REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST
TYPE A, B, and C
PERIODIC TESTS FOR
MAY 1980 to FEBRUARY 1982

POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333

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SECTION 1

PURPOSE

The purpose of this report is to present an analysis and interpretation of the February, 1982 Type A test and a summary of the last two periodic Type B and C tests performed at the James A. FitzPatrick Nuclear Power Plant (JAFNPP) between May, 1980 and February, 1982. JAFNPP is owned and operated by the Power Authority of the State of New York (PASNY).

This report is submitted as required by 10CFR50, Appendix J, Paragraph V.B, as amended September 22, 1980.

SECTION 2

SUMMARY

2.1 TYPE A TEST

2.1.1 Test Summary

On February 13, 1982, pressurization was started at 2013 hours. A fairly constant rate of 6 psig per hour was maintained throughout the pressurization period. The compressors were secured at 0330 hours on February 14, 1982, with a peak instantaneous pressure of 61.0 psia.

Both the torus and drywell air temperatures were changing significantly, apparently due to Condensate Transfer System in-leakage to the torus and due to the isolation of the shutdown cooling mode of the Residual Heat Removal (RHR) System. At approximately 0825 hours, the condensate transfer supply ("Keep Full") to the RHR System was isolated. At approximately 0930 hours, the shutdown cooling mode of the RHR System was restarted. At approximately 1100 hours, the average hourly drywell and torus temperature satisfied the stabilization criteria.

From 1100 to 1700 hours (Attachment 2.1A), a fairly stable mass loss of about 14 lbm per hour was observed. This rate was slightly in excess of the NRC endorsed limit of 0.375%/day (13 lbm per hour) but within the procedural rate of 0.5%/day (17.4 lbm per hour).

In order to identify leakage paths, the following actions were taken:

a. An extensive investigation of all penetration areas was conducted. This search revealed small packing leaks on several valves, the most significant on 27-AOV-101A.

b. Pressure readings were taken between the Main Steam Isolation Valves (MSIVs).

In order to reduce the mass trend, the following actions were taken and the leakage effects of all the isolated penetrations (floor drains, sumps, and MSIV line) were quantified using the Type "A" Test mass trend data.

a. At 1700 hours, the manual operator on 27-AOV-101A was wrapped in plastic in order to quantify the packing leakage. A Local Leak Rate Test (LLRT) produced a leakage of approximately 8 standard cubic feet per day (SCFD).

NOTE: This reading was lower than expected, perhaps due to excessive pressure drop in the tubing to the LLRT Panel, problems in containing the leak, etc. Although this was a significant packing leak, it was not a significant contribution to the total Type "A" leakage.

b. At 1731 hours, manual valves, downstream of the outboard equipment and floor drain sump isolation valves, were closed. The position of the inboard isolation valves had not been clearly established by the procedure. These valves had been left open for the Type "A" Test.

c. At 1830 hours, an air block of 40 psig was established on the "B" MSIV line. This was done to check if the outboard isolation valve was holding pressure.

Typically, significant changes in the mass trend can be achieved by isolating significant leakage paths. Using graphical techniques, these changes or breakpoints can usually be seen immediately although several data points, i.e., 2 hours minimum, are required before an analytical analysis can be predicted with certainty. Arguments for the breakpoint analysis can be offered by reviewing the 1978 JAFNPP mass trend data from 1500 to 2400 hours on November 26, 1978. A slightly excessive mass loss of 16.2 lbm per hour was observed from 1500 to 1940 hours. An air block was established on the "A" MSIV line at 1945 with the mass loss after this isolation at 12.5 lbm per hour. The "as-found" ILRT of this penetration confirmed the Type "A" predicted LLRT results of approximately 1175 SCFD.

From 1800 to 2240 hours on February 14, 1982 (Attachment 2.1A), a fairly stable mass loss of about 8 lbm per hour was observed. The bag on 27-AOV-101A was removed and the manual valves on the equipment and floor drain sump lines were reopened in order to demonstrate that these were not a major contributing source to the observed mass trends. Thus, the entire mass trend improvement of about 6 lbm per hour was assigned to the MSIV. This mass rate change corresponds to a leakage rate of 1900 SCFD for the MSIV penetration.

At approximately 0320 hours on February 15, 1982, reactor coolant temperature approached a normal shutdown limit of 180°F. RHR service water was supplied to the RHR heat exchangers for about 30 minutes reducing reactor coolant temperature about 25°F.

This caused a containment temperature change of approximately 0.79°F over the next 2 hours, thus exceeding the procedure's temperature stabilization criteria. Flow to the non-regenerative Reactor Water Clean-Up (RWCU) heat exchangers was increased in an attempt to stabilize and control the reactor coolant temperature throughout the test period. Containment temperature

stabilization and a means for maintaining reactor coolant temperature within a narrow band were not established until approximately 1500 hours on February 15, 1982. At approximately 1630 hours, service water flow of 3000 gpm was established through the RHR heat exchangers for 45-60 seconds. This was repeated every hour to maintain reactor coolant temperature.

The Type A was successfully completed with the "B" MSIV leakage path blocked with an air plug, at 1500 hours on February 16, 1982, with a UCL of 0.213258%/day. A mass step verification test was successfully completed from 1620 to 1750 hours on February 16, 1982. Depressurization was started at 2040 hours with the drywell pressure at 61.304 psig.

At the completion of the ILRT, a LLRT of the "B" MSIV line indicated a leak rate of approximately 3.0 SCFD. This was similar to the "as left" leakage recorded by the Type "C" test but was not in agreement with the Type "A" predicted results of 1900 SCFD.

An extensive review of the trend data from approximately 1100 to 0600 hours on February 14 and 15, 1982 (Attachment 2.1A), indicated an instrumentation readout problem with the drywell manometer (C190). The discontinuities in the drywell mass trend, that existed at approximately 1700 and 2300 hours, disappeared when the average drywell manometer value (C192) was adjusted to restore the separation that existed between the two drywell manometers (C190 and C191) during previous readings. Additionally, a torus temperature readout problem (C230) was observed to be erratically fluctuating by as much as +4°F, starting at approximately 1830 hours.

When the effects of these instruments were removed from the mass trends (Attachment 2.1B), the previously assumed breakpoint disappeared. In fact, the adjusted trends showed the mass trend change to be very gradual and not a direct result of the MSIV isolation.

Upon further analysis of the drywell and torus air temperature data (Attachment 2.1C), it can be observed that the torus temperature trends had not yet approached the equilibrium (torus water) temperature. Therefore, the apparent 14 lbm per hour mass trend from 1100 to 1700 hours on February 14, 1982, can be directly attributed to this temperature equalization process. From 0400 to 1700 hours on February 14, 1982, the temperature dropped approximately 5°F, after which it remained fairly constant at 71.5°F.

2.1.2 Conclusions

a. The predicted MSIV leakage rate value of 1900 SCFD was based upon malfunctioning sensors inputting to the computer, and the significant mismatch of torus air and water temperature.

b. When these instruments were deleted from the mass calculation there were no breakpoints that were attributable to the MSIV air block (Attachment 2.1B).

c. The torus air-water temperature mismatch significantly attributed the apparent 14 lbm per hour mass trend.

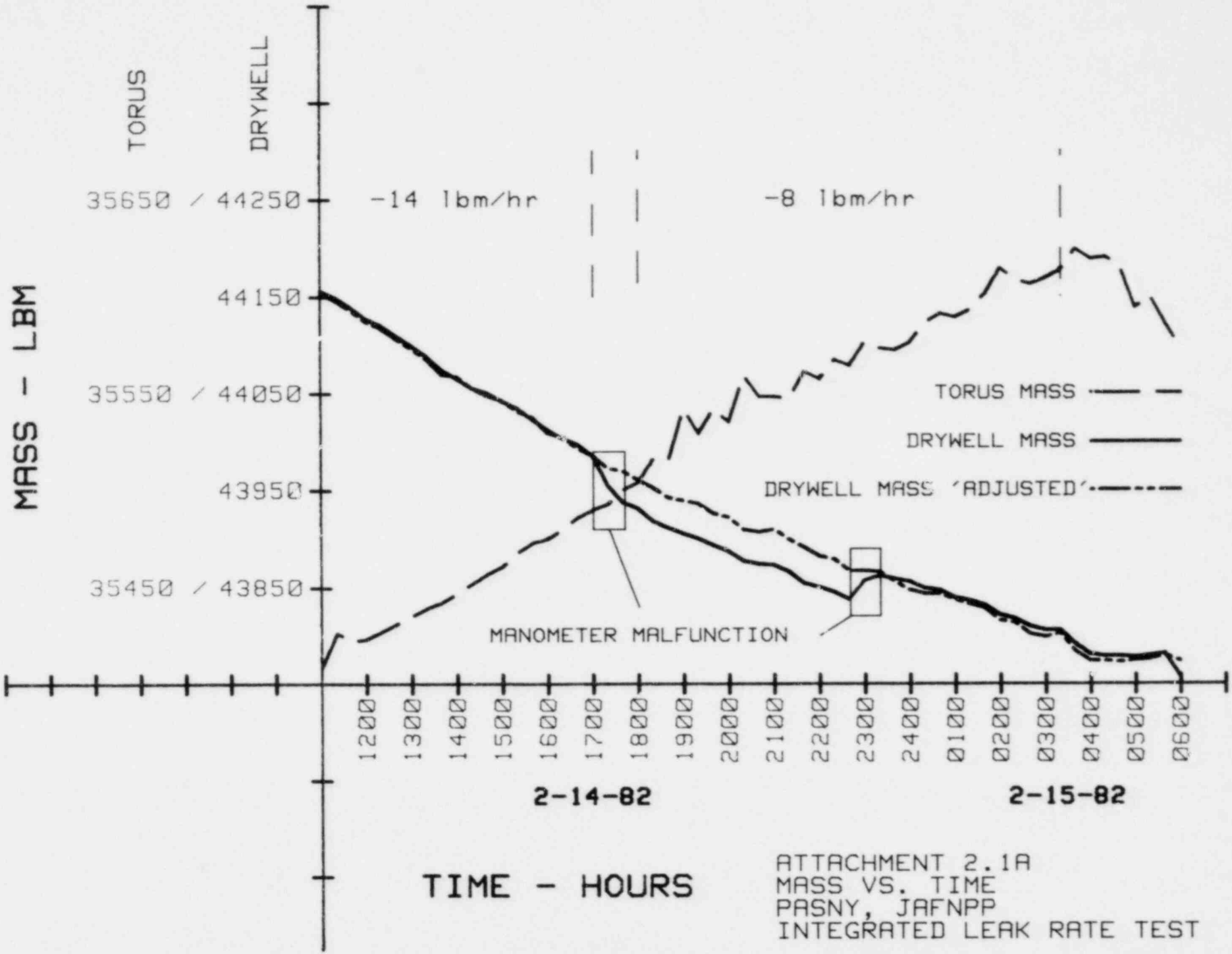
d. The MSIV air block had no effect on the Type "A" Test results. The "as-found" and the "as left" are recorded in Attachment 3.3E.

e. The Data Analysis Program results, without C190 and C230 (Attachments 3.3A-3.3D), indicate a UCL of approximately 0.213258%/day, which is well below the acceptance criteria.

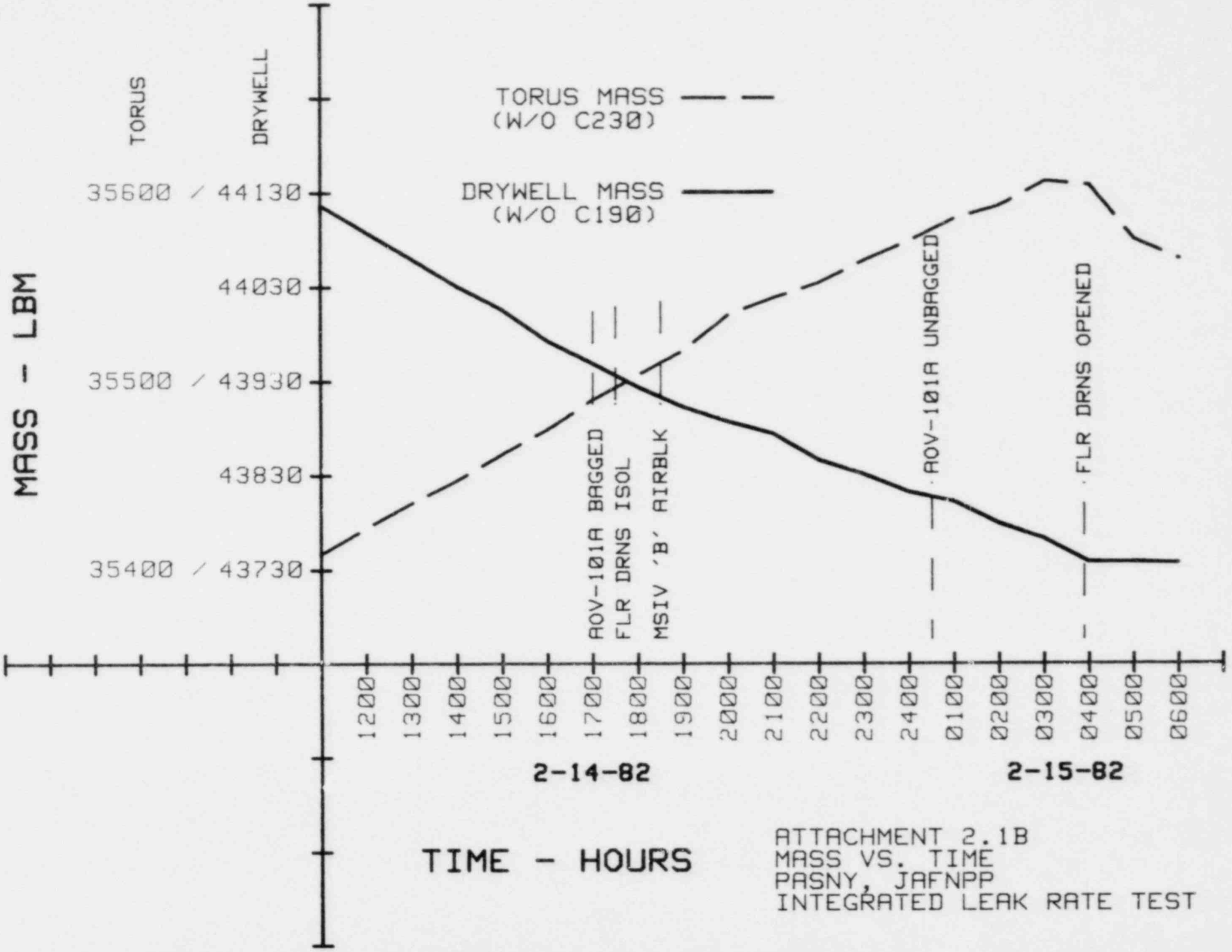
2.2 LOCAL LEAK RATE TESTS (TYPE B AND C)

The Local Leak Rate Tests (LLRT) of containment isolation valves and other primary containment penetrations were performed by the methods described in the plant surveillance procedure No. F-ST-39B, "Type 'B' and 'C' LLRT of Containment Penetrations."

