperature 14	( 89.510 )	= 89.510 deg. F
temperature 15	( 77.800 )	= 77.800 deg. F
temperature 16	( 77.700 )	= 77.700 deg. F
temperature 17	( 77.730 )	= 77.730 deg. F
temperature 18	( 77.770 )	= 77.770 deg. F
dewpoint 1	( 69.810 )	= 69.810 deg. F , 0.3606 psia
dewpoint 2	( 69.010 )	= 69.010 deg. F , 0.3508 psia
dewpoint 3	( 68.990 )	= 68.990 deg. F , 0.3506 psia
dewpoint 4	( 69.190 )	= 69.190 deg. F , 0.3530 psia
dewpoint 5	( 76.500 )	= 76.500 deg. F , 0.4516 psia
dewpoint 6	( 75.930 )	= 75.930 deg. F , 0.4432 psia
pressure 1	( 49.5159 )	= 49.5159 psia
pressure 2	( 49.5226 )	= 49.5226 psia

weighted averages, volume and air mass

temperature	=	88.21146 deg. F
pressure	=	49.51590 psia
vapor pressure	=	0.39266 psia
volume	=	343040 cu. ft.
dry air mass	=	83018.19 lbm



## WNP-2 1991 ILRT TYPE A TEST

data set 32

time = 345 date = 609

sensor	raw data	value
temperature 1	( 110.890 )	= 110.890 deg. F
temperature 2	( 101.650 )	= 101.650 deg. F
temperature 3	( 93.630 )	= 93.630 deg. F
temperature 4	( 88.670 )	= 88.670 deg. F
temperature 5	( 103.500 )	= 103.500 deg. F
temperature 6	( 89.650 )	= 89.650 deg. F
temperature 7	( 93.470 )	= 93.470 deg. F
temperature 8	( 93.510 )	= 93.510 deg. F
temperature 9	( 93.710 )	= 93.710 deg. F
temperature 10	( 102.950 )	= 102.950 deg. F
temperature 11	( 110.450 )	= 110.450 deg. F
temperature 12	( 93.280 )	= 93.280 deg. F
temperature 13	( 93.610 )	= 93.610 deg. F
temperature 14	( 89.540 )	= 89.540 deg. F
temperature 15	( 77.800 )	= 77.800 deg. F
temperature 16	( 77.690 )	= 77.690 deg. F
temperature 17	( 77.730 )	= 77.730 deg. F
temperature 18	( 77.770 )	= 77.770 deg. F
dewpoint 1	( 69.840 )	= 69.840 deg. F , 0.3609 psia
dewpoint 2	( 69.050 )	= 69.050 deg. F , 0.3513 psia
dewpoint 3	( 69.030 )	= 69.030 deg. F , 0.3511 psia
dewpoint 4	( 69.230 )	= 69.230 deg. F , 0.3535 psia
dewpoint 5	( 76.510 )	= 76.510 deg. F , 0.4518 psia
dewpoint 6	( 75.920 )	= 75.920 deg. F , 0.4430 psia
pressure 1	( 49.5166 )	= 49.5166 psia
pressure 2	( 49.5227 )	= 49.5227 psia

weighted averages, volume and air mass

temperature	=	88.22069 deg. F
pressure	=	49.51660 psia
vapor pressure	=	0.39292 psia
volume	=	343040 cu. ft.
dry air mass	=	83017.53 lbm

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## WNP-2 1991 ILRT TYPE A TEST

data set 33

time = 400 date = 609

sensor	raw data	value
temperature 1	( 110.900 )	= 110.900 deg. F
temperature 2	( 101.720 )	= 101.720 deg. F
temperature 3	( 93.670 )	= 93.670 deg. F
temperature 4	( 88.690 )	= 88.690 deg. F
temperature 5	( 103.540 )	= 103.540 deg. F
temperature 6	( 89.650 )	= 89.650 deg. F
temperature 7	( 93.490 )	= 93.490 deg. F
temperature 8	( 93.530 )	= 93.530 deg. F
temperature 9	( 93.730 )	= 93.730 deg. F
temperature 10	( 103.000 )	= 103.000 deg. F
temperature 11	( 110.500 )	= 110.500 deg. F
temperature 12	( 93.300 )	= 93.300 deg. F
temperature 13	( 93.630 )	= 93.630 deg. F
temperature 14	( 89.510 )	= 89.510 deg. F
temperature 15	( 77.800 )	= 77.800 deg. F
temperature 16	( 77.710 )	= 77.710 deg. F
temperature 17	( 77.720 )	= 77.720 deg. F
temperature 18	( 77.770 )	= 77.770 deg. F
dewpoint 1	( 69.870 )	= 69.870 deg. F , 0.3613 psia
dewpoint 2	( 69.090 )	= 69.090 deg. F , 0.3518 psia
dewpoint 3	( 69.060 )	= 69.060 deg. F , 0.3514 psia
dewpoint 4	( 69.270 )	= 69.270 deg. F , 0.3540 psia
dewpoint 5	( 76.480 )	= 76.480 deg. F , 0.4513 psia
dewpoint 6	( 75.910 )	= 75.910 deg. F , 0.4429 psia
pressure 1	( 49.5166 )	= 49.5166 psia
pressure 2	( 49.5228 )	= 49.5228 psia

weighted averages, volume and air mass

temperature	=	88.23477 deg. F
pressure	=	49.51660 psia
vapor pressure	=	0.39305 psia
volume	=	343040 cu. ft.
dry air mass	=	83015.19 lbm



PRE-DATA REPORT

title = WNP-2 1991 ILRT VERIFICATION

volume = 343040

La = 0.5000

leap year : no

Temperature volume fractions ( sum = 1.0000 )

t( 1)=0.0265	t( 2)=0.0402	t( 3)=0.0398	t( 4)=0.0563	t( 5)=0.0402
t( 6)=0.0563	t( 7)=0.0398	t( 8)=0.0398	t( 9)=0.0398	t(10)=0.0402
t(11)=0.0265	t(12)=0.0398	t(13)=0.0398	t(14)=0.0563	t(15)=0.1047
t(16)=0.1047	t(17)=0.1047	t(18)=0.1046		

dewpoint volume fractions ( sum = 1.0000 )

dp( 1)=0.1194	dp( 2)=0.1737	dp( 3)=0.1688	dp( 4)=0.1194	dp( 5)=0.2094
dp( 6)=0.2093				

pressure volume fractions ( sum = 1.0000 )

p( 1)=1.0000 p( 2)=0.0000

## WNP-2 1991 ILRT VERIFICATION

## DATA SUMMARY REPORT

data set	time	date	temperature deg F	pressure psia	vapor pressure psia	dry air mass lbm
1	515	609	88.2693	49.5055	0.3942	82989.17
2	530	609	88.2729	49.5032	0.3944	82984.48
3	545	609	88.2852	49.5010	0.3945	82978.81
4	600	609	88.2932	49.4985	0.3948	82972.83
5	615	609	88.2952	49.4957	0.3950	82967.41
6	630	609	88.3026	49.4938	0.3953	82962.64
7	645	609	88.3130	49.4908	0.3953	82955.97
8	700	609	88.3150	49.4887	0.3956	82951.66
9	715	609	88.3176	49.4860	0.3957	82946.39
10	730	609	88.3299	49.4837	0.3957	82940.62
11	745	609	88.3408	49.4816	0.3962	82934.65
12	800	609	88.3335	49.4788	0.3964	82930.66
13	815	609	88.3528	49.4765	0.3966	82923.56
14	830	609	88.3532	49.4740	0.3971	82918.37
15	845	609	88.3671	49.4715	0.3971	82912.14
16	900	609	88.3663	49.4689	0.3972	82907.68
17	915	609	88.3582	49.4666	0.3975	82904.48

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains.

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## WNP-2 1991 ILRT VERIFICATION

data set 1

time = 515 date = 609

sensor	raw data	value
temperature 1	( 110.990 )	= 110.990 deg. F
temperature 2	( 101.870 )	= 101.870 deg. F
temperature 3	( 93.730 )	= 93.730 deg. F
temperature 4	( 88.710 )	= 88.710 deg. F
temperature 5	( 103.700 )	= 103.700 deg. F
temperature 6	( 89.680 )	= 89.680 deg. F
temperature 7	( 93.590 )	= 93.590 deg. F
temperature 8	( 93.580 )	= 93.580 deg. F
temperature 9	( 93.770 )	= 93.770 deg. F
temperature 10	( 103.170 )	= 103.170 deg. F
temperature 11	( 110.590 )	= 110.590 deg. F
temperature 12	( 93.360 )	= 93.360 deg. F
temperature 13	( 93.690 )	= 93.690 deg. F
temperature 14	( 89.570 )	= 89.570 deg. F
temperature 15	( 77.770 )	= 77.770 deg. F
temperature 16	( 77.690 )	= 77.690 deg. F
temperature 17	( 77.700 )	= 77.700 deg. F
temperature 18	( 77.740 )	= 77.740 deg. F
dewpoint 1	( 70.060 )	= 70.060 deg. F , 0.3637 psia
dewpoint 2	( 69.310 )	= 69.310 deg. F , 0.3545 psia
dewpoint 3	( 69.240 )	= 69.240 deg. F , 0.3536 psia
dewpoint 4	( 69.440 )	= 69.440 deg. F , 0.3560 psia
dewpoint 5	( 76.450 )	= 76.450 deg. F , 0.4509 psia
dewpoint 6	( 75.890 )	= 75.890 deg. F , 0.4426 psia
pressure 1	( 49.5055 )	= 49.5055 psia
pressure 2	( 49.5121 )	= 49.5121 psia

weighted averages, volume and air mass

temperature	=	88.26929 deg. F
pressure	=	49.50550 psia
vapor pressure	=	0.39425 psia
volume	=	343040 cu. ft.
dry air mass	=	82989.17 lbm

