REACTOR CONTAINMENT BUILDING
INTEGRATED LEAK RATE TEST
TYPES A, B, AND C

SURVEILLANCE TEST

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY NUCLEAR POWER STATION
UNIT NO. 1

JUNE 1981

8111040104 811029
PDR ADOCK 05000280
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REFERENCES

1. 10CFR50 Appendix J, Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors, April 19, 1976

2. Bechtel Topical Report BN-TOP-1, Rev. 1, Testing Criteria for Integrated Leak Rate Testing of Primary Containment Structures for Nuclear Power Plants, November 1, 1972

3. 1-PT-16.3, Reactor Containment Building Integrated Leak Rate Test, 1980

4. ANSI 56.8, Containment System Leakage Testing Requirements, February 19, 1981

SECTION 1

PURPOSE

The purpose of this report is to present a description and analyses of the Surveillance Types A, B, and C Containment Integrated Leak Rate Test (CILRT) results conducted on the Virginia Electric and Power Company's Surry Nuclear Power Station, Unit No. 1.

This report is submitted as required by 10CFR50 Appendix J, paragraph V.B (Reference 1).

SECTION 2

SUMMARY

2.1 TYPE A TEST

Pressurization for the CILRT was initiated at 1835 hours on 25 June 1981. At approximately 2135 hours, one 1500 scfm air compressor failed and was isolated from the pressurization rig. During pressurization a decrease in the pressurizer level was observed. This was judged to be caused by air entrapment in the reactor coolant system. At approximately 2300 hours, a charging pump was run to return pressurizer level to within indicating range.

Test pressure was reached at approximately 0543 hours on 26 June 1981 and containment pressurization was secured. At approximately 0800 hours, it was observed that the outside Recirculation Spray Suction Pump MOV's were open, although the procedure required them to be closed. Upon investigation it was discovered that the valves had been opened to perform a surveillance test and had not been returned to the Type A lineup. It was decided to leave the MOV's in the open position, which resulted in the Recirculation Spray Pumps and piping system being pressurized outside containment.

Containment temperature stabilization criterion was met at approximately 1230 hours. Leak rate data was continually recorded until 1400 hours when an abrupt temperature change of 0.5°F was recorded. This change lasted approximately 30 minutes and was followed by stable data. The change was felt to be the result of unstable temperature conditions.

Data recorded from 1440 hours to 2210 hours indicated an acceptable leak rate. At 2220 hours, a 1.5°F temperature increase was recorded with a corresponding loss of mass. A detailed inspection was initiated at approximately 2225 hours to identify major leakage paths. No major leakage paths were identified. At 2300 hours, the temperature and mass returned to the trends shown before 2200 hours. At approximately 2330 hours, a loop verification on the computer RTD instrumentation was initiated. At approximately 0001 hours on 27 June 1981, a 1°F temperature increase and corresponding loss of mass were recorded. Subsequently, it was discovered that a cold solder joint in the common RTD power source was faulty. The connection was resoldered at approximately 0130 hours. After the repairs were made, the leakage rate returned to the acceptable trend shown prior to the two temperature changes.

From 0130 hours to 1420 hours, the calculated leak rate was acceptable and the requirements of the procedure were satisfied.

At approximately 1700 hours, the mass pump-back verification test commenced. At approximately 1820 hours, the calculated mass pumped into containment satisfied the requirements of the procedure.

Depressurization of the containment commenced at approximately 1939 hours on 27 June 1981. Depressurization was completed at approximately 0540 hours on 28 June 1981.

2.2 LOCAL LEAK RATE TESTS (TYPES B AND C)

The local leak rate testing of containment isolation valves and primary contaimment penetrations was conducted as required by station procedures since the last Type A Test. The penetrations tested and their associated leak rates are listed in Section 4 of this report.

SECTION 3

TYPE A TEST

3.1 EDITED LOG OF EVENTS

25 June 1981

1835-Initiated containment pressurization

2300-Ran charging pump to maintain pressurizer level

26 June 1981

0543-Secured containment pressurization

1230-Completed stabilization

1400-Containment temperature spiked 0.5°F

1440-Containment temperature returned to pre-spike trend

2220-Containment temperature spiked 1.5°F

2300-Containment temperature returned to pre-spike trend

27 June 1981

0001-Containment temperature spiked 1°F

0130-Completed resoldering of RTD power source

-Containment temperature returned to pre-spike trend

1420-Integrated leak rate test terminated

1700-Started mass pumpback test

1820-Completed mass pumpback test

1939-Commenced containment depressurization

28 June 1981

0540-Completed containment depressurization

3.2 GENERAL TEST DESCRIPTION

3.2.1 Prerequisites

In accordance with the Surry Unit No. 1 CILRT procedure, 1-PT-16.3 (Reference 3), the following is a partial listing of the prerequisites that were completed and documented prior to containment pressurization.

1. General inspection of the accessible interior and exterior surfaces of the containment structure was performed.

2. All equipment and instrumentation that could be damaged or destroyed by test pressure was removed or protected.

3. All instrumentation used for test was calibrated within 6 months of the test.

4. Valve lineups, as required, were completed, including closure of the containment isolation valves.

5. Component cooling and chilled water systems were operable.

6. Plant computers were operational and programmed for the CILRT.

7. Instrument location verification tests were completed (see Appendixes 3B and 3C).

8. The Official Log of Events book was established and available prior to commencement of the test.

9. Site meteorology data was taken for 7 days prior to and throughout the performance of the CILRT.

3.2.2 Equipment and Instrumentation

Pressurization of the containment was achieved by utilization of nine air compressors. Air was piped through two aftercoolers in parallel and a refrigerated air dryer. Instrumentation and valving were installed to maintain proper monitoring and control during pressurization. The total capacity of the pressurization system as installed was rated at 9,990 scfm.

During the test, the necessary variables used to determine containment leakage were continually monitored using instrumentation which consisted of multiple resistance temperature detectors (RTD's), chilled mirror dew point indicators, and two absolute pressure quartz manometers (see Appendix 3D).

A mass flowmeter in the service air systems was used during the mass pump back verification test. All test instrumentation

readings are input into the plant computer for data acquisition and averaging.

3.2.3 Data Acquisition System

The Surry Unit No. 1 CILRT utilized a Westinghouse Prodac P250 to scan, log, average, and analyze data received from the containment instrumentation.

The P250 analog scan package reads all the analog inputs in a preestablished manner, converts these readings into engineering units, and then stores these values for use by the plant operators and by the plant application programs.

For the CILRT, the P250 Plant Computer monitored the following instrumentation:

Type	Scan Rate (sec)
24 RTD's	20
4 chilled mirrors	20
2 quartz manometers	2

Instantaneous values of the CILRT instruments were recorded every 5 minutes during the test period, using the P250 digital trend function on the operator's console.

A 10-minute time average of the readings, calculated by the P250 Average and Integrate (A&I) package, was used as input in the plant computer CILRT programs.

The plant computer CILRT program consists of ILRTDATA, which runs every 10 minutes, collects A&I data for all the instrumentation, performs sensor validity checks, and calculates weighted average dew point temperature, vapor pressure, weighted average containment temperature, and containment air mass.

3.2.4 Data Resolution System

After the appropriate data have been acquired and averaged utilizing the plant computer system, the results are manually input to a remote computer system for leak rate calculations.

3.2.4.1 Absolute Method Mass Point Analysis

The Absolute Method of Mass Point Analysis consists of calculating air masses within the containment structure over a period of time from pressure, temperature, and dew point observations during the CILRT. The air masses are computed using the ideal gas law as follows:

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

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, 1.8×10^6 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 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. The air mass is computed separately, and the result is correlated as a function of time by means of a least-squares 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 T distribution.

The sum of the leakage rate and the 95 percent confidence interval is the UCL.

The leak rate is less than the UCL with the probability of 95 percent.

Absolute Method Total Time Analysis

The absolute method of total time analysis consists of calculating air lost from the containment pressure, temperature, and dew point observations during the CILRT.

The containment air mass is computed using Equation 1 (Section 3.2.4.1).

The measured leakage rate at any time (t) is then determined by subtracting the mass at the time (Mt) from the initial mass (Mi) and dividing by the initial mass. The measured leak rate is expressed as a percentage of containment mass lost in 24 hours or symbolically:

$$\text{MEA. Leak Rate} = \frac{Mi - Mt}{Mi\ (\Delta t)}\ (2400)$$

The sign convention is such that an outward leak is positive and the units are in percent/day.

The estimated leakage rate is then determined by plotting the measured leak rate as a function of time and then performing a least-squares fit of the measured leak rate values as follows:

$$\text{Est. Leak Rate} = At + B$$

Where A is the slope and B is the Y intercept of the least-squares curve.

The 95 percent confidence interval is determined with the T distribution.

This analysis method was used in conjunction with the procedure 1-PT-16.3 (Reference 3).

3.3 TEST ANALYSIS

Test data acquired from the start of stabilization to the termination of the mass pump back verification test are shown as a graph in Appendix 3J.

The graph is divided into the following zones:

Zone A - depicts temperature stabilization period from 0800 to 1240 hours on 26 June 1981

Zone B - depicts acceptable mass trend from 1240 to 1400 hours on 26 June 1981

Zone C - depicts 0.5°F temperature spike and mass loss from 1400 to 1440 hours on 26 June 1981

Zone D - depicts acceptable mass trend from 1440 to 2210 hours on 26 June 1981

Zone E - depicts two 1°F temperature spikes and mass losses from 2210 hours on 26 June 1981 to 0140 hours on 27 June 1981

Zone F - depicts acceptable mass trend from 0140 to 1420 hours on 27 June 1981. This zone contains the data used for leakage rate calculations.

Zone G - depicts mass pumpback verification test from 1700 to 1840 hours on 27 June 1981

The cause of the three temperature spikes as shown in Zones C and E was a result of the fault in the RTD power source.

The slopes of the mass trend in Zones B, D, and F are similar. Also, during each temperature spike the pressure continued in a stable trend, which further indicates that the spikes were caused by the faulty power source.

The leakage rate analysis was performed by Virginia Electric and Power Company's CILRT Program (Section 3.2.4). The input data for the VEPCO CILRT Program are shown in Appendix 3F.

The Absolute Method Mass Point Analysis (Section 3.4.1) represents the results of the containment leakage rate. The results given in Appendix 3G show that the UCL is 0.037783 percent/day, which is within the acceptable limit of 0.0735 percent/day (0.075 less the Type C penalty for valves on systems not vented to the containment).

The Absolute Method Total Time Analysis (Section 3.4.2) is used to determine the acceptability of the CILRT if the test duration is less than 24 hours. The data used in Zone F satisfy the requirements of the test procedure. The results of the total time analysis are tabulated in Appendix 3H.

The results show the UCL to be 0.070724 percent/day, which is within the acceptable limit of 0.075 percent/day (La).

The following appendix summarize the plots provided by this report:

Appendix	Description
3J	Containment air mass, temperaure and pressure vs time (0820 hours on 6/26/81 to 1840 hours on 6/27/81)
3K	Containment leak rate and UCL vs time, mass point analysis (0140 to 1440 hours on 6/27/81)
3L	Containment leak rate vs time, total time analysis (0140 to 1440 hours on 6/27/81)

The leakage rate test calculations were verified by the mass pump back method. The test ran from 1700 to 1820 hours on 27 June 1981. The computer calculated air mass was within 0.25 La of the metered valve and satisfied the procedure.

3.4 TEST RESULTS

3.4.1 CILRT Results - Total Time Method

1.	Leakage rate calculated, Lam	0.024019
2.	95 percent upper confidence interval	0.046706
3.	UCL, Lam leakage rate with 95 percent confidence interval (1 + 2)	0.070724

3.4.2 CILRT Results-Mass Point Method

1.	Leakage rate calculated, Lam	0.034379
2.	95 percent upper confidence interval	0.003404
3.	UCL, Lam leakage rate with 95 percent confidence interval (1 + 2)	0.037783
4.	Type C leakage penalty	0.0015
5.	Total reportable Type A leak rate (3 + 4)	0.039283

3.4.3 Verification Test Results

1.	Metered mass of air inserted	6737 SCF
2.	Difference between initial computer air mass and final computer air mass	7092 SCF
3.	0.25 La verification limit	1789 SCF
4.	Difference between computer air mass and metered air (2-1)	355 SCF

3.4.4 Types C and B Penetration Leakage to be Added to Containment Calculated Leakage

Penetration No./Leakage (SCFH)

10/0.4
11/2.0
13/0.1
16/0.2
17/0.8
26/1.1

Total Type C leakage to be added	4.6 SCFH
Total Type B leakage to be added	0
Total Types B and C leakage to be added	0.0015 percent/day

NOTE: The above penetrations were in a non-vented valve lineup configuration for this test, with their respective leak rates taken from 2-PT-16.3B.