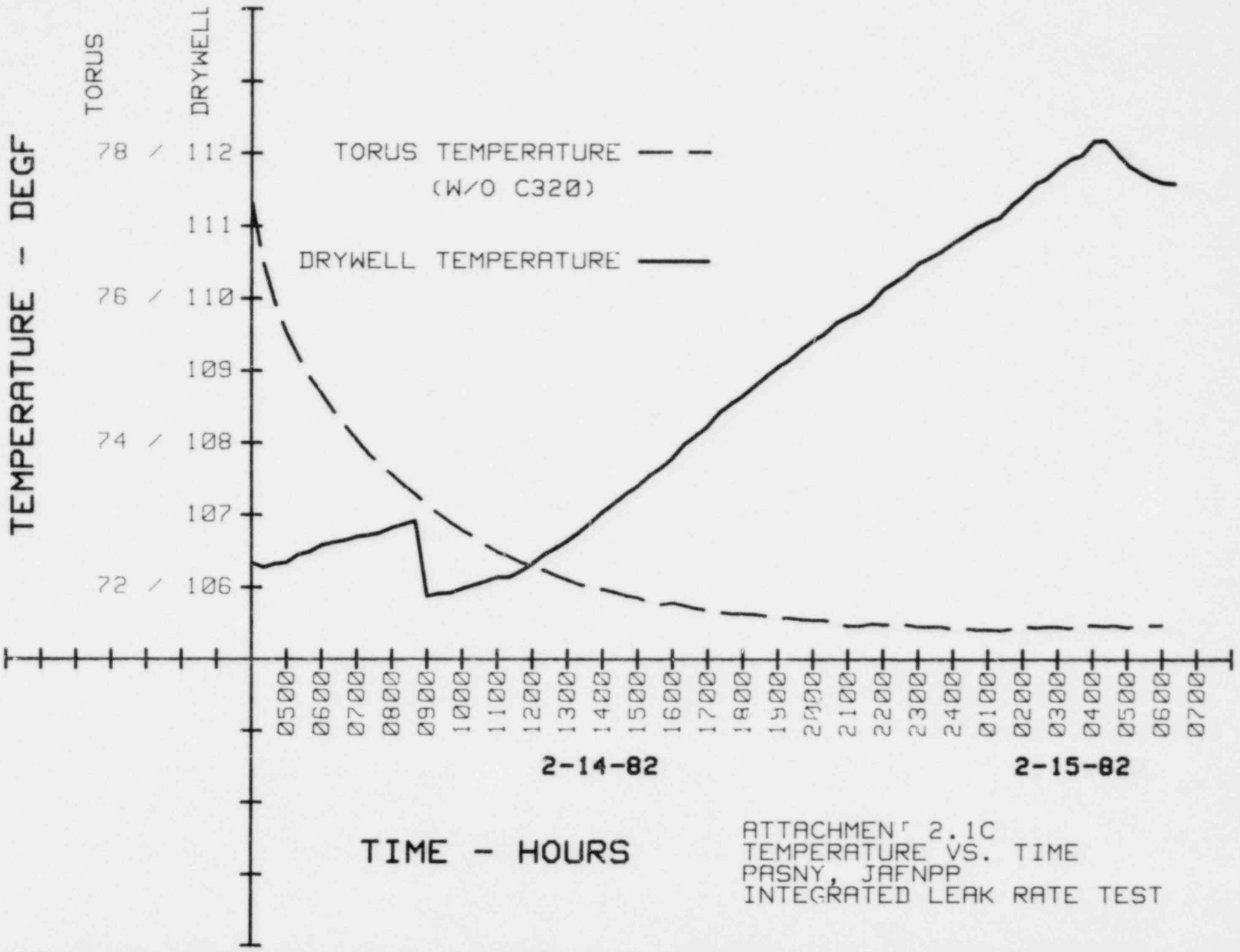
Data for the two surveillance periods (1980 and 1981/1982) of LLRT's performed since the last Type A Test in accordance with Appendix J to 10CFR50, Paragraph V.3, is summarized in Section 4 of this report.



ATTACHMENT 2.1A
MASS VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST



ATTACHMENT 2.1B
MASS VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST



ATTACHMENT 2.1C
TEMPERATURE VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST

SECTION 3

TYPE A TEST

3.1 EDITED LOG OF EVENTS

This log was edited from the PCILRT log, Shift Supervisor's log, Nuclear Control Operator's log, and Nuclear Operator C's log.

February 11, 1982

At 0800 hours, the valve lineups were started for the PCILRT.

February 12, 1982

At 2000 hours, the dewcells were fed through the vacuum breakers, VB-1 and VB-3, into the torus.

At 2100 hours, the drywell interior inspection was completed.

February 13, 1982

At 1200 hours, the torus exterior inspection was completed.

Between 1420 and 1430 hours, it was determined that the readings from the dewcells 16-1-DC-B1 (C238) and 16-1-DC-C1 (C242) were invalid.

Containment pressurization commenced at 2013 hours in accordance with surveillance procedure No. F-ST-39F entitled "Type 'A' Test (60 psia) Primary Containment Integrated Leak Rate Test." During pressurization, accessible external areas of the drywell were inspected for possible leakage.

February 14, 1982

At 0335 hours, with the drywell pressure at 61.0 psia (instantaneous computer reading), the pressurization equipment was isolated and secured. The minimum 4-hour stabilization period began.

At 0345 hours, the valve lineup for temperature stabilization period was completed, and an extensive search for leakage paths was initiated.

At 0447 hours, the Residual Heat Removal (RHR) shutdown cooling system was isolated; 10-MOV-17 and 10-MOV-18 closed.

At 0825 hours, the Condensate Transfer supply to the RHR System was isolated.

At 0915 hours, a packing leak at 27-AOV-101A and a slight packing leak at 27-AOV-101B were observed. The manual operator of 27-AOV-101A was wrapped in plastic at 1700 hours.

At 0930 hours, the "B" loop of the RHR System was restarted for shutdown cooling.

At 1100 hours, the temperature stabilization criterion was satisfied and the PCILRT was started.

At 1700 hours, slight seat leakage was found at 27-AOV-131A, CAD-68, 27-AOV-132A, and CAD-67. Other slight leaks were also noted at the seat of a Traversing Incore Probe (TIP) ball valve, at the packing of 16-1-AOV-101B, and at IAS-21.

At 1730 hours, the manual valves, downstream of the outboard equipment and floor drain sump isolation valves (20-AOV-95 and 20-AOV-83), were closed.

At 1830 hours, an "air plug" was established between the inboard and outboard isolation valves in the 'B" main steam line.

Between 1900 and 1930 hours, slight leakage was located on "A" mini purge. It was also noted that the apparent leak through the seats of 10-MOV-31A and RHR-52A was actually caused by the charging air header (RHR-50A).

February 15, 1982

At 0030 hours, the "bag" was removed from the manual operator of 27-AOV-101A.

Between 0330 and 0350 hours, the reactor coolant system was cooled by establishing service water flow to the RHR heat exchangers.

At 0353 hours, the manual valves, downstream of the outboard equipment and floor drain sump isolation valves (20-AOV-95 and 20-AOV-83), were opened.

At 0500 hours, the rate of change in containment temperature exceeded the procedure temperature criterion, 0.5°F/hour.

At 0800 hours, reactor building closed loop cooling (RBCLC) water flow was increased to the nonregenerative Reactor Water Clean-Up (RWCU) heat exchangers.

Between 1200 and 1400 hours, the RBCLC water temperature was decreased from 80°F to 50°F.

At 1500 hours, containment temperature stabilization requirements were satisfied.

At approximately 1630 hours, the RHR service water flow to the RHR heat exchangers went into service for 45-60 seconds, at 3000 gpm, once per hour, on the half-hour.

February 16, 1982

At 1500 hours, the PCILRT test period was completed, and preparation for the pump back verification test began.

At 1620 hours, the pump back verification test was initiated.

At 1720 hours, the mass pump back was completed with 4,200 scf of air pumped back into the containment as read on flow totalizer 16-1-FQT-101.

At approximately 1800 hours, problems with the plant computer software were encountered when changing the printout paper. Computer operations were restored at approximately 2100 hours.

At 1845 hours, the packing on 27-AOV-101A and 27-AOV-101B were adjusted and both valves were cycled to ensure operability.

At 2035 hours, the PCILRT and verification test were documented as complete, and depressurization of the containment started.

3.2 General Test Description

3.2.1 Prerequisites

In accordance with F-ST-39F, the following is a listing of the pertinent prerequisites completed and documented prior to pressurization:

a. Required instrumentation cleaned, calibrated, and placed in service.

b. All Type B and Type C leak rate testing completed.

c. Satisfactory inspection of accessible interior and exterior surfaces of the primary containment structures and components completed.

d. Temporary air compressors and test skid ready for use as pressurization source.

e. Two drywell ventilation fans adjusted for continuous operation at test pressure (45 psig), and their associated dampers blocked in the open position.

f. All computer software used for test calculations tested and operational.

g. Water levels recorded for the suppression pool, reactor vessel, drywell equipment sump, and drywell floor drain sump.

h. Controlled Work Area plan in effect.

i. An official log of events ready to be maintained by the test director.

j. Valves lined up in accordance with the Valve Line-Up List.

k. Site meteorology data recorded at least 3 days prior to and during PCILRT (Attachment 3.2A).

3.2.2 Equipment and Instrumentation

Pressurization of the containment was achieved by utilizing a temporary system consisting of three air compressors, manifolded to an in-line water cooled heat exchanger and a moisture separator (Attachment 3.2B). The total capacity of the air compressors was 3,600 scfm. The system included the necessary valving and instrumentation to maintain proper monitoring and operation, and was protected by a temporary enclosure. The discharge of the temporary system was routed to the primary containment via the drywell spray portion of the RHR System (Attachment 3.2C).

The variables required to calculate containment leakage during the test were monitored using a leakage monitoring system consisting of pressure sensors, RTDs, and dewcells for both the drywell and torus. The general location of the RTDs and dewcells, including applicable test zones, are shown in Attachments 3.2E and 3.2F.

Flow instrumentation in the air supply system was used during the pump back verification test.

Pertinent data for the test instrumentation is listed in Attachment 3.2D. All test instrumentation except that used for the pump back verification test is input to the plant computer for data acquisition and averaging.

3.2.3 Data Acquisition System

The James A. FitzPatrick plant computer systsem (PCS) performs reactor core calculations and provides the plant operator with current core operating data. The PCS also scans, calculates, stores, logs, and alarms information which has been collected for the plant operation.

The PCS analog scan package reads all the analog inputs in a pre-established manner, converts these readings into engineering units, and then stores these values into predefined locations for use by the plant operators and by the plant application programs.

For the PCILRT, the function of the PCS is to provide sufficient sensor and zone pair information for manual entry into a remote computer PCILRT calculation program via a terminal hookup.

The plant computer monitored the following instrumentation:

Type	Scan Rate
18 RTDs	every 60 sec
6 Dewcells	every 60 sec
4 Absolute Manometers	every 60 sec

The PCS PCILRT sensor programs converts binary-coded decimal digital information from each manometer to an analog value, calculates a 10-minute rolling average of each of the 28 sensors, and calculates a zone pair average (see Attachments 3.2E and 3.2F). These data, along with the instantaneous sensor values, are logged on the utility typer every 10 minutes.

3.2.4 Data Resolution System

Periodically, during the PCILRT test period, leak rate trends were monitored using a programmable calculator. Data was obtained from the plant computer log.

After the appropriate data had been acquired and averaged, utilizing the plant computer system, the results were input to a

remote computer system for leak rate calculations, utilizing the Absolute Method of Mass Point Analysis.

Absolute Method of Mass Point Analysis

The Absolute Method of Mass Point Analysis consists of calculating air masses within the containment structure, over a minimum of 24 hours, from pressure, temperature, and dewpoint observations made during the PCILRT. The air masses are computed using the ideal gas law as follows:

$$M = \frac{144V(P-Pv)}{RT} \qquad \text{(Eq. 1)}$$

where:

M = air mass, lb
P = total pressure, psia
Pv = average vapor pressure, psia
R = 53.35 ft. lbf/lbm °R (for air)
T = average containment temperature, °R
V = containment free volume, ft^3

The leakage rate is then determined by plotting the air mass as a function of time, using a least-squares fit to determine the slope, A = dM/dT. The leak rate is expressed as a percentage of the air mass lost in 24 hours or symbolically:

$$\text{Leak rate} = A/B(-2400) \qquad \text{(Eq. 2)}$$

where A is the slope of the least-squares curve and B is the y-intercept. The sign convention is such that an outward leak is positive and the units are in percent/day.

There are two containments: torus (suppression chamber) and drywell. The masses for each containment are computed separately and added together. The result is correlated as a function of time by means of a least-squares curve fit of the form:

$$m = At+B \qquad \text{(Eq. 3)}$$

The slope A and the y-intercept B are then used in Equation 2 to determine the leak rate.

A 95 percent confidence interval is calculated using a Students T distribution. The sum of the leakage rate and the 95 percent confidence interval is the upper confidence limit (UCL). The measured leak rate may be described as 95 percent accurate to within the value of the UCL.

ATTACHMENT 3.2A

SITE METEOROLOGY

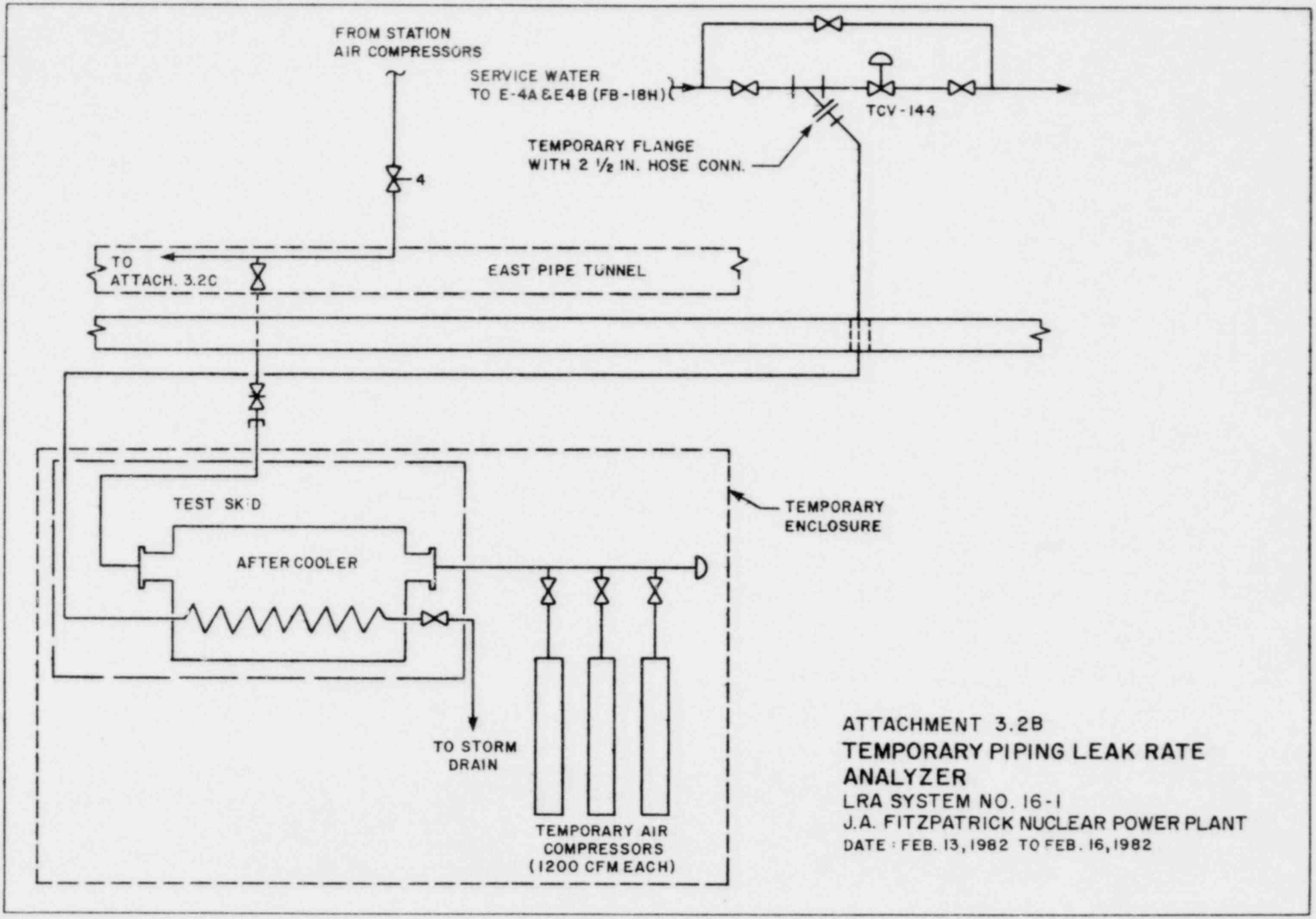
Date	Time	Temperature Ambient, °F	Barometric Pressure, in. Hg	Wind Velocity, mph	Wind Direction	Relative Humidity %	Reactor Bldg. Temperature °F
2/9/82	0100	23	29.54	10	240° (SW)	68	70
	0500	20	29.46	12	150	92	70
	0800	22	29.40	6	100	99	70
	1200	26	29.30	4	20	93	70
	1700	26	29.23	12	340	90	71
	2000	26	29.24	22	273	95	71
	2400	20	29.27	30	305	90	71
2/10/82	0400	17	29.32	32	320	74	71
	0800	18	29.45	24	310	77	71
	1200	16	29.56	25	240	70	72
	1600	14	29.58	24	240	70	72
	2000	14	29.61	25	260	63	72
	2400	11	29.64	30	250	69	71
2/11/82	0400	7	29.67	20	225	66	72
	0800	8	29.70	15	210	57	73
	1200	16	29.70	16	200	57	74
	1600	19	29.64	10	190	55	74
	2000	18	29.64	30	260	74	75
	2400	N/A	N/A	N/A	N/A	N/A	N/A
2/12/82	0400	N/A	N/A	N/A	N/A	N/A	N/A
	0800	22	29.83	16	300	81	75
	1200	24	29.88	14	315	89	75
	1600	21	29.83	0	160	77	75
	2200	20	29.76	11	180	88	75
2/13/82	0400	N/A	N/A	N/A	N/A	N/A	N/A
	0800	20	29.61	14	45	88	76
	1200	22	29.58	12	0	78	76
	1700	22	29.54	13	290	67	75
	2000	23	29.53	6	210	67	75
	2043-Start Pressurization						
	2205	23	29.52	11	270	88	75
2/14/82	0005	21	29.52	10	220	77	75
	0245	19	29.50	14	190	86	75
	0445	21	29.52	2	330	86	76
	0715	19	29.54	2	100	93	75
	0900	20	29.59	5	90	96	75
	1100	21	29.62	4	70	96	75
	1200	23	29.63	6	30	N/A	70
	1300	24	29.63	5	10	60	70
	1400	26	29.63	8	20	60	70
	1500	27	29.63	6	35	60	76
	1600	28	29.65	4	45	60	76