## WNP-2 1991 ILRT VERIFICATION

data set 2

time = 530 date = 609

sensor	raw data	value
temperature 1	( 111.000 )	= 111.000 deg. F
temperature 2	( 101.910 )	= 101.910 deg. F
temperature 3	( 93.740 )	= 93.740 deg. F
temperature 4	( 88.720 )	= 88.720 deg. F
temperature 5	( 103.730 )	= 103.730 deg. F
temperature 6	( 89.690 )	= 89.690 deg. F
temperature 7	( 93.590 )	= 93.590 deg. F
temperature 8	( 93.600 )	= 93.600 deg. F
temperature 9	( 93.800 )	= 93.800 deg. F
temperature 10	( 103.200 )	= 103.200 deg. F
temperature 11	( 110.580 )	= 110.580 deg. F
temperature 12	( 93.360 )	= 93.360 deg. F
temperature 13	( 93.670 )	= 93.670 deg. F
temperature 14	( 89.570 )	= 89.570 deg. F
temperature 15	( 77.760 )	= 77.760 deg. F
temperature 16	( 77.680 )	= 77.680 deg. F
temperature 17	( 77.700 )	= 77.700 deg. F
temperature 18	( 77.730 )	= 77.730 deg. F
dewpoint 1	( 70.080 )	= 70.080 deg. F , 0.3639 psia
dewpoint 2	( 69.310 )	= 69.310 deg. F , 0.3545 psia
dewpoint 3	( 69.310 )	= 69.310 deg. F , 0.3545 psia
dewpoint 4	( 69.490 )	= 69.490 deg. F , 0.3567 psia
dewpoint 5	( 76.420 )	= 76.420 deg. F , 0.4504 psia
dewpoint 6	( 75.890 )	= 75.890 deg. F , 0.4426 psia
pressure 1	( 49.5032 )	= 49.5032 psia
pressure 2	( 49.5098 )	= 49.5098 psia

weighted averages, volume and air mass

temperature	=	88.27290 deg. F
pressure	=	49.50320 psia
vapor pressure	=	0.39440 psia
volume	=	343040 cu. ft.
dry air mass	=	82984.48 lbm





# WNP-2 1991 ILRT VERIFICATION

data set 3

time = 545 date = 609

sensor	raw data	value
temperature 1	( 111.020 )	= 111.020 deg. F
temperature 2	( 101.950 )	= 101.950 deg. F
temperature 3	( 93.760 )	= 93.760 deg. F
temperature 4	( 88.730 )	= 88.730 deg. F
temperature 5	( 103.780 )	= 103.780 deg. F
temperature 6	( 89.710 )	= 89.710 deg. F
temperature 7	( 93.570 )	= 93.570 deg. F
temperature 8	( 93.600 )	= 93.600 deg. F
temperature 9	( 93.820 )	= 93.820 deg. F
temperature 10	( 103.240 )	= 103.240 deg. F
temperature 11	( 110.610 )	= 110.610 deg. F
temperature 12	( 93.370 )	= 93.370 deg. F
temperature 13	( 93.700 )	= 93.700 deg. F
temperature 14	( 89.600 )	= 89.600 deg. F
temperature 15	( 77.770 )	= 77.770 deg. F
temperature 16	( 77.680 )	= 77.680 deg. F
temperature 17	( 77.690 )	= 77.690 deg. F
temperature 18	( 77.730 )	= 77.730 deg. F
dewpoint 1	( 70.120 )	= 70.120 deg. F , 0.3644 psia
dewpoint 2	( 69.350 )	= 69.350 deg. F , 0.3550 psia
dewpoint 3	( 69.350 )	= 69.350 deg. F , 0.3550 psia
dewpoint 4	( 69.500 )	= 69.500 deg. F , 0.3568 psia
dewpoint 5	( 76.390 )	= 76.390 deg. F , 0.4500 psia
dewpoint 6	( 75.860 )	= 75.860 deg. F , 0.4421 psia
pressure 1	( 49.5010 )	= 49.5010 psia
pressure 2	( 49.5072 )	= 49.5072 psia

weighted averages, volume and air mass

temperature	=	88.28520 deg. F
pressure	=	49.50100 psia
vapor pressure	=	0.39445 psia
volume	=	343040 cu. ft.
dry air mass	=	82978.81 lbm

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# WNP-2 1991 ILRT VERIFICATION

data set 4

time = 600 date = 609

sensor	raw data	value
temperature 1	( 111.060 )	= 111.060 deg. F
temperature 2	( 101.970 )	= 101.970 deg. F
temperature 3	( 93.760 )	= 93.760 deg. F
temperature 4	( 88.730 )	= 88.730 deg. F
temperature 5	( 103.810 )	= 103.810 deg. F
temperature 6	( 89.700 )	= 89.700 deg. F
temperature 7	( 93.610 )	= 93.610 deg. F
temperature 8	( 93.620 )	= 93.620 deg. F
temperature 9	( 93.830 )	= 93.830 deg. F
temperature 10	( 103.270 )	= 103.270 deg. F
temperature 11	( 110.650 )	= 110.650 deg. F
temperature 12	( 93.380 )	= 93.380 deg. F
temperature 13	( 93.710 )	= 93.710 deg. F
temperature 14	( 89.630 )	= 89.630 deg. F
temperature 15	( 77.750 )	= 77.750 deg. F
temperature 16	( 77.680 )	= 77.680 deg. F
temperature 17	( 77.690 )	= 77.690 deg. F
temperature 18	( 77.730 )	= 77.730 deg. F
dewpoint 1	( 70.150 )	= 70.150 deg. F , 0.3648 psia
dewpoint 2	( 69.370 )	= 69.370 deg. F , 0.3552 psia
dewpoint 3	( 69.370 )	= 69.370 deg. F , 0.3552 psia
dewpoint 4	( 69.550 )	= 69.550 deg. F , 0.3574 psia
dewpoint 5	( 76.410 )	= 76.410 deg. F , 0.4503 psia
dewpoint 6	( 75.880 )	= 75.880 deg. F , 0.4424 psia
pressure 1	( 49.4985 )	= 49.4985 psia
pressure 2	( 49.5047 )	= 49.5047 psia

weighted averages, volume and air mass

temperature	=	88.29315 deg. F
pressure	=	49.49850 psia
vapor pressure	=	0.39478 psia
volume	=	343040 cu. ft.
dry air mass	=	82972.83 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 5

time = 615 date = 609

sensor	raw data	value
temperature 1	( 111.060 )	= 111.060 deg. F
temperature 2	( 102.000 )	= 102.000 deg. F
temperature 3	( 93.790 )	= 93.790 deg. F
temperature 4	( 88.740 )	= 88.740 deg. F
temperature 5	( 103.840 )	= 103.840 deg. F
temperature 6	( 89.700 )	= 89.700 deg. F
temperature 7	( 93.600 )	= 93.600 deg. F
temperature 8	( 93.620 )	= 93.620 deg. F
temperature 9	( 93.830 )	= 93.830 deg. F
temperature 10	( 103.310 )	= 103.310 deg. F
temperature 11	( 110.670 )	= 110.670 deg. F
temperature 12	( 93.380 )	= 93.380 deg. F
temperature 13	( 93.710 )	= 93.710 deg. F
temperature 14	( 89.580 )	= 89.580 deg. F
temperature 15	( 77.760 )	= 77.760 deg. F
temperature 16	( 77.670 )	= 77.670 deg. F
temperature 17	( 77.690 )	= 77.690 deg. F
temperature 18	( 77.720 )	= 77.720 deg. F
dewpoint 1	( 70.190 )	= 70.190 deg. F , 0.3653 psia
dewpoint 2	( 69.400 )	= 69.400 deg. F , 0.3556 psia
dewpoint 3	( 69.370 )	= 69.370 deg. F , 0.3552 psia
dewpoint 4	( 69.580 )	= 69.580 deg. F , 0.3578 psia
dewpoint 5	( 76.430 )	= 76.430 deg. F , 0.4506 psia
dewpoint 6	( 75.880 )	= 75.880 deg. F , 0.4424 psia
pressure 1	( 49.4957 )	= 49.4957 psia
pressure 2	( 49.5022 )	= 49.5022 psia

weighted averages, volume and air mass

temperature	=	88.29519 deg. F
pressure	=	49.49570 psia
vapor pressure	=	0.39500 psia
volume	=	343040 cu. ft.
dry air mass	=	82967.41 lbm

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6. The sixth part of the document is a list of the names and addresses of the members of the committee.

## WNP-2 1991 ILRT VERIFICATION

data set 6

time = 630 date = '609

sensor	raw data	value
temperature 1	( 111.090 )	= 111.090 deg. F
temperature 2	( 102.040 )	= 102.040 deg. F
temperature 3	( 93.770 )	= 93.770 deg. F
temperature 4	( 88.750 )	= 88.750 deg. F
temperature 5	( 103.870 )	= 103.870 deg. F
temperature 6	( 89.710 )	= 89.710 deg. F
temperature 7	( 93.620 )	= 93.620 deg. F
temperature 8	( 93.630 )	= 93.630 deg. F
temperature 9	( 93.830 )	= 93.830 deg. F
temperature 10	( 103.340 )	= 103.340 deg. F
temperature 11	( 110.660 )	= 110.660 deg. F
temperature 12	( 93.390 )	= 93.390 deg. F
temperature 13	( 93.730 )	= 93.730 deg. F
temperature 14	( 89.620 )	= 89.620 deg. F
temperature 15	( 77.750 )	= 77.750 deg. F
temperature 16	( 77.670 )	= 77.670 deg. F
temperature 17	( 77.680 )	= 77.680 deg. F
temperature 18	( 77.720 )	= 77.720 deg. F
dewpoint 1	( 70.210 )	= 70.210 deg. F , 0.3655 psia
dewpoint 2	( 69.500 )	= 69.500 deg. F , 0.3568 psia
dewpoint 3	( 69.440 )	= 69.440 deg. F , 0.3560 psia
dewpoint 4	( 69.620 )	= 69.620 deg. F , 0.3582 psia
dewpoint 5	( 76.390 )	= 76.390 deg. F , 0.4500 psia
dewpoint 6	( 75.860 )	= 75.860 deg. F , 0.4421 psia
pressure 1	( 49.4938 )	= 49.4938 psia
pressure 2	( 49.4990 )	= 49.4990 psia

weighted averages, volume and air mass

temperature	=	88.30263 deg. F
pressure	=	49.49380 psia
vapor pressure	=	0.39526 psia
volume	=	343040 cu. ft.
dry air mass	=	82962.64 lbm