APPENDIX 3A
SITE METEOROLOGY PRIOR TO CILRT

Date	Time	Barometric Pressure (in Hg)	Dew Point(°F)	Dry Bulb (°F)
6/18/81	1600	30.05	48.2	70.1
	2000	30.04	53.2	66.8
	2400	30.04	55.7	56.9
6/19/81	0400	30.03	56.3	60.4
	0800	30.03	60.3	62.7
	1200	30.01	58.3	74.3
	1600	29.97	57.4	76.4
	2000	29.96	58.5	68.7
	2400	29.97	58.6	63.5
6/20/81	0400	29.96	60.9	63.3
	0800	29.95	62.2	67.9
	1200	29.93	61.4	81.4
	1600	29.85	57.3	82.7
	2000	29.84	48.1	75.5
	2400	29.87	70.0	72.0
6/21/81	0400	29.89	69.0	71.0
	0800	29.92	71.0	76.0
	1200	29.92	70.0	86.0
	1600	29.89	74.0	88.0
	2000	29.89	75.0	83.0
	2400	29.86	73.7	76.8
6/22/81	0400	29.83	73.2	78.3
	0800	29.83	76.3	80.6
	1200	29.79	74.6	90.6
	1600	29.71	70.4	94.3
	2000	29.74	71.6	87.7
	2400	29.83	71	87
6/23/81	0400	29.90	67	79
	0800	29.97	59	80
	1200	30.05	56	80
	1600	30.06	57	81
	2000	30.05	59	79
	2400	30.12	63.8	71
6/24/81	0400	30.13	63.5	65.5
	0800	30.18	67.2	71.0
	1200	30.18	69.2	80.5
	1600	30.13	67.9	85.1
	2000	30.11	71.3	81.2
	2400	30.12	71	76
6/25/81	0400	30.08	74	76
	0800	30.05	75	79
	1200	30.18	74	88.9
	1600	30.19	70.8	93.0

APPENDIX 3B

SITE METEOROLOGY DURING THE CILRT

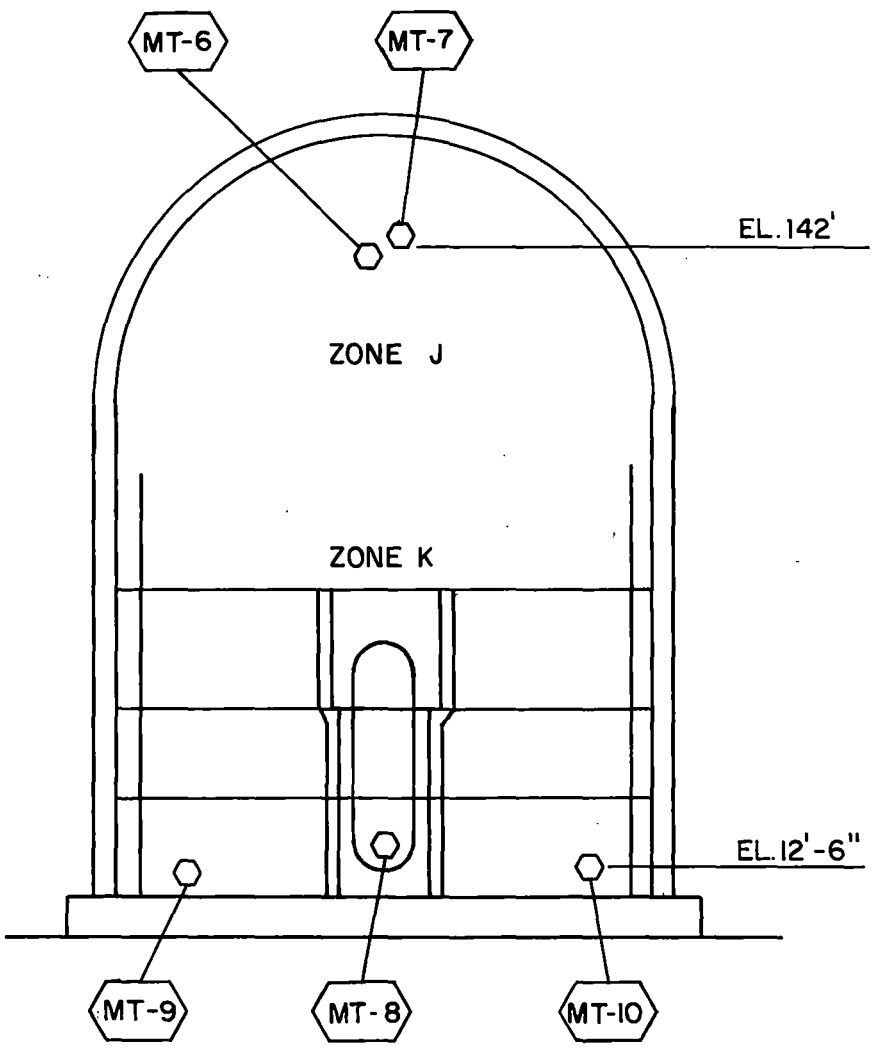
Date	Time	Barometric Pressure (in Hg)	Dew Point(°F)	Dry Bulb (°F)
6/25/81	1830	30.18	68.8	90.9
	1930	30.19	70.9	88.6
	2030	30.24	71.7	86.2
	2130	30.23	66.6	86.8
	2230	30.23	61.4	83.1
	2330	30.23	61.5	82.7
6/26/81	0030	30.23	64.8	80.1
	0130	30.23	65.0	77.7
	0230	30.24		76.4
	0330	30.23	66.5	74.3
	0430	30.23	66.0	72.6
	0530	30.23	66.8	71.4
	0630	30.23	68.1	72.3
	0730	30.22	66.7	75.1
	0830	30.21	64.3	72.9
	0930	30.22	63.6	74.1
	1030	30.24	62.0	72.9
	1130	30.22	61.4	72.9
	1230	30.22	63.6	74.1
	1330	30.21	62.0	72.9
	1430	30.20	61.4	72.9
	1530	30.18	59.5	78.3
	1630	30.23	58.8	77.2
	1730	30.23	58.8	79.0
	1830	30.23	58.6	78.0
	1930	30.24	62.8	75.6
	2030	30.24	54.0	73.5
	2130	30.23	52.1	72.0
	2230	30.23	51.3	70.9
	2330	30.23	48.8	70.8
6/27/81	0030	30.23	50.4	68.0
	0130	30.23	50.0	66.7
	0230	30.23	****	67.6
	0330	30.23	52.0	66.7
	0430	30.23	53.2	65.4
	0530	30.23	53.4	64.5
	0630	30.23	53.8	64.0
	0730	30.23	54.4	65.1
	0830	30.22	54.6	67.3
	0930	30.22	54.3	69.5
	1030	30.22	51.5	71.2
	1130	30.23	49.1	72.9
	1230	30.20	48.0	74.2
	1330	30.21	49.4	74.7
	1430	30.18	****	76.2
	1530	30.17	47.5	76.0
	1630	30.24	49.3	75.7
	1730	30.24	48.8	75.4

APPENDIX 3C

INSTRUMENTATION TABLE

The following instrumentation was calibrated, and functionally tested no greater than 6 months prior to the performance of this test and in accordance with 10CFR50, Appendix J, and field calibration procedures using instrumentation traceable to the National Bureau of Standards.

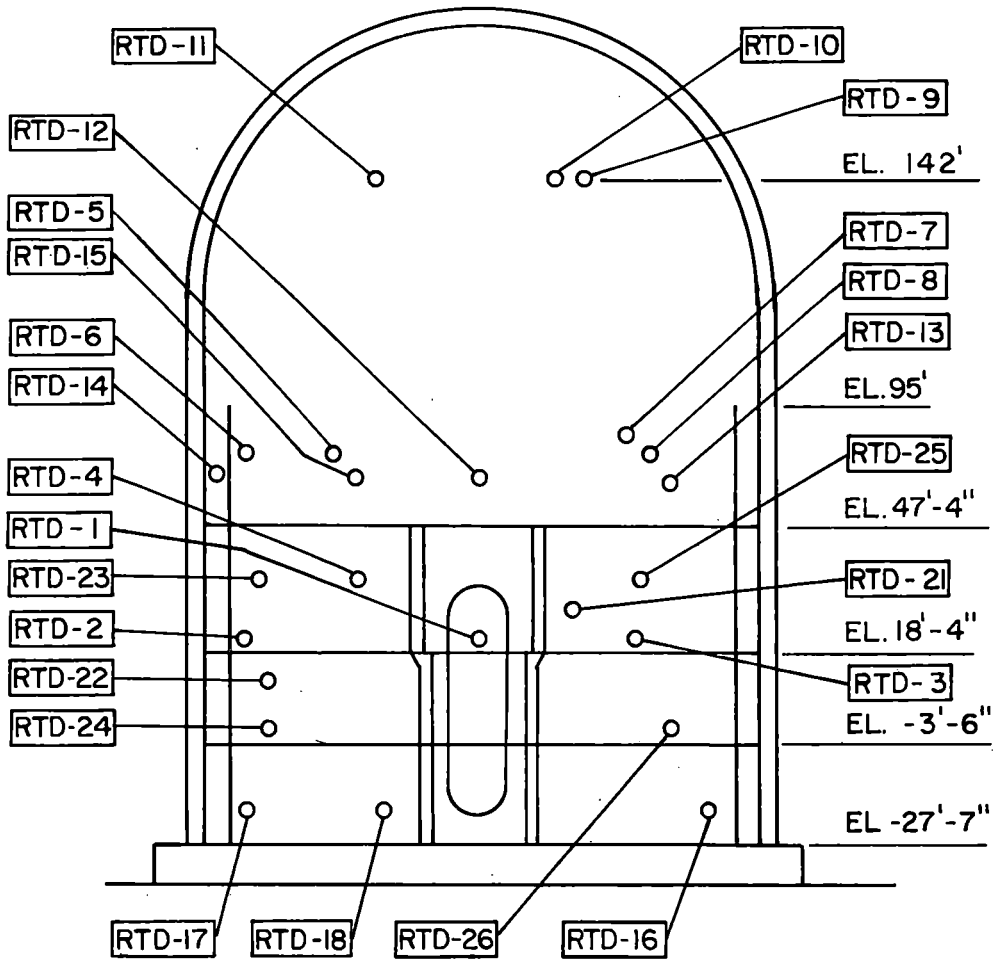
Instrument	Weight Factor	Computer Point	Range	Zone	Accuracy	Sensitivity
RTD-LM-100-1	0.025697	T1000A	55-105°F	F	±0.1°F	±0.09°F
RTD-LM-100-2	0.022766	T1001A	55-105°F	F	±0.1°F	±0.09°F
RTD-LM-100-3	0.025609	T1002A	55-105°F	F	±0.1°F	±0.09°F
RTD-LM-100-4	0.014484	T1003A	55-105°F	E	±0.1°F	±0.09°F
RTD-LM-100-5	0.088892	T1004A	55-105°F	B	±0.1°F	±0.09°F
RTD-LM-100-6	0.088892	T1005A	55-105°F	B	±0.1°F	±0.09°F
RTD-LM-100-7	0.088892	T1006A	55-105°F	C	±0.1°F	±0.09°F
RTD-LM-100-8	0.088892	T1007A	55-105°F	C	±0.1°F	±0.09°F
RTD-LM-100-9	0.049432	T1008A	55-105°F	A	±0.1°F	±0.09°F
RTD-LM-100-10	0.049432	T1009A	55-105°F	A	±0.1°F	±0.09°F
RTD-LM-100-11	0.049432	T1010A	55-105°F	A	±0.1°F	±0.09°F
RTD-LM-100-12	0.024442	T1011A	55-105°F	D	±0.1°F	±0.09°F
RTD-LM-100-13	0.024442	T1012A	55-105°F	D	±0.1°F	±0.09°F
RTD-LM-100-14	0.024442	T1013A	55-105°F	E	±0.1°F	±0.09°F
RTD-LM-100-15	0.024442	T4024A	55-105°F	E	±0.1°F	±0.09°F
RTD-LM-100-16	0.043602	T4025A	55-105°F	J	±0.1°F	±0.09°F
RTD-LM-100-17	0.043602	T4026A	55-105°F	J	±0.1°F	±0.09°F
RTD-LM-100-18	0.043602	T4027A	55-105°F	J	±0.1°F	±0.09°F
RTD-LM-100-21	0.024296	T4009A	55-105°F	G	±0.1°F	±0.09°F
RTD-LM-100-22	0.053389	T4020A	55-105°F	G	±0.1°F	±0.09°F
RTD-LM-100-23	0.035157	T4021A	55-105°F	H	±0.1°F	±0.09°F
RTD-LM-100-24	0.024778	T4022A	55-105°F	H	±0.1°F	±0.09°F
RTD-LM-100-25	0.021109	T4032A	55-105°F	I	±0.1°F	±0.09°F
RTD-LM-100-26	0.020279	T4050A	55-105°F	I	±0.1°F	±0.09°F
MT-LM-100-6		T4039A	-40 to +200°F	K	±0.4°F	±0.05°F
MT-LM-100-7		T4040A	-40 to +200°F	K	±0.4°F	±0.05°F
MT-LM-100-8		T4041A	-40 to +200°F	L	±0.4°F	±0.05°F
MT-LM-100-9		T4042A	-40 to +200°F	L	±0.4°F	±0.05°F
MT-LM-100-10		T4043A	-40 to +200°F	L	±0.4°F	0.05°F
PI-LM-106	0.5	U0962	0-100 psia		±0.068 psia	0.001%
PI-LM-107	0.5	U0963	0-100 psia		±0.068 psia	0.001%



PROFILE VIEW

NOTE:
MT-6MT-LM-100-6(TYP)