ATTACHMENT 3.2A (Cont.)

Date	Time	Temperature Ambient, °F	Barometric Pressure, in. Hg	Wind Velocity, mph	Wind Direction	Relative Humidity%	Reactor Bldg. Temperature °F
2/14/82	1700	28	29.65	4	70	60	76
	1800	23	29.66	8	110	64	76
	1900	22	29.66	10	120	64	76
	2000	22	29.66	9	120	70	76
	2100	21	29.66	11	110	76	76
	2205	23	29.62	12	110	77	76
	2305	23	29.59	13	120	77	76
	2400	26	29.57	14	120	81	76
2/15/82	0100	26	29.54	11	100	81	76
	0200	26	29.50	16	120	81	76
	0300	26	29.47	15	110	81	76
	0400	26	29.45	15	130	81	76
	0500	26	29.41	18	120	80	76
	0600	26	29.37	10	180	80	76
	0700	26	29.36	27	130	80	76
	0800	28	29.36	14	120	80	76
	0900	38	29.30	16	150	50	76
	1000	42	29.35	22	160	50	76
	1100	48	29.34	16	160	47	78
	1200	49	29.39	22	180	47	78
	1300	49	29.31	13	180	47	78
	1400	47	29.31	16	200	49	78
	1500	44	29.30	16	200	48	78
	1500	Start PCILRT					
	1600	44	29.31	14	200	48	78
	1700	42	29.32	17	210	48	78
	1800	39	29.34	10	200	51	78
	1900	39	29.37	7	210	51	78
	2000	38	29.37	15	220	70	78
	2100	38	29.37	17	210	70	77
	2200	39	29.38	19	210	70	77
	2300	39	29.38	17	210	79	77
	2400	38	29.39	12	200	79	77
2/16/82	0100	36	29.40	12	250	79	77
	0200	35	29.40	14	240	79	77
	0300	34	29.40	7	220	79	77
	0400	33	29.41	7	220	79	77
	0500	33	29.44	10	240	78	77
	0600	34	29.46	15	285	78	77
	0700	34	29.46	14	290	78	77
	0800	34	29.47	16	310	92	77
	0900	34	29.50	14	330	92	77
	1000	35	29.52	9	335	92	77
	1100	35	29.52	18	330	76	77

ATTACHMENT 3.2A (Cont.)

Date	Time	Temperature Ambient, °F	Barometric Pressure, in. Hg	Wind Velocity, mph	Wind Direction	Relative Humidity%	Reactor Bldg. Temperature °F
2/16/82	1200	36	29.53	22	350	76	77
	1300	35	29.53	22	350	76	76
	1400	35	29.53	20	350	70	76
	1500	34	29.54	20	350	70	76
	1500	Complete PCILRT					



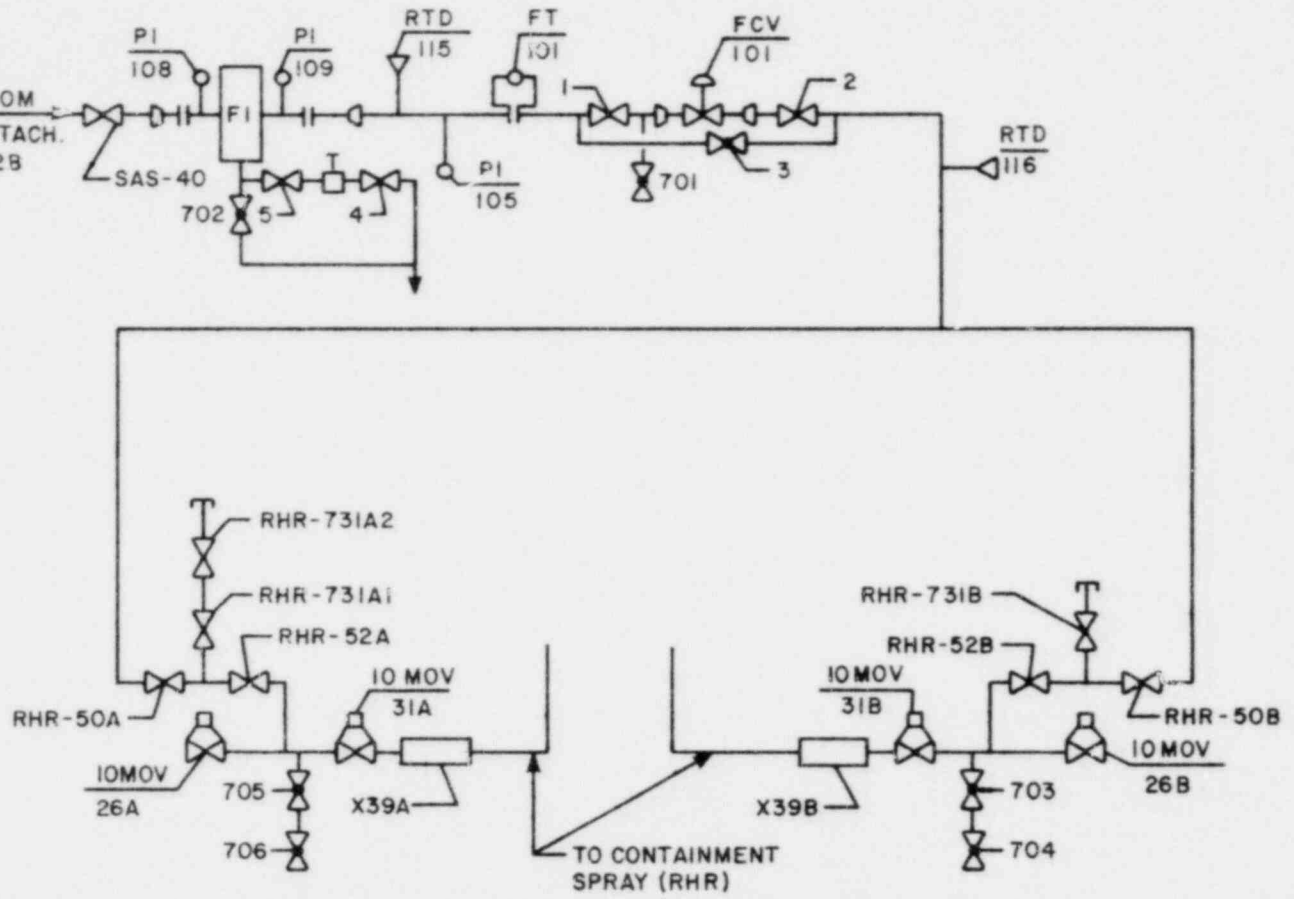
ATTACHMENT 3.2B

TEMPORARY PIPING LEAK RATE ANALYZER

LRA SYSTEM NO. 16-1

J.A. FITZPATRICK NUCLEAR POWER PLANT

DATE : FEB. 13, 1982 TO FEB. 16, 1982



ALL MANUAL VALVES ARE PREFIXED WITH LRA, WHICH IS LEAK RATE ANALYZER SYSTEM NO. 16-1, EXCEPT AS NOTED.