1. The first part of the document is a list of names and addresses of the members of the committee.





## WNP-2 1991 ILRT VERIFICATION

data set 7

time = 645 date = 609

sensor	raw data	value
temperature 1	( 111.090 )	= 111.090 deg. F
temperature 2	( 102.080 )	= 102.080 deg. F
temperature 3	( 93.780 )	= 93.780 deg. F
temperature 4	( 88.750 )	= 88.750 deg. F
temperature 5	( 103.910 )	= 103.910 deg. F
temperature 6	( 89.720 )	= 89.720 deg. F
temperature 7	( 93.630 )	= 93.630 deg. F
temperature 8	( 93.650 )	= 93.650 deg. F
temperature 9	( 93.850 )	= 93.850 deg. F
temperature 10	( 103.380 )	= 103.380 deg. F
temperature 11	( 110.680 )	= 110.680 deg. F
temperature 12	( 93.400 )	= 93.400 deg. F
temperature 13	( 93.730 )	= 93.730 deg. F
temperature 14	( 89.650 )	= 89.650 deg. F
temperature 15	( 77.750 )	= 77.750 deg. F
temperature 16	( 77.670 )	= 77.670 deg. F
temperature 17	( 77.680 )	= 77.680 deg. F
temperature 18	( 77.720 )	= 77.720 deg. F
dewpoint 1	( 70.260 )	= 70.260 deg. F , 0.3662 psia
dewpoint 2	( 69.470 )	= 69.470 deg. F , 0.3564 psia
dewpoint 3	( 69.450 )	= 69.450 deg. F , 0.3562 psia
dewpoint 4	( 69.670 )	= 69.670 deg. F , 0.3589 psia
dewpoint 5	( 76.370 )	= 76.370 deg. F , 0.4497 psia
dewpoint 6	( 75.850 )	= 75.850 deg. F , 0.4420 psia
pressure 1	( 49.4908 )	= 49.4908 psia
pressure 2	( 49.4972 )	= 49.4972 psia

weighted averages, volume and air mass

temperature	=	88.31302 deg. F
pressure	=	49.49080 psia
vapor pressure	=	0.39527 psia
volume	=	343040 cu. ft.
dry air mass	=	82955.97 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 8

time = 700 date = 609

sensor	raw data	value
temperature 1	( 111.110 )	= 111.110 deg. F
temperature 2	( 102.110 )	= 102.110 deg. F
temperature 3	( 93.800 )	= 93.800 deg. F
temperature 4	( 88.760 )	= 88.760 deg. F
temperature 5	( 103.940 )	= 103.940 deg. F
temperature 6	( 89.720 )	= 89.720 deg. F
temperature 7	( 93.620 )	= 93.620 deg. F
temperature 8	( 93.670 )	= 93.670 deg. F
temperature 9	( 93.860 )	= 93.860 deg. F
temperature 10	( 103.410 )	= 103.410 deg. F
temperature 11	( 110.690 )	= 110.690 deg. F
temperature 12	( 93.410 )	= 93.410 deg. F
temperature 13	( 93.750 )	= 93.750 deg. F
temperature 14	( 89.640 )	= 89.640 deg. F
temperature 15	( 77.740 )	= 77.740 deg. F
temperature 16	( 77.670 )	= 77.670 deg. F
temperature 17	( 77.660 )	= 77.660 deg. F
temperature 18	( 77.700 )	= 77.700 deg. F
dewpoint 1	( 70.280 )	= 70.280 deg. F , 0.3664 psia
dewpoint 2	( 69.540 )	= 69.540 deg. F , 0.3573 psia
dewpoint 3	( 69.470 )	= 69.470 deg. F , 0.3564 psia
dewpoint 4	( 69.690 )	= 69.690 deg. F , 0.3591 psia
dewpoint 5	( 76.360 )	= 76.360 deg. F , 0.4495 psia
dewpoint 6	( 75.870 )	= 75.870 deg. F , 0.4423 psia
pressure 1	( 49.4887 )	= 49.4887 psia
pressure 2	( 49.4946 )	= 49.4946 psia

weighted averages, volume and air mass

temperature	=	88.31498 deg. F
pressure	=	49.48870 psia
vapor pressure	=	0.39555 psia
volume	=	343040 cu. ft.
dry air mass	=	82951.66 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 9

time = 715 date = 609

sensor	raw data	value
temperature 1	( 111.120 )	= 111.120 deg. F
temperature 2	( 102.130 )	= 102.130 deg. F
temperature 3	( 93.810 )	= 93.810 deg. F
temperature 4	( 88.760 )	= 88.760 deg. F
temperature 5	( 103.960 )	= 103.960 deg. F
temperature 6	( 89.740 )	= 89.740 deg. F
temperature 7	( 93.640 )	= 93.640 deg. F
temperature 8	( 93.670 )	= 93.670 deg. F
temperature 9	( 93.870 )	= 93.870 deg. F
temperature 10	( 103.440 )	= 103.440 deg. F
temperature 11	( 110.640 )	= 110.640 deg. F
temperature 12	( 93.440 )	= 93.440 deg. F
temperature 13	( 93.770 )	= 93.770 deg. F
temperature 14	( 89.590 )	= 89.590 deg. F
temperature 15	( 77.740 )	= 77.740 deg. F
temperature 16	( 77.670 )	= 77.670 deg. F
temperature 17	( 77.650 )	= 77.650 deg. F
temperature 18	( 77.700 )	= 77.700 deg. F
dewpoint 1	( 70.350 )	= 70.350 deg. F , 0.3673 psia
dewpoint 2	( 69.560 )	= 69.560 deg. F , 0.3575 psia
dewpoint 3	( 69.550 )	= 69.550 deg. F , 0.3574 psia
dewpoint 4	( 69.730 )	= 69.730 deg. F , 0.3596 psia
dewpoint 5	( 76.330 )	= 76.330 deg. F , 0.4491 psia
dewpoint 6	( 75.840 )	= 75.840 deg. F , 0.4418 psia
pressure 1	( 49.4860 )	= 49.4860 psia
pressure 2	( 49.4921 )	= 49.4921 psia

weighted averages, volume and air mass

temperature	=	88.31758 deg. F
pressure	=	49.48600 psia
vapor pressure	=	0.39574 psia
volume	=	343040 cu. ft.
dry air mass	=	82946.39 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 10

time = 730 date = 609

sensor		raw data		value	
temperature	1	( 111.120 )	=	111.120 deg.	F
temperature	2	( 102.180 )	=	102.180 deg.	F
temperature	3	( 93.830 )	=	93.830 deg.	F
temperature	4	( 88.760 )	=	88.760 deg.	F
temperature	5	( 103.990 )	=	103.990 deg.	F
temperature	6	( 89.740 )	=	89.740 deg.	F
temperature	7	( 93.660 )	=	93.660 deg.	F
temperature	8	( 93.680 )	=	93.680 deg.	F
temperature	9	( 93.870 )	=	93.870 deg.	F
temperature	10	( 103.480 )	=	103.480 deg.	F
temperature	11	( 110.720 )	=	110.720 deg.	F
temperature	12	( 93.460 )	=	93.460 deg.	F
temperature	13	( 93.760 )	=	93.760 deg.	F
temperature	14	( 89.680 )	=	89.680 deg.	F
temperature	15	( 77.740 )	=	77.740 deg.	F
temperature	16	( 77.660 )	=	77.660 deg.	F
temperature	17	( 77.650 )	=	77.650 deg.	F
temperature	18	( 77.690 )	=	77.690 deg.	F
dewpoint	1	( 70.360 )	=	70.360 deg.	F , 0.3674 psia
dewpoint	2	( 69.600 )	=	69.600 deg.	F , 0.3580 psia
dewpoint	3	( 69.540 )	=	69.540 deg.	F , 0.3573 psia
dewpoint	4	( 69.770 )	=	69.770 deg.	F , 0.3601 psia
dewpoint	5	( 76.290 )	=	76.290 deg.	F , 0.4485 psia
dewpoint	6	( 75.840 )	=	75.840 deg.	F , 0.4418 psia
pressure	1	( 49.4837 )	=	49.4837	psia
pressure	2	( 49.4898 )	=	49.4898	psia

weighted averages, volume and air mass

temperature	=	88.32989 deg.	F
pressure	=	49.48370	psia
vapor pressure	=	0.39575	psia
volume	=	343040	cu. ft.
dry air mass	=	82940.62	lbm





## WNP-2 1991 ILRT VERIFICATION

data set 11

time = 745 date = 609

sensor		raw data		value	
temperature	1	( 111.150 )	=	111.150 deg. F	
temperature	2	( 102.220 )	=	102.220 deg. F	
temperature	3	( 93.840 )	=	93.840 deg. F	
temperature	4	( 88.780 )	=	88.780 deg. F	
temperature	5	( 104.040 )	=	104.040 deg. F	
temperature	6	( 89.750 )	=	89.750 deg. F	
temperature	7	( 93.670 )	=	93.670 deg. F	
temperature	8	( 93.700 )	=	93.700 deg. F	
temperature	9	( 93.910 )	=	93.910 deg. F	
temperature	10	( 103.510 )	=	103.510 deg. F	
temperature	11	( 110.750 )	=	110.750 deg. F	
temperature	12	( 93.460 )	=	93.460 deg. F	
temperature	13	( 93.780 )	=	93.780 deg. F	
temperature	14	( 89.640 )	=	89.640 deg. F	
temperature	15	( 77.740 )	=	77.740 deg. F	
temperature	16	( 77.650 )	=	77.650 deg. F	
temperature	17	( 77.660 )	=	77.660 deg. F	
temperature	18	( 77.700 )	=	77.700 deg. F	
dewpoint	1	( 70.420 )	=	70.420 deg. F	, 0.3682 psia
dewpoint	2	( 69.600 )	=	69.600 deg. F	, 0.3580 psia
dewpoint	3	( 69.630 )	=	69.630 deg. F	, 0.3584 psia
dewpoint	4	( 69.810 )	=	69.810 deg. F	, 0.3606 psia
dewpoint	5	( 76.340 )	=	76.340 deg. F	, 0.4492 psia
dewpoint	6	( 75.830 )	=	75.830 deg. F	, 0.4417 psia
pressure	1	( 49.4816 )	=	49.4816 psia	
pressure	2	( 49.4874 )	=	49.4874 psia	

weighted averages, volume and air mass

temperature	=	88.34077 deg. F
pressure	=	49.48160 psia
vapor pressure	=	0.39621 psia
volume	=	343040 cu. ft.
dry air mass	=	82934.65 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 12

time = 800 date = 609

sensor	raw data	value
temperature 1	( 111.140 )	= 111.140 deg. F
temperature 2	( 102.220 )	= 102.220 deg. F
temperature 3	( 93.840 )	= 93.840 deg. F
temperature 4	( 88.780 )	= 88.780 deg. F
temperature 5	( 104.050 )	= 104.050 deg. F
temperature 6	( 89.750 )	= 89.750 deg. F
temperature 7	( 93.680 )	= 93.680 deg. F
temperature 8	( 93.690 )	= 93.690 deg. F
temperature 9	( 93.890 )	= 93.890 deg. F
temperature 10	( 103.530 )	= 103.530 deg. F
temperature 11	( 110.730 )	= 110.730 deg. F
temperature 12	( 93.450 )	= 93.450 deg. F
temperature 13	( 93.770 )	= 93.770 deg. F
temperature 14	( 89.680 )	= 89.680 deg. F
temperature 15	( 77.720 )	= 77.720 deg. F
temperature 16	( 77.640 )	= 77.640 deg. F
temperature 17	( 77.640 )	= 77.640 deg. F
temperature 18	( 77.670 )	= 77.670 deg. F
dewpoint 1	( 70.440 )	= 70.440 deg. F , 0.3684 psia
dewpoint 2	( 69.660 )	= 69.660 deg. F , 0.3587 psia
dewpoint 3	( 69.630 )	= 69.630 deg. F , 0.3584 psia
dewpoint 4	( 69.830 )	= 69.830 deg. F , 0.3608 psia
dewpoint 5	( 76.340 )	= 76.340 deg. F , 0.4492 psia
dewpoint 6	( 75.840 )	= 75.840 deg. F , 0.4418 psia
pressure 1	( 49.4788 )	= 49.4788 psia
pressure 2	( 49.4849 )	= 49.4849 psia

weighted averages, volume and air mass

temperature	=	88.33347 deg. F
pressure	=	49.47880 psia
vapor pressure	=	0.39643 psia
volume	=	343040 cu. ft.
dry air mass	=	82930.66 lbm