APPENDIX 3D
INSTRUMENTATION LOCATION
DEW POINT SENSORS
SURRY POWER STATION-UNIT 1
INTEGRATED LEAK RATE TEST



PROFILE VIEW

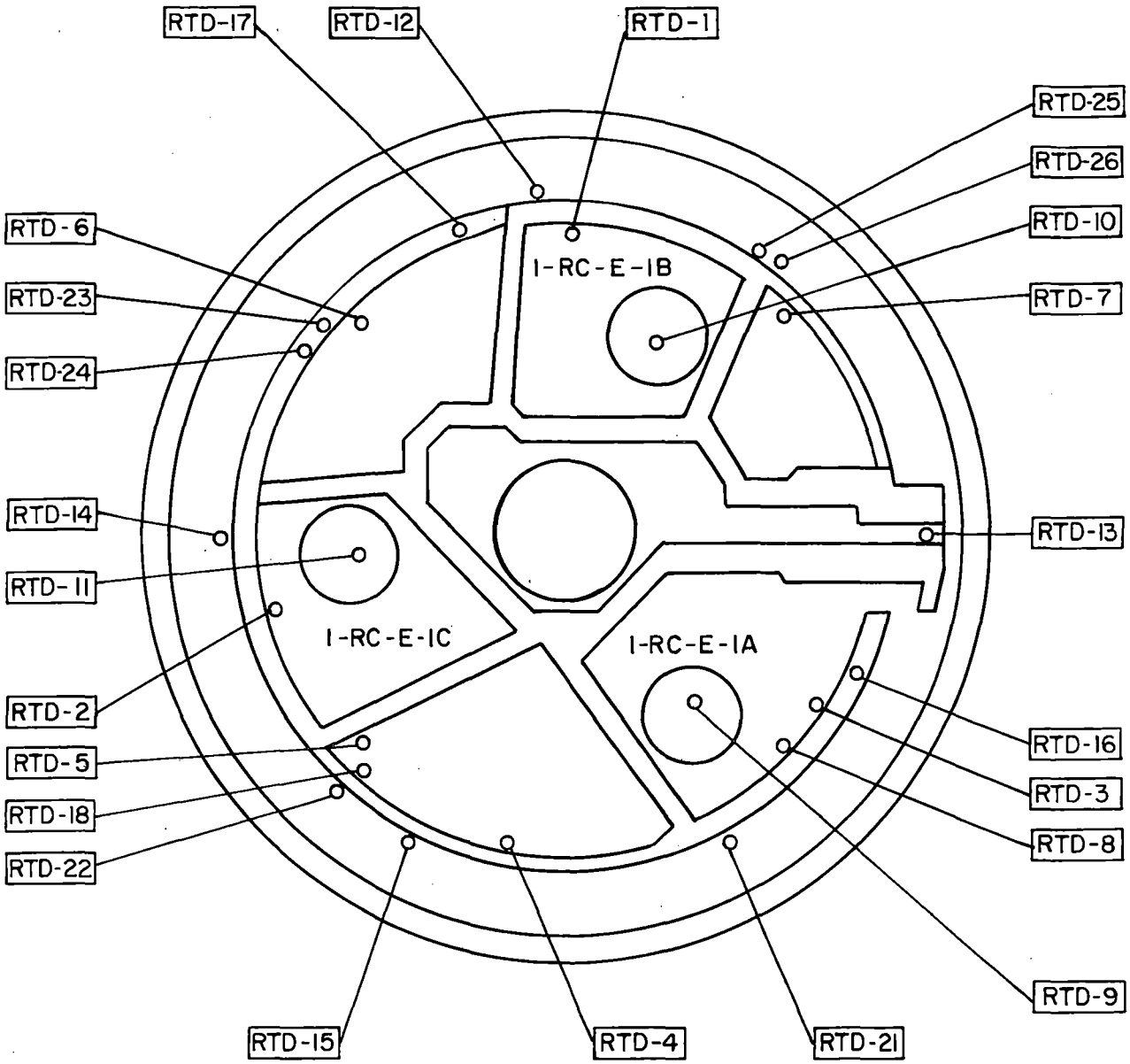
NOTES:

1. RTD-1 = RTD-LM-100-1 (TYP)
2. RTD-19,20 NOT USED

APPENDIX 3D

INSTRUMENTATION LOCATION RESISTANCE TEMPERATURE DETECTORS (RTD)

SURRY POWER STATION-UNIT 1
INTEGRATED LEAK RATE TEST



PLAN VIEW

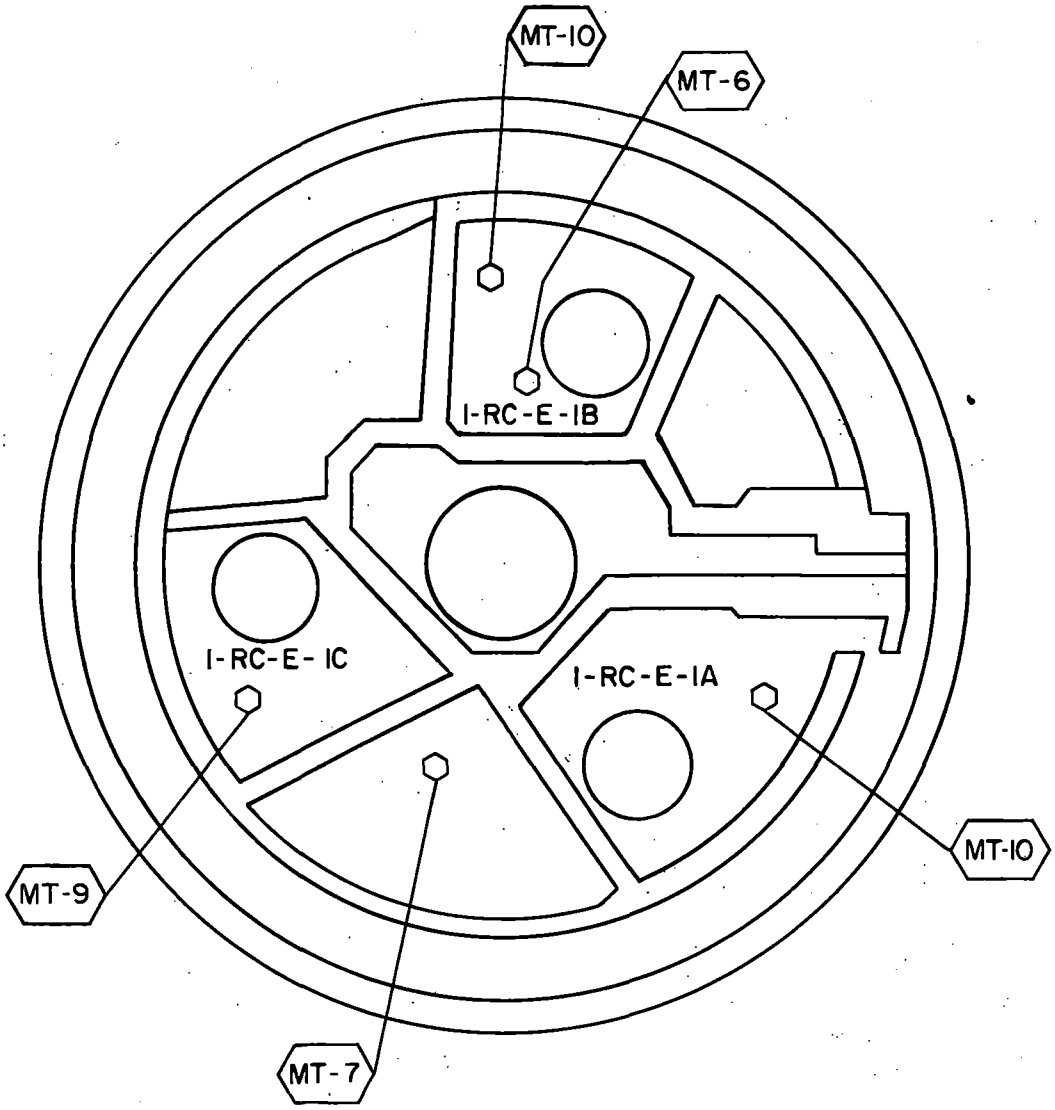
NOTES:

1. RTD-1 = RTD-LM-100-1(TYP)
2. RTD-19,20 NOT USED

APPENDIX 3E

INSTRUMENTATION LOCATION RESISTANCE TEMPERATURE DETECTORS (RTD)

SURRY POWER STATION - UNIT 1
INTEGRATED LEAK RATE TEST



PLAN VIEW

NOTE:
MT-6 MT-LM-100-6(TYP)

APPENDIX 3E
INSTRUMENTATION LOCATION
DEW POINT SENSORS
SURRY POWER STATION - UNIT 1
INTEGRATED LEAK RATE TEST

APPENDIX 3F

VEPCO SURRY POWER STATION UNIT NO. 1
INTEGRATED LEAK RATE TEST FROM 0140
HOURS ON 6/27/81 TO 1440 HOURS ON 6/27/81
40 DATA SETS

Time (Hours)	ABS Pressure (Psia)	Rel Humidity (%)	Vap Press (Psia)	Dry Bulb Temperature(°R)
0.0	60.717	71.36	0.3801	544.73
0.334	60.715	71.38	0.3804	544.72
0.667	60.712	71.40	0.3806	544.71
1.000	60.709	71.39	0.3805	544.69
1.334	60.706	71.26	0.3788	544.66
1.667	60.703	71.26	0.3788	544.65
2.000	60.699	71.23	0.3784	544.62
2.334	60.696	71.24	0.3786	544.60
2.667	60.693	71.22	0.3783	544.58
3.000	60.690	71.21	0.3782	544.56
3.334	60.687	71.19	0.3779	544.54
3.667	60.684	71.18	0.3778	544.51
4.000	60.682	71.21	0.3782	544.50
4.334	60.680	71.22	0.3783	544.48
4.667	60.677	71.12	0.3770	544.46
5.000	60.675	71.12	0.3770	544.45
5.334	60.671	71.12	0.3770	544.42
5.667	60.668	71.13	0.3772	544.39
6.000	60.665	71.22	0.3783	544.36
6.334	60.662	71.23	0.3784	544.34
6.667	60.659	71.22	0.3783	544.31
7.000	60.655	71.22	0.3783	544.26
7.334	60.652	71.29	0.3792	544.26
7.667	60.650	71.22	0.3783	544.23
8.000	60.648	71.20	0.3780	544.22
8.334	60.645	71.11	0.3769	544.20
8.667	60.643	71.13	0.3772	544.18
9.000	60.641	71.13	0.3772	544.16
9.334	60.639	71.17	0.3777	544.12
9.667	60.636	71.22	0.3783	544.12
10.000	60.633	71.17	0.3777	544.09
10.334	60.629	71.18	0.3778	544.07
10.667	60.625	71.19	0.3779	544.02
11.000	60.621	71.19	0.3779	544.00
11.334	60.617	71.17	0.3777	543.96
11.667	60.613	71.15	0.3774	543.92
12.000	60.608	71.15	0.3774	543.89
12.334	60.605	71.14	0.3773	543.87
12.667	60.601	71.00	0.3755	543.85
13.001	60.599	71.02	0.3757	543.81

APPENDIX 3G

VEPCO SURRY POWER STATION UNIT NO. 1
INTEGRATED LEAK RATE TEST FROM 0140
HOURS ON 6/27/81 TO 1440 HOURS ON 6/27/81
40 DATA SETS
ABSOLUTE TEST METHOD, MASS POINT ANALYSIS

Time (Hours)	Mass (Lbm)	Leakage (%/day)	Conf (%/day)	UCL (%/day)
0.0	538154.18	0.0	0.0	0.0
0.334	538143.92	0.0	0.0	0.0
0.667	538124.74	0.196813	0.296144	0.492957
1.000	538118.89	0.167321	0.067758	0.235080
1.334	538136.70	0.080212	0.122418	0.202630
1.667	538119.82	0.076159	0.072738	0.148896
2.000	538117.22	0.070292	0.049099	0.119391
2.334	538109.07	0.071061	0.035299	0.106360
2.667	538104.36	0.070890	0.026660	0.097550
3.000	538098.50	0.071214	0.020878	0.092093
3.334	538093.79	0.071014	0.016805	0.087820
3.667	538097.81	0.066101	0.014751	0.080852
4.000	538086.41	0.065981	0.012354	0.078335
4.334	538087.18	0.063721	0.010753	0.074474
4.667	538091.62	0.059178	0.010354	0.069532
5.000	538083.65	0.057185	0.009230	0.066415
5.334	538077.61	0.056279	0.008154	0.064433
5.667	538079.34	0.054250	0.007500	0.061750
6.000	538071.92	0.053509	0.006725	0.060235
6.334	538063.77	0.053762	0.006037	0.059799
6.667	538067.79	0.052553	0.005577	0.058130
7.000	538081.52	0.048845	0.006261	0.055106
7.334	538046.71	0.050554	0.005950	0.056504
7.667	538066.54	0.048711	0.005740	0.054451
8.000	538060.87	0.047529	0.005399	0.052927
8.334	538064.15	0.045816	0.005254	0.051069
8.667	538063.79	0.044132	0.005132	0.049264
9.000	538065.70	0.042269	0.005100	0.047369
9.334	538082.83	0.038893	0.005788	0.044681
9.667	538050.31	0.038705	0.005398	0.044103
10.000	538058.92	0.037622	0.005154	0.042776
10.334	538041.83	0.037813	0.004830	0.042643
10.667	538054.41	0.036870	0.004625	0.041495
11.000	538038.47	0.036973	0.004350	0.041323
11.334	538044.60	0.036493	0.004124	0.040617
11.667	538050.73	0.035555	0.003998	0.039553
12.000	538035.74	0.035465	0.003780	0.039245
12.334	538029.87	0.035563	0.003579	0.039142
12.667	538029.91	0.035508	0.003394	0.038901
13.001	538049.33	0.034379	0.003404	0.037783