ATTACHMENT 3.2C

PERMANENT PIPING LEAK RATE ANALYZER

LRA SYSTEM NO. 16-1

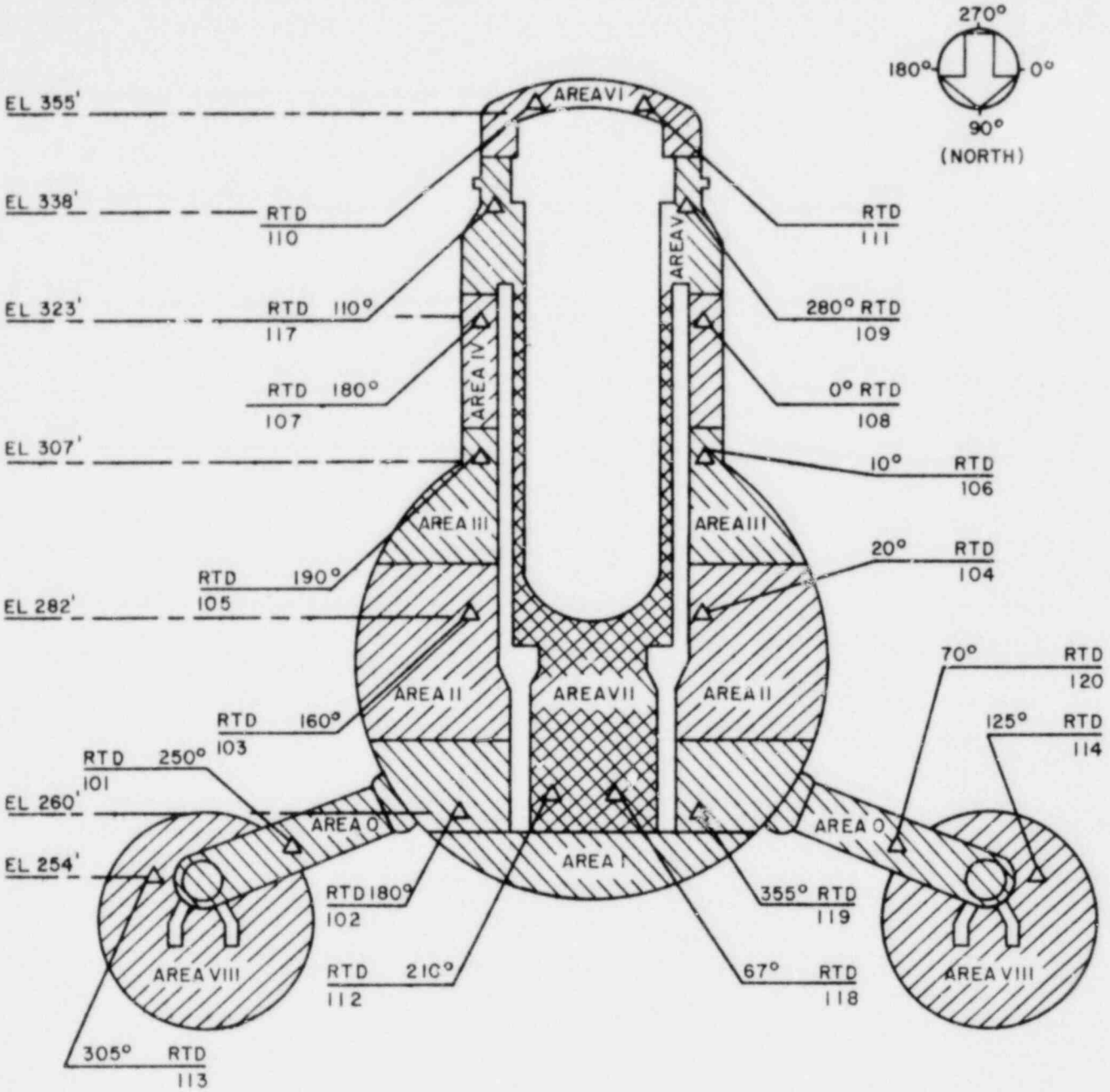
J.A. FITZPATRICK NUCLEAR POWER PLANT

DATE: FEB. 13, 1982 TO FEB. 16, 1982

ATTACHMENT 3.2D

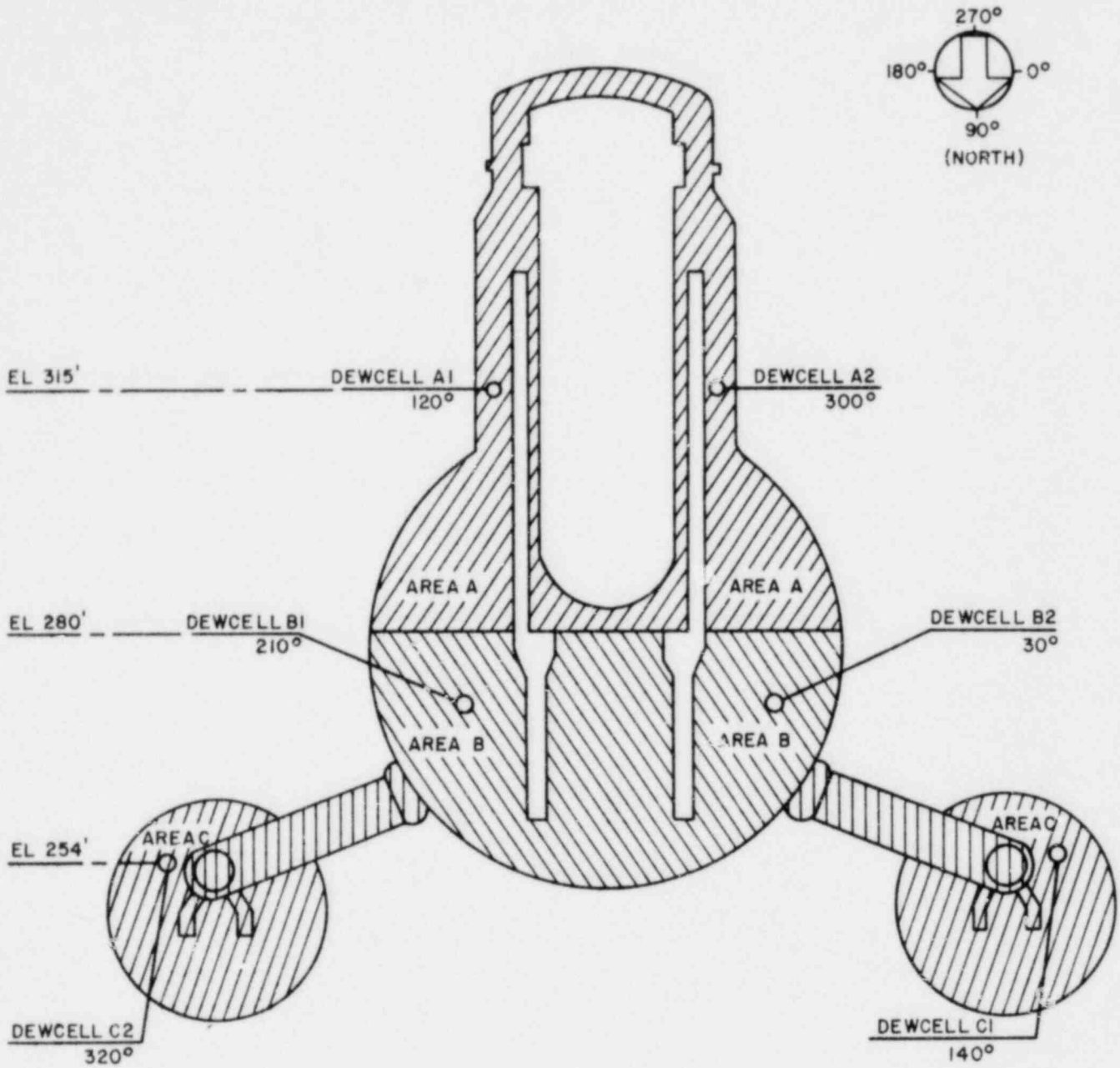
INSTRUMENTATION

Instrument	Weight Factor	Computer Point	Range	Zone	Accuracy
A. Temperature					
16-1-RTD-101	0.056755	C198	0°-300°F	0	±1.0°F
16-1-RTD-120	0.056755	C199	0°-300°F	0	±1.0°F
16-1-RTD-102	0.082510	C202	0°-300°F	1	±1.0°F
16-1-RTD-119	0.082510	C203	0°-300°F	1	±1.0°F
16-1-RTD-103	0.178020	C206	0°-300°F	2	±1.0°F
16-1-RTD-104	0.178020	C207	0°-300°F	2	±1.0°F
16-1-RTD-105	0.065685	C210	0°-300°F	3	±1.0°F
16-1-RTD-106	0.065685	C211	0°-300°F	3	±1.0°F
16-1-RTD-107	0.023505	C214	0°-300°F	4	±1.0°F
16-1-RTD-108	0.023505	C215	0°-300°F	4	±1.0°F
16-1-RTD-109	0.026685	C218	0°-300°F	5	±1.0°F
16-1-RTD-117	0.026685	C219	0°-300°F	5	±1.0°F
16-1-RTD-110	0.035765	C222	0°-300°F	6	±1.0°F
16-1-RTD-111	0.035765	C223	0°-300°F	6	±1.0°F
16-1-RTD-112	0.031075	C226	0°-300°F	7	±1.0°F
16-1-RTD-118	0.031075	C227	0°-300°F	7	±1.0°F
16-1-RTD-113	0.000000	C230	0°-300°F	8	±1.0°F
16-1-RTD-114	1.000000	C231	0°-300°F	8	±1.0°F
B. Pressure					
16-1-PIT-101	0.00	C190	0-100 psia	Drywell	±0.02%
16-1-PIT-102	1.00	C191	0-100 psia	Drywell	±0.02%
16-1-PIT-103	0.50	C194	0-100 psia	Torus	±0.02%
16-1-PIT-104	0.50	C195	0-100 psia	Torus	±0.02%
C. Dewpoint					
16-1-DC-A1	0.50	C234	38.5°-118.5°F	A	±1°-2°F
16-1-DC-A2	0.50	C235	38.5°-118.5°F	A	±1°-2°F
16-1-DC-B1	0.00	C238	38.5°-118.5°F	B	±1°-2°F
16-1-DC-B2	1.00	C239	38.5°-118.5°F	B	±1°-2°F
16-1-DC-C1	0.00	C242	38.5°-118.5°F	C	±1°-2°F
16-1-DC-C2	1.00	C243	38.5°-118.5°F	C	±1°-2°F
D. Pump Back Verification Test Flow Computer					
16-1-PT-105	N/A	N/A	0-165 psia	N/A	±2% F.S.
16-1-TT-115	N/A	N/A	0°-150°F	N/A	±0.1°F
16-1-FE-101	N/A	N/A	0-20 in. H_2O	N/A	±1% F.S.
16-1-FQT-101	N/A	N/A	Flow Totalizer (scf)	N/A	±2% of reading



NOTE
RTD ELEVATIONS AND AZIMUTH POSITIONS ARE APPROXIMATE

ATTACHMENT 3.2E
ILRT TEMPERATURE DETECTOR LOCATIONS
ILRA SYSTEM NO. 16 -1
J.A. FITZPATRICK NUCLEAR POWER PLANT
DATE: FEB. 13, 1982 TO FEB. 16, 1982



NOTE
MOISTURE DETECTOR ELEVATIONS AND AZIMUTH POSITIONS ARE APPROXIMATE.

ATTACHMENT 3.2F
ILRT MOISTURE DETECTOR LOCATIONS
LRA SYSTEM NO. 16-1
J.A. FITZPATRICK NUCLEAR POWER PLANT
DATE: FEB. 13, 1982 TO FEB. 16, 1982

3.3 TEST RESULTS

3.3.1 Analysis of Test Results

The test data for the period of 1500 hours on February 15, 1982 through 1500 hours on February 16, 1982, were analyzed for the final test results using PASNY's PCILRT program. The input data and results obtained by PCILRT are shown in Attachments 3.3A through 3.3D.

Test Run 1 utilized 10-minute zone averages of absolute pressure, vapor pressure, and temperature data for the drywell and torus. These averages were generated by the Plant Data Acquisition System.

In the PCILRT program, weight factors of 0.00 were assigned to a torus RTD (C230) and a drywell manometer (C190) when they were found to be malfunctioning.

Calculated results are well below the test procedure acceptance criteria and the technical specification limit of 0.50 percent/day. These results include corrections for Type C leakage and water level (Section 3.3.2).

Five graphs (Attachments 3.3F through 3.3J) are provided showing the following quantities vs time:

1. Containment Leak Rate
2. Containment Air Mass
3. Drywell and Torus Average Temperatures
4. Drywell and Torus Pressures
5. Drywell and Torus Vapor Pressures

The leak rate and 95 percent confidence limit were calculated only for the test period shown. The onsite computer calculations include data for the overall test duration which began on February 13, 1982.

The leak rate test calculations were verified during the supplemental test which used the metered pump back test method. Approximately 75 percent of the maximum allowable 24-hour leakage (Ld) was inserted into the containment in a one hour period. The calculated reading using the PCILRT computer program was within 0.25 Ld of the metered input.

3.3.2 60-psia PCILRT Results

The 60-psia PCILRT was conducted in accordance with Section VII.3 of surveillance procedure No. F-ST-39F.

a.	Lam leak rate calculated (percent/day)	0.202093
b.	95 percent confidence level (percent/day)	0.011165
c.	UCL, leakage rate with 95 percent confidence level (percent/day)	0.213258
d.	Corrections due to water level (percent/day)	

Torus	0.0177
Reactor Vessel	None
Drywell Equipment Sump	0.0056
Drywell Floor Sump	0.00036
Total	0.0237

e.	Correction for Type C leakage (percent/day) (see Attachment 3.3E)	0.0167
f.	Total reported Type A leak rate (percent/day)	0.253658

Total allowable leakage is less than Ld or 0.50 percent/day.

3.3.3 Supplemental Test Results

The Supplemental Verification Test was performed using the Mass Pump Back Method in accordance with Section VII.4 of F-ST-39F.

a.	Verification air inserted	319.2 lbm (4200 SCF)
b.	Computer calculated change in containment air mass using Type A test instrumentation	306.551 lbm
c.	Agreement between measured and calculated air added to containment	12.649 lbm
d.	0.25 Ld	104.3 lbm

Results were acceptable within ±0.25 Ld in accordance with 10CFR50, Appendix J, Paragraph III A.3.b.

ATTACHMENT 3.3A

PRIMARY CONTAINMENT INTEGRATED LEAK RATE TEST
PASNY JAMES A. FITZPATRICK NUCLEAR POWER PLANT
FROM 1500 ON 02-15-82 TO 1500 ON 02-16-82

LOG 1 - TEN MINUTE ZONE AVERAGES

TIME	ABSOLUTE	PRESS	TEMPERATURES									DEWPOINT TEMPS		
HRS	DRY	TOR	ZONE 0	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8	ZONE A	ZONE B	ZONE C
0.000	60.88	60.935	103.79	108.83	110.63	118.26	126.73	144.63	126.58	102.88	71.55	98.03	96.57	73.60
0.999	60.90	60.958	103.98	109.16	110.96	118.76	127.33	145.52	127.19	103.12	71.58	98.29	96.92	73.77
2.001	60.92	60.976	104.20	109.42	111.24	119.21	127.85	146.22	127.72	103.31	71.61	98.40	96.89	73.78
3.000	60.94	60.990	104.30	109.56	111.42	119.50	128.20	146.70	128.24	103.42	71.59	98.57	96.91	73.80
3.999	60.94	60.998	104.41	109.69	111.59	119.79	128.39	147.03	128.68	103.23	71.60	98.65	97.13	73.81
4.998	60.95	61.006	104.53	109.92	111.79	120.08	128.64	147.21	129.09	103.42	71.65	98.80	97.40	73.86
5.997	60.96	61.014	104.65	110.03	111.94	120.29	128.83	147.42	129.35	103.78	71.66	99.02	97.35	73.90
6.996	60.96	61.018	104.77	110.20	112.06	120.52	129.02	147.49	129.58	103.85	71.69	99.01	97.39	74.07
7.995	60.97	61.021	104.91	110.33	112.28	120.75	129.22	147.48	129.67	104.07	71.72	99.10	97.57	74.14
8.994	60.97	61.029	105.03	110.36	112.34	120.94	129.33	147.51	129.84	104.17	71.72	99.25	97.77	74.17
9.993	60.97	61.029	105.13	110.48	112.47	121.13	129.49	147.48	129.84	104.27	71.77	99.39	97.76	74.16
10.992	60.98	61.037	105.19	110.58	112.61	121.31	129.62	147.61	129.90	104.34	71.78	99.53	97.81	74.20
11.991	60.98	61.037	105.29	110.69	112.69	121.48	129.80	147.72	129.92	104.43	71.79	99.56	97.89	74.20
12.990	60.99	61.045	105.35	110.84	112.82	121.70	129.94	147.80	130.00	104.50	71.82	99.56	97.98	74.18
13.989	60.99	61.045	105.44	110.95	112.96	121.91	130.13	147.97	130.10	104.24	71.88	99.79	98.17	74.39
14.988	60.99	61.045	105.52	110.93	113.06	122.05	130.27	147.93	130.04	104.57	71.88	99.66	98.12	74.52
15.987	61.00	61.053	105.52	111.11	113.12	122.22	130.33	147.98	130.06	104.16	71.87	99.51	98.10	74.48
16.986	61.00	61.053	105.60	111.13	113.23	122.37	130.46	148.11	130.11	104.61	71.88	99.64	98.21	74.56
18.000	61.00	61.053	105.74	111.23	113.36	122.57	103.62	148.09	130.06	104.78	71.93	99.70	98.23	74.56
18.999	61.01	61.061	105.89	111.41	113.43	122.68	130.59	148.16	129.96	104.88	71.92	99.77	98.34	74.62
19.998	61.01	61.061	105.97	111.48	113.54	122.82	103.78	148.04	129.79	104.89	71.92	99.78	98.23	74.54
20.997	61.01	61.068	106.00	111.58	113.65	122.95	130.82	148.06	129.76	105.03	71.92	99.96	98.44	74.62
21.996	61.01	61.068	106.07	111.66	113.75	123.12	130.99	148.27	129.60	105.12	71.93	99.95	98.57	74.70
22.995	61.01	61.068	106.17	111.77	113.81	123.33	131.07	148.32	129.54	104.88	71.93	99.98	98.67	74.93
24.000	61.01	61.068	106.22	111.85	113.93	123.50	131.23	148.35	129.54	105.18	71.95	100.06	98.71	74.99

PRIMARY CONTAINMENT INTEGRATED LEAK RATE TEST
PASNY JAMES A. FITZPATRICK NUCLEAR POWER PLANT
FROM 1500 ON 2-15-82 TO 1500 ON 2-16-82

LOG 2 - INPUT VARIABLES

	DRYWELL				TORUS		
TIME HRS	ABS PRESS PSIA	VAP PRESS PSIA	ABS TEMP DEGR	ABS DEWPT DEGR	ABS PRESS PSIA	VAP PRESS PSIA	ABS TEMP DEGR
0.000	60.88	0.8747	573.62	557.30	60.935	0.4100	531.55
0.999	60.90	0.8829	574.01	557.60	60.958	0.4123	531.58
2.001	60.92	0.8840	574.34	557.65	60.976	0.4124	531.61
3.000	60.94	0.8865	574.56	557.74	60.990	0.4127	531.59
3.999	60.94	0.8906	574.74	557.89	60.998	0.4129	531.60
4.998	60.95	0.8963	574.96	558.10	61.006	0.4136	531.65
5.997	60.96	0.8986	575.13	558.19	61.014	0.4141	531.66
6.996	60.96	0.8990	575.28	558.20	61.018	0.4165	531.69
7.995	60.97	0.9027	575.46	558.33	61.021	0.4175	531.72
8.994	60.97	0.9075	575.55	558.51	61.029	0.4179	531.72
9.993	60.97	0.9093	575.66	558.57	61.029	0.4177	531.77
10.992	60.98	0.9119	575.78	558.67	61.037	0.4183	531.78
11.991	60.98	0.9134	575.88	558.72	61.037	0.4183	531.79
12.990	60.99	0.9146	576.01	558.77	61.045	0.4180	531.82
13.989	60.99	0.9205	576.12	558.98	61.045	0.4210	531.88
14.988	60.99	0.9180	576.20	558.89	61.045	0.4228	531.86
15.987	61.00	0.9156	576.26	558.81	61.053	0.4222	531.87
16.986	61.00	0.9189	576.37	558.93	61.053	0.4234	531.88
18.000	61.00	0.9201	576.49	558.96	61.053	0.4234	531.93
18.999	61.01	0.9226	576.58	559.06	61.061	0.4242	531.92

TIME HRS	DRYWELL ABS PRESS PSIA	DRYWELL VAP PRESS PSIA	DRYWELL ABS TEMP DEGR	DRYWELL ABS DEWPT DEGR	TORUS ABS PRESS PSIA	TORUS VAP PRESS PSIA	TORUS ABS TEMP DEGR
19.998	61.01	0.9212	576.65	559.01	61.061	0.4231	531.92
20.997	61.01	0.9266	576.74	559.20	61.068	0.4242	531.92
21.996	61.01	0.9283	576.83	559.26	61.068	0.4254	531.93
22.995	61.01	0.9301	576.90	559.32	61.068	0.4286	531.93
24.000	61.01	0.9318	577.01	559.39	61.068	0.4295	531.95

INITIALIZATION	DRYWELL	TORUS	CONTROLS	OUTPUT	NDATA
ABS PRESS	60.88	60.935		100	25
VAP PRESS	0.8747	0.4100			
ABS TEMP	573.62	531.55			
VOLUME	154476.	115800.			