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## WNP-2 1991 ILRT VERIFICATION

data set 13

time = 815 date = 609

sensor	raw data	value
temperature 1	( 111.200 )	= 111.200 deg. F
temperature 2	( 102.270 )	= 102.270 deg. F
temperature 3	( 93.860 )	= 93.860 deg. F
temperature 4	( 88.790 )	= 88.790 deg. F
temperature 5	( 104.090 )	= 104.090 deg. F
temperature 6	( 89.760 )	= 89.760 deg. F
temperature 7	( 93.700 )	= 93.700 deg. F
temperature 8	( 93.710 )	= 93.710 deg. F
temperature 9	( 93.910 )	= 93.910 deg. F
temperature 10	( 103.570 )	= 103.570 deg. F
temperature 11	( 110.780 )	= 110.780 deg. F
temperature 12	( 93.470 )	= 93.470 deg. F
temperature 13	( 93.790 )	= 93.790 deg. F
temperature 14	( 89.700 )	= 89.700 deg. F
temperature 15	( 77.730 )	= 77.730 deg. F
temperature 16	( 77.650 )	= 77.650 deg. F
temperature 17	( 77.650 )	= 77.650 deg. F
temperature 18	( 77.680 )	= 77.680 deg. F
dewpoint 1	( 70.480 )	= 70.480 deg. F , 0.3689 psia
dewpoint 2	( 69.690 )	= 69.690 deg. F , 0.3591 psia
dewpoint 3	( 69.690 )	= 69.690 deg. F , 0.3591 psia
dewpoint 4	( 69.880 )	= 69.880 deg. F , 0.3614 psia
dewpoint 5	( 76.300 )	= 76.300 deg. F , 0.4487 psia
dewpoint 6	( 75.830 )	= 75.830 deg. F , 0.4417 psia
pressure 1	( 49.4765 )	= 49.4765 psia
pressure 2	( 49.4825 )	= 49.4825 psia

weighted averages, volume and air mass

temperature	=	88.35281 deg. F
pressure	=	49.47650 psia
vapor pressure	=	0.39659 psia
volume	=	343040 cu. ft.
dry air mass	=	82923.56 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 14

time = 830 date = 609

sensor	raw data	value
temperature 1	( 111.190 )	= 111.190 deg. F
temperature 2	( 102.300 )	= 102.300 deg. F
temperature 3	( 93.870 )	= 93.870 deg. F
temperature 4	( 88.800 )	= 88.800 deg. F
temperature 5	( 104.120 )	= 104.120 deg. F
temperature 6	( 89.770 )	= 89.770 deg. F
temperature 7	( 93.680 )	= 93.680 deg. F
temperature 8	( 93.710 )	= 93.710 deg. F
temperature 9	( 93.930 )	= 93.930 deg. F
temperature 10	( 103.590 )	= 103.590 deg. F
temperature 11	( 110.790 )	= 110.790 deg. F
temperature 12	( 93.490 )	= 93.490 deg. F
temperature 13	( 93.800 )	= 93.800 deg. F
temperature 14	( 89.620 )	= 89.620 deg. F
temperature 15	( 77.720 )	= 77.720 deg. F
temperature 16	( 77.650 )	= 77.650 deg. F
temperature 17	( 77.650 )	= 77.650 deg. F
temperature 18	( 77.680 )	= 77.680 deg. F
dewpoint 1	( 70.500 )	= 70.500 deg. F , 0.3692 psia
dewpoint 2	( 69.740 )	= 69.740 deg. F , 0.3597 psia
dewpoint 3	( 69.710 )	= 69.710 deg. F , 0.3593 psia
dewpoint 4	( 69.910 )	= 69.910 deg. F , 0.3618 psia
dewpoint 5	( 76.420 )	= 76.420 deg. F , 0.4504 psia
dewpoint 6	( 75.810 )	= 75.810 deg. F , 0.4414 psia
pressure 1	( 49.4740 )	= 49.4740 psia
pressure 2	( 49.4801 )	= 49.4801 psia

weighted averages, volume and air mass

temperature	=	88.35320 deg. F
pressure	=	49.47400 psia
vapor pressure	=	0.39713 psia
volume	=	343040 cu. ft.
dry air mass	=	82918.37 lbm

## WNP-2 1991 ILRT VERIFICATION

data set 15

time = 845 date = 609

sensor	raw data	value
temperature 1	( 111.200 )	= 111.200 deg. F
temperature 2	( 102.340 )	= 102.340 deg. F
temperature 3	( 93.890 )	= 93.890 deg. F
temperature 4	( 88.810 )	= 88.810 deg. F
temperature 5	( 104.150 )	= 104.150 deg. F
temperature 6	( 89.770 )	= 89.770 deg. F
temperature 7	( 93.700 )	= 93.700 deg. F
temperature 8	( 93.730 )	= 93.730 deg. F
temperature 9	( 93.950 )	= 93.950 deg. F
temperature 10	( 103.630 )	= 103.630 deg. F
temperature 11	( 110.810 )	= 110.810 deg. F
temperature 12	( 93.500 )	= 93.500 deg. F
temperature 13	( 93.820 )	= 93.820 deg. F
temperature 14	( 89.630 )	= 89.630 deg. F
temperature 15	( 77.730 )	= 77.730 deg. F
temperature 16	( 77.650 )	= 77.650 deg. F
temperature 17	( 77.660 )	= 77.660 deg. F
temperature 18	( 77.690 )	= 77.690 deg. F
dewpoint 1	( 70.530 )	= 70.530 deg. F , 0.3695 psia
dewpoint 2	( 69.770 )	= 69.770 deg. F , 0.3601 psia
dewpoint 3	( 69.740 )	= 69.740 deg. F , 0.3597 psia
dewpoint 4	( 69.950 )	= 69.950 deg. F , 0.3623 psia
dewpoint 5	( 76.310 )	= 76.310 deg. F , 0.4488 psia
dewpoint 6	( 75.830 )	= 75.830 deg. F , 0.4417 psia
pressure 1	( 49.4715 )	= 49.4715 psia
pressure 2	( 49.4776 )	= 49.4776 psia

weighted averages, volume and air mass

temperature	=	88.36707 deg. F
pressure	=	49.47150 psia
vapor pressure	=	0.39708 psia
volume	=	343040 cu. ft.
dry air mass	=	82912.14 lbm



## WNP-2 1991 ILRT VERIFICATION

data set 16

time = 900 date = 608

sensor	raw data	value
temperature	1 ( 111.210 )	= 111.210 deg. F
temperature	2 ( 102.360 )	= 102.360 deg. F
temperature	3 ( 93.900 )	= 93.900 deg. F
temperature	4 ( 88.810 )	= 88.810 deg. F
temperature	5 ( 104.180 )	= 104.180 deg. F
temperature	6 ( 89.780 )	= 89.780 deg. F
temperature	7 ( 93.730 )	= 93.730 deg. F
temperature	8 ( 93.750 )	= 93.750 deg. F
temperature	9 ( 93.950 )	= 93.950 deg. F
temperature	10 ( 103.670 )	= 103.670 deg. F
temperature	11 ( 110.810 )	= 110.810 deg. F
temperature	12 ( 93.510 )	= 93.510 deg. F
temperature	13 ( 93.820 )	= 93.820 deg. F
temperature	14 ( 89.600 )	= 89.600 deg. F
temperature	15 ( 77.720 )	= 77.720 deg. F
temperature	16 ( 77.630 )	= 77.630 deg. F
temperature	17 ( 77.640 )	= 77.640 deg. F
temperature	18 ( 77.680 )	= 77.680 deg. F
dewpoint	1 ( 70.580 )	= 70.580 deg. F , 0.3402 psia
dewpoint	2 ( 69.790 )	= 69.790 deg. F , 0.3309 psia
dewpoint	3 ( 69.770 )	= 69.770 deg. F , 0.3408 psia
dewpoint	4 ( 69.960 )	= 69.960 deg. F , 0.3332 psia
dewpoint	5 ( 76.300 )	= 76.300 deg. F , 0.4559 psia
dewpoint	6 ( 75.810 )	= 75.810 deg. F , 0.4485 psia
pressure	1 ( 49.4689 )	= 49.4689 psia
pressure	2 ( 49.4752 )	= 49.4752 psia

weighted averages, volume and air mass

temperature	=	88.36633 deg. F
pressure	=	49.46890 psia
vapor pressure	=	0.39718 psia
volume	=	343040 cu. ft.
dry air mass	=	82907.68 lbm