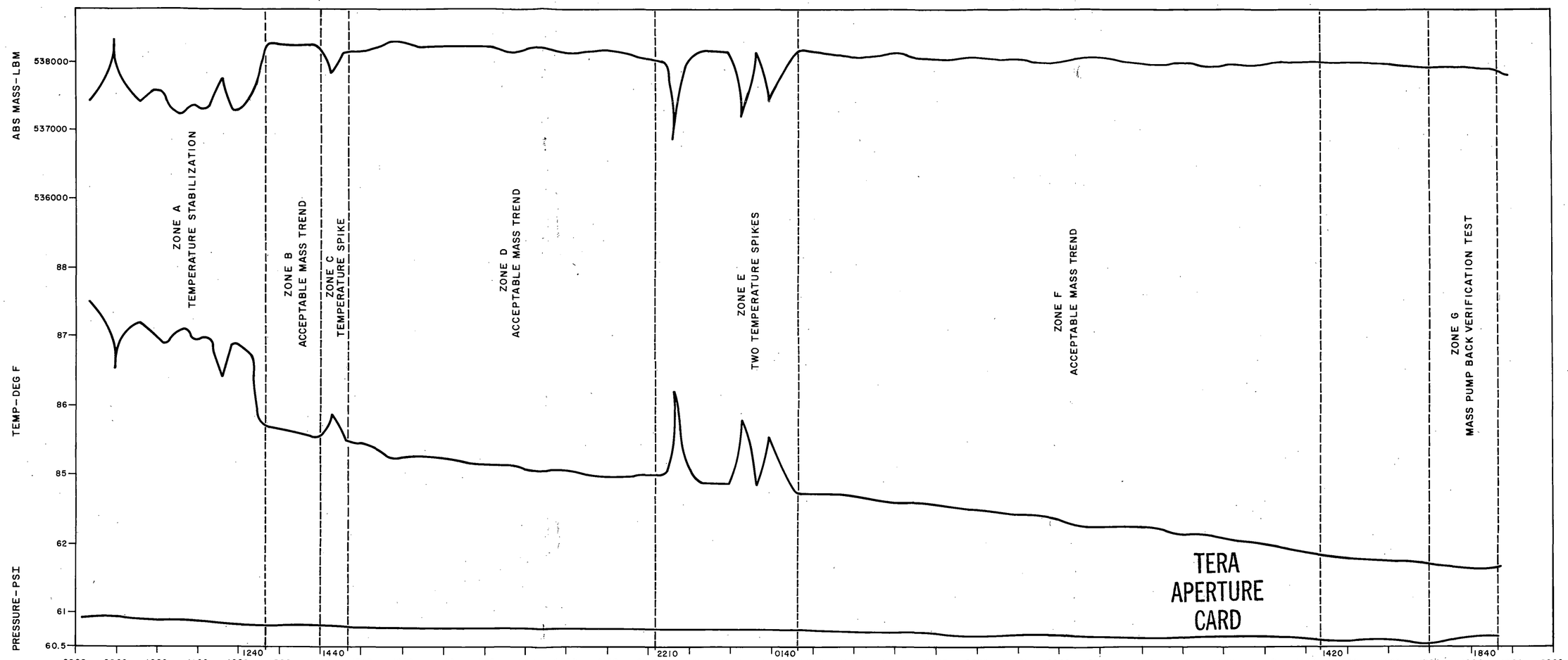
Initial estimated mass = 538128.72

Final estimated mass = 538028.50

APPENDIX 3H

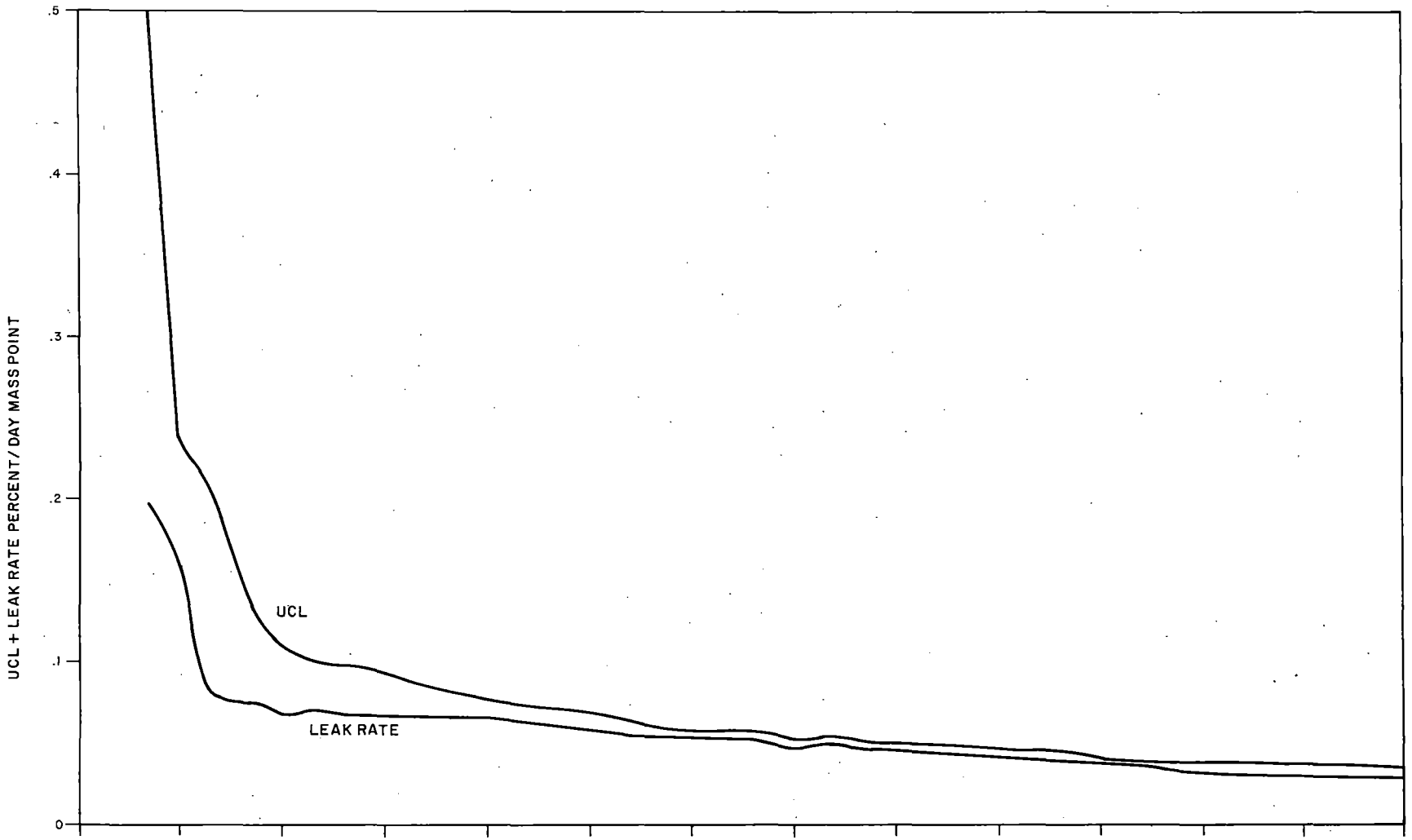
VEPCO SURRY POWER STATION UNIT NO. 1
INTEGRATED LEAK RATE TEST FROM 0140
HOURS ON 6/27/81 TO 1440 HOURS ON 6/27/81
40 DATA SETS
ABSOLUTE TEST METHOD - TOTAL TIME ANALYSIS

Time (Hours)	Mass Lbm	Meas Leakage (%/day)	Est Leakage (%/day)	Conf (%/day)	UCL (%/day)
0.0	538154.18	0.0	0.0	0.0	0.0
0.334	538143.92	0.136989	0.0	0.0	0.0
0.667	538124.74	0.196843	0.0	0.0	0.0
1.000	538118.89	0.157381	0.173934	0.392789	0.566723
1.334	538136.70	0.058427	0.096079	0.283647	0.379726
1.667	538119.82	0.091917	0.082577	0.181753	0.264330
2.000	538117.22	0.082418	0.071611	0.139336	0.210947
2.334	538109.07	0.086192	0.067852	0.119148	0.187000
2.667	538104.36	0.083308	0.064993	0.106068	0.171061
3.000	538098.50	0.082769	0.063413	0.097210	0.160623
3.334	538093.79	0.080782	0.062027	0.090420	0.152447
3.667	538097.81	0.068554	0.057494	0.083635	0.141129
4.000	538086.41	0.075555	0.056502	0.079590	0.136091
4.334	538087.18	0.068936	0.054158	0.075527	0.129685
4.667	538091.62	0.059780	0.050219	0.071529	0.121748
5.000	538083.65	0.062902	0.048066	0.068677	0.116743
5.334	538077.61	0.064019	0.046753	0.066527	0.113280
5.667	538079.34	0.058891	0.044744	0.064291	0.109035
6.000	538071.92	0.061138	0.043688	0.062676	0.106364
6.334	538063.77	0.063655	0.043408	0.061576	0.104984
6.667	538067.79	0.057784	0.042198	0.060090	0.102289
7.000	538081.52	0.046292	0.039230	0.058208	0.097438
7.334	538046.71	0.065352	0.040023	0.058083	0.098106
7.667	538066.54	0.050975	0.038446	0.056741	0.095187
8.000	538060.87	0.052018	0.037319	0.055655	0.092975
8.334	538064.15	0.048175	0.035820	0.054512	0.090332
8.667	538063.79	0.046512	0.034341	0.053446	0.087787
9.000	538065.70	0.043841	0.032727	0.052405	0.085132
9.334	538082.83	0.034092	0.030029	0.051216	0.081245
9.667	538050.31	0.047917	0.029515	0.050752	0.080267
10.000	538058.92	0.042484	0.028416	0.050047	0.078463
10.334	538041.83	0.048484	0.028211	0.049784	0.077995
10.667	538054.41	0.041710	0.027268	0.049173	0.076440
11.000	538038.47	0.046911	0.027062	0.048920	0.075982
11.334	538044.60	0.043118	0.026479	0.048485	0.074964
11.667	538050.73	0.039545	0.025601	0.047940	0.073541
12.000	538035.74	0.044017	0.025315	0.047670	0.072985
12.334	538029.87	0.044948	0.025175	0.047478	0.072653
12.667	538029.91	0.043753	0.024962	0.047237	0.072199
13.001	538049.33	0.035965	0.024019	0.046706	0.070724

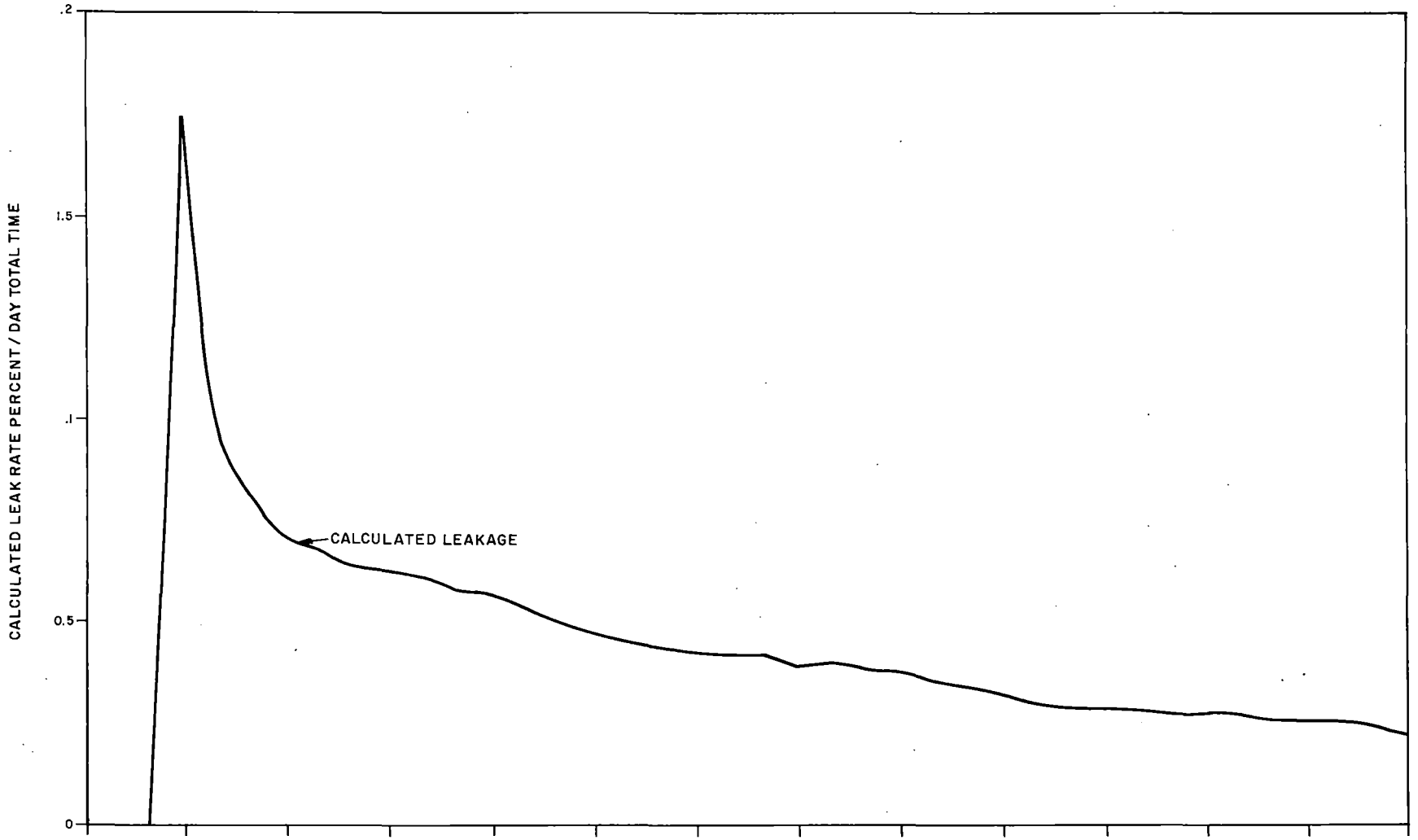


APPENDIX 3J
STABILIZATION, CILRT+VERIFICATION
CONTAINMENT AIR MASS, TEMP+
PRESSURE VS TIME
SURRY POWER STATION-UNIT 1
INTEGRATED LEAK RATE TEST

8111040104-01



APPENDIX 3K
CONTAINMENT LEAK RATE + UCL VS TIME
SURRY POWER STATION-UNIT 1
INTEGRATED LEAK RATE TEST



6/27/81

APPENDIX 3L
CALCULATED CONTAINMENT
LEAK RATE VS TIME
SURRY POWER STATION-UNIT 1
INTEGRATED LEAK RATE TEST

SECTION 4

LOCAL LEAK RATE TESTS (TYPES B AND C)

Local leak rate tests were performed by pressurizing the penetrations listed in the following tables and either measuring leakage across containment isolation valves (Type C) or across resilient seals (Type B).