ATTACHMENT 3.3C

PRIMARY CONTAINMENT INTEGRATED LEAK RATE TEST
PASNY JAMES A. FITZPATRICK NUCLEAR POWER PLANT
FROM 1500 ON 2-15-82 TO 1500 ON 2-16-82

LOG 3 - ABSOLUTE METHOD TEST RESULTS

TIME HOURS	MASS OF AIR POUNDS	LEAK RATE PCT/DAY	95 PCT CONF PCT/DAY	UCL
0.000	79207.528	0.000000	0.000000	0.000000
0.999	79196.789	0.000000	0.000000	0.000000
2.001	79193.684	0.209576	0.478740	0.688316
3.000	79199.153	0.085524	0.299133	0.384656
3.999	79186.864	0.118065	0.149024	0.267089
4.998	79174.093	0.165804	0.114977	0.280781
5.997	79170.250	0.177590	0.077843	0.255434
6.996	79157.728	0.199339	0.063311	0.262650
7.995	79148.163	0.215539	0.052356	0.267894
8.994	79142.360	0.221633	0.041574	0.263207
9.993	79129.071	0.233198	0.036579	0.269777
10.992	79129.192	0.230766	0.030155	0.260920
11.991	79119.756	0.231122	0.025187	0.256309
12.990	79119.323	0.225121	0.022651	0.247772
13.989	79100.809	0.229625	0.020248	0.249873
14.988	79095.374	0.231210	0.017690	0.248900
15.987	79105.975	0.221467	0.019602	0.241069
16.986	79093.458	0.217403	0.018024	0.235427
18.000	79080.285	0.217317	0.016042	0.233359
18.999	79083.872	0.212595	0.015469	0.228064

ATTACHMENT 3.3C (Cont.)

TIME HOURS	MASS OF AIR POUNDS	LEAK RATE PCT/DAY	95 PCT CONF PCT/DAY	UCL
19.998	79060.228	0.207777	0.015105	0.222881
20.997	79073.231	0.204213	0.014339	0.218552
21.996	79063.742	0.202411	0.013227	0.215638
22.995	79055.589	0.201471	0.012142	0.213613
24.000	79044.067	0.202093	0.011165	0.213258

ATTACHMENT 3.3D

PRIMARY CONTAINMENT INTEGRATED LEAK RATE TEST
PASNY JAMES A. FITZPATRICK NUCLEAR POWER PLANT
FROM 1500 ON 2-15-82 TO 1500 ON 2-16-82

LOG 4 - INITIALIZATION AND CONTROL VARIABLES

WEIGHTING FACTORS FOR TEMPERATURE AND DEWPOINT AVERAGING

ZONE 0	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8	ZONE A	ZONE B	ZONE C
0.11351	0.16502	0.35604	0.13137	0.04701	0.05337	0.07153	0.06215	1.00000	0.50000	0.50000	1.00000

POLYNOMIAL COEFFICIENTS FOR VAPOR PRESSURE CONVERSION

0.919818D-14 0.172223D-10 0.105015D-08 0.349876D-06 0.179585D-04 0.112199D-02 0.211397D-01

STUDENT'S T CONSTANTS
1.95996 2.37226 2.82250

ATTACHMENT 3.3E

TYPE C PENETRATION LEAKAGE TO BE ADDED
TO CALCULATED PCILRT LEAK RATE

1. Penetrations to be penalized from initial valve lineup (see Type B and C data):

Penetration	Description	Leakage (SCFD)
X-9A	"A" Feedwater Line	31.98
X-9B	"B" Feedwater Line	88.41
X-14	RWCU Supply	28.40
X-23	Drywell Cooling Equipment	0.204
X-24	Drywell Cooling Equipment	0.204
X-36	CRD Return	30.90
	Total (percent/day)	0.0164

2. Penetrations isolated during Type A Test (post-isolation results added to Type A leakage):

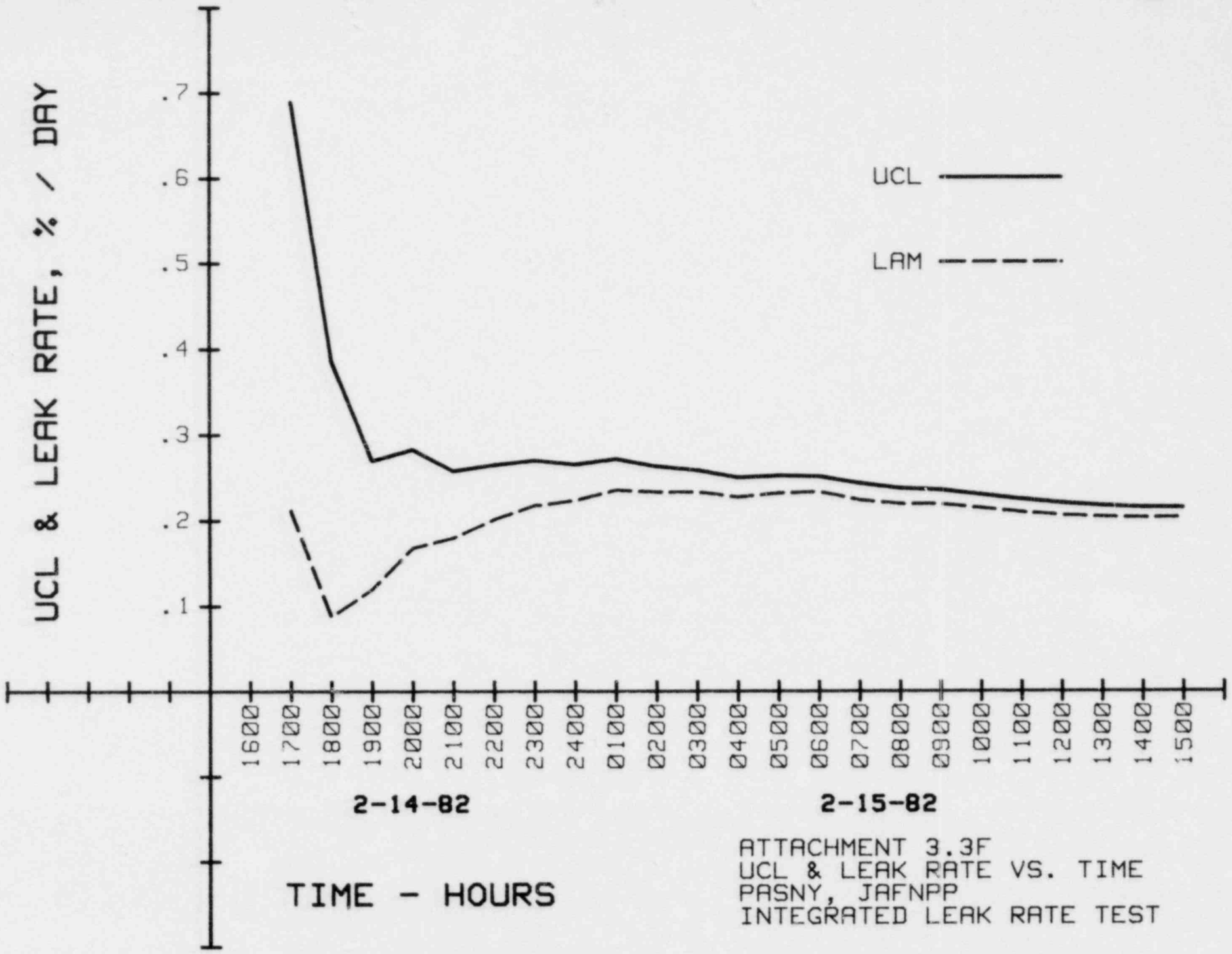
Penetration (1)	Description	Pre-Isolation Leakage(2) (SCFD)	Post-Isolation Leakage(2) (SCFD)
X-7B	"B" Main Steam Line	4.67	3.00
	Total (percent/day)		0.0003

3. Total corrections for Type C leakage 0.0167

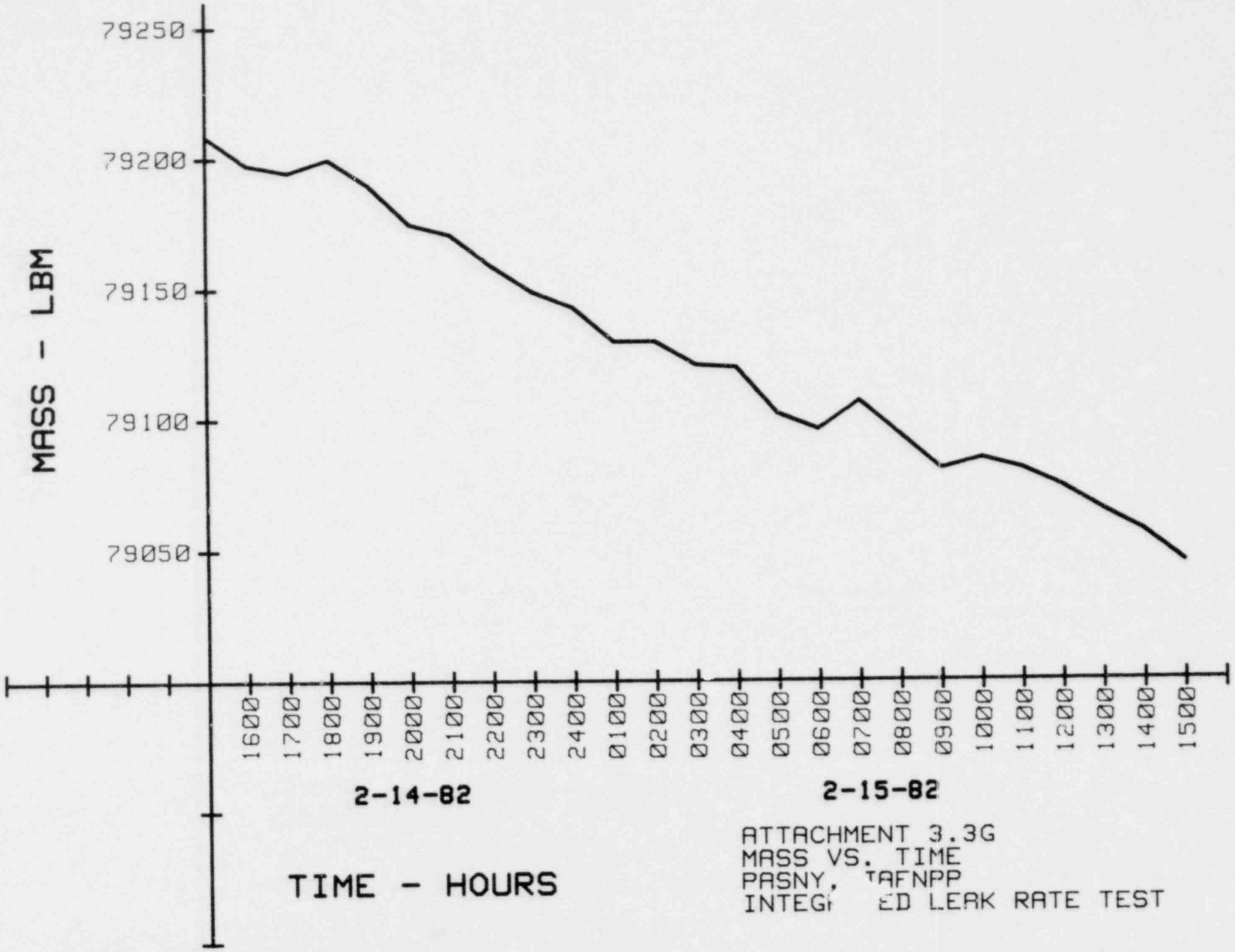
NOTES:

(1) The manual valves downstream of the outboard equipment and floor drain sump isolation valves (20-AOV-95 and 20-AOV-83) and 27-AOV-101A were isolated and returned to their normal valve lineup; therefore, there is no penalty applicable.

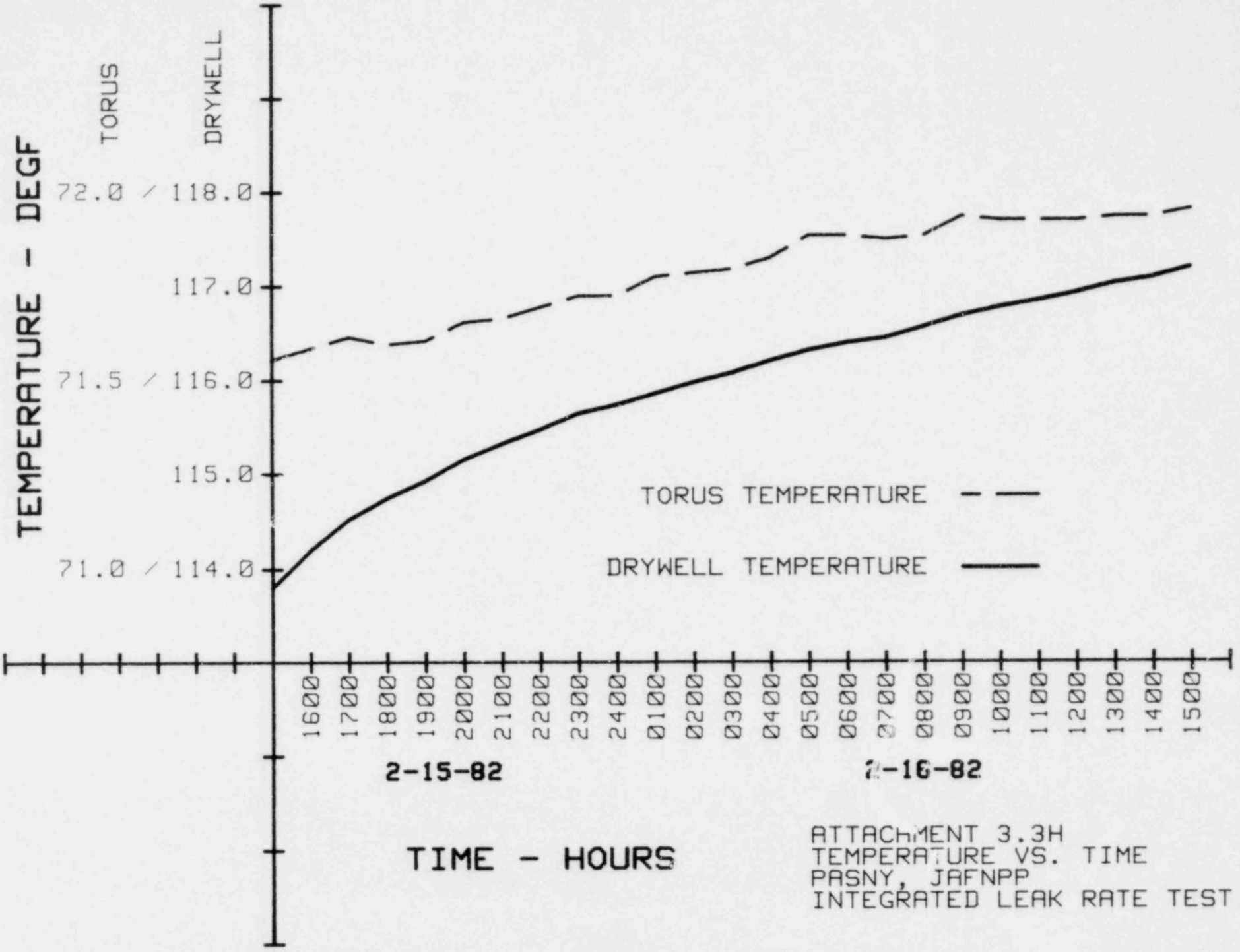
(2) The pre-isolation results of 4.67 SCFD were taken from the LLRT performed prior to the Type A Test. The post-isolation results were taken from the LLRT performed after the Type A Test. No repair was performed.