## WNP-2 1991 ILRT VERIFICATION

data set 17

time = 915 date = 609

sensor		raw data		value	
temperature	1	( 111.200 )	=	111.200	deg. F
temperature	2	( 102.370 )	=	102.370	deg. F
temperature	3	( 93.870 )	=	93.870	deg. F
temperature	4	( 88.790 )	=	88.790	deg. F
temperature	5	( 104.180 )	=	104.180	deg. F
temperature	6	( 89.750 )	=	89.750	deg. F
temperature	7	( 93.720 )	=	93.720	deg. F
temperature	8	( 93.740 )	=	93.740	deg. F
temperature	9	( 93.930 )	=	93.930	deg. F
temperature	10	( 103.680 )	=	103.680	deg. F
temperature	11	( 110.770 )	=	110.770	deg. F
temperature	12	( 93.510 )	=	93.510	deg. F
temperature	13	( 93.830 )	=	93.830	deg. F
temperature	14	( 89.650 )	=	89.650	deg. F
temperature	15	( 77.700 )	=	77.700	deg. F
temperature	16	( 77.620 )	=	77.620	deg. F
temperature	17	( 77.630 )	=	77.630	deg. F
temperature	18	( 77.670 )	=	77.670	deg. F
dewpoint	1	( 70.600 )	=	70.600	deg. F , 0.3704 psia
dewpoint	2	( 69.860 )	=	69.860	deg. F , 0.3612 psia
dewpoint	3	( 69.810 )	=	69.810	deg. F , 0.3606 psia
dewpoint	4	( 70.000 )	=	70.000	deg. F , 0.3629 psia
dewpoint	5	( 76.290 )	=	76.290	deg. F , 0.4485 psia
dewpoint	6	( 75.820 )	=	75.820	deg. F , 0.4415 psia
pressure	1	( 49.4666 )	=	49.4666	psia
pressure	2	( 49.4729 )	=	49.4729	psia

weighted averages, volume and air mass

temperature	=	88.35818	deg. F
pressure	=	49.46660	psia
vapor pressure	=	0.39750	psia
volume	=	343040	cu. ft.
dry air mass	=	82904.48	lbm



**APPENDIX IV**  
**TYPE B AND C TEST RESULTS**  
**SUMMARY REPORT**

**TYPE B AND C TEST RESULTS  
SUMMARY REPORT**

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**TYPE B AND C TEST RESULTS  
SUMMARY REPORT**

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## 1.0 INTRODUCTION

During each annual spring outage in 1988, 1989, 1990, and 1991, Type B and C local leak rate testing was performed on Primary Containment Isolation Valves as prescribed by Appendix J, WNP-2 FSAR and Plant Technical Specifications. Leak testing is initially performed with valves in their "as-found" condition, i.e, prior to any adjustments or repairs which would affect a valve's leakage characteristics. Each Type C penetration is analyzed for total leakage using single failure criteria to arrive at the 'maximum pathway' leakage rate total for that containment penetration. The total penetration leakage reported is the largest leak rate calculated from considering all possible single failures of active isolation boundaries.

The Primary Containment Integrated Leak Rate Test (PCILRT) was conducted at the end of the 1991 outage, after Type B and C testing was complete. Several isolation valves were repaired prior to the PCILRT due to excessive leakage detected from LLRT's or due to scheduled maintenance on resilient seals. The ILRT results (as-left) are adjusted by the difference in minimum pathway leakage rates before and after repairs or maintenance activities to arrive at the Type A "as-found" value.

The totals for Type B and C testing for the 1988, 1989, 1990 and 1991 outages yielded as-found values greater than 0.6 La. The deficiencies which led to the excessive leakages and the corrective actions taken to reduce the total leakage to below 0.6 La are included in the as-found testing section of this report.

## 2.0 DISCUSSION (Type B & C Tests)

### 2.1 Methods

The pneumatic Type B & C tests were performed utilizing the Pressure Decay and Flow Makeup methods. Hydrostatic Type C testing on water sealed valves was accomplished using the Flow Makeup Method.

### 2.2 Specific Testing Categories, Acceptance Criteria, and Results

The first category consists of air and nitrogen - tested Type B & C penetrations. During the 1988, 1989, 1990 and 1991 outages, Type B & C testing was performed in accordance with Exemption to Appendix J Testing issued by the NRC with Amendment No. 41 to Facility Operating Licence NPF-21. This allowed testing of approximately half of the Type B & C penetrations during each shutdown for refueling. For determining the Type B & C summations, those penetrations not tested have leakage values applied from the previous outage as-left condition.

The measured Type B & C Leakage rate summations are tabulated in the following Table 1.





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Outage Year	Sum of Type B	Sum of Type C	Sum of Type B & C	Allowable Limit
1988	2,499 sccm	16,718 sccm	19,217 sccm	56,600 sccm (0.5 La)
1989	3,170 sccm	25,751 sccm	28,921 sccm	56,600 sccm (0.5 La)
1990	2,056 sccm	25,726 sccm	27,782 sccm	56,600 sccm (0.5 La)
1991	252 sccm	12,580 sccm	12,832 sccm	56,600 sccm (0.5 La)

**Table 1**  
**LLRT Results for Type B & C Testing**  
**Performed Since 1987 ILRT**

The second category is a subset of the above Type C tests, being the measured leakage rates on the secondary containment bypass lines that must be included in the sum of the Type B & C tests. The allowable leakage rate from these secondary containment bypass sources is 349.2 sccm. The total is derived by employing minimum pathway analysis for these specific penetrations with exception of the penetration yielding the largest leakage from a single component failure<sup>(1)</sup>. The results are tabulated in Table 2.

Notes: 1. Passive components are considered exempt

Penetration	Service	Leakage Rate (SCCM)			
		1988	1989	1990	1991
X-14	RWCU from RPV	40.3/2	56.8 *	4.3	0
X-22	MS Drain	32/2	4.3/2	14.25	0
X-27f	TIP Line	5.0	.4	18.2	3
X-53	Drywell HVAC Supply	7.0	9.7	9.7	52.5
X-56	CIA to SRV Accumulators.	4.6	43.9	43.9	65 *
X-66	Wetwell HVAC Supply	72.2 *	0	0	0
X-77Aa	RRC Sample Line	6.3	26.9	26.9 *	12
X-92	DW Service to Drywell	4.0/2	4.5	4.5	19/2
X-93	Air to Drywell for Maintenance	2.4/2	0	0	22.3/2
* failed component	TOTALS	134.35	130.8	113.28	153.15

**Table 2**  
**LLRT Results for Secondary Bypass Leakage Sources**

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A third category applies to the Main Steam Isolation Valves (MSIV's). They are similar to the second category in that any process line leakage passes directly from the PRC to the Turbine Building, thereby "bypassing" the SGT system. The line leakage is not added to the sum of the Type C leakage rates because the Main Steam Leakage Control System intercepts all leakage past the inboard CIV up to the allowable limit. The allowable leakage rate per Technical Specifications is 5428 sccm per valve at test pressure of 25 psig. The as-left test results are tabulated in Table 3.

Penetration	Leakage Rate (SCCM)			
	1988	1989	1990	1991
X-18A	344	173	3275	2343
X-18B	688	0	158	703
X-18C	375	341	0	406
X-18D	290	0	126	1322

Table 3  
As-left LLRT Results for MSIV's

The fourth and final category pertains to Containment Isolation Valves (CIV) sealed with fluid from a seal system. Hydrostatic tests were performed on water sealed valves required to maintain Primary Reactor Coolant System integrity during an accident event. Leak rate testing was performed at a pressure equal to 1.1 Pa using the flow makeup method with water. The maximum allowable leakage rate per Technical Specifications is 1.0 gpm times the total number of valves. The total number of valves greatly decreased with the exclusion of vent and drain connections from the leak rate program in 1990. The total measured leakage from all valves was .053 gpm for the 1988 outage, .058 gpm for the 1989 outage, .014 gpm for the 1990 outage, and 1.13 gpm for the 1991 outage.

### 3.0 TYPE B & C AS-FOUND TESTING

During the 1988, 1989, 1990 and 1991 testing sequences, the total Type B & C As-Found leakage rates exceed 0.6 La (67,920 sccm). Several valves had leakage rates in excess of the measuring capabilities of the testing instruments used or could not be pressurized to the required test pressure (Pa). For these valves, the as-found leakage rate is conservatively reported as greater than 0.6 La.

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During the 1991 outage testing sequence, significant efforts were made to establish the leakage quantity of each isolation valve in series when tested simultaneously by pressurizing between two valves. In this way, the as-found minimum pathway leakage rate for a given penetration could be established for use in arriving at the As-Found Type A leakage rate.

Tables 4, 5, 6, and 7 list the isolation valves repaired or otherwise adjusted due to excessive as-found leakage and includes a description of the deficiency which caused the excessive leakage and the corrective action taken to reduce the leakage, thus lowering the overall Type B and C leak rate below 0.5 La.

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-13	SLC-V-4B	1½"	SLC Injection	2.2	26.5	Replaced internals, Squib type valve
X-22	MS-V-19	3"	Main Steam Header	1508	32	Disassembled, lapped seats and wedge
X-24	FDR-V-3	3"	Containment floor drain header	4940	335	Flushed debris with demineralized water
X-27A	TIP-V-1	¾"	TIP Containment Isolation	6.7	2.67	Scheduled replacement of ball valves
X-27B	TIP-V-2	¾"	TIP Containment Isolation	6.4	17	Scheduled replacement of ball valves
X-27C	TIP-V-3	¾"	TIP Containment Isolation	6.4	1	Scheduled replacement of ball valves
X-27D	TIP-V-4	¾"	TIP Containment Isolation	6.4	5	Scheduled replacement of ball valves
X-27E	TIP-V-5	¾"	TIP Containment Isolation	4.4	1	Scheduled replacement of ball valves
X-27F	TIP-V-15	¾"	TIP Containment Isolation	> 0.6 La	5	Scheduled replacement of ball valves
X-42C	PI-V-X42C2	1"	Process Instrument line Isolation	415	6	Disassembled, lapped seats
X-46	RCC-V-40 , RCC-V-21	10"	Reactor Closed Cooling Return	> 0.6 La	5	Flushed debris with air
X-47	RHR-V-134A	2"	RHR loop A pump test line	862	16	Flushed with demineralized water
X-48	RHR-FCV-64B	3"	RHR loop B pump test line	6850	102	Flushed and cycled valve
X-66	CSP-V-5	24"	Wetwell HVAC supply	> 0.6 La	3.3	Replaced seat
X-67	CSP-V-6, CSP-V-8	24"	Wetwell HVAC exhaust	> 0.6 La	1930	Replaced seat and seal
X-77Aa	RRC-V-20	1"	RRC sample line	> 0.6 La	348.3	Disassembled and cleaned
X-83a	PSR-V-X83-2	1"	Post accident sample (wetwell)	242	8.5	Flushed with air and cycled valve
X-96	CAC-V-2, CAC-FCV-2A	4"	CAC discharge to drywell	3400	499	Flushed valves with demineralized water
X-99	CAC-V-6, CAC-FCV-1A	4"	CAC suction from drywell	1981	115	Flushed and stroked valves
X-103	CAC-V-13, CAC-FCV-4B	4"	CAC suction from wetwell	17,090	380	Flushed valves with demineralized water