The total Types B and C leakage documented was verified to be in accordance with station procedures. The following pages list the penetrations tested and their documented leakage.

APPENDIX 4A

1975-1981 TYPE B DATA SUMMARY

Penetration	Equipment Tested	Prerepair Leakage(SCFH)/Date	Postrepair Leakage(SCFH)/Date	Remarks
1981 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	1.1/6-25-81	N/A	N/A
Equipment hatch	O-ring	0.0/6-25-81	N/A	N/A
Fuel transfer tube	O-ring	10.0/6-24-81	N/A	N/A
Emergency air lock	O-ring	0.0/6-25-81	N/A	N/A
1980 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	4.1/8-8-80		
Personnel air lock	O-ring	0.0/5-10-80	N/A	N/A
Personnel air lock	O-ring	0.0/1-7-80	N/A	N/A
Equipment hatch	O-ring	0.0/8-8-80	N/A	N/A
Equipment hatch	O-ring	0.0/5-7-80	N/A	N/A
Equipment hatch	O-ring	5.0/1-6-80		
1979 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	0.0/10-21-79	N/A	N/A
Personnel air lock	O-ring	0.0/5-23-79	N/A	N/A
Equipment hatch	O-ring	0.0/10-23-79	N/A	N/A
Equipment hatch	O-ring	0.0/5-14-79	N/A	N/A
1978 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	25.0/12-31-78	10.0/12-31-78	N/A
Personnel air lock	O-ring	0.0/11-10-78	N/A	N/A
Personnel air lock	O-ring	2.0/9-17-78		
Personnel air lock	O-ring	11.2/7-1-78	0.4/7-2-78	Replaced O-rings
Equipment hatch	O-ring	0.0/12-22-78	N/A	N/A
Equipment hatch	O-ring	0.0/6-26-78	N/A	N/A
1977 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	0.0/12-5-77	N/A	N/A
Personnel air lock	O-ring	0.0/5-11-77	N/A	N/A
Personnel air lock	O-ring	0.0/5-9-77	N/A	N/A
Personnel air lock	O-ring	0.4/5-6-77		
Personnel air lock	O-ring	1.2/1-17-77		Replaced O-rings
Equipment hatch	O-ring	0.0/12-4-77	N/A	N/A
Equipment hatch	O-ring	0.0/12-1-77	N/A	N/A
Equipment hatch	O-ring	0.0/1-16-77	N/A	N/A
1975 TYPE B DATA SUMMARY				
Personnel air lock	O-ring	0.0/11-29-75	N/A	N/A
Personnel air lock	O-ring	0.0/9-11-75	N/A	N/A
Personnel air lock	O-ring	0.0/4-14-75	N/A	N/A
Personnel air lock	O-ring	0.0/1-17-75	N/A	N/A
Equipment hatch	O-ring	0.0/11-28-75	N/A	N/A
Equipment hatch	O-ring	0.0/1-17-75	N/A	N/A

All electrical penetrations were tested in 1975, 1976, 1977, 1980, and 1981 with no significant leakages noted. The following canisters were replaced to allow more cable capacity during the 1981 steam generator replacement outage: 5B, 9B, 1C, 15C, 17C, 12D, 7E, 14E, and FB.

APPENDIX 4B

1975-1981 TYPE C DATA SUMMARY

1975 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
15	Charging (CH)	1-CH-309	0.0/(10-20-75)	N/A	N/A
		MOV-1289A	0.0/(10-20-75)	N/A	N/A
19	Charging (CH)	MOV-1381	0.9/(10-29-75)	N/A	N/A
28	Chemical & Volume Control	HCV-12000A,B,C TV-1204	0.0/(10-21-75) 4.7/(10-29-75)	N/A	N/A
37	Charging (CH)	1-CH-323	0.0/(11-28-75)	N/A	N/A
37	Charging	1-CH-333	1.7/(11-28-75)	N/A	N/A
35	Charging (CH)	1-CH-349	0.0/(11-28-75)	N/A	N/A
46	Charging (CH)	FCV-1160	0.0/(10-19-75)	N/A	N/A
60	Safety Injection (SI)	MOV-1890A	12.7/(11-27-75)	S1006165/11-28-75/Replace Torque Operator	8.0/(11-28-75)
62	Safety Injection (SI)	MOV-1890B	11.2/(11-27-75)	S1006162/11-28-75/Reset Torque Limit	1.5/(11-28-75)
61	Safety Injection (SI)	MOV-1890C MOV-1864A&B	0.0/(11-27-75) 1.9/(11-27-75)	N/A	N/A
21	Safety Injection	MOV-1842	1.1/(11-27-75)	N/A	N/A
113	Safety Injection (SI)	1-SI-174 MOV-1869A	0.6/(11-27-75)	S1005293/10-31-75/Replaced Bonnet Gasket & Packing	N/A
23	Safety Injection (SI)	MOV-1869B	2.0/(11-27-75)	S1005294/10-31-75/Replaced Flex Gasket & Packing	N/A
7	Safety Injection (SI)	1-SI-150 MOV-1968C&D	0.5/(11-27-75)	N/A	N/A
20	Safety Injection (SI)	1-SI-32	0.0/(10-20-75)	N/A	N/A

APPENDIX 4B (Cont)

1975 TYPE DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
106	Safety Injection (SI)	1-SI-73	0.2/(11-4-75)	N/A	N/A
55	Sample System (SS)	TV-SS-104A	0.0/(11-17-75)	S1005488/10-23-75/Replaced Valve Stem	N/A
		TV-SS-104B	0.0/(11-17-75)	N/A	N/A
56	Sample System (SS)	TV-SS-100A TV-SS-100B	0.0/(10-15-75)	N/A	N/A
56	Sample System (SS)	TV-SS-102A	0.0/(10-15-75)	S1005736/11-2-75/Adjusted Stroke	N/A
		TV-SS-102B	0.0/(10-15-75)	N/A	
56	Sample System (SS)	TV-SS-106A	0.0/(10-29-75)	S1005490/10-23-75/Adjusted Stroke	N/A
		TV-SS-106B	0.2/(10-29-75)	S1005490/10-23-75/Cleaned Valve	N/A
57	Sample System (SS)	TV-SS-101A	0.0/(11-3-75)	N/A	N/A
		TV-SS-101B	0.0/(11-3-75)	S1005487/10-23-75/Cleaned Valve	N/A
97	Sample System (SS)	TV-SS-103	0.0/(10-15-75)	N/A	N/A
33	Gaseous Drains (GS)	TV-SS-108A	1.9/(10-15-75)	N/A	N/A
		TV-SS-108B	0.0/(10-15-75)	N/A	N/A
104	Reactor Cavity Purification(RL)	1-RL-13	0.0/(10-16-75)	N/A	N/A
		1-RL-15	0.0/(10-16-75)	N/A	N/A
63	Containment Spray (CS)	1-CS-24	0.0/(11-7-75)	S1005549/10-23-75/New Gaskets & Packing	N/A
		MOV-CS-101C&D	10.0/(11-5-75)	S1005719/11-3-75/Lapped Valve & Replaced Bonnet Gasket	N/A
24	Residual Heat Removal (RH)	MOV-RH-100	1.3/(11-16-75)	N/A	N/A
64	Containment Spray (CS)	1-CS-13	0.0/(11-7-75)	S1005548/10-22-75/New Gaskets & Packing	N/A
		MOV-CS-101A	9.0/(11-4-75)		
		MOV-CS-101B		N/A	N/A
70	Recirculation Spray (RS)	1-RS-11	3.0/(10-25-75)	S1005547/10-22-75/New Gaskets & Packing	N/A
		MOV-RS-156B	0.4/(11-5-75)		
71	Recirculation Spray (RS)	1-RS-17	3.0/(11-5-75)	S100546/10-23-75/Cleaned Valve	N/A
		MOV-RS-156A	20.1/(11-5-75)		

APPENDIX 4B (Cont)

1975 TYPE DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
66,69	Recirculation Spray (RS)	MOV-RS-155A&B	1.7/(11-17-75)	S1005670/11-15/75/Lapped Valve & Repacked	N/A
66,68	Safety Injection (SI)	MOV-RS-1860A&B	0.6/(11-21-75)	S1005721/11-21-75/New Bonnet Gasket & Packing	N/A
54	Primary Vent (VA)	1-VA-1	0.0/(10-15-75)	S100550/10-28-75/Replaced Diaphragm	N/A
		1-VA-6	8.7/(10-15-75)	N/A	N/A
50	Safety Injection (SI)	TV-SI-101A	0.0/(10-29-75)	N/A	N/A
		TV-SI-101B	0.0/(10-29-75)	N/A	N/A
48	Vent & Drain (VG)	TV-VG-109A	1.0/(10-15-75)	N/A	N/A
		TV-VG-109B	3.4/(10-15-75)	N/A	N/A
38	Aerated Drain (DA)	TV-DA-100A	0.0/(10-16/75)	N/A	N/A
		TV-DA-100B	1.9/(10-16-75)	N/A	N/A
58	Instrument Air (IA)	1-IA-446	0.4/(10-15-75)	N/A	N/A
		1-IA-938	0.4/(10-15-75)	N/A	N/A
47	Instrument Air (IA)	1-IA-446	0.0/(10-15-75)	N/A	N/A
		1-IA-939	0.0/(10-15-75)	N/A	N/A
42	Service Air (SA)	1-SA-60	0.1/(11-26-75)	N/A	N/A
		1-SA-62	0.2/(11-26-75)	N/A	N/A
53	Safety Injection (SI)	TV-SI-100	0.0/(11-4-75)	N/A	N/A
		1-SI-234	0.0/(11-4-75)	N/A	N/A
43	Air Monitoring (RM)	1-RM-3	0.0/(10-29-75)	N/A	N/A
		TV-RM-100A	1.1/(10-28-75)	N/A	N/A
44	Air Monitoring (RM)	TV-RM-100B	0.3/(10-28-75)	N/A	N/A
		TV-RM-100C	0.2/(10-28-75)	N/A	N/A
91	Ventilation (VS)	MOV-VS-100A	1.3/(10-17-75)	N/A	N/A
		MOV-VS-100B	10.9/(10-17-75)	N/A	N/A
		MOV-VS-102			
90	Ventilation (VS)	MOV-VS-100C	0.0/(10-17-75)	N/A	N/A
		MOV-VS-100D	0.0/(10-17-75)	N/A	N/A
		MOV-VS-101			

APPENDIX 4B (Cont)

1975 TYPE DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
93	Containment Vacuum (CV)	TV-CV-150	0.0/(10-19-75)	S1005290/10-19-75/Lapped Valve	N/A
		TV-CV-150B	0.0/(10-19-75)	S1005291/10-19-75/Lapped Valve	N/A
92	Containment Vacuum (CV)	TV-CV-150C	1.0/(10-19-75)	N/A	N/A
		TV-CV-150D	0.0/(10-19-75)	N/A	N/A
94	Containment Vacuum (CV)	HCV-CV-100	1.9/(3-11-75)	S1005289/10-31-75/New Bonnet Gasket	
		1-CV-1	1.9/(11-5-75)		
89	Air Ejector Discharge	1-VP-12	6.3/(10-18-75)	N/A	N/A
		TV-SV-102	0.0/(10-19-75)	N/A	
45	Primary Grade Water (PG)	1-RC-160	9.3/(11-11-75)	N/A	N/A
		TV-1519A	0.0/(11-11-75)	N/A	N/A

APPENDIX 4B (Cont)

1976-1977 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
15	Charging (CH)	1-CH-309 MOV-1289A	0.0/(10-29-76) 0.0/(10-29-76)	N/A N/A	N/A N/A
19	Charging (CH)	MOV-1381	0.0/(10-28-76)	N/A	N/A
28	Chemical & Volume Control	HCV-1200A,B,C TV-1204	0.4/(10-28-76) 0.0/(10-29-76)	N/A N/A	N/A N/A
36	Charging (CH)	1-CH-323	327.4/(10-28-76)		6.3/(12-23-76)
37	Charging (CH)	1-CH-333	10.0/(10-28-76)	N/A	N/A
35	Charging (CH)	1-CH-349	8.8/(10-28-76)	N/A	N/A
46	Charging (CH)	FCV-1160	174.8/(10-29-76)	S1014318/11-3-76/Replaced Seat & Gasket	5.2/(11-3-76)
60	Safety Injection (SI)	MOV-1890A	6.7/(10-18-76)	N/A	N/A
62	Safety Injection (SI)	MOV-1890B	37.2/(10-18-76)	S114178/1-8-77/Cleaned Seat	0.47/(1-15-77)
61	Safety Injection (SI)	MV-1890C MOV-1864A&B	6.3/(10-18-76)	N/A	N/A
21	Safety Injection (SI)	MOV-1842	0.0/(10-18-76)	N/A	N/A
113	Safety Injection (SI)	1-SI-174 MOV-1869A	4.1/(10-18-76)	N/A	N/A
23	Safety Injection (SI)	MOV-1869B	0.0/(10-18-76)	N/A	N/A
7	Safety Injection (SI)	1-SI-150 MOV-1867C&D	2.8/(10-18-76)	S114745/1-8-77/replaced valve (1-SI-150)	1.1/(1-15-77)
20	Safety Injection (SI)	1-SI-32	0.0/(10-29-76)	N/A	N/A

APPENDIX 4B (Cont)

