REACTOR CONTAINMENT BUILDING

INTEGRATED LEAKAGE RATE TEST

TYPES A, B, AND C

NORTHEAST UTILITIES

MILLSTONE NUCLEAR
POWER STATION
UNIT 3

JULY 1985

Prepared by
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LIST OF ATTACHMENTS

REFERENCES

1. 10CFR50, Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors, October 22, 1980.

2. 3-INT-2002, Integrated Leak Rate (ILRT) and Structural Integrity (SIT) Test.

3. ANSI N45.4, American National Standard Leakage-Rate Testing of Containment Structures for Nuclear Reactors, March 16, 1972.

4. ANSI/ANS-56.8, Containment System Leakage Testing Requirements, February 19, 1981[1].

[1] This document used only as a guideline and any reference to said document in no way implies compliance.

SECTION 1

PURPOSE

The purpose of this report is to present a description and analysis of the July 1985, Type A Reactor Containment Building Integrated Leakage Rate Test (ILRT), and summary of the Types B and C Local Leakage Rate Tests (LLRT's) conducted on Northeast Utilities' Millstone Nuclear Power Station Unit 3.

Northeast Nuclear Energy Company (NNECo.) acts as the agent for Northeast Utilities and is responsible for the operation, maintenance, and testing of Millstone 3. NNECo. uses the technical support services of Northeast Utilities Service Company (NUSCo.) in engineering, design, procurement, construction, accounting, planning, and quality assurance activities. NUSCo. and NNECo. are wholly owned subsidiaries of Northeast Utilities.

NNECo. performed the Type A test with test engineering consultation services provided by Stone & Webster Engineering Corporation (SWEC).

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

SECTION 2

SUMMARY

2.1 TYPE A TEST

The Structural Integrity Test (SIT) was successfully completed on July 12, 1985. The containment was opened and an entry was made to repitch the containment air recirculation fan blades and to perform the Type A inspection. The containment fans were secured during the SIT due to high motor amperage.

The valve lineup required for the ILRT had been established for the SIT. The ILRT valve lineup conservatively vented portions of systems that were outside of the outboard isolation valve.

Pressurization for the ILRT was started at approximately 1510 hours on July 12, 1985. The compressors were secured at approximately 0200 hours on July 13, 1985 with a peak instantaneous pressure of 56.013 psia.

At 0628 hours on July 13, 1985, the procedural temperature stabilization criteria was satisfied. This time was used as the start time for the ILRT. Extensive investigations of all penetration areas were conducted throughout the test. These investigations revealed only minor packing leakage, or minor leakage observed through the downstream vent path.

Initial Type A computer analysis results indicated a very low leakage rate, approximately one-tenth of the 0.75 L_a, or 0.675 percent per day would be obtained. The Type A test duration was twenty four hours. The preoperational test will serve as a baseline for future surveillance tests which will be performed on a reduced duration basis.

At 2300 hours on July 13, 1985, Zone III temperature channel T7 (3LMS-TE20G) was deleted from the ILRT analysis. As shown on Attachment 3.2A, there are four temperature channels that are equally distributed in Zone III. With four channels, the weight factor was 0.06755 for each channel. Because the T7 channel was erratic and not consistent with the temperature trends of its zone mates, the weight factor for T7 was changed to 0.0, and the weight factor for T5, T8, and T9 was changed to 0.09007.

At 0500 hours on July 14, 1985, Zone A moisture channel D1 (3LMS-ME22A) was deleted from the ILRT analysis. As shown on Attachment 3.2A, there are two moisture channels that are equally distributed in Zone A. With two channels, the weight factor was 0.27530 for each channel. Because the D1 channel was erratic and not consistent with the moisture trend of D2, the weight factor for D1 was changed to 0.0, and the weight factor for D2 was changed to 0.55060.

The reduced input variables as shown in Attachment 3.3A were recalculated when the weight factors were changed. This deletes the sensors for the entire Type A and superimposed leakage verification test durations. The failed instrument channels, T7 and D1, were still scanned and their data recorded, but were not used in the ILRT analysis.

The Type A test was successfully completed at 0634 hours on July 14, 1985. A superimposed leakage verification test was successfully completed from 0822 to 1223 hours on July 14, 1985.