Table 4  
1988 Outage - Isolation Valves Repaired/Adjusted

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-3	CEP-V-1A, CEP-V-2A	30"	Drywell HVAC exhaust	2303.3	1890	Replaced elastomer seals
X-4	RCIC-V-40	10"	RCIC turbine exhaust	> 0.6 La	440	Replaced soft seat
X-13	SLC-V-4A	1½"	SLC to Reactor	26.5	3.5	Replaced internals, Squib type valve
X-14	RWCU-V-1	6"	RWCU from Reactor	40.1	56.8	Operator grease changeout
X-17A	RFW-V-10A	24"	RFW line A	4.8	171	Replaced soft seat (EQ)
X-17A	RFW-V-32A	24"	RFW line A	347.47	1188.39	Replaced soft seat (EQ)
X-17A	RFW-V-65A	24"	RFW line A	> 0.6 La	9460.42	Disassembled, lapped disc/seat
X-17B	RFW-V-32B	24"	RFW line B	93.13	5376.91	Replaced soft seat (EQ)
X-17B	RFW-V-10B	24"	RFW line B	> 0.6 La	6111.34	Replaced soft seat/corrected clearance
X-21	RCIC-V-76	1"	RHR condensing mode stm supply	> 0.6 La	12.2	Repacked/Movats
X-21	RCIC-V-63	10"	RHR condensing mode stm supply	> 0.6 La	12.2	Movats
X-22	MS-V-16, MS-V-19	3"	MS line	1180	4.3	Operator grease changeout
X-24	FDR-V-3	3"	Drywell floor drain	7660	6390	Flushed with demineralized water
X-27F	TIP-V-6	¾"	TIP lines	> 0.6 La	.4	Disassembled/cleaned internals
X-46	RCC-V-40	10"	RCC outlet header	426.7	2.3	Operator grease changeout
X-49	HPCS-V-23	12"	HPCS test line	934.5	557	Movats
X-49	HPCS-V-83, HPCS-V-84	¾"	HPCS test line vent	8	0	Replaced valves
X-53	CSP-V-1, CSP-V-2	30"	Drywell HVAC supply	48.2	3.86	Replaced elastomer seals
X-66	CSP-V-5, CSP-V-7	24"	Wetwell HVAC supply	3.3	139	Replaced elastomer seals (EQ)
X-66	CSP-V-3, CSP-V-4	24"	Wetwell HVAC supply	642.9	219	Replaced elastomer seals (EQ)

Table 5  
1989 Outage - Isolation Valves Repaired/Adjusted

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-66	CSP-V-800-11	¾"	Wetwell HVAC supply vent	2543.33	15.9	Lapped seat
X-67	CSP-V-6, CSP-V-8	24"	RB/Wetwell vacuum breakers	1930	33.33	Replaced elastomer seals (EQ)
X-67	CEP-V-3A, CEP-V-4A	24"	Wetwell HVAC exhaust	720	12.9	Replaced elastomer seals (EQ)
X-72F	PI-EFC-X72f	1"	Process instrument line	4720	6.2	Cleaned internals
X-73e	PI-EFC-X73e	1"	Process instrument line	287	58	Cleaned internals
X-77Aa	RRC-V-20	1"	RRC sample line	348.3	81.2	Replaced valve
X-77Ac	PSR-V-X77A1	1"	Post accident sample return	5103	4400	Lapped internals
X-77Ac	PSR-V-X77A2	1"	Post accident sample return	5476.6	3300	Lapped internals
X-91	CIA-V-31B	½"	CIA line B for ADS accumulators	> 0.6 La	56.33	Cleaned/lapped internals
X-119	CSP-V-9, CSP-V-10	24"	RB/Wetwell vacuum breakers	1592	74	Replaced elastomer seals (EQ)
X-119	CSP-V-800-16	¾"	RB/Wetwell vacuum bkr line vent	566	15.66	Lapped internals

**Table 5 (CONTINUED)**  
**1989 Outage - Isolation Valves Repaired/Adjusted**

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-5	RCC-V-104	10"	RCC inlet header	102.3	483	Movats
X-14	RWCU-V-1	6"	RWCU from Reactor	15	4.3	Repacked valve
X-17A	RFW-V-65A, RFW-V-65B	24"	RFW line A	> 0.6 La	1510.56	Repacked valves/Movats
X-21	RCIC-V-8	4"	RHR condensing mode stm supply	> 0.6 La	1510.56	Grease changeout/Repack/Movats
X-21	RCIC-V-76	1"	RHR condensing mode stm supply	> 0.6 La	1510.56	Grease changeout/Repack/Movats
X-22	MS-V-16, MS-V-19	3"	MS line	102	14.25	Repack/Movats
X-46	RCC-V-40 , RCC-V-21	10"	Reactor Closed Cooling Return	41	8.3	Movats
X-49	HPCS-V-23	12"	HPCS test line	142	51	Disassemble/corrected operator problem
X-49	HPCS-V-12	4"	HPCS test line	375	175	Repack/Movats
X-53	CSP-V-1, CSP-V-2	30"	Drywell HVAC supply	4510	103.33	Replaced seats
X-56	CIA-V-20	¾"	CIA supply to SRV accumulators	25	69.5	Operator grease changeout/Movats
X-63	LPCS-V-12	12"	LPCS test line	202.33	636	Repack
X-63	LPCS-FCV-11	3"	LPCS test line	110.6	220	Grease changeout/Repack
X-64	RCIC-V-69	1½"	RCIC vacuum pump discharge	113.33	218	Grease changeout
X-65	RCIC-V-19	2"	RCIC pump minimum flow line	167	3.3	Grease changeout
X-67	CEP-V-3A, CEP-V-4A	24"	Wetwell HVAC exhaust	> 0.6 La	322	Adjusted linkage
X-72f	PI-EFC-X72f	1"	Radiation monitoring return line	1185	134.3	Disassembled and cleaned internals
X-89B	CIA-V-30A	½"	CIA line A for ADS accumulators	44	47	Grease changeout
X-91	CIA-V-30B	½"	CIA line B for ADS accumulators	4	2.67	Grease changeout

**Table 6**  
**1990 Outage - Isolation Valves Repaired/Adjusted**





Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-96	CAC-V-2	4"	CAC discharge to drywell	180	364	Grease changeout
X-97	CAC-V-15, CAC-V-1B	4"	CAC suction from drywell	2570	713.8	Clean seats/grease changeout
X-98	CAC-V-11	4"	CAC discharge to drywell	387	279.75	Grease changeout
X-99	CAC-V-6, CAC-FCV-1A	4"	CAC suction from drywell	8600	400	Clean seats/grease changeout
X-102	CAC-V-4	4"	CAC discharge to wetwell	772	257.6	Grease changeout
X-103	CAC-V-13, CAC-FCV-4B	4"	CAC suction from wetwell	5000	348	Cleaned seats/ grease changeout
X-104	CAC-V-17	4"	CAC discharge to wetwell	352.3	73.3	Grease changeout
X-105	CAC-V-8	4"	CAC suction from wetwell	568	2.66	Grease changeout
X-119	CSP-V-10	24"	RB/Wetwell vacuum breakers	718	820	Adjusted disc turnbuckle

Table 6 (CONTINUED)  
1990 Outage - Isolation Valves Repaired/Adjusted

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-3	CEP-V-1A, CEP-V-2A	30"	Drywell HVAC exhaust	4585	625	Adjusted linkage
X-4	RCIC-V-68	10"	RCIC turbine exhaust	470	177	Refurbishment/movats
X-5	RCC-V-5, RCC-V-104	10"	RCC inlet header	483	523	Refurbishment/movats
X-11A	RHR-V-16A	16"	Drywell spray loop A	1074.14	977.37	Refurbishment/movats
X-11B	RHR-V-16B	16"	Drywell spray loop B	221	0	Refurbishment/clean seats/movats
X-13	SLC-V-4A	1½"	SLC Injection	8	0	Replaced internals, squib type valve
X-14	RWCU-V-1, RWCU-V-4	6"	RWCU from Reactor	78	0	Refurbishment/movats
X-17A	RWCU-V-40	6"	RFW line A	1229	0	Refurbishment/movats
X-17B	RFW-V-32B	24"	RFW line B	53089	546.67	Replaced soft seat
X-21	RCIC-V-76	1"	RHR condensing mode stm supply	6730	89.9	Packing replacement
X-21	RCIC-V-8	4"	RHR condensing mode stm supply	6730	89.9	Packing replacement
X-22	MS-V-16	3"	Main Steam Header	12	0	Replaced disc/movats
X-24	FDR-V-3, FDR-V-4	3"	Containment floor drain header	0	1	Replaced both valves with new design
X-25B	RHR-V-27B	6"	Wetwell spray loop B	> 0.6 La	3	Refurbishment/movats
X-43A	RRC-V-16A	¾"	RRC pump A seal water	3.66	35.33	Refurbishment/repack/movats
X-43B	RRC-V-16B	¾"	RRC pump B seal water	3	1	Refurbishment/repack/movats
X-47	RHR-V-73A	2"	RHR loop A pump test line	5	29.93	Refurbishment/movats
X-48	RHR-V-73B	2"	RHR loop B pump test line	0	0	Refurbishment/movats
X-48	RHR-V-134B	2"	RHR loop B pump test line	5	30.8	Refurbishment/movats
X-49	HPCS-V-12	4"	HPCS test line	34.3	0	Refurbishment/movats

Table 7  
1991 Outage - Isolation Valves Repaired/Adjusted

Pen #	Valve No.	Size	Function	As-Found (SCCM)	As-Left (SCCM)	Deficiency/Corrective Action
X-53	CSP-V-2	30"	Drywell HVAC supply	90	550	Adjusted linkage
X-63	LPCS-V-12	12"	LPCS test line	1405	1620	Movats
X-66	CSP-V-5	24"	Wetwell HVAC supply	> 0.6 La	84.3	Adjusted linkage
X-66	CSP-V-93	1"	Wetwell HVAC supply	8300	0	Replaced o-ring seat
X-67	CSP-V-3A, CSP-V-4A	24"	Wetwell HVAC exhaust	3860	40	Replaced soft seat in both
X-73f	PSR-V-X73-2	1"	Post accident sample (drywell)	1538.33	132.75	Flushed debris with air
X-83a	PSR-V-X83-1	1"	Post accident sample (wetwell)	153.13	131.33	Flushed with air and cycled valve
X-84f	PSR-V-X84-2	1"	Post accident sample (wetwell)	2580	5	Flushed with air
X-89B	CIA-V-31A	½"	CIA line A for ADS accumulators	665	156	Replaced soft seat insert
X-89B	CIA-V-30A	½"	CIA line A for ADS accumulators	0	0	Movats
X-91	CIA-V-30B	½"	CIA line B for ADS accumulators	0	0	Movats
X-101	FPC-V-149	6"	Wetwell cleanup return	0	47	Refurbishment/movats
X-101	FPC-V-156	6"	Wetwell cleanup return	0	47	Refurbishment/movats
X-119	CSP-V-10	24"	RB/Wetwell vacuum breakers	1250	2008	Adjusted disc linkage

Table 7 (CONTINUED)  
1991 Outage - Isolation Valves Repaired/Adjusted



### 3.1 Main Steam Isolation Valves (MSIV's)

The as-found leak rates for the MSIV's are shown in Table 7. These valves are tested @ 25 psig in accordance with Plant Technical Specifications and are not included in the sum of Type B and C testing. However, these isolation boundaries are subject to the Type A test and as such, their leak rates are reflected in the total Type A results. The allowable leak rate per Technical Specifications is 5427 sccm per valve.