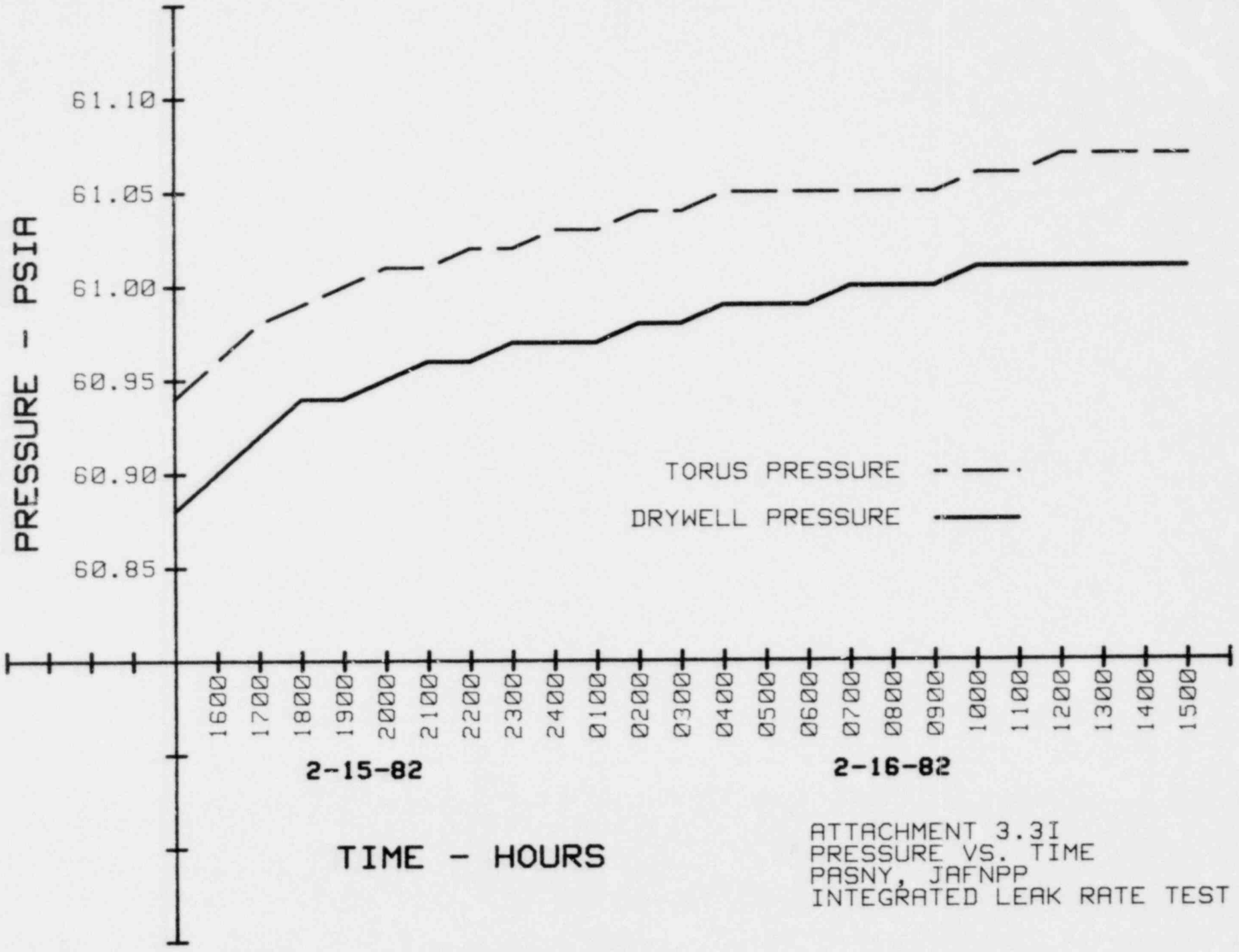
ATTACHMENT 3.3F
UCL & LEAK RATE VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST



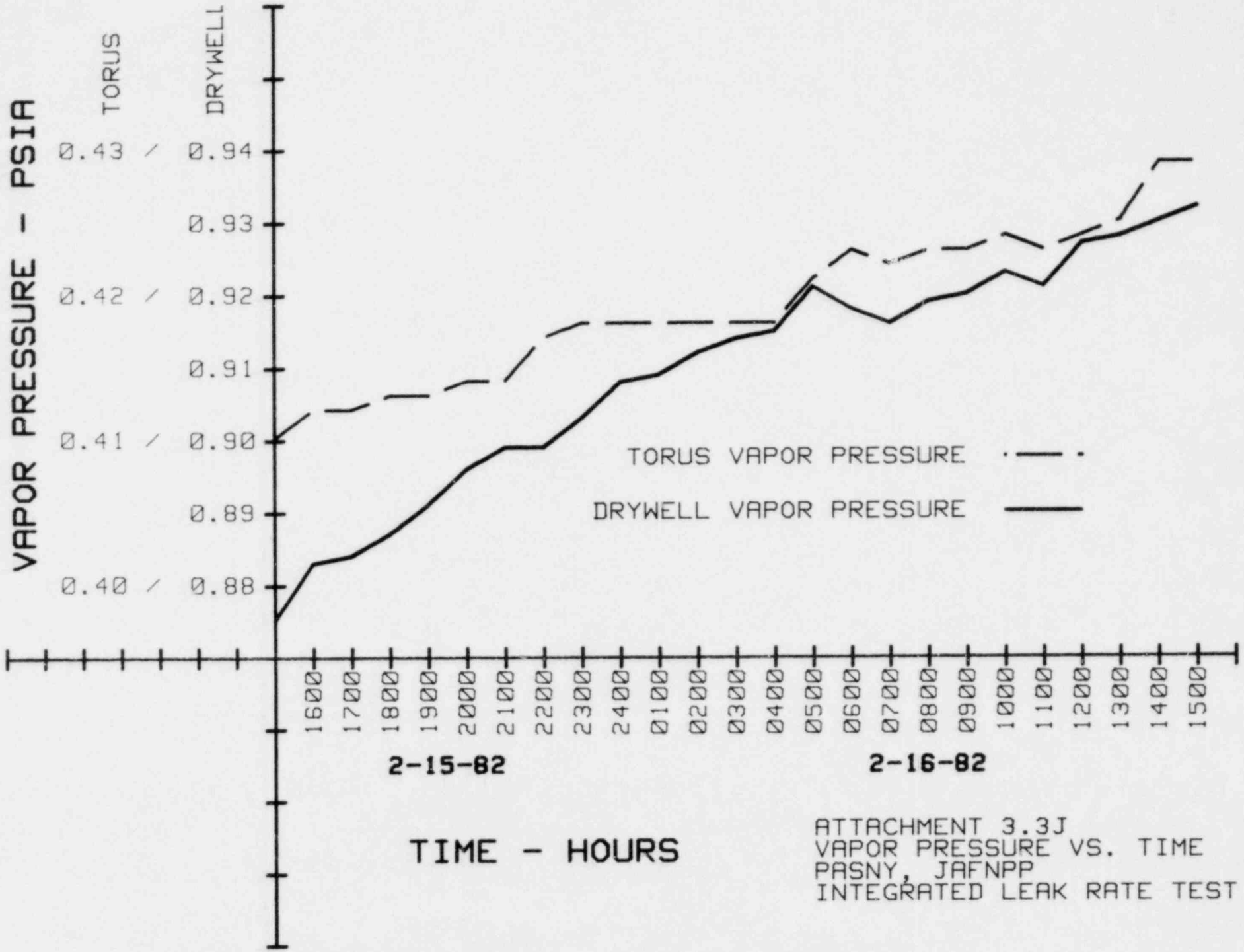
ATTACHMENT 3.3G
MASS VS. TIME
PASNY, TAFNPP
INTEGRATED LEAK RATE TEST



ATTACHMENT 3.3H
TEMPERATURE VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST



ATTACHMENT 3.3I
PRESSURE VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST



ATTACHMENT 3.3J
VAPOR PRESSURE VS. TIME
PASNY, JAFNPP
INTEGRATED LEAK RATE TEST

SECTION 4

LOCAL LEAK RATE TESTS (TYPE B AND C)

Attachments 4A and 4C, which follow, summarize the LLRT data which has been obtained from periodic testing performed since the last Type A Test. Pre-repair data is provided for surveillance testing performed in 1981/1982 and 1980. Values listed in both summaries are individual valve measurements, unless otherwise noted. Each penetration's leak rate can be obtained from site reference material. These LLRT's were performed using "Volumetric" leakage measuring equipment with a maximum calibrated range of 1,018 SCFD. Corrective action was taken whenever the penetration leakage was greater than 100 SCFD or when leakage was significantly greater than historical "as found" values. No attempt to establish the actual leak rate was made when the maximum range of the test instrumentation was exceeded.

In 1981/1982 a new drywell electrical penetration, X-100D, was added and Type B tested.

The acceptance criteria for Type B and C testing are in accordance with 10CFR50, Appendix J. The combined leakage rate for all penetrations and valves subject to Type B and C tests shall be less than 0.6 Ld. The LLRT's performed in 1980 and 1981/1982 were well below the acceptance criteria.

The Attachments for this section are:

Attachment No.	Title	Surveillance Period
4A	1981/1982 Type B and C Data Summary	10/26/81 through 2/3/82
4B	1981/1982 Primary Containment Boundary Modifications	
4C	1980 Type B and C Data Summary	5/5/80 through 8/14/80

ATTACHMENT 4A
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
Drywell Stabilizer					
0° (GE-90°)	B	"O" rings	<0.102	<0.102	
45° (GE-135°)	B	"O" rings	<0.102	<0.102	
90° (GE-180°)	B	"O" rings	<0.102	<0.102	
135° (GE-225°)	B	"O" rings	0.155	0.155	
180° (GE-270°)	B	"O" rings	<1.02	<1.02	
225° (GE-315°)	B	"O" rings	<1.02	<1.02	
270° (GE-0°)	B	"O" rings	<1.02	<1.02	
315° (GE-45°)	B	"O" rings	<1.02	<1.02	
Dry Well Head	B	"O" rings	<0.025	<0.025	
X-1A Equipment and Emergency Escape Hatch	B	"O" rings	0.102	0.102	
X-1B Equipment Hatch	B	"O" rings	0.204	0.204	
X-2A Personnel Access Hatch	B	"O" rings	2.378	2.378	
X-4 Drywell Head Manhole	B	"O" rings	<1.02	<1.02	
X-6 CRD Removal Hatch	B	"O" rings	<0.102	<0.102	
X-7A "A" Main Steam Line	C	29-AOV-80A (IPC) 29-AOV-86A (OPC)	1.19	1.19	
X-7B "B" Main Steam Line	C	29-AOV-80B (IPC) 29-AOV-86B (OPC)	4.67	4.67	
X-7C "C" Main Steam Line	C	29-AOV-80C (IPC) 29-AOV-86C (OPC)	448.39 (Combined)	79.15	AOV-86C machined seat; lapped pilot disc; replaced packing, ring, gasket, and pin;
X-7D "D" Main Steam Line	C	29-AOV-80D (IPC) 29-AOV-86D (OPC)	80.93	80.93	
X-8 Condensate Drain	C	29-MOV-74 (IPC) 29-MOV-77 (OPC)	64.39 1.79	64.39 1.79	

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-9A Feedwater	C	34-FWS-28A (IPC) 13-MOV-21 (OPC) 34-NRV-111A (OPC) RWC-62 (OPC)	19.14 (FWS-28A) >1018 (MOV-21) (NRV-111A) (RWC-62)	19.14 (FWS-28A) 6.78 (MOV-21) (RWC-62) 25.2 (NRV-111A)	NRV-111A lapped seat ring and flapper; adjusted stuffing box and pin bearing; adjusted linkage on actuator; RWC-62 lapped seat and flapper; replaced gasket;
X-9B Feedwater	C	34-FWS-28B (IPC) 23-MOV-19 (OPC) 34-NRV-111B (OPC)	123.76 (FWS-28B) >1018 (MOV-19) (NRV-111B)	88.41 (FWS-28B) 3.0 (MOV-19) (NRV-111B)	FWS-29B tightened packing; NRV-111B lapped disc and seat; replaced gaskets and packing;
X-10 Steam to RCIC Turbine	C	13-MOV-16 (IPC) 13-MOV-15 (OPC)	<1.018 <1.018	<1.018 <1.018	
X-11 Steam to HPCI Turbine	C	23-MOV-15 (IPC) 23-MOV-16 (OPC) 23-MOV-60 (OPC)	2.05	2.05	MOV-15 tightened packing; cleaned inside body bore to lap area;
X-12 Shutdown Supply to RHR	C	10-MOV-17 (IPC) 10-MOV-18 (OPC)	>1018 >1018	<0.102 <0.102	MOV-17 lapped seat and disc; replaced seal and safety ring; MOV-18 and RHR-88 repaired packing leaks;
X-13A RHR Return	C	10-MOV-27A (OPC) 10-MOV-25A (OPC)	>1018 9.62	292.17 9.62	MOV-27A replaced packing; RHR-703A replaced valve;
X-13B RHR Return	C	10-MOV-27B (OPC) 10-MOV-25B (OPC)	12.32 >1018	12.32 14.51	AOV-68B replaced bonnet gasket; RHR-700B replaced stem packing and disc; lapped seat; RHR-701B replaced stem packing and disc;
X-14 RWCU Supply to Recirculation Pumps	C	12-MOV-15 (IPC) 12-MOV-18 (OPC) 12-MOV-80 (OPC)	2.38 (MOV-15) 36.6 (MOV-18) (MOV-80)	2.38 28.4 (MOV-18) (MOV-80)	MOV-15 replaced packing; MOV-18 replaced packing;

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-16A Core Spary Pump Discharge	C	14-MOV-11A (OPC) 14-MOV-12A (OPC)	0.554 2.94	0.554 2.94	AOV-13A cleaned seat ring; lapped disc; replaced gasket;
X-16B Core Spray Pump Discharge	C	14-MOV-11B (OPC) 14-MOV-12B (OPC)	15.37 3.57	15.37 3.57	
X-17 RPV head Spray	C	10-MOV-32 (IPC) 10-MOV-33 (OPC)	1.25 6.99	1.25 6.99	
X-18 Floor Sump Pump Discharge	C	20-MOV-82 (IPC) 20-MOV-83 (OPC)	<1.02 <1.02	<1.02 <1.02	
X-19 Equipment Sump Pump Discharge	C	20-MOV-94 (IPC) 20-AOV-95 (OPC)	1.53 17.15	1.53 17.15	
X-21 Service Air	C	39-SAS-10 (IPC) 39-SAS-9 (OPC)	254.91 70.65	0.375 <1.02	SAS-10 relapped; new wedge, stem, and gasket; SAS-9 honed seat; new gasket and wedge;
X-22 Instrument Air	C	IAS-22 (IPC) IAS-21 (OPC) IAS-23 (OPC)	48.76 >1018 <1.02	48.76 <1.02 <1.02	IAS-21 replaced packing;
X-23 Cooling Water Supply	C	46-ESW-16B (OPC) 15-RBC-24A (OPC)	<0.102 <0.102	<0.102 <0.102	
X-24 Cooling Water Supply	C	46-ESW-16A (OPC) 15-RBC-24B (OPC)	<0.102 <0.102	<0.102 <0.102	
X-25 Drywell Inerting and CAD and Purge X-71	C	27-AOV-111 (OPC) 27-AOV-112 (OPC) 27-AOV-131A (OPC) CV-68 27-AOV-131B (OPC) CV-69	>1018 (AOV-111) (AOV-112) 463.19 (AOV-131A) (CV-68) 22.9 (AOV-131B) (CV-69)	2.19 (AOV-111) (AOV-112) 3.62 (AOV-131A) (CV-68) 22.9 (AOV-131B) (CV-69)	AOV-111 & AOV-112 new gaskets and packing; readjusted; CV-68 lapped disc and seat;