Depressurization of the containment began on the afternoon of July 14, 1985 and was completed during the early morning hours of July 15, 1985.

2.1.1 Conclusion

The July 1985 Millstone Nuclear Power Staion Unit 3 Type A Test is considered a successful test in that it demonstrated the leak-tightness of the containment boundary. The measured leakage rates were well within the plant's maximum allowable leakage rate.

2.2 LOCAL LEAKAGE RATE TESTS (TYPES B AND C)

The Local Leakage Rate Tests (LLRT's) of containment isolation valves and other containment penetrations were performed by the methods described in Station Test Procedure No. T3312A1M02, Local Leak Rate Test - Type B and T3312A1M03, Local Leak Rate Test - Type C.

In accordance with Appendix J to 10CFR50, Paragraph V.B., data for the Local Leakage Rate Tests are summarized in Section 4 of this report.

SECTION 3

TYPE A TEST

3.1 EDITED LOG OF EVENTS

This log was edited from the information contained in the Official Log of Events.

July 12, 1985

1230 - Repositioned fan blades on 3HVU-FN1A, B, and C.

1330 - Commenced final containment inspection.

1400 - Completed final containment inspection, no abnormalities observed.

1510 - Completed the local leakage rate test on the personnel hatch.

- Commenced containment pressurization.

July 13, 1985

0200 - Secured containment pressurization with a peak instantaneous pressure of 56.013 psia.

- Commenced containment stabilization period.

0628 - Completed stabilization, ILRT started.

2300 - Removed failed Temperature Detector 3LMS-TE20G (Channel T7) from program.

July 14, 1985

0500 - Removed failed Moisture Detector 3LMS-ME22A (Channel D1) from program.

0634 - Satisfied 24 hour ILRT criteria.

0700 - Rebalanced Moisture Detector 3LMS-ME22B (Channel D2).

0805 - Commenced superimposed leakage flow.

0822 - Stabilized superimposed leakage rate at 52.57 standard cubic feet per minute.

- Commenced superimposed leakage verification test.

1223 - Satisfied the superimposed leakage verification test.

1300 - Began depressurization.

3.2 GENERAL TEST DESCRIPTION

3.2.1 Prerequisites

In accordance with the Millstone Nuclear Power Station Unit 3 ILRT procedure, 3-INT-2002 (Reference 2), the following is a listing of the pertinent prerequisites that were completed and documented prior to containment pressurization:

a. All required Types B and C local leakage rate testing completed.

b. All required system valve line-ups completed.

c. Controlled access plan in effect.

d. Temporary air compressors and test skid checked out and available for pressurization.

e. All equipment and instrumentation, that could be damaged by test pressure, removed or protected.

f. General inspection of the accessible interior and exterior surfaces of the containment structures and components completed.

g. Containment air recirculation fans adjusted for continuous operation at test pressure (53 psig).

h. The Official Log of Events was established.

i. All compressed gas cylinders removed from containment.

j. All test instrumentation functionally verified within 6 months of the test.

k. The Data Acqusition and Analysis Computers were operational and programed for ILRT functions.

l. Water levels were taken prior to the start of the Type A test.

3.2.2 Equipment and Instrumentation

Pressurization of the containment was achieved by the utilization of ten temporary air compressors.

Air was piped through two aftercoolers in parallel and a refrigerated air dryer. The system included adequate instrumentation and valving to maintain proper monitoring and control of the compressed air quality throughout the pressurization sequence. The total capacity of the pressurization system as installed was rated at approximately 12,000 cubic feet per minute (CFM).

The various containment parameters required to calculate containment leakage during the test were monitored using instrumentation which consisted of multiple resistance temperature detectors (RTD's), dew point sensors (chilled mirror type) and an absolute pressure quartz manometer. Pertinent data for the test instrumentation is listed in Attachment 3.2A, and the general locations of the temperature and moisture sensors are shown in Attachments 3.2B through 3.2E.

A mass flowmeter was used to perform the superimposed leakage verification test. All test instrumentation with the exception of that used for the superimposed leakage verification test was monitored by Northeast Utilities' HP 3497A data acquisition unit and portable computer.

3.2.3 Data Acquisition System

The data acquisition system used for the Millstone Nuclear Power Station Unit 3 ILRT was Northeast Utilities' HP 3497A Data Acquisition Unit, which was linked to the plant computer.