Penetration Number	Valve Number	As-Found Leakage Rates (SCCM)			
		1988	1989	1990	1991
18A	MS-V-22A MS-V-28A	344	173.4	3275	2343.19
18B	MS-V-22B MS-V-28B	687.8	0	157.47	703.21
18C	MS-V-22C MS-V-28C	375.22	341.29	0	405.88
18D	MS-V-22D MS-V-28D	290.2	0	126	1321.46

Table 8  
As-Found Leak Rates for MSIV's

### 4.0 TYPE A TEST

The as-left Type A test results were corrected to include the minimum pathway leak rate differential for Type B and C containment isolation boundaries which were repaired or otherwise adjusted during the refueling outage just prior to the 1991 PCILRT. This corrected value is referred to as the As-found Type A leak rate. The containment boundaries which were repaired or adjusted during the 1991 outage and their as-found and as-left minimum pathway leak rates are listed in Table 9.

The total adjustment for repaired or adjusted Type B & C penetrations from Table 6 was 4,935 sccm. Adding this figure to the as-left Type A leak rate (total time 95% UCL value of 0.2973 %/day, yields a total as-found Type A leak rate of 0.320 %/day. This does not exceed the maximum allowable leakage rate (La) of 0.5 %/day (Ref. 1) or the As-Found acceptance criteria set forth in NRC I.E., Information Notice 85-71 of 0.75 La.



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Pen #	Valve No.	Deficiency/Corrective Action	As-Found (SCCM)	As-Left (SCCM)	Penalties
X-3	CEP-V-1A, CEP-V-2A	Adjusted linkage	2292.5	312.5	1980
X-4	RCIC-V-68	Refurbishment/movats	235	88.5	146.5
X-5	RCC-V-5, RCC-V-104	Refurbishment/movats	0	262.5	-262.5
X-11A	RHR-V-16A	Refurbishment/movats	537.07	488.69	48.38
X-11B	RHR-V-16B	Refurbishment/clean seats/movats	221	0	221
X-13	SLC-V-4A	Replaced internals, squib type valve	8	0	8
X-14	RWCU-V-1, RWCU-V-4	Refurbishment/movats	39	0	39
X-17A	RWCU-V-40	Refurbishment/movats	1229	0	1229
X-17B	RFW-V-32B	Replaced soft seat			
X-22	MS-V-16	Replaced disc/movats	6	0	6
X-24	FDR-V-3, FDR-V-4	Replaced both valves with new design	0	1	1
X-43B	RRC-V-16B	Refurbishment/repack/movats	3	1	2
X-47	RHR-V-73A	Refurbishment/movats	242.55	217.62	-25
X-48	RHR-V-73B	Refurbishment/movats	386	411.8	-25.8
X-48	RHR-V-134	Refurbishment/movats			
X-49	HPCS-V-12	Refurbishment/movats	85.3	51.0	34.3
X-53	CSP-V-2	Adjusted linkage	97.5	327.5	-230
X-63	LPCS-V-12	Movats	1625	1840	-215

Table 9  
1991 Minimum Pathway Leak Rates for  
As-Found Type A Adjustment

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Pen #	Valve No.	Deficiency/Corrective Action	As-Found (SCCM)	As-Left (SCCM)	Penalties
X-66	CSP-V-5	Adjusted linkage			
X-66	CSP-V-93	Replaced o-ring seat	397.2	175.65	221.55
X-67	CSP-V-3A, CSP-V-4A	Replaced soft seat in both	2089.5	179.5	1910
X-84f	PSR-V-X84-2	Flushed debris with air	8.33	5.0	3.33
X-101	FPC-V-149	Refurbishment/Movats	0		
X-101	FPC-V-156	Refurbishment/Movats		23.5	-23.5
X-119	CSP-V-10	Adjusted disc linkage	625	1004	-379
Total					4690

Table 9  
1991 Minimum Pathway Leak Rates for  
As-Found Type A Adjustment (CONTINUED)



## **5.0 TYPE B & C CONTAINMENT PENETRATION TEST SCHEDULE**

On April 29, 1987, the NRC granted an exemption to a provision of Appendix J to WNP-2 (issued by the NRC with Amendment No. 41 to Facility Operating Licence NPF-2). This exemption allowed containment isolation boundaries to be tested at a frequency of every 24 months rather than every refueling outage as required by Appendix J.

Certain conditions were agreed upon between the NRC and WNP-2 Plant Staff regarding the exceptions to the 24 month duration between leak rate tests. Of greatest significance is the requirement to establish leakage limits for each containment barrier. Barriers which exceed this leakage limit are required to be retested during the next refueling outage.

One of the conditions of the granted exemption is that the reporting requirements of Appendix J be augmented to include the information associated with the unique aspects of the WNP-2 Type B & C testing program. In particular, a tabulation of leakage limits established for each barrier is required. This tabulation must also indicate those barriers which were tested during the 1991 outage, those which exceeded their leakage limits and must be retested during the 1992 outage, and those penetrations/valves not tested in 1991 and thus being scheduled for testing during the 1992 refueling outage.

The table that follows includes the information required under the conditions of the granted exemption to Appendix J.

**TABLE 10**  
**CONTAINMENT PENETRATION SCHEDULE FOR TYPE B & C TESTS**

Page 1 of 5

PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	YES	TESTED IN 1991			TEST IN 1992	NOTES
					NO	PASSED	FAILED		
X-3	STEP A6	PPM 7.4.6.1.8.3 - CEP-V-1A,1B,2A,2B	5660	X		X			1
X-4	X-4-4	RCIC-V-68,-40	1475	X		X			
X-5	X-5-4	RCC-V-5,-104	1475	X		X			
X-11A	X-11A-1	RHR-V-17A,-16A	1415	X		X			
X-11B	X-11B-1	RHR-V-16B,-17B,	1415	X		X			
X-13	X-13-1	SLC-V-7	221		X			X	
X-13	X-13-2	SLC-V-4A,-4B	221	X		X			
X-14	X-14-1	RWCU-V-1,-4	885	X		X			
X-17A	X-17A-1	RFW-V-10A	2125	X		X		X	4
X-17A	X-17A-2	RFW-V-65B,-65A, RWCU-V-40	2125	X		X			
X-17A	X-17A-4	RFW-V-32A	2125	X		X		X	4
X-17B	X-17B-1	RFW-V-10B	2125	X		X		X	4
X-17B	X-17B-2	RFW-V-32B	2125	X			X	X	4
X-21	X-21-1	RCIC-V-64,-63,-76,-8	1475	X			X	X	
X-22	X-22-1	MS-V-16,-19	442	X		X			
X-23	X-23-1	EDR-V-20	442	X		X			
X-23	X-23-2	EDR-V-19	442	X		X			
X-24	X-24-1	FDR-V-4	442	X		X			
X-24	X-24-2	FDR-V-3	442	X		X			
X-25A	X-25A-1	RHR-V-27A	885		X			X	
X-25B	X-25B-3	RHR-V-27B	885	X			X		
X-26	X-26-1	RHR-FCV-64C	442		X			X	
X-26	X-26-3	RHR-V-21	1595		X			X	
X-27A	X-27A-2	TIP-V-1	50	X		X			
X-27B	X-27B-2	TIP-V-2	50	X		X			
X-27C	X-27C-2	TIP-V-3	50	X		X			
X-27D	X-27D-2	TIP-V-4	50	X		X			
X-27E	X-27E-2	TIP-V-5	50	X		X			
X-27F	X-27F-2	TIP-V-15 AND THREADED UNION	148	X		X			
X-27F	X-27F-3	TIP-V-6	74	X		X			
X-29a/c	X-29ac-1	PI-VX-257	148	X		X			
X-29a/c	X-29ac-2	PI-VX-256	148	X		X			
X-42d	X-42d-1	PI-VX-42d, PI-VX-216	148	X		X			
X-43A	X-43A-1	RRC-V-13A	110	X		X			
X-43A	X-43A-2	RRC-V-16A	110	X		X			

**TABLE 10**  
**CONTAINMENT PENETRATION SCHEDULE FOR TYPE B & C TESTS**

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PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	TESTED IN 1991				TEST IN 1992	NOTES
				YES	NO	PASSED	FAILED		
X-43B	X-43B-1	RRC-V-16B	110	X		X			
X-43B	X-43B-3	RRC-V-13B	110	X		X			
X-46	X-46-1	RCC-V-40,-21	1475		X			X	
X-47	X-47-1	RHR-V-134A	295		X			X	
X-47	X-47-3	RHR-FCV-64A	442		X			X	
X-47	X-47-6	RHR-V-121,-120	885		X			X	
X-47	X-47-9	RHR-V-24A,-11A	1595	X		X			
X-47	X-47-11	RHR-V-73A	295	X		X			
X-48	X-48-4	RHR-V-11B, -24B	1595		X			X	
X-48	X-48-5	RHR-FCV-64B	442		X			X	
X-48	X-48-6	RHR-V-134B	295	X		X			
X-48	X-48-8	RHR-V-73B	295	X		X			
X-49	X-49-1	HPCS-V-23	1062		X			X	
X-49	X-49-3	HPCS-V-12	590	X		X			
X-53	X-53-1	CSP-V-96	148	X		X			
X-53	X-53-2	CSP-V-97	148	X		X			
X-53	X-53-5	PPM 7.4.6.1.8.3 - CSP-V-1,-2	5660	X		X			1
X-54Aa	X-54Aa-1	RCIC-V-184, -740	148	X		X			
X-54Bf	X-54Bf-1	PI-VX-54Bf, PI-VX-218	148	X		X			
X-56	X-56-1	CIA-V-21	110	X		X			
X-56	X-56-3	CIA-V-20	110	X		X			
X-61f	X-61f-1	PI-VX-219, PI-VX-61f	148	X		X			
X-62f	X-62f-1	PI-VX-62f, PI-VX-220	148	X		X			
X-63	X-63-1	LPCS-V-12	1062	X			X	X	
X-63	X-63-4	LPCS-FCV-11	442		X				
X-64	X-64-1	RCIC-V-69, -28	221	X			X	X	
X-65	X-65-1	RCIC-V-19	295	X		X			
X-66	X-66-1	CSP-V-98	148	X		X			
X-66	X-66-2	CSP-V-93	148	X			X	X	
X-66	X-66-3	CSP-V-5, -7	2124	X			X	X	
X-66		PPM 7.4.6.1.8.2 - CSP-V-3,-4	5660	X		X			1
X-67	X-67-1	CSP-V-6, -8	2124	X		X			
X-67		PPM 7.4.6.1.8.2 - CEP-V-3A,3B,4A,4B	5660	X		X			1
X-69c	X-69c-1	PI-VX-69c, PI-VX-221	148	X		X			
X-72f	X-72f-1	PI-VX-253	148	X		X			
X-72f	X-72f-2	PI-EFC-X72f	148	X		X			