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-26A Containment Atmospheric Sampling	C	CAD-204	0.102	0.102	
		27-SOV-120A (OPC)	95.34	<0.102	SOV-120A replaced piston spring, disc, o-ring, set screw, and viton plug; SOV-121A, SOV-121B, SOV-120B SOV-122A, and SOV-122B replaced o-ring; changed plugs from TFE to Viton;
		27-SOV-120B (OPC)	1.26	<0.102	
		CAD-206	0.102	0.102	
		27-SOV-122A (OPC)	8.0	0.025	
		27-SOV-122B (OPC)	1.89	1.59	
		CAD-205	0.102	0.102	
		27-SOV-121A (OPC)	0.097	<0.102	
		27-SOV-121B (OPC)	1.83	<0.102	
X-26A, X-26B Containment Vent and Purge	C	27-AOV-113 (OPC)	>1018 (AOV-113)	0.276 (AOV-113)	AOV-113 & AOV-114 adjusted actuators; AOV-113 Replaced T-ring, o-ring, actuator return spring, and flange gaskets;
		27-AOV-114 (OPC)	(AOV-114)	(AOV-114)	
		27-MOV-113 (OPC)	0.188 (MOV-113)	0.188 (MOV-113)	
		27-MOV-122	(MOV-122)	(MOV-122)	
X-31Ac "A" Recirculation Pump Mini Purge	C	02-RWR-13A (IPC)	14.56 (RWR-13A)	14.56 (RWR-13A)	
		02-RWR-14A	(RWR-14A)	(RWR-14A)	
		02-RWR-40A (OPC)	1018 (RWR-14A)	39.75 (RWR-14A)	
			(RWR-14A)	(RWR-40A)	RWR-40A replaced valve;
X-31Ad Drywell Inert and Purge	C	27-SOV-135A (OPC)	13.13	13.13	
		27-SOV-135B (OPC)	>1018	44.69	SOV-135B replaced o-ring, disc, seal ring, and spring; honed inside piston wall; CAD-81 replaced disc and packing; lapped seat;
X-31Bc "B" Recirculation Pump Mini Purge	C	02-RWR-13B (IPC)	44.44 (RWR-13B)	44.44 (RWR-13B)	
		02-RWR-14B	(RWR-14B)	(RWR-14B)	
		02-RWR-40B (OPC)	0.25 (RWR-40B)	0.25 (RWR-40B)	
			(RWR-14B)	(RWR-14B)	
X-35A TIP Probe	C/B	Ball Valve (OPC)	26.42	26.42	
		"O" ring (OPC)	<1.02	<1.02	
X-35B TIP Probe	C/B	Ball Valve (OPC)	8.5	8.5	
		"O" ring (OPC)	<1.02	<1.02	
X-35C TIP Probe	C/B	Ball Valve (OPC)	14.3	14.3	
		"O" ring (OPC)	<1.02	<1.02	
X-35D TIP Probe	C/B	Ball Valve (OPC)	9.93	9.93	
		"O" ring (OPC)	<1.02	<1.02	

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-35Z TIP Purge	C/B	TP-1 (OPC) "O" ring (OPC)	1.39 <1.02	1.39 <1.02	
X-36 CRD Return	C	CRD-113 (IPC) CRD-110 (OPC)	1.92 >1018	1.92 30.9	CRD-110 lock bracket caught in flapper, installed new lock bracket;
X-39A Containment Spray	C	10-MOV-26A (OPC) 10-MOV-31A (OPC) RHR-52A (OPC)	<1.018	<1.018	
X-39B Containment Spray	C	10-MOV-26B (OPC) 10-MOV-31B (OPC) RHR-52B (OPC)	55.68	55.68	
X-41 Recirculation Loop Sample	C	02-AOV-39 (IPC) RWR-255 02-2-AOV-40 (OPC)	4.81 (AOV-39) (RWR-255) 0.31 (AOV-40) (RWR-255)	4.81 (AOV-39) (RWR-255) 0.31 (AOV-40) (RWR-255)	
X-42 Standby Liquid Control	C	11-SLC-17 (IPC) 11-SLC-16 (OPC)	70.75 1.89	70.75 1.89	
X-45 Leak Rate Analyzer	C	16-1-AOV-101A 16-1-AOV-101B LRA-20 (OPC) LRA-21 (OPC)	0.41 (AOV-101A) (AOV-101B) <0.025 (LRA-20) (LRA-21)	0.41 (AOV-101A) (AOV-101B) <0.025 (LRA-20) (LRA-21)	
X-55B Drywell CAD Inert and Purge	C	27-SOV-125A (OPC) 27-SOV-125B (OPC)	0.316 >1018	0.316 <1.02	SOV-125B replaced disc and body o-ring; installed piston rings;
X-58B CAD System	C	CAD-214	0.102	0.102	
X-58C CAD System	C	CAD-215	0.102	0.102	
X-58D CAD System	C	CAD-216	0.102	0.102	

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-59 Drywell CAD Inert and Purge	C	27-SOV-123A(OPC) 27-SOV-123B(OPC) CAD-207	196.47 >1018 0.102	1.02 5.14 0.102	SOV-123A & SOV-123B replaced piston spring, disc, o-ring, and set screw; changed plugs from TFE to Viton; SOV-123B polished piston and sidewalls; lapped seat;
X-61 Breathing Air	C	BAS-5(IPC) BAS-4(OPC)	85.51 43.16	40.26 29.06	BAS-5 lapped seat and flapper; BAS-4 cleaned and polished seat and wedge;
X-62 Drywell Cooling Return	C	RBC-26B(OPC)	0.406	0.406	
X-63 "B" Recirculation Pump MTR Cooling Supply	C	15-RBC-21A(OPC) 46-ESW-15B(OPC)	<0.1018 5.97	<0.1018 5.97	
X-64 "A" Recirculation Pump MTR Cooling Return	C	15-RBC-22A(OPC)	42.76	42.76	
X-65 Equipment Drain Pump Clr Return	C	15-RBC-33(OPC)	<0.1018	<0.1018	
X-66 "A" Drywell Clr Assembly Return	C	15-RBC-26A(OPC)	0.163	0.163	
X-67 "A" Recirculation Pump MTR Cooling Supply	C	15-RBC-21B(OPC) 46-ESW-15A(OPC)	<0.1018 <0.1018	<0.1018 <0.1018	
X-68 "B" Recirculation Pump MTR Cooling Return	C	15-RBC-22B(OPC)	<0.1018	<0.1018	
X-100A Elect	B	"O" rings	0.045	0.045	
X-100B Elect	B	"O" rings	<0.025	<0.025	
X-100C Elect	B	"O" rings	0.121	0.121	
X-100D Elect	B	"O" rings	<0.102	<0.102	New penetration;
X-100F Elect	B	"O" rings	<0.025	<0.025	
X-100G Elect	B	"O" rings	0.422	0.422	

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-100K Elect	B	"O" rings	0.074	0.074	
X-101A Elect	B	"O" rings	0.046	0.046	
X-101B Elect	B	"O" rings	<0.025	<0.025	
X-101C Elect	B	"O" rings	0.052	0.052	
X-100D Elect	B	"O" rings	<0.025	<0.025	
X-101E Elect	B	"O" rings	<0.025	<0.025	
X-101F Elect	B	"O" rings	<0.025	<0.025	
X-103A Elect	B	"O" rings	<0.025	<0.025	
X-103B Elect	B	"O" rings	0.053	0.053	
X-104C Elect	B	"O" rings	<0.025	<0.025	
X-104D Elect	B	"O" rings	0.038	0.038	
X-104E Elect	B	"O" rings	<0.025	<0.025	
X-106A Elect	B	"O" rings	0.067	0.067	
X-106B Elect	B	"O" rings	<0.025	<0.025	
X-107 Elect	B	"O" rings	0.084	0.084	
X-108 Elect	B	"O" rings	0.062	0.062	
X-109 Elect	B	"O" rings	0.042	0.042	
X-110C Elect	B	"O" rings	0.049	0.049	
X-110D Elect	B	"O" rings	0.103	0.103	
X-111B Elect	B	"O" rings	0.039	0.039	
X-200A Torus Access	B	"O" rings	0.102	0.102	
X-200B Torus Access	B	"O" rings	0.102	0.102	
X-200C Torus Access	B	"O" rings	2.822	2.822	

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-202BG Vacuum Breaker	C	27-AOV-101B (OPC) VB-7 (OPC) 27-AOV-101A (OPC) VB-6 (OPC)	>1018 (AOV-101B) (VB-7) 3.64 (AOV-101A) (VB-6)	<1.102 (AOV-101B) (VB-7) 3.64 (AOV-101A) (VB-6)	AOV-101B replaced T-ring, set screw, and gasket;
X-202F Vacuum Breaker	B	"O" ring (VB-1)	27.13	27.13	
X-202G Vacuum Breaker	B	"O" ring (VB-2)	49.88	49.88	
X-202H Vacuum Breaker	B	"O" ring (VB-3)	46.27	<0.102	VB-3 honing and replaced o-rings;
X-202I Vacuum Breaker	B	"O" ring (VB-4)	5.11	5.11	
X-202J Vacuum Breaker	B	"O" ring (VB-5)	28.30	28.30	
X-203A O_2 Analyzer Sample	C	27-SOV-119A (OPC) 27-SOV-119B (OPC) CAD-201	5.34 2.86 0.102	<0.102 <0.102 0.102	SOV-119A & SOV-119B replaced o-rings; changed plugs from TFE to Viton;
X-203B O_2 Analyzer Sample	C	27-SOV-124A (OPC) 27-SOV-124B (OPC) CAD-202 CAD-203	2.49 2.89 0.419 0.286	2.49 2.89 0.419 0.286	
X-205 Drywell Inert CAD and Purge	C	27-AOV-117 (OPC) 27-AOV-118 (OPC) 27-MOV-117 (OPC) 27-MOV-123	19.9 (AOV-117) (AOV-118) 52.07 (MOV-117) (MOV-123)	19.9 (AOV-117) (AOV-118) 42.41 (MOV-117) (MOV-123)	MOV-117 removed fit-up spacers;
X-211A Containment Spray	C	10-MOV-34A (OPCL) 10-MOV-38A (OPC) 10-MOV-39A (OPC)	61.28	61.28	
X-211B Containment Spray	C	10-MOV-34B (OPC) 10-MOV-38B (OPC) 10-MOV-39B (OPC)	738.56 (Combined)	202.6	MOV-34b replaced seat disc; lapped seat and disc; new gasket;
X-212 RCIC Turbine Exhaust	C	RCIC-04 (OPC) RCIC-05 (OPC) 13-MOV-130	>1018 >1018 13.64	44.91 138.45 13.64	RCIC-04 & RCIC-05 re-lapped machine disc;

ATTACHMENT 4A (Cont.)
1981/1982 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-214 HPCI Turbine Exhaust	C	23-HPI-12 (OPC)	291.66	291.66	
		23-HPI-65 (OPC)	>1018	40.97	HPI-65 lapped seat and disc; rebuilt backseat;
X-217 HPCI Turbine Exhaust Vent	C	23-MOV-59 (OPC) 23-HPI-403 (OPC) 23-HPI-402	18.37	18.37	
X-218 Leak Rate Analyzer	C	LRA-13 (OPC)	<1.02 (LRA-13)	<1.02 (LRA-13)	
		LRA-14 (OPC)	(LRA-14)	(LRA-14)	
		AOV-102A	<1.02 (AOV-102A)	<1.02 (AOV-102A)	
		AOV-102B	(AOV-102B)	(AOV-102B)	
X-220 Drywell CAD Inert and Purge	C	27-AOV-132A	2.48 (AOV-132A)	2.48 (AOV-132A)	
		CV-67	(CV-67)	(CV-67)	
		27-AOV-132B	85.56 (AOV-132B)	87.87 (AOV-132B)	CV-70 lapped seat and and piston; new gaskets; replaced disc;
		CV-70	(CV-70)	(CV-70)	
		27-AOV-115	14.71 (AOV-115)	14.71 (AOV-115)	
		27-AOV-116	(AOV-116)	(AOV-116)	
X-221 Condensate from RCIC Turbine	C	13-RCIC-07	1.35	1.35	
		13-RCIC-08	<1.02	<1.02	
X-231 Elect	B	"O" rings	<0.025	<0.025	

ATTACHMENT 4B

PRIMARY CONTAINMENT BOUNDARY MODIFICATIONS

The following JAFNPP Primary Containment boundaries were modified during the 1981/1982 refueling outage.

1. Penetrations modified to provide taps for the H_2 Monitoring System:

   a. x-58B A manual valve (CAD-214) and cap are currently installed. SOV-122F1 and SOV-122F2 will be tied in later.

   b. x-58C A manual valve (CAD-215) and cap are currently installed. SOV-120F1 and SOV-120F2 will be tied in later.

   c. x-58D A manual valve (CAD-216) and cap are currently installed. SOV-123F1 and SOV-123F2 will be tied in later.

   d. x-59 A manual valve (CAD-207) and cap are currently installed. SOV-123E1 and SOV-123E2 will be tied in later.

   e. x-26A Manual valves (CAD-204, CAD-205, and CAD-206) and caps are currently installed. SOV-120E1, SOV-120E2, SOV-119F1, SOV-119F2, SOV-122E1, and SOV-122E2 will be tied in later.

   f. x-203A A manual valve (CAD-201) and cap are currently installed. SOV-119E1 and SOV-119E2 will be tied in later.

   g. x-203B Manual valves (CAD-202 and CAD-203) and caps are currently installed. SOV-124E1, SOV-124E2, SOV-124F1, and SOV-124F2 will be tied in later.

2. Instrument lines added:

   a. Level taps for monitoring Torus water level were added at penetrations x-206C1, x-206C2, x-206A1, x-206A2, x-206B1, and x-206D1.

   b. Pressure and level taps were added at penetrations x-26A and x-26B.

3. Vent and Purge lines added:

   a. x-205, upstream of MOV-117.

   b. x-26A & B, upstream of MOV-122.