For the ILRT, the HP 3497A monitored the following instrumentation:

Type	Containment
Temperature Detectors	23
Dew Point Sensors	5
Quartz Manometers	2

The input to the ILRT program was an HP 3497A calculated fifteen minute instantaneous average. Each data set was time stamped. Instantaneous data (e.g. one sampling for each sensor) was also taken every fifteen minutes during the test period.

3.2.4 Data Resolution System

After the appropriate data had been acquired and averaged, utilizing the HP 3497A, the reduced parameters were input into Northeast Utilities' HP 9836 portable computer for leakage rate calculations.

For the Millstone Nuclear Power Station Unit 3 ILRT, both the Absolute Method of Mass Point Analysis and Absolute Method of Total Time Analysis were used to determine the leakage rate.

Absolute Method of Mass Point Analysis

The Absolute Method of Mass Point Analysis consists of calculating the air mass within the containment structure, over the test period, using pressure, temperature, and dew point observations made during the ILRT. The air mass is computed using the ideal gas law as follows:

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

where:

M = air mass, lbm
P = total pressure, psia
Pv = average vapor pressure, psia
R = 53.35 ft-lbf/lbm ^{o}R (for air)
T = average containment temperature, ^{o}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 leakage rate is expressed as a percentage of the air mass lost in 24 hours or symbolically:

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

Where A is the slope of the least-squares curve and B is the y-intercept. The sign convention is such that the leakage out of the containment is positive and the units are in percent/day.

The air mass is calculated and 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 leakage rate.

A 95 percent confidence interval is calculated using a Student's T distribution. The sum of the leakage rate and the 95 percent confidence interval is the upper confidence limit - mass point (UCL-MP). The measured leakage rate may be described as 95 percent accurate to within the value of the UCL-MP.

Absolute Method of Total Time Analysis

The Absolute Method of Total Time Analysis consists of calculating air lost from the containment, using pressure, temperature, and dew point observations made during the ILRT.

The containment air mass is computed using Equation 1. The measured leakage rate at any time (t) is then determined by subtracting the mass at that time (Mt) from the initial mass (Mi) and dividing by the initial mass. The measured leakage rate is expressed as a percentage of containment mass lost in 24 hours or symbolically:

$$\text{Measured Leakage Rate} = \frac{Mi - Mt}{Mi} \quad \frac{(2400)}{(\Delta t)} \qquad \text{(Eq. 4)}$$

The sign convention is such that leakage out of the containment is positive and the units are in percent/day.

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

$$\text{Estimated Leakage Rate} = At + B \qquad \text{(Eq. 5)}$$

where A is the slope and B is the y-intercept of the least-squares curve.

The confidence interval is determined in accordance with the equations of BN-TOP-1, Revision 1, Testing Criteria for Integrated Leakage Rate Testing of Primary Containment Structures for Nuclear Power Plants. The sum of the estimated leakage rate and the 95 percent confidence interval is the upper confidence limit - total time (UCL-TT).

This analysis method was used in conjunction with procedure 3-INT-2002 (Reference 2).

ATTACHMENT 3.2A

INSTRUMENTATION

The following instrumentation was calibrated and/or functionally verified within 6 months prior to the performance of this test and in accordance with 10CFR50, Appendix J.