**TABLE 10**  
**CONTAINMENT PENETRATION SCHEDULE FOR TYPE B & C TESTS**

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PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	YES	TESTED IN 1991			TEST IN 1992	NOTES
					NO	PASSED	FAILED		
X-73e	X-73e-1	PI-VX-259	148	X		X			
X-73e	X-73e-2	PI-EFC-X-73e	148	X			X	X	
X-73f	X-73f-1	PSR-V-X73-1	148	X		X			
X-73f	X-73f-2	PSR-V-X73-2	148	X			X	X	
X-77Aa	X-77Aa-1	RRC-V-20	148	X		X			
X-77Aa	X-77Aa-2	RRC-V-19	148	X		X			
X-77Ac	X-77Ac-1	PSR-V-X77A-1	148		X			X	
X-77Ac	X-77Ac-2	PSR-V-X77A-2	148		X			X	
X-77Ad	X-77Ad-1	PSR-V-X77A-3	148		X			X	
X-77Ad	X-77Ad-2	PSR-V-X77A-4	148		X			X	
X-78d	X-78d-1	LPCS-V-66, -67	148	X		X			
X-78e	X-78e-1	HPCS-V-65, -68	148	X		X			
X-80b	X-80b-1	PSR-V-X80-1	148	X		X			
X-80b	X-80b-2	PSR-V-X80-2	148	X		X			
X-82d	X-82d-1	PSR-V-X82-1	148		X			X	
X-82d	X-82d-2	PSR-V-X82-2	148		X			X	
X-82e	X-82e-1	CAS-VX-82e, CAS-V-730	148	X		X			
X-82f	X-82f-1	PSR-V-X82-7	148	X		X			
X-82f	X-82f-4	PSR-V-X82-8	148	X		X			
X-83a	X-83a-1	PSR-V-X83-1	148	X			X	X	
X-83a	X-83a-4	PSR-V-X83-2	148	X		X			
X-84f	X-84f-1	PSR-V-X84-1	148	X		X			
X-84f	X-84f-4	PSR-V-X84-2	148	X			X	X	
X-85a/c	X-85ac-1	PI-VX-251	148	X		X			
X-85a/c	X-85ac-2	PI-VX-250	148	X		X			
X-88	X-88-1	PSR-V-X88-1	148		X			X	
X-88	X-88-4	PSR-V-X88-2	148		X			X	
X-89B	X-89B-1	CIA-V-30A	74	X		X			
X-89B	X-89B-2	CIA-V-31A	74	X			X	X	
X-91	X-91-1	CIA-V-30B	74	X		X			
X-91	X-91-3	CIA-V-31B	74	X		X			
X-92	X-92-1	DW-V-156,-157	295	X		X			
X-93	X-93-1	SA-V-109 AND PIPE CAP	295	X		X			
X-94	X-94-1	MWR-V-124	110	X		X			
X-94	X-94-2	X-94 PIPE CAP	0						



**TABLE 10  
CONTAINMENT PENETRATION SCHEDULE FOR TYPE B & C TESTS**

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PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	TESTED IN 1991				TEST IN 1992	NOTES
				YES	NO	PASSED	FAILED		
X-95	X-95-1	MWR-V-125	110	X		X			
X-95	X-95-2	X-95 PIPE CAP	0						
X-96	X-96-1	CAC-V-2, CAC-FCV-2A	590		X			X	
X-97	X-97-1	CAC-V-15, CAC-FCV-1B	590	X		X			
X-98	X-98-1	CAC-V-11, CAC-FCV-2B	590		X			X	
X-99	X-99-1	CAC-V-6, CAC-FCV-1A	590	X		X			
X-101	X-101-1	FPC-V-156,-149	885	X		X			
X-102	X-102-1	CAC-V-4, CAC-FCV-4A	590	X			X	X	
X-103	X-103-1	CAC-V-13, CAC-FCV-4B	590	X		X			
X-104	X-104-1	CAC-V-17, CAC-FCV-3B	590		X			X	
X-105	X-105-1	CAC-V-8, CAC-FCV-3A	590		X			X	
X-117	X-117-1	RHR-V-124A, -124B	221		X			X	
X-118	X-118-1	RHR-V-125A, -125B	221		X			X	
X-119	X-119-1	CSP-V-9, -10	2124	X		X			

**TYPE B TESTS**

PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	TESTED IN 1991				TEST IN 1992	NOTES
				YES	NO	PASSED	FAILED		
BX-000		DRYWELL HEAD	50	X		X			3
BX-1A		INSPECTION PORT	50	X		X			
BX-1B		INSPECTION PORT	50	X		X			
BX-1C		INSPECTION PORT	50	X		X			
BX-1D		INSPECTION PORT	50	X		X			
BX-1E		INSPECTION PORT	50	X		X			
BX-1F		INSPECTION PORT	50	X		X			
BX-1G		INSPECTION PORT	50	X		X			
BX-1H		INSPECTION PORT	50	X		X			
BX-15		EQUIPMENT HATCH	50	X		X			3
BX-16		PERSONNEL AIRLOCK - PPM 7.4.6.1.3.2	5664	X		X			2
BX-27A	BX-27A-1	TIP DRIVE FLANGE	50		X			X	
BX-27B	BX-27B-1	TIP DRIVE FLANGE	50		X			X	
BX-27C	BX-27C-1	TIP DRIVE FLANGE	50		X			X	
BX-27D	BX-27D-1	TIP DRIVE FLANGE	50		X			X	
BX-27E	BX-27E-1	TIP DRIVE FLANGE	50		X			X	
BX-27F	BX-27F-1	TIP PURGE FLANGE	50	X		X			
BX-28		CRD REMOVAL HATCH	50		X			X	
BX-51		SUPPRESSION CHAMBER HATCH	50	X		X			3
BX-100A		NEUTRON MONITORING	50	X		X			
BX-100B		NEUTRON MONITORING	50	X		X			
BX-100C		NEUTRON MONITORING	50	X		X			

**TABLE 10**  
**CONTAINMENT PENETRATION SCHEDULE FOR TYPE B & C TESTS**

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PEN #	TEST ID #	DESCRIPTION	LEAKLIMIT	YES	TESTED IN 1991			TEST IN 1992	NOTES
					NO	PASSED	FAILED		
BX-100D		NEUTRON MONITORING	50	X		X			
BX-101A		CONTROL ROD POSITION INDICATOR	50	X		X			
BX-101B		THERMOCOUPLE AND RTD	50	X		X			
BX-101C		THERMOCOUPLE AND RTD	50	X		X			
BX-101D		THERMOCOUPLE AND RTD	50	X		X			
BX-102A		THERMOCOUPLE AND RTD	50	X		X			
BX-102B		THERMOCOUPLE AND RTD	50	X		X			
BX-103A		MEDIUM VOLTAGE POWER	50	X		X			
BX-103B		MEDIUM VOLTAGE POWER	50	X		X			
BX-103C		MEDIUM VOLTAGE POWER	50	X		X			
BX-103D		MEDIUM VOLTAGE POWER	50	X		X			
BX-104A		LOW VOLTAGE POWER	50	X		X			
BX-104B		LOW VOLTAGE POWER	50	X		X			
BX-104C		LOW VOLTAGE POWER	50	X		X			
BX-104D		LOW VOLTAGE POWER	50	X		X			
BX-105A		CONTROL AND INDICATION	50	X		X			
BX-105B		CONTROL AND INDICATION	50	X		X			
BX-105C		CONTROL AND INDICATION	50	X		X			
BX-105D		CONTROL AND INDICATION	50	X		X			
BX-106C		WIDE RANGE NEUTRON MONITORING	50	X		X			
BX-106D		WIDE RANGE NEUTRON MONITORING	50	X		X			
BX-107A		LOW VOLTAGE PWR. AND CTL. IND.	50	X		X			
BX-107B		LOW VOLTAGE PWR. AND CTL. IND.	50	X		X			
BX-26	BX26RV-1	RHR-RV-25C DISCHARGE FLANGE	50	X					
BX-26	BX26RV-2	RHR-RV-88C DISCHARGE FLANGE	50		X			X	
BX-47	BX47RV-1	RHR-RV-1A DISCHARGE FLANGE	50		X			X	
BX-47	BX47RV-2	RHR-RV-25A DISCHARGE FLANGE	50		X			X	
BX-47	BX47RV-3	RHR-RV-88A DISCHARGE FLANGE	50		X			X	
BX-48	BX48RV-1	RHR-RV-1B DISCHARGE FLANGE	50		X			X	
BX-48	BX48RV-2	RHR-RV-5 DISCHARGE FLANGE	50		X			X	
BX-48	BX48RV-3	RHR-RV-25B DISCHARGE FLANGE	50	X		X			
BX-48	BX48RV-4	RHR-RV-88B DISCHARGE FLANGE	50		X			X	
BX-48	BX48RV-5	RHR-RV-30 DISCHARGE FLANGE	50		X			X	
BX-49	BX49RV-1	HPCS-RV-14 DISCHARGE FLANGE	50		X			X	
BX-63	BX63RV-1	LPCS-RV-18 DISCHARGE FLANGE	50		X			X	
BX-63	BX63RV-2	LPCS-RV-31 DISCHARGE FLANGE	50	X		X			

- NOTES:**
1. Containment Purge butterfly valves; tested every 6 months per Plant Technical Specifications. Leakage limit defined by Technical Specifications
  2. Airlock tested every 6 months per Plant Technical Specifications  
Leakage limit defined by Technical Specifications
  3. Component will be leak tested if opened during the 1992 outage
  4. Feedwater check valve soft seat. Tested every refueling outage per conditions of granted exemption.