1976-1977 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
106	Safety Injection (SI)	1-SI-73	1.3/(10-27-76)	N/A	N/A
55	Sample System (SS)	TV-SS-104A	167.4/(10-26-76)	S1014209/12-13-76/Adjusted Spring Replaced Bonnet Gasket	0.4/(12-15-76)
		TV-SS-104B	67.0/(10-26-76)	S1014208/12-13-76/Replaced Bellows, Plug, Lapped Seat	0.9/(12-15-76)
56	Sample System (SS)	TV-SS-100A	0.0/(10-26-76)	N/A	N/A
		TV-SS-100B	0.0/(10-26-76)	N/A	N/A
56	Sample System (SS)	TV-SS-1002A	0.0/(10-25-76)	N/A	N/A
		TV-SS-102B	42.8/(10-25-76)	S10114199/12-13-76/Replaced Plug, Lapped Seat	0.0/(12-15-76)
56	Sample System (SS)	TV-SS-106A	0.0/(10-25-76)	N/A	N/A
		TV-SS-106B	0.0/(10-25-76)	N/A	N/A
57	Sample System (SS)	TV-SS-101A	0.0/(10-25-76)	N/A	N/A
		TV-SS-101B	0.0/(10-25-76)	N/A	N/A
97	Sample System (SS)	TV-SS-103	0.0/(10-25-76)	N/A	N/A
33	Gaseous Drains (GS)	TV-DF-108A	0.0/(11-27-76)	N/A	N/A
		TV-DG-108B	0.0/(11-27-76)	N/A	N/A
103	Reactor Cavity Purification (RL)	1-RL-3	0.0/(10-21-76)	N/A	N/A
		1-RL-5			
104	Reactor Cavity Purification (RL)	1-RL-13	0.0/(10-21-76)	N/A	N/A
		1-RL-15	0.0/(10-21-76)	N/A	N/A
63	Containment Spray (CS)	1-CS-24	0.0/(10-25-76)	N/A	N/A
		MOV-CS-101C&D	491.0/(10-27-76)	S10114321/11-12-76/Lapped Valve	39.0/(11-13-76)
24	Residual Heat Removal (RH)	MOV-RH-100	4.9/(10-27-76)	N/A	N/A
64	Containment Spray (CS)	1-CS-13	0.0/(10-25-76)	S1014221/10-30-76/Lapped Disc, Replaced Bonnet Gasket	9.3/(11-4-76)
		MOV-CS-101A	1.9/(10-27-76)		
70	Recirculation Spray (RS)	1-RS-11	1.3/(10-25-76)	S114428/16-30-76/Repaired Seat, Disc	0.0/(11-16-77)
		MOV-RS-156B	8.6/(1-14-77)	N/A	N/A

APPENDIX 4B (Cont)

1976-1977 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
71	Recirculation Spray (RS)	1-RS-17	6.3/(10-23-76)	S114428/10-30/76/Repaired Seat, Disc	0.9/(1-16-77)
		MOV-RS-156A	5.4/(10-27-76)	S1014868/1-15-77/Lapped Seat & Disc	1.2/(1-16-77)
66,69	Recirculation Spray (RS)	MOV-RS-155A&B	331.0/(10-22-76)	S11266/1-2-77/Replaced Valves	5.9/(1-7-77)
67,68	Safety Injection (SI)	MOV-RS-1860A&B	7.4/(10-22-76)	N/A	N/A
54	Primary Vent (VA)	1-VA-1	1.1/(10-30-76)	N/A	N/A
		1-VA-6	0.8/(10-30-76)	N/A	N/A
50	Safety Injection	TV-SI-101A	0.0/(11-5-76)	N/A	N/A
48	Vent & Drain (VG)	TV-VG-109A	1.6/(10-31-76)	N/A	N/A
		TV-VG-109B	6.3/(10-31-76)		1.2/(12-30-76)
38	Aerated Drain (DA)	TV-DA-100A			
		TV-DA-100B	111.6/(11-7-76)	S1014739/12-29-76/repaired seat	1.5/(1-5-77)
47	Instrument Air (IA)	1-IA-446	57.1/(11-10-76)	S1014452/11-12-76/Lapped Valve	0.0/(11-13-76)
		1-IA-030	26.0/(11-10-76)	S1014451/11-12-76/Lapped Valve	1.2/(11-13-76)
42	Service Air (SA)	1-SA-60	130.2/(1-12-77)		0.0/1-15-77)
		1-SA-62	111.0/(1-12-77)		
53	Safety Injection (SI)	TV-SI-100	0.0/(11-8-76)	N/A	N/A
		1-SI-234	0.0/(11-8-76)	N/A	N/A
43	Air Monitoring (RM)	1-RM-3	3.2/(11-26-76)	N/A	N/A
		TV-RM-100C	0.0/(11-24-76)	N/A	N/A
44	Air Monitoring (RM)	TV-RM-100B	0.0/(11-24-76)	N/A	N/A
		TV-RM-100C	0/0/(11-24-76)	N/A	N/A
91	Ventilation (VS)	MOV-VS-100C	0.0/(11-18-76)	N/A	N/A
		MOV-VS-100D	0.0/(11-18-76)	N/A	N/A
		MOV-VS-101			
90	Ventilation (VS)	MOV-VS-100C	0.0/(11-18-76)	N/A	N/A
		MOV-VS-100D	0.0/(11-18-76)	N/A	N/A

APPENDIX 4B (Cont)

1976-1977 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
93	Containment Vacuum (CV)	TV-CV-150A	299.0/(10-28-76)	S10114312/10-31-76/Lapped Plug to Seat, Replaced Gasket	0.0/(11-2-76)
		TV-CV-150B	39.1/(10-28-76)	S1014313/10-31-76/Lapped Valve, Replaced Gasket	0.0/(11-2-76)
92	Containment Vacuum (CV)	TV-CV-150C	55.8/(10-28-76)	S1014314/10-31-76/Lapped Valve, Replaced Gasket	0.0/(11-9-76)
		TV-CV-150D	148.8/(10-28-76)	S1014315/10-31-76/Replaced Packing and Gasket	0.0/(11-9-76)
94	Containment Vacuum (CV)	HCV-CV-100	11.7/(10-31-76)		2.6/(11-1-76)
		1-CV-2	3.0/(10-29-76)	N/A	N/A
89	Air Ejector Discharge	1-VP-12	26.0/(10-21-76)		0.0/(10-26-76)
		TV-SV-102	0.0/(10-20-76)	N/A	N/A
97,105, 55,57	Leakage Monitoring (LM)	TV-LM-100A TV-LM-100C TV-LM-100E TV-LM-100G TV-LM-100B TV-LM-100D TV-LM-100F TV-LM-100H	0.0/(10-22-76)	N/A	N/A
105	Liquid Monitoring (LM)	TV-LM-101A	0.0/(11-23-76)	N/A	N/A
93	Gaseous Waste (GW)	1-GW-166	0.0/(10-28-76)	N/A	N/A
92	Gaseous Waste (GW)	1-GW-175	0.0/(10-28-76)	N/A	N/A
45	Primary Grade Water (PG)	1-RC-160	160.0/(10-31-76)	S1014327/12-12-76/Lapped Valve	0.6/(12-22-76)

APPENDIX 4B (Cont)

1978 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
15	Charging (CH)	1-CH-309 MOV-1289A	200.0/(5-12-78) 0.0/(5-12-78)	S1805111015/5-13-78/Lapped Valve & Replaced Gasket N/A	0.0/(5-15-78) N/A
19	Charging (CH)	MOV-1381	0.0/(5-8-78)	N/A	N/A
28	Chemical & Volume Control	HCV-1200A,B,C TV-1204	0.0/(5-19-78) 0.0/(5-7-78)	N/A N/A	N/A N/A
46	Charging (CH)	FCV-1160	0.0/(4-25-78)	N/A	N/A
60	Safety Injection (SI)	MOV-1890A	0.0/(4-23-78)	N/A	N/A
62	Safety Injection (SI)	MOV-1890B	0.0/(4-23-78)	N/A	N/A
61	Safety Injection (SI)	MOV-1890C MOV-1864A&B	7.4/(6-20-78) 1.9/(6-20-78)	S1804221601/6-24-78/Repacked Valve N/A	1.0/(6-26-78) 1.9/(6-20-78)
21	Safety Injection (SI)	MOV-1942	0.0/(4-23-78)	N/A	0.6/(6-20-78)
113	Safety Injection (SI)	1-SI-174 MOV-1869A	290.5/(4-23-78)	S1806091320/6-10-78/Set Limits & Torque	0.6/(6-20-78)
23	Safety Injection (SI)	MOV-1869B	347.8/4-23-78)	S1805160900/5-20-78/Replaced Valve	0.0/(6-22-78)
7	Safety Injection (SI)	1-S1150 MOV-1867C*D	0.0/(4-23-78)	N/A	0.0/(4-23-78)
20	Safety Injection (SI)	1-SI-32	0.0/(4-25-78)	N/A	N/A
106	Safety Injection (SI)	1-SI-73	0.0/(4-24-78)	N/A	N/A
55	Sample System (SS)	TV-SS-104A TV-SS-104B	0.0/(5-1-78) 0.0/(5-1-78)	D.C. 78-01 Replaced Valves	0.0/(6-6-78) 0.0/(6-6-78)
56	Sample System (SS)	TV-SS-100A TV-SS-100B	0.0/(5-1-78) 0.0/(5-1-78)	D.C. 78.01 Replaced Valves	0.0(6-6-78)

APPENDIX 4B (Cont)

1978 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
56	Sample System (SS)	TV-SS-102A TV-SS-10	0.0/(5-1-78) 0.0/(5-1-78)	D.C.78.01 Replaced Valves	0.0(6-6-78)
56	Sample System (SS)	TV-SS-106A TV-SS-106B	0.0/(5-1-78) 0.0/(5-1-78)	D.C.78.01 Replaced Valves	0.0/6-6-78)
57	Sample System (SS)	TV-SS-101A TV-SS-101B	150.0/(5-1-78) 0.0/(5-1-78)	D.C.78-01 Replaced Valves N/A	0.0/(6-6-78) 0.0/(6-6-78)
97	Sample System (SS)	TV-SS-103	70.0/(5-13-78)	S180515801/5-16-78/Lapped Seat & Disc	0.0/(5-26-78)
33	Gaseous Drains (GS)	TV-DG-108A TV-DG-108B	5.0/(5-20-78) 74.0/(5-20-78)	S1806061326/6-6-78/Lapped Seat & Disc S1805240835/6-2-78/Cleaned Valve	0.0/(6-23-78) 1.2/(6-24-78)
103	Reactor Cavity Purification (RL)	1-RL-3 1-RL-5	0.0/(4-24-78)	N/A	N/A
104	Reactor Cavity Purification (RL)	1-RL-13 1-RL-15	0.0/(4-24-78)	N/A	N/A
63	Containment Spray (CS)	1-CS-24 MOV-CS-101C&D	0.0/(5-2-78) 148.0/(5-3-78)	N/A S1805281217/6-14-78/Lapped Valve Discs	N/A 20.5/(7-2-78)
24	Residual Heat (RH)	MOV-RH-100	118.3/(4-28-78)	S185051452/5-2-78/Lapped Seat & Disc, Replaced Gasket	1.9/(6-30-78)
64	Containment Spray (CS)	1-CS-13 MOV-CS-101A MOV-CS-101B	0.0/(5-2-78) 100.0/(5-3-78)	N/A S1805030920/5-11-78/Cleaned Seat, Lapped Gate	N/A 12.0/(5-20-78)
70	Recirculation Spray (RS)	1-RS-11	100.0/(5-2-78)	S1805091545/5-9-78/Motor Not Engaging	45.4/(7-3-78)
71	Recirculation Spray (RS)	1-RS-17 MOV-RS-156A	23.6/(5-2-78) 18.6/(5-4&8)	Packing Repaired S1806161013/6-13-78/Set Limits	0.4/(5-3-78) 3.7/(6-23-78)
66,69	Recirculation Spray (RS)	MOV-RS-155A&B	0.0/(5-3-78)	N/A	N/A
66,68	Safety Injection (SI)	MOV-RS-1860A&B	111.6/(5-11-78)	S1805051608/5-22-78/Lapped Disc & Gate, Replaced Bonnet Gasket	16.0/(9-6-78)

APPENDIX 4B (Cont)

1978 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
54	Primary Vent (VA)	1-VA-1 1-VA-6	0.0/(5-13-78)	N/A	N/A
50	Safety Injection (SI)	TV-SI-101A TV-SI-101B	0.0/(5-17-78)	N/A	N/A
48	Vent & Drain (VG)	TV-VG-109A TV-VG-109B	5.9/(5-13-78)	S180510800/5-20-78/Cleaned & Replaced Gasket	0.0/(6-15-78)
38	Aerated Drain (DA)	TV-DA-100A	305.0/(5-16-78)	S1805150800/5-20-78/Cleaned & Replaced Gasket	0.0/(6-15-78)
		TV-DA-100B	7.4/(5-16-78)	S1805180802/6-16-78/Replaced Seat, Gasket Packing	0.0/(6-16-78)
58	Instrument Air (IA)	2-IA-446 1-IA-938	0.0/(5-15-78)	N/A	N/A
47	Instrument Air (IA)	1-IA-446 1-IA_939	0.0/(5-15-78)	N/A	N/A
42	Service Air (SA)	1-SA-60	0.0/(4-30-78)	N/A	N/A
		1-SA-62	0.0/(4-30-78)	N/A	N/A
53	Safety Injection	TV-SI-100	0.0/(5-17-78)	N/A	N/A
				S1805180801/5-21-78/Lapped Seat & Disc	0.0/(6-19-78)
43	Air Monitoring (RM)	1-RM-3	300.0/(5-22-78)	S1805230801/6-12-78/Lapped Disc to Seat	0.0/(6-14-78)
		TV-RM-100A	0.0/(5-22-78)	N/A	N/A
44	Air Monitoring (RM)	TV-RM-100B	1.3/(5-22-78)	N/A	N/A
		TV-RM-100C	0.4/(5-22-78)	N/A	N/A
91	Ventilation (VS)	MOV-VS-100A	0.0/(6-1-78)	N/A	N/A
	(VS)	MOV-VS-100B	331.1/(6-1-78)	S1806121916/6-13-78/Replaced Valve	0.0/(6-19-78)
	(VS)	MOV-VS-100D	331.1/(6-1-78)	S1806121919/6-29-78/Cleaned Seat & Disc	0.0/(6-29-78)
93	Containment Vacuum (CV)	TV-CV-150A	1.9/(4-23-78)	S1804241146/5-22-78/Machined Disc-Installed New Seat	0.0/(6-16-78)
		TV-CV-150B	327.2/(4-23-78)	S1804241149/5-23-78/Machined Disc-Installed New Seat	0.0/(6-16-78)