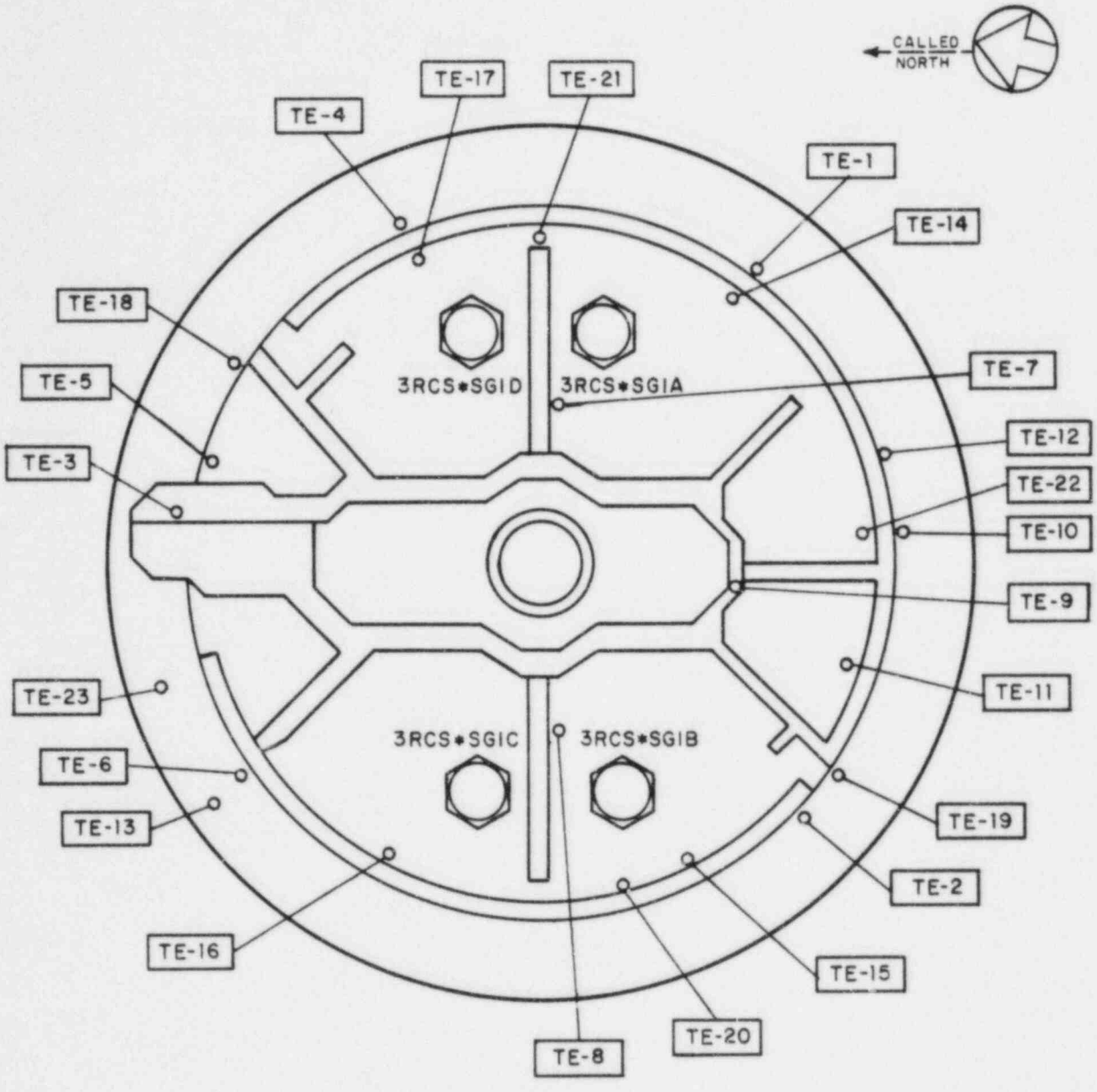
Note: Instruments that were assigned a zero weight factor were not used in the leakage rate calculations.

Instrument	Weight Factor	Channel	Range	Zone	Elevation	Accuracy	Sensitivity
A. Temperature							
3LMS-TE20A	0.06820	T1	0-200°F	I	145'-00"	±1.0°F	±0.02°F
3LMS-TE20B	0.06820	T2	0-200°F	I	141'-09"	±1.0°F	±0.02°F
3LMS-TE20C	0.06820	T3	0-200°F	I	144'-06"	±1.0°F	±0.02°F
3LMS-TE20D	0.05057	T4	0-200°F	II	94'-00"	±1.0°F	±0.02°F
3LMS-TE20F	0.05057	T6	0-200°F	II	86'-00"	±1.0°F	±0.02°F
3LMS-TE20K	0.05057	T10	0-200°F	II	70'-00"	±1.0°F	±0.02°F
3LMS-TE20E	0.09007	T5	0-200°F	III	88'-00"	±1.0°F	±0.02°F
3LMS-TE20G	0.00000	T7	0-200°F	III	75'-00"	±1.0°F	±0.02°F
3LMS-TE20H	0.09007	T8	0-200°F	III	75'-00"	±1.0°F	±0.02°F
3LMS-TE20J	0.09007	T9	0-200°F	III	86'-06"	±1.0°F	±0.02°F
3LMS-TE20M	0.03523	T12	0-200°F	IV	32'-00"	±1.0°F	±0.02°F
3LMS-TE20N	0.02826	T13	0-200°F	IV	33'-00"	±1.0°F	±0.02°F
3LMS-TE20T	0.03114	T18	0-200°F	IV	15'-06"	±1.0°F	±0.02°F
3LMS-TE20U	0.02488	T19	0-200°F	IV	15'-06"	±1.0°F	±0.02°F