4. A new drywell electrical penetration, x-100D, was added for the H.R. Containment Rad. Monitoring System.

ATTACHMENT 4C
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
Drywell Stabilizer					
0° (GE-90°)	B	"O" rings	0.102	0.102	
45° (GE-135°)	B	"O" rings	0.102	0.102	
90° (GE-180°)	B	"O" rings	0.102	0.102	
135° (GE-225°)	B	"O" rings	0.102	0.102	
180° (GE-270°)	B	"O" rings	0.102	0.102	
225° (GE-315°)	B	"O" rings	0.102	0.102	
270° (GE-0°)	B	"O" rings	0.102	0.102	
315° (GE-45°)	B	"O" rings	0.102	0.102	
Dry Well Head	B	"O" rings	<1.02	<1.02	
X-1A Equipment and Emergency Escape Hatch	B	"O" rings	0.54	0.54	
X-1B Equipment Hatch	B	"O" rings	<0.102	<0.102	
X-2A Personnel Access Hatch	B	"O" rings	0.408	0.408	
X-4 Drywell Head Manhole	B	"O" rings	<0.102	0.102	
X-6 CRD Removal Hatch	B	"O" rings	<0.102	<0.102	
X-7A "A" Main Steam Line	C	29-AOV-80A(IPC) 29-AOV-86A(OPC)	238.21 (Combined)	238.21	"A" and "B" Main Steam Lines were tested at the beginning of the outage. See site reference local leak rate progress log for retest information.
X-7B "B" Main Steam Line	C	29-AOV-80B(IPC) 29-AOV-86B(OPC)	2.84 (Combined)	2.84	
X-7C "C" Main Steam Line	C	29-AOV-80C(IPC) 29-AOV-86C(OPC)	715.65 (Combined	98.75	AOV-86C replaced packing and lantern ring;
X-7D "D" Main Steam Line	C	29-AOV-80D(IPC) 29-AOV-86D(OPC)	>1018 (Combined)	5.67	AOV-86D ground and lapped; repacked stem; replaced bonnet to body gasket;

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-8 Condensate Drain	C	29-MOV-74 (IPC) 29-MOV-77 (OPC)	29.78 <1.02	29.78 <1.02	
X-9A Feedwater	C	34-FWS-28A (IPC) 13-MOV-21 (OPC) 34-NRV-111A (OPC) RWC-62 (OPC)	40.52 <1.02 (MOV-21) (NRV-111A) (RWC-62)	40.52 <1.02 (MOV-21) (NRV-111A) (RWC-62)	
X-9B Feedwater	C	34-FWS-28B (IPC) 23-MOV-19 (OPC) 34-NRV-111B (OPC)	51.71 >1018 (MOV-19) (NRV-111B)	51.71 8.81 (MOV-19) (NRV-111B)	NRV-111B replaced bushings; lapped disc;
X-10 Steam to RCIC Turbine	C	13-MOV-16 (IPC) 13-MOV-15 (OPC)	>1018 (Combined)	0.102 0.113	MOV-15 repaired disc; lapped; repacked;
X-11 Steam to HPCI Turbine	C	23-MOV-15 (IPC) 23-MOV-16 (OPC)	<1.02 (Combined)	<1.02	23-MOV-60 (OPC)
X-12 Shutdown Supply to RHR	C	10-MOV-17 (IPC) 10-MOV-18 (OPC)	512.56 >1018	161.35 <1.02	MOV-17 & MOV-18 adjusted torque;
X-13A RHR Return	C	10-MOV-27A (OPC) 10-MOV-25A (OPC)	>1018 18.07	179.68 18.07	MOV-27A no repair was performed; Problem was with valve line-up;
X-13B RHR Return	C	10-MOV-27B (OPC) 10-MOV-25B (OPC)	823.0 100.8	80.62 100.8	MOV-27B lapped seat ring body; lapped body and bonnet surfaces; replaced disc and stem assembly and gaskets;
X-14 RWCU Supply to Recirculation Pumps	C	12-MOV-15 (IPC) 12-MOV-18 (OPC) 12-MOV-80 (OPC)	0.102 >1018 (MOV-18) (MOV-80)	0.74 9.93 (MOV-18) (MOV-80)	MOV-18 & MOV-80 gross pre-repair leakage caused by leakage at MOV-15; MOV-15 replaced packing;
X-16A Core Spray Pump Discharge	C	14-MOV-11A (OPC) 14-MOV-12A (OPC)	0.967 9.65	0.967 9.65	AOV-13A adjusted operator; tightened bonnet;
X-16B Core Spray Pump Discharge	C	14-MOV-11B (OPC) 14-MOV-12B (OPC) 14-AOV-13B	0.63 4.54 94.9	0.63 4.54 94.9	

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-17 RPU Head Spray	C	10-MOV-32 (IPC)	<0.102	<0.102	
		10-MOV-33 (OPC)	>102	0.102	MOV-33 lapped disc; replaced gasket and packing;
X-18 Floor Sump Pump Discharge	C	20-MOV-82 (IPC)	<0.102	<0.102	
		20-MOV-83 (OPC)	<0.102	<0.102	
X-19 Equipment Sump Pump Discharge	C	20-MOV-94 (IPC)	<0.102	<0.102	
		20-AOV-95 (OPC)	10.6	10.6	
X-21 Service Air	C	39-SAS-10 (IPC)	>1018	0.102	SAS-10 cleaned piston seat area and cover; new gasket;
		39-SAS-9 (OPC)	<1.02	<1.02	
X-22 Instrument Air	C	IAS-22 (IPC)	150.7	150.7	IAS-22 (513) cleaned;
		IAS-21 (OPC)	0.102	0.102	
		IAS-23 (OPC)	0.102	0.102	
X-23 Cooling Water Supply	C	46-ESW-16B (OPC)	>1018	1.36	ESW-16B replaced disc and gasket;
		15-RBC-24A (OPC)	0.102	0.102	
X-24 Cooling Water Supply	C	46-ESW-16A (OPC)	<0.102	<0.102	RBC-23B lapped seat and
		15-RBC-24B (OPC)	<0.102	<0.102	gate; replaced gasket;
X-25 Drywell Inerting and CAD and Purge X-71	C	27-AOV-111 (OPC)	6.1 (AOV-111)	6.1 (AOV-111)	
		27-AOV-112 (OPC)	(AOV-112)	(AOV-112)	
		27-AOV-131A (OPC)	>1080 (AOV-131A)	23.30 (AOV-131A)	AOV-131A relapped plug
		CV-68	(CV-68)	(CV-68)	and stem; replaced seat
		27-AOV-131B (OPC)	19.80 (AOV-131B)	19.80 (AOV-131B)	ring and bonnet gasket;
		CV-69	(CV-69)	(CV-69)	CV-68 replaced valve;
X-26A Containment Atmospheric Sampling	C	27-SOV-120A (OPC)	4.27	4.27	SOV-120B & SOV-121A
		27-SOV-120B (OPC)	>1018	0.146	removed rust from
		27-SOV-122A (OPC)	<0.102	<0.102	seat; replaced o-ring;
		27-SOV-122B (OPC)	4.06	4.06	
		27-SOV-121A (OPC)	61.94	0.102	
		27-SOV-121B (OPC)	2.48	2.48	
X-26A, X-26B Containment Vent and Purge	C	27-AOV-113 (OPC)	54.15 (Combined)	<0.102	AOV-114 cleaned; replaced flange gaskets; installed new elastomer T-ring;
		27-AOV-114 (OPC)			
		27-MOV-113 (OPC)			

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-31AC "A" Recirculation Pump Mini Purge	C	02-RWR-13A (IPC) 02-RWR-40A (OPC)	>1016 40.92	64.89 11.04	RWR-13A & RWR-40A lapped and cleaned; replaced bonnet gaskets;
X-31AD Drywell Inert and Purge	C	27-SOV-135A (OPC) 27-SOV-135B (OPC)	11.19 13.2	6.5 2.3	SOV-135A replaced o-ring; SOV-135B rebuilt valve;
X-31Bc "B" Recirculation Pump Mini Purge	C	02-RWR-13B (IPC) 02-RWR-40B (OPC)	44.5 5.97	1.02 5.97	RWR-13B replaced valve;
X-35A TIP Probe	C/B	Ball Valve (OPC) "O" ring (OPC)	28.09 0.102	28.09 0.102	
X-35B TIP Probe	C/B	Ball Valve (OPC) "O" ring (OPC)	1.9 0.102	1.9 0.102	
X-35C TIP Probe	C/B	Ball Valve (OPC) "O" ring (OPC)	6.16 0.16	6.16 0.16	
X-35D TIP Probe	C/B	Ball Valve (OPC) "O" ring (OPC)	11.6 0.133	11.6 0.133	
X-35E TIP Purge	C/B	TP-1 (OPC) "O" ring (OPC)	0.188 0.160	0.188 0.160	
X-36 CRD Return	C	CRD-113 (IPC) CRD-110 (OPC)	6.08 24.84	6.08 24.84	
X-39A Containment Spray	C	10-MOV-26A (OPC) 10-MOV-31A (OPC) RHR-52A (OPC)	133.35 (Combined)	<1.02	MOV-26A lapped disc; replaced seat ring; RHR-52A lapped disc;
X-39B Containment Spray	C	10-MOV-26B (OPC) 10-MOV-31B (OPC) RHR-52B (OPC)	>1018 (Combined)	63.12	MOV-26B rebuilt disc; replaced seat rings and bonnet gasket;
X-41 Recirculation Loop Sample	C	02-2-AOV-39 (IPC) 02-2-AOV-40 (OPC)	9.6 1.02	9.6 1.02	
X-42 Standby Liquid Control	C	11-SLC-17 (IPC) 11-SLC-16 (OPC)	14.66 17.05	14.66 17.05	

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-45 Leak Rate Analyzer	C	16-1-AOV-101A 16-1-AOV-101B LRA-20 (OPC) LRA-21 (OPC)	0.44 (AOV-101A) (AOV-101B) <0.102 (LRA-20) (LRA-21)	0.44 (AOV-101A) (AOV-101B) <0.102 (LRA-20) (LRA-21)	
X-55b Drywell CAD Inert and Purge	C	27-SOV-125A (OPC) 27-SOV-125B (OPC)	<0.102 >1018	<0.102 8.3	SOV-125B replaced disc and body O-ring;
X-59 Drywell CAD Inert and Purge	C	27-SOV-123A (OPC) 27-SOV-123B (OPC)	1.43 >1018	1.43 26.2	SOV-123B replaced body O-ring with insert and new disc;
X-61 Breathing Air	C	BAS-5 (IPC) BAS-4 (OPC)	<1.02 <1.02	<1.02 <1.02	
X-62 Drywell Cooling Return	C	RBC-26B (OPC)	>1018	<0.102	RBC-26B lapped seat and globe; repacked; replaced gasket;
X-63 "B" Recirculation Pump MTR Cooling Supply	C	15-RBC-21A (OPC) 46-ESW-15B (OPC)	<0.102 31.2	<0.102 31.2	RBC-20A lapped seat replaced gasket;
X-64 "A" Recirculation Pump MTR Cooling Return	C	15-RBC-22A (OPC)	>1018	<0.102	RBC-22A lapped seat and globe; replaced gasket;
X-65 Equipment Drain Pump Clr Return	C	15-RBC-33 (OPC)	283.5	283.5	RBC-33 replaced globe and gasket;
X-66 "A" Drywell Clr Assembly Return	C	15-RBC-26A (OPC)	<0.102	<0.102	
X-67 "A" Recirculation Pump MTR Cooling Supply	C	15-RBC-21B (OPC) 46-ESW-15A (OPC)	0.102 1.02	0.102 1.02	
X-68 "B" Recirculation Pump MTR Cooling Return	C	15-RBC-22B (OPC)	>1018	<0.102	RBC-22B lapped disc to seat; replaced gasket;
X-100A Elect	B	"O" rings	0.0010	0.0010	
X-100B Elect	B	"O" rings	0.0000	0.0000	
X-100C Elect	B	"O" rings	0.21	0.21	

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-100F Elect	B	"O" rings	0.17	0.17	
X-100G Elect	B	"O" rings	0.013	0.013	
X-100K Elect	B	"O" rings	0.0000	0.0000	
X-101A Elect	B	"O" rings	0.0015	0.0015	
X-101B Elect	B	"O" rings	0.0005	0.0005	
X-101C Elect	B	"O" rings	0.0005	0.0005	
X-101D Elect	B	"O" rings	0.0000	0.0000	
X-101E Elect	B	"O" rings	0.0000	0.0000	
X-101F Elect	B	"O" rings	0.0010	0.0010	
X-103A Elect	B	"O" rings	0.1273	0.1273	
X-103B Elect	B	"O" rings	0.038	0.038	
X-104C Elect	B	"O" rings	0.0000	0.0000	
X-104D Elect	B	"O" rings	0.0010	0.0010	
X-104E Elect	B	"O" rings	0.0000	0.0000	
X-106A Elect	B	"O" rings	0.0010	0.0010	
X-106B Elect	B	"O" rings	0.0000	0.0000	
X-107 Elect	B	"O" rings	0.0000	0.0000	
X-108 Elect	B	"O" rings	0.0000	0.0000	
X-109 Elect	B	"O" rings	<0.102	<0.102	
X-110C Elect	B	"O" rings	0.031	0.031	
X-110D Elect	B	"O" rings	0.93	<0.102	
X-111B Elect	B	"O" rings	0.0015	0.0015	
X-200A Torus Access	B	"O" rings	<0.102	<0.102	

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-200B Torus Access	B	"O" rings	<0.102	<0.102	
X-200C Torus Access	B	"O" rings	<0.102	<0.102	
X-202BG Vacuum Breaker	C	27-AOV-101B (OPC) VB-7 (OPC) 27-AOV-101A (OPC) VB-6 (OPC)	<0.102 (AOV-101B) (VB-7) <0.102 (AOV-101A) (VB-6)	<0.102 (AOV-101B) (VB-7) <0.102 (AOV-101A) (VB-6)	
X-202E Vacuum Breaker	C	13-MOV-130 (OPC)	7.65	7.65	
X-202F Vacuum Breaker	B	"O" ring (VB-1)	11.96	11.96	
X-202G Vacuum Breaker	B	"O" ring (VB-2)	23.31	23.31	
X-202H Vacuum Breaker	B	"O" ring (VB-3)	73.3	1.03	VB-3 replaced all packing and o-ring seals in both stuffing boxes;
X-202I Vacuum Breaker	B	"O" ring (VB-4)	<0.102	<0.102	
X-202J Vacuum Breaker	B	"O" ring (VB-5)	27.79	27.79	
X-203A O_2 Analyzer Sample	C	27-SOV-119A (OPC) 27-SOV-119B (OPC)	1.08 0.38	1.08 0.38	
X-203B O_2 Analyzer Sample	C	27-SOV-124A (OPC) 27-SOV-124B (OPC)	0.4 0.48	0.4 0.48	
X-205 Dryweli Inert CAD and Purge	C	27-AOV-117 (OPC) 27-AOV-118 (OPC) 27-MOV-117 (OPC)	18.07 (Combined)	18.07	
X-211A Containment Spray	C	10-MOV-34A (OPC) 10-MOV-38A (OPC) 10-MOV-39A (OPC)	19.05 (Combined)	19.05	
X-211B Containment Spray	C	10-MOV-34B (OPC) 10-MOV-38B (OPC) 10-MOV-39B (OPC)	380.2 (Combined)	312.02	MOV-38B replaced disc, seat ring and bonnet gasket;

ATTACHMENT 4C (Cont.)
1980 TYPE B AND C DATA SUMMARY

Penetration No.	Type Test	Equipment/Valves Tested	Pre-Repair Leakage (scf/day)	Post-Repair Leakage (scf/day)	Remarks
X-212 RCIC Turbine Exhaust	C	RCIC-04 (OPC) RCIC-05 (OPC)	>1018 >1018	3.25 30.18	RCIC-04 lapped both disc and seat; replaced gasket; RCIC-05 replaced pin hanger, nut holder, gasket, disc, and disc ring; emory clothed seat members;
X-214 HPCI Turbine Exhaust	C	23-HPI-12 (OPC) 23-HPI-65 (OPC)	170.00 >1018	121 576.18	HPI-12 polished seat; replaced gasket; HPI-65 replaced disc holder; lapped disc; replaced gasket and pin plug gasket;
X-217 HPCI Turbine Exhaust Vent	C	23-MOV-59 (OPC) 23-HPI-403 (OPC) 23-HPI-402	30.54 (Combined)	30.54	
X-218 Leak Rate Analyzer	C	LRA-13 (OPC) LRA-14 (OPC) AOV-102A AOV-102B	0.646 (LRA-13) (LRA-14) 3.914 (AOV-102A) (AOV-102B)	0.646 (LRA-13) (LRA-14) 3.914 (AOV-102A) (AOV-102B)	
X-220 Drywell CAD Inert and Purge	C	27-AOV-132A CV-67 27-AOV-132B CV-70 27-AOV-115 27-AOV-116	253.0 (AOV-132A) (CV-67) 134.0 (AOV-132B) (CV-70) 2.8 (AOV-115) (AOV-116)	11.8 (AOV-132A) (CV-67) 27.2 (AOV-132B) (CV-70) 2.8 (AOV-115) (AOV-116)	CV-67 & CV-70 disassembled; cleaned piston and seat; resurfaced piston and lapped into seat; replaced bonnet gasket;
X-221 Condensate from RCIC Turbine	C	13-RCIC-07 13-RCIC-08	22.8 4.1	22.8 4.1	
X-231 Elect	B	"O" rings	<0.102	<0.102	