APPENDIX 4B (Cont)

1978 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
92	Containment Vacuum (CV)	TV-CV-150C	3.7/(4-23-78)	S1804241148/5-22-78/Machined Disc-Installed New Seat	0.0/(6-16-78)
		TV-CV-150D	7.4/(4-23-78)	S180424147/5-22-78/Machined Disc-Installed New Seat	0.0/(6-16-78)
94	Containment Vacuum (CV)	HCV-CV-100	21.88/(5-3-78)	S1805030925/5-12-78/Shimmed Ball Disc Seat	0.0/(5-13-78)
		1-CV-2	3.7/(4-25-78)	N/A	N/A
89	Air Ejector Discharge	1-VP-12	126.1/(5-2-78)	S1803100436/5-22-78/Lapped Seat	0.2/(6-6-78)
		TV-SV-102	21.2/(4-28-78)		0.0/(6-14-78)
97,105, 55,57	Leakage Monitoring (LM)	TV-LM-100A TV-LM-100C TV-LM-100E TV-LM-100G TV-LM-100B TV-LM-100D TV-LM-100F TV-LM-100H	0.0/(5-2-78)	N/A	N/A
105	Liquid Monitoring (LM)	TV-LM-101A	0.0/(4-26-78)	N/A	N/A
105	Liquid Monitoring (LM)	TV-LM-101B	0.0/(4-26-78)	N/A	N/A
93	Gaseous Waste (GW)	1-GW-166	0.0/(4-23-78)	N/A	N/A
92	Gaseous Waste (GW)	1-GW-175	0.0/(4-23-78)	N/A	N/A
45	Primary Grade Water (PG)	1-RC-160	0.0/(5-17-78)	N/A	N/A
		TV-1519A	0.0/(5-17-78)	N/A	N/A
112	Instrument Air (IA)	TV-IA-101A	0.0/(5-13-78)	N/A	N/A
		TV-IA-101B	0.0/(5-13-78)	N/A	N/A

APPENDIX 4B (Cont)

1979 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
28	Charging	HCV-1200A HCV-1200B HCV-1200C	25.0/(9-26-79) 25.0/(9-26-79) 25.0/(9-26-79)	S1909250950/9-26-79/Installed New SOV's	0.1/(10-3-79) 0.5/(10-3-79) 0.5/(10-3-79)
21	Safety Injection (SI)	MOV-1842	0.0/(10-12-79)	N/A	N/A
7	Safety Injection (SI)	1-SI-150	0.0/(10-12-79)	N/A	N/A
103	Reactor Letdown (RL)	1-RL-3 1-RL-5	0.0/(10-13-79) 0.0/(10-13-79)	N/A	N/A
63	Containment Spray (CS)	1-CS-24	0.0/(9-26-79)	N/A	N/A
64	Containment Spray (CS)	1-CS-13	0.0/(9-25-79)	N/A	N/A

APPENDIX 4B (Cont)

1980 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
15	Charging (CH)	1-CH-309 MOV-1289A	0.0/(4-2-80) 0.5/(4-1-80)	N/A N/A	N/A N/A
19	Charging (CH)	MOV-1381	0.0/(4-4-80)	N/A	N/A
28	Chemical & Volume Control	HCV-1200A,B,C TV-1204	0.0/(4-7-80) 0.0/(4-1-80)	N/A	N/A
46	Charging (CH)	FCV-1160	105.0/(4-1-80)	S1004160853/4-16-80/Adjusted Stroke	0.23/(4-16-80)
60	Safety Injection (SI)	MOV-1890A	0.0/(4-16-80)	N/A	N/A
62	Safety Injection (SI)	MOV-1890B	1.5/(4-16-80)	N/A	N/A
61	Safety Injection (SI)	MOV-1890C MOV-1864A&B	0.0/(5-5-80) 0.5/(4-16-80)	N/A N/A	N/A N/A
21	Safety Injection (SI)	MOV-1842	0.0/(4-12-80)	N/A	N/A
113	Safety Injection (SI)	1-SI-174 MOV-1869	1.8/(4-12-80)	N/A	N/A
23	Safety Injection (SI)	MOV-1869B	0.0/(4-12-80)	N/A	N/A
7	Safety Injection (SI)	1-SI-15 MOV-1867C&D	2/6/(4-13-80)	N/A	N/A
20	Safety Injection (SI)	1-SI-32	0.0/(4-2-80	N/A	N/A
106	Safety Injection (SI)	1-SI-73	0.0/(4-5-80)	N/A	N/A
55	Sample System (SS)	TV-SS-104A TV-SS-104B	70.0/(4-2-80) 24.0/(4-2-80)	S1004021305/4-17-80/Installed New Valve S1004021306/4-16-80/Installed New Valve	0.0/(4-25-80) 0.0/(4-25-80)
56	Sample System (SS)	TV-SS-100A TV-SS-100B	0.0/(4-2-80) 0.0/(4-2-80)	N/A N/A	N/A N/A

APPENDIX 4B (Cont)

1980 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
56	Sample System (SS)	TV-SS-102A	0.0/(4-2-80)	N/A	N/A
		TV-SS-102B	0.0/(4-2-80)	N/A	N/A
56	Sample System (SS)	TV-SS-106A	0.0/(4-2-80)	N/A	N/A
		TV-SS-106B	0.0/(4-2-80)	N/A	N/A
57	Sample System (SS)	TV-SS-101A	0.0/(4-2-80)	N/A	N/A
		TV-SS-101B	0.0/(4-2-80)	N/A	N/A
97	Sample System (SS)	TV-SS-103	0.0/(4-2-80)	N/A	N/A
33	Gaseous Drains (GS)	TV-DG-108A	0.0/(404080)	N/A	N/A
		TV-DG-108B	20.0/(4-4-80)	N/A	N/A
103	Reactor Cavity Purification (RL)	1-RL-3	0.0/(4-2-80)	N/A	N/A
		1-RL-5	0.0/(4-2-80)	N/A	N/A
104	Reactor Cavity Purification (RL)	1-RL-13	0.0/(4-2-80)	N/A	N/A
		1-RL-15	0.0/(4-2-80)	N/A	N/A
63	Containment Spray (CS)	1-CS-24	0.0/(4-10-80)	N/A	N/A
		MOV-CS-101C&D	0.0/(4-10-80)	N/A	N/A
24	Residual Heat Removal (RH)	MOV-RH-100	0.0/(4-7-80)	N/A	N/A
64	Containment Spray (CS)	1-CS-13	0.0/(4-10-80)	N/A	N/A
		MOV-CS-101A	135.0/(4-11-80)	S1004111616/4-14-80/Replaced Bonnet Gasket	10.0/(4-21-80)
		MOV-CS-101B	135.0/(4-11-80)	S1004111616/4-14-80/Replaced Bonnet Gasket	10.0/(4-21-80)
70	Recirculation (RS)	1-RS-11	2.3/(4-3-80)	N/A	N/A
		MOV-RS-156B	406.0/(4-3-80)	S1004031723/4-9-80/Repaired Valve Seat, Replaced Bonnet Gasket	0.0/(4-25-80)
71	Recirculation Spray (RS)	1-RS-17	0.0/(4-9-80)	N/A	N/A
		MOV-RS-156A	0.85/(4-9-80)	S1004100730/4-10-80/Replaced Bonnet Gasket	0.0/(4-11-80)
66,69	Recirculation (RS)	MOV-RS-155A&B	26.5/(4-10-80)	S1004101105/4-11-80/Tightened Bonnet	2.5/(4-14-80)

APPENDIX 4B (Cont)

1980 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
67,68	Safety Injection (SI)	MOV-RS-1860A&B	10.5/(4-15-80)	N/A	N/A
54	Primary Vent (VA)	1-VA-1	72.0/(4-1-80)		0.0/(4-24-80)
		1-VA-6	0.0/(4-24-80)	N/A	N/A
50	Safety Injection (SI)	TV-SI-101A	0.0/(4-24-80)	N/A	N/A
		TV-SI-101B	0.0/(4-24-80)	N/A	N/A
48	Vent & Drain (VG)	TV-VG-109A	500.0/(4-11-80)	S1004041526/4-10-80/Replaced Bonnet Gasket	0.0/(4-13-80)
		TV-VG-109B	0.0/(4-11-80)	N/A	N/A
38	Aerated Drain (DA)	TV-DA-100A	20.0/(4-5-80)	S1004051705/4-18-80/Cleaned Internals, Replaced Gasket	8.5/(4-18-80)
		TV-DA-100B	31.0/(4-5-80)	S1004051706/4-18-80/Cleaned Internals, Replaced Gasket	14.5/(4-18-80)
58	Instrument Air (IA)	2-IA-446	0.0/(4-8-80)	N/A	N/A
		1-IA-938	0.0/(4-8-80)		
47	Instrument Air (IA)	1-IA-446	0.0/(4-15-80)	N/A	N/A
		1-IA-939	4.0/(4-15-80)	N/A	N/A
42	Service Air (SA)	1-SA-60	2.8/(4-7-80)	N/A	N/A
		1-SA-62	2.8/(4-7-80)	N/A	N/A
53	Safety Injection (SI)	TV-SI-100	0.0/(4-5-80)	N/A	N/A
		1-SI-234	0.0/(4-5-80)	N/A	N/A
43	Air Monitoring (RM)	1-RM-3	3.6/(4-4-80)	N/A	N/A
		TV-RM-100A	0.6/(4-4-80)	N/A	N/A
44	Air Monitoring (RM)	TV-RM-100B	0.0/(4-4-80)	N/A	N/A
		TV-RM-100C	0.0/(4-4-80)	N/A	N/A
91	Ventilation (VS)	MOV-VS-10	0.95/(4-8-80)	N/A	N/A
		MOV-VS-100B	0.4/(4-9-80)	N/A	N/A
		MOV-VS-102			
90	Ventilation (VS)	MOV-VS-100C	0.9/(4-12-80)	N/A	N/A
		MOV-VS-100D	6.0/(4-12-80)	N/A	N/A
		MOV-VS-101			

APPENDIX 4B (Cont)

1980 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No./Date/Repair	Post Repair Leakage/Date
93	Containment Vacuum (CV)	TV-CV-150A	24.0/(3-31-80)	S1004010840/4-2-80/Replaced Gaskets	1.25/(4-17-80)
		TV-CV-150B	260.0/(3-31-80)	S1004172018/4-2-80/Overhauled Valve	1.5/(4-17-80)
92	Containment Vaccum (CV)	TV-CV-150C	130.0/(3-31-80)	S1004010842/4-3-80/Replaced Gaskets	0.4/(4-17-80)
		TV-CV-150D	10.0/(3-31-80)	S1004010843/4-3-80/Replaced Gaskets	0.9/(4-17-80)
94	Containment Vacuum (CV)	HCV-CV-100	0.0/(4-1-80)	N/A	N/A
		1-CV-2	4.81/(4-3-80)	S1004031736/4-7-80/Lapped Valve, Bonnet Gasket	2.8/(4-15-80)
89	Air Ejector Discharge	1-VP-12	25.0/(4-3-80)	S1004031735/4-5-80/Cleaned Valve Disc and Seat	0.0/(4-7-80)
		TV-SV-102	1.2/(4-5-80)	S1005291231/4-5-80/Changed Solenoid	0.0/(4-7-80)
97,105 55,57	Leakage Monitoring (LM)	TV-LM-100A TV-LM-100C TV-LM-100E TV-LM-100G	0.0/(4-7-80)	N/A	N/A
		TV-LM-100B TV-LM-100D TV-LM-100F TV-LM-100H	0.0/(4-7-80)	N/A	N/A
105	Liquid Monitoring (LM)	TV-LM-101A	0.0/(4-5-80)	N/A	N/A
105	Liquid Monitoring (LM)	TV-LM-101BA	0.0/(4-5-80)	N/A	N/A
93	Gaseous Waste (GW)	1-GW-166	0.0/(3-31-80)	N/A	N/A
92	Gaseous Waste (GW)	1-GW-175	0.0/(3-31-80)	N/A	N/A
45	Primary Grade Water (PG)	1-RC-160	0.6/(4-4-80)	N/A	N/A
		TV-1519A	0.0/(4-4-80)	N/A	N/A
112	Instrument Air (IA)	TV-IA-101A	0.0/(4-3-80)	N/A	N/A
		TV-IA-101B	0.0/(4-3-80)	N/A	N/A
51	Service Water (SW)	1-SW-206	0.0/(4-7-80)	N/A	N/A
		1-SW-208	0.0/(4-7-80)	N/A	N/A

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
15	Charging (CH)	1-CH-309 MOV-1289A	0.0/(4-29-81) 3.5/(3-30-81)	N/A S110330103/5-5-81/Reseated Valve & Replaced Gasket	N/A 3.5/(5-5-81)
19	Charging (CH)	MOV-1381	0.0/(4-23-81)	N/A	N/A
28	Chemical & Volume Control	HCV-1200A,B,C TV-1204	0.25/(6-7-81) 0.0/(4-27-81)	N/A N/A	N/A N/A
46	Charging (CH)	FCV-1160	0.0/(4-29-81)	N/A	N/A
60	Safety Injection (SI)	MOV-1890A	6.0/(6-23-81)	N/A	N/A
62	Safety Injection (SI)	MOV-1890B	10.0/(6-23-81)	N/A	N/A
61	Safety Injection (SI)	MOV-1890C MOV-1864A&B	9.0/(4-24-81) 0.0/(3-9-81)	Adjusted S1104241416/6-24-81/Limitorque N/A	0.0/(6-23-81) N/A
21	Safety Injection (SI)	MOV-1842	0.0/(6-5-81)	N/A	N/A
113	Safety Injection (SI)	1-SI-174 MOV-1869A	0.0/(6-5-81) 0.0/(6-5-81)	N/A N/A	N/A N/A
23	Safety Injection (SI)	MOV-1869B	0.0/(6-5-81)	N/A	N/A
7	Safety Injection (SI)	1-SI-150 MOV-1867C&D	0.0/(6-5-81) 0.0/(6-5-81)	N/A N/A	N/A N/A