ATTACHMENT 3.2A (Con't)

INSTRUMENTATION

Instrument	Weight Factor	Channel	Range	Zone	Elevation	Accuracy	Sensitivity
3LMS-TE20L	0.01287	T11	0-200°F	V	45'-00"	±1.0°F	±0.02°F
3LMS-TE20P	0.02210	T14	0-200°F	V	26'-00"	±1.0°F	±0.02°F
3LMS-TE20Q	0.02107	T15	0-200°F	V	30'-00"	±1.0°F	±0.02°F
3LMS-TE20R	0.02107	T16	0-200°F	V	30'-00"	±1.0°F	±0.02°F
3LMS-TE20S	0.02210	T17	0-200°F	V	26'-00"	±1.0°F	±0.02°F
3LMS-TE20V	0.03870	T20	0-200°F	VI	-12'-06"	±1.0°F	±0.02°F
3LMS-TE20W	0.03870	T21	0-200°F	VI	-16'-00"	±1.0°F	±0.02°F
3LMS-TE20X	0.03870	T22	0-200°F	VI	-14'-00"	±1.0°F	±0.02°F
3LMS-TE20Y	0.03870	T23	0-200°F	VI	-16'-00"	±1.0°F	±0.02°F
B. Dewpoint							
3LMS-ME22A	0.00000	D1	-25°F to 125°F	A	145'-00"	±0.4°F	±0.1°F
3LMS-ME22B	0.55060	D2	-25°F to 125°F	A	147'-00"	±0.4°F	±0.1°F
3LMS-ME22C	0.14980	D3	-25°F to 125°F	B	-16'-00"	±0.4°F	±0.1°F
3LMS-ME22D	0.14980	D4	-25°F to 125°F	B	-16'-06"	±0.4°F	±0.1°F
3LMS-ME22E	0.14980	D5	-25°F to 125°F	B	-16'-00"	±0.4°F	±0.1°F
C. Pressure							
3LMS-PIT41	1.0	-	0-100 psia	-	-	±0.015 psia	±0.001%
3LMS-PIT42	0.0	-	0-100 psia	-	-	±0.015 psia	±0.001%
D. Superimposed Leakage Verification Test Mass Flow Meter							
3SAS-FT28	-	-	0-150 scfm	-	-	1% F.S.	0.2% F.S.