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
20	Safety Injection (SI)	1-SI-32	0.0/(3-31-81)	N/A	N/A
106	Safety Injection (SI)	1-SI-73	0.0/(4-15-81)	N/A	N/A
55D	Sample System (SS)	TV-SS104A TV-SS-104B	16.4/(4-17-81) 0.0/(6-18-81)	S1104170826/5-2-81/Adjusted Valve N/A	0.0/(6-18-81) N/A
56C	Sample System (SS)	TV-SS-100A TV-SS-102B	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A
56D	Sample System (SS)	TV-SS-102A TV-SS-102B	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A
56B	Sample System (SS)	TV-SS-106A TV-SS-106B	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A
57D	Drain System (DA)	TV-DA-103A TV-DA-103B	0.0/(5-27-81) 0.0/(5-27-81)	N/A N/A	N/A N/A
101	Fire Protection (FP)	1-FP-151 1-FP-152	0.0/(5-14-81) 0.0/(5-14-81)	N/A N/A	N/A N/A
57C	Sample System (SS)	TV-SS-101A TV-SS-101B	0.0/(6-2-81) 0.0/(4-17-81)	N/A S1104170821/5-2-81/Adjusted Limits	N/A 0.04/(6-2-81)
97D	Sample System (SS)	TV-SS-103A TV-SS-103B	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A
33	Gaseous Drains (GS)	TV-DG-108A TV-DG-108B	84/(4-27-81) 4.89/(1-9-81)	S1104271101/5-15-81/Overhauled Valve S1101130800/1-16-81/Tightened Packing Gland S1004041024/5-19-81/Overhauled Valve	0.0/(6-2-81) 0.8/(6-2-81)
103	Reactor Cavity Purification (RL)	1-RL-3 1-RL-5	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
104	Reactor Cavity Purification (RL)	1-RL-13 1-RL-15	0.0/(6-13-81) 0.0/(6-13-81)	N/A N/A	N/A N/A
63	Containment Spray (CS)	1-CS-24 MOV-CS-101C&D	0.0/(5-21-81) 0.0/(5-22-81)	N/A N/A	N/A N/A
24	Residual Heat Removal (RH)	MOV-RH-100	8/(4-2-81)	S1104031531/4-23-81/Repaired Seating Surfaces	0.0/(4-23-81)
64	Containment Spray (CS)	1-CS-13 MOV-CS-101A	0.0/(5-21-81) 0.0/(5-22-81)	N/A N/A	N/A N/A
70	Recirculation Spray (RS)	1-RS-11 MOV-RS-156B	0.0/(4-30-81) 0.0/(5-4-81)	N/A N/A	N/A N/A
71	Recirculation Spray (RS)	1-RS-17 MOV-RS-156A	0.0/(5-18-81) 15/(5-19-81)	N/A S1105092101/5-27-81/Adjusted Limit Steps	N/A 0.0/5-28-81
66,69	Recirculation Spray (RS)	MOV-RS-155A MOV-RS-155B	0.0/(4-24-81) 0.0/(6-16-81)	N/A N/A	N/A N/A
67,68	Safety Injection (SI)	MOV-RS-1860A&B	0.0/(6-4-81)	N/A	N/A
54	Primary Vent (VA)	1-VA-1 1-VA-6	0.0/(4-21-81) 0.0/(4-21-81)	N/A N/A	N/A N/A
50	Safety Injection (SI)	TV-SI-101A TV-SI-101B	0.0/(4-14-81) 0.0/(4-14-81)	N/A N/A	N/A N/A
48	Vent & Drain (VG)	TV-VG-109A TV-VG-109B	0.0/(6-19-81) 3.5/(3-30-81)	N/A S1103301421/4-2-81/Adjusted Stroke & Repacked Valve	N/A 0.0/6-18-81

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
38	Aerated Drain (DA)	TV-DA-100A	0.0/(4-22-81)	N/A	N/A
		TV-DA-100B	0.0/(5-21-81)	N/A	N/A
58	Instrument Air (IA)	1-IA-446	0.3/(4-23-81)	N/A	N/A
		1-IA-938	0.0/(3-20-81	N/A	N/A
47	Instrument Air (IA)	1-IA-446	0.0/(3-23-81)	N/A	1.5/4-27-81
		1-IA-939	2.3/(3-13-81)	S1103131521/3-21-81 Cleaned Valve	
		TV-IA-100		S1104011435/4-4-81)/Adjusted Limit Switches	0.0/4-6-81 N/A
32	Gaseous Waste (GW)	TV-GW-106	0.0/(6-18-81)	N/A	N/A
		TV-GW-107	0.0/(6-18-81)	N/A	N/A
		1-GW-T7	0.0/(6-18-81)	N/A	N/A
		1-GW-T8	0.0/(6-18-81)	N/A	N/A
		1-GW-183	0.0/(3-24-81)	N/A	N/A
		1-GW-182	0.0/(3-24-81)	N/A	N/A
100	Gaseous Waste (GW)	TV-GW-102	0.0/(6-18-81)	N/A	N/A
		TV-GW-103	0.0/(6-18-81)	N/A	N/A
		1-GW-T10	0.0/(6-18-81)	N/A	N/A
		1-GW-T11	0.0/(6-18-81)	N/A	N/A
		1-GW-174	0.0/(6-18-81)	N/A	N/A
		1-GW-173	0.0/(6-18-81)	N/A	N/A
42	Service Air (SA)	1-SA-60	0.0/(3-19-81)	N/A	N/A
		1-SA-62	0.0/(3-19-81)	N/A	N/A
53	Safety Injection (SI)	TV-SI-100	0.75/(4-14-81)	N/A	N/A
		1-SI-234	0.0/(4-14-81)	N/A	N/A
43	Air Monitoring (RM)	1-RM-3	1.1/(4-20-81)	N/A	N/A
		TV-RM-100A	0.4/(4-13-81)	N/A	N/A
44	Air Monitoring (RM)	TV-RM-100B	0.0/(4-17-81)	N/A	N/A
		TV-RM-100C	0.0/(4-17-81)	N/A	N/A
91	Ventilation (VS)	MOV-VS-100A	180/(4-29-81)	S1104291101/6-24-81/Replaced Seat Rubber & Retainer Screws, Adjusted Test Ring	0.0/(6-24-81)
		MOV-VS-100B	11.0/(6-24-81)	N/A	N/A
		MOV-VS-102	11.0/(6-24-81)	N/A	N/A

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
90	Ventilation (VS)	MOV-VS-100C	0.75/(6-25-81)	N/A	N/A
		MOV-VS-100D	0.0/(6-25-81)	N/A	N/A
		MOV-VS-101	0.0/(6-25-81)	N/A	N/A
93	Containment Vacuum (CV)	TV-CV-150A	0.0/(3-27-81)	N/A	N/A
		TV-CV-150B	0.0/(3-27-81)	N/A	N/A
92	Containment Vacuum (CV)	TV-CV-150C	9.0/(1-15-81)	S1101211000/1-27-81/Replaced Plug, Seat & Stem, Blued W Seat	0.6/(3-26-81)
				S1012051200/1-12-81/Replaced Gaskets, Blued & Adjusted	N/A
		TV-CV-150D	0.0/(3-26-81)	N/A	N/A
94	Containment Vacuum (CV)	HCV-CV-100	0.0/(4-7-81)	N/A	0.0/(4-6-81)
		1-CV-2	2.6/(3-31-81)	S1104011326/(4-4-81)Lapped Valve Seats	
89	Air Ejector Discharge	1-VP-12	32(4-14-81)	S1102241405/3-6-81/Adjusted Stroke	0.9/4-21-81
		TV-SV-102	0.0/(4-24-81)	S1103020839/3-3-81/Adjusted Limit Switches	0.0/4-24-81
97A,105D, 55A,57A	Leakage Monitoring (LM)	TV-LM-100A	0.0/(4-15-81)	N/A	N/A
		TV-LM-100C	0.0/(4-15-81)	N/A	N/A
		TV-LM-100E	0.0/(4-15-81)	N/A	N/A
		TV-LM-100G	0.0/(4-15-81)	N/A	N/A
		TV-LM-100B	0.0/(4-15-81)	N/A	N/A
		TV-LM-100D	0.0/(4-15-81)	N/A	N/A
		TV-LM-100F	0.0/(4-15-81)	N/A	N/A
		TV-LM-100H	0.0/(4-15-81)	N/A	N/A
45	Primary Grade Water (PG)	1-RC-160	1.1/(5-28-81)	N/A	N/A
		TV-1519A	0.0/(5-28-81)	N/A	N/A
112	Instrument Air (IA)	TV-IA-101A	0.0/(4-23-81)	N/A	N/A
		TV-IA-101B	0.0/(4-23-81)	N/A	N/A

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
92	Gaseous Waste (GW)	TV-GW-100	0.0/(6-18-81	N/A	N/A
		TV-GW-101	0.0/(6-18-81)	N/A	N/A
		TV-GW-T1	0.0/(6-18-81)	N/A	N/A
		TV-GW-T2	0.0/(6-18-81	N/A	N/A
93	Gaseous Waste (GW)	TV-GW-104	0.0/(6-17-81)	N/A	N/A
		TV-GW-105	0.0/(6-17-81)	N/A	N/A
		1-GW-T4	0.0/(3-24-81)	N/A	N/A
		1-GW-T5	0.0/(3-24-81)	N/A	N/A
1,4	Comp Cool (CC)	TV-CC-109B	0.0/(4-6-81)	S1101211001/	N/A
		1-CC-176	0.0/(6-6-81)	S1104061512/6-6-81/Replaced Springs & Refurbished Seating Surfaces	N/A
2,5	Comp Cool (CC)	1-CC-177	9.8/(4-17-81)	S1104071501/6-22-81/Refurbished Seating Surfaces	0.0/(6-21-81)
		TV-CC-109A	0.0/(4-7-81)	N/A	N/A
8	Comp Cool (CC)	TV-CC-107	4.4/(4-8-81)	S1104081013/4-8-81/Lapped Disc & Seat, Replaced Gasket	0.0/(4-13-81)
9,13	Comp Cool (CC)	1-CC-224	0.0/(4-8-81)	N/A	N/A
		TV-CC-110C	0.1/(4-8-81)	N/A	N/A
10,12	Comp Cool (CC)	1-CC-233	1.8/ 4-9-81)	S1104091236/4-21-81/None	0.4/(4-21-81)
		TV-CC-1108	0.0/(4-9-81)	N/A	N/A
11,14	Comp Cool (CC)	1-CC-242	32/(4-9-81)	S1104091259/6-30-81/Moved Valve	2.0/(6-19-81)
		TV-CC-110A	0.0/(4-9-81)	N/A	N/A
17,27	Comp Cool	1-CC-58	32/(4-13-81)	S1104130250/4-19-81/Cleaned Seat	0.8/(6-11-81)
	(CC)	TV-CC-105B	2.4/(4-10-81)	S1106120401/4-10-81/Cleaned Seat	0.0/(6-21-81)
18,25	Comp Cool (CC)	1-CC-1	0.0/(4-10-81)	N/A	N/A
		TV-CC-105A	0.0/(4-10-81)	N/A	N/A
16,26	Comp Cool (CC)	TV-CC-105C	1.1(4-13-81)	N/A	N/A
		1-CC-59	0.2/(4-13-81)	N/A	N/A
39	Gen Blowdown (BD)	TV-BD-100A	54/(4-20-81)	S1104201607/6-20-81/Overhauled Valve	2.0/(6-19-81)
		TV-BD-100B	98/(4-20-81)	S1104201629/6-2-81/Overhauled Valve	0.0/(6-2-81)

APPENDIX 4B (Cont)

1981 TYPE C DATA SUMMARY (Cont)

Penetration	System	Valve(s) Tested	Leakage(SCFH)/Date	MR No/Date/Repair	Postrepair Leakage/Date
40	Gen Blowdown (BD)	TV-BD-100E	>20/(5-27-81)	S1105271451/6-9-81/Overhauled Valve	0.0/(6-13-81)
		TV-BD-100F	0.31(4-28-81)	N/A	N/A
41	Gen Blowdown (BD)	TV-BD-100C	98/(4-24-81)	S1104280659/6-9-81/Overhauled Valve	0.0/(1-16-81)
		TV-BD-100D	98/(4-24-81)	S1104242359/6-9-81/Overhauled Valve	0.0/(6-3-81)
51	Service Water (SW)	1-SW-206	0.0/(4-14-81)	N/A	N/A
		1-SW-208	0.0/(4-14-81)	N/A	N/A
79,83	Spray Recirc Water (SW)	MOV-SW-104D	0.0/(6-7-81)	N/A	N/A
		MOV-SW-105D	0.5/(5-27-81)	N/A	N/A
80,84	Spray Recirc Water (SW)	MOV-SW-104C	0.0/(5-29-81)	N/A	N/A
		MOV-SW-105C	0.01/(5-27-81)	N/A	N/A
81,85	Spray Recirc Water (SW)	MOV-SW-104B	0.0/(6-2-81)	N/A	N/A
		MOV-SW-105B	0.0/(5-27-81)	N/A	N/A
82,86	Spray Recirc Water (SW)	MOV-SW-105A	0.0/(5-18-81)	N/A	N/A
		MOV-SW-104A	0.7(5-12-81)	N/A	N/A