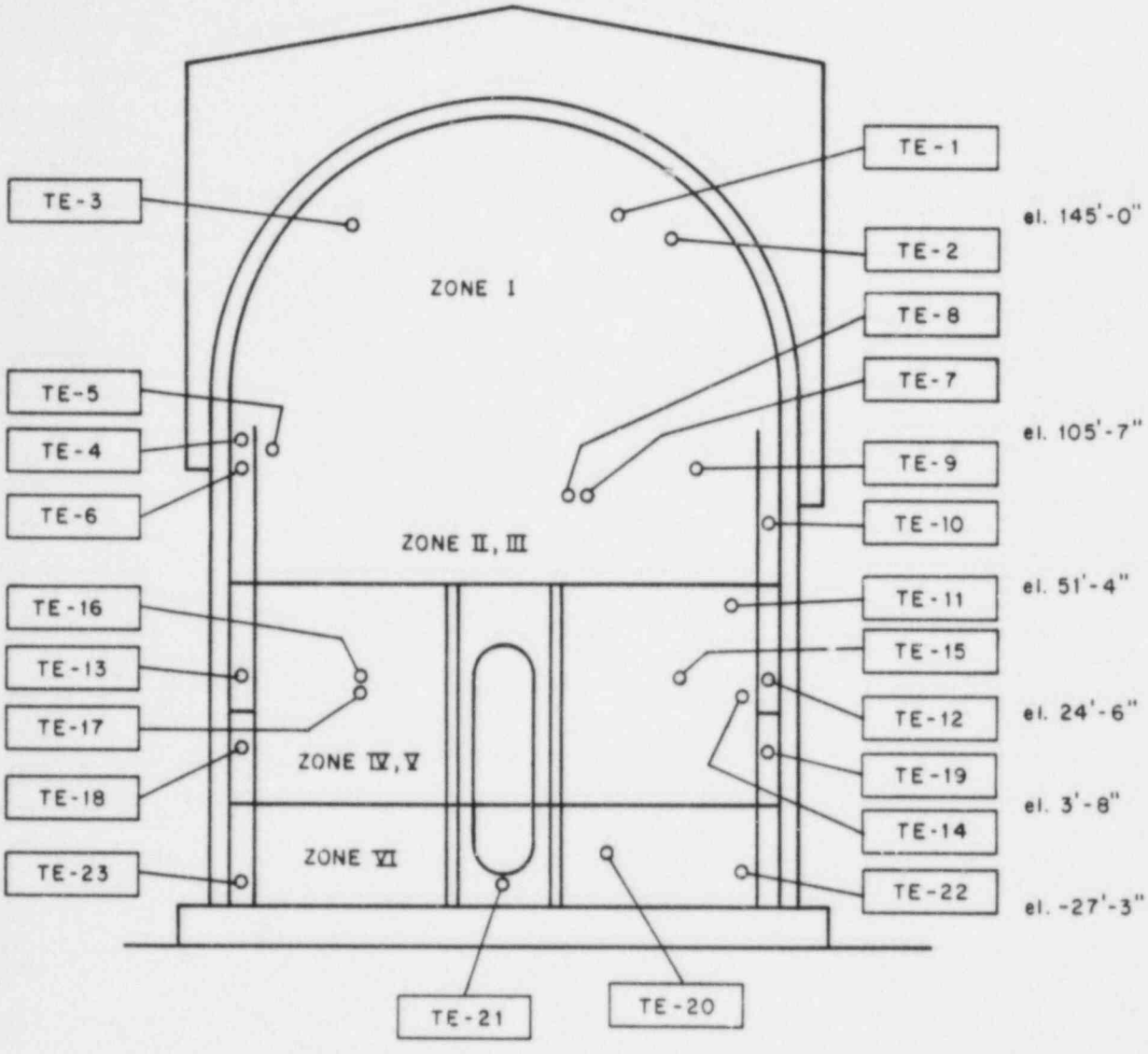


PLAN VIEW

NOTE:

1. TE-1 = 3LMS-TE20A (TYP)

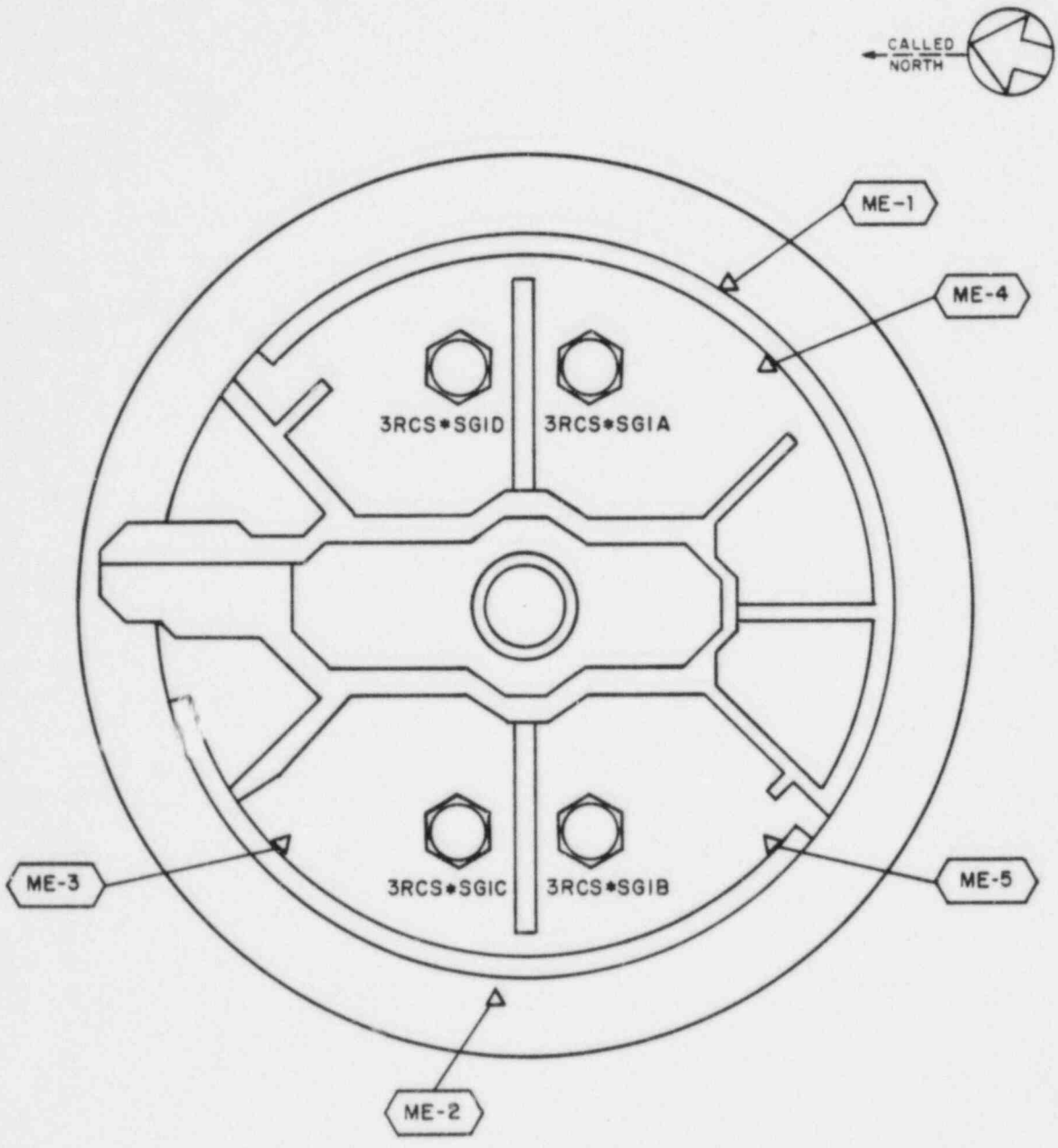
ATTACHMENT 3.2B
INSTRUMENTATION LOCATION
RESISTANCE TEMPERATURE
DETECTORS (RTD)
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST



PROFILE VIEW

NOTE:
1. TE-1 = 3LMS-TE20A (TYP)

ATTACHMENT 3.2C
INSTRUMENTATION LOCATION
RESISTANCE TEMPERATURE
DETECTORS (RTD)
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST

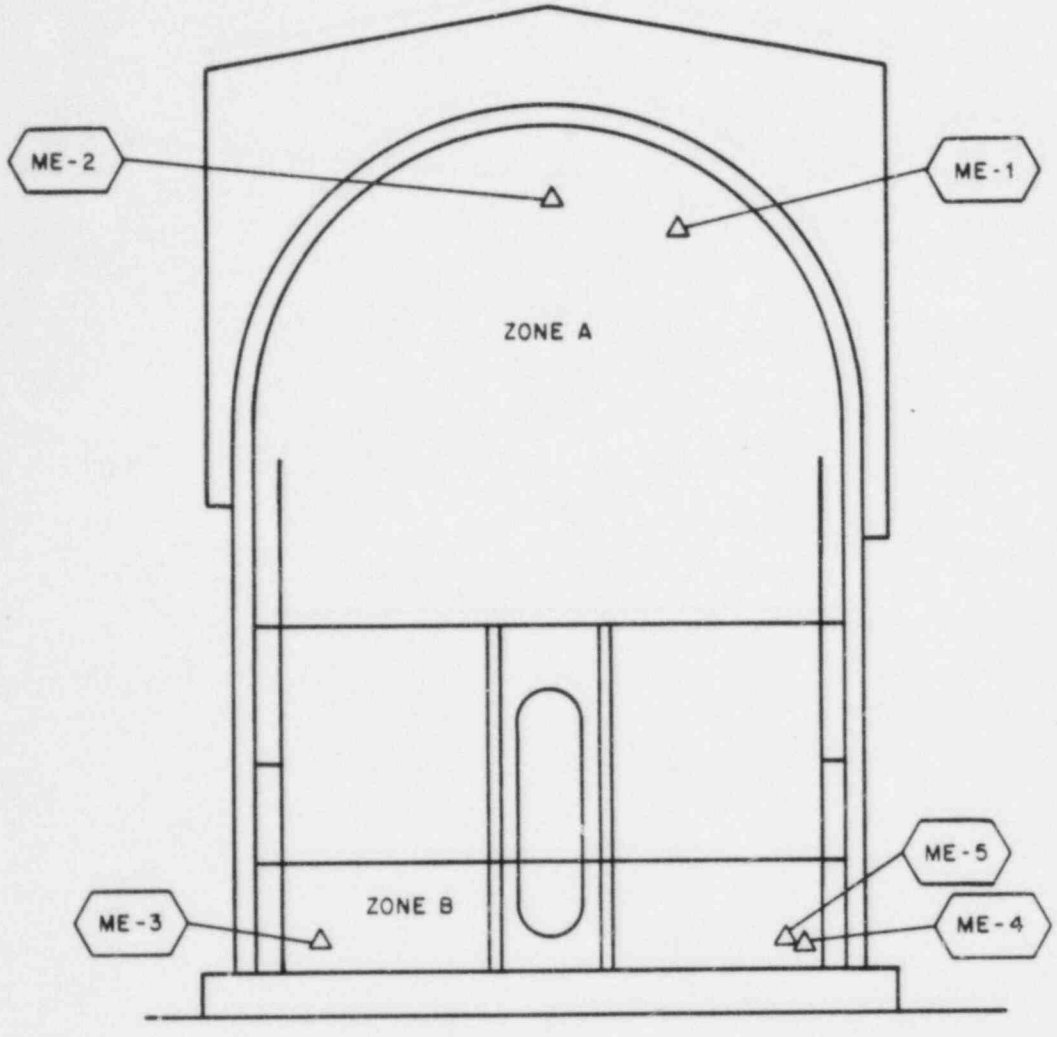


PLAN VIEW

NOTE:

1. ME-1 = 3LMS-ME22A (TYP)

ATTACHMENT 3.2D
INSTRUMENTATION LOCATION
DEW POINT SENSORS
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST



PROFILE VIEW

NOTE:
1. ME-1 = 3LMS - ME 22A (TYP)

ATTACHMENT 3.2E
INSTRUMENTATION LOCATION
DEW POINT SENSORS
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST

3.3 TEST RESULTS

3.3.1 Presentation of Test Results

The test data for the July 1985 ILRT is based on a 24 hour period starting at 0628 hours on July 13, 1985. The final test results were determined using Northeast Utilities' ILRT computer program. The reduced input data, Mass Point Analysis test results, Total Time Analysis test results, and representative graphs are contained in Attachments 3.3A through 3.3G.

Both the Mass Point and Total Time Analysis test results for the ILRT satisfied the procedural acceptance criteria.

The Type A test instrumentation was verified by the superimposed leakage verification test method. Both the Mass Point and Total Time Analysis test results for the superimposed leakage verification test satisfied the procedural acceptance criteria.

3.3.2 ILRT Results

The ILRT was conducted in accordance with Millstone Nuclear Power Station Unit 3 station test procedure 3-INT-2002. The results for the ILRT and for the supplemental test are shown below.

3.3.2.1 Mass Point Analysis

Item	(Percent/Day)
1. Lam, leakage rate calculated	0.0669
2. Confidence level	0.0023
3. UCL-MP Lam leakage rate plus confidence level (1 & 2)	0.0692

Results were within the acceptable limit of 0.675 percent/day.

3.3.2.2 Total Time Analysis

Item	(Percent/Day)
1. Lam, leakage rate estimated	0.0747
2. Confidence level	0.0313
3. UCL-TT Lam leakage rate plus confidence level (1 & 2)	0.106

Results were within the acceptable limit of 0.675 percent/day.

3.3.2.3 Supplemental Test Results

The Supplemental Verification Test was performed using the Superimposed Leakage Verification Test Method in accordance with station test procedure 3-INT-2002. The results for the superimposed leakage verification test are shown below.

1. The Superimposed Leakage Verification Test is acceptable provided L_c falls within the following range:

$$(L_{am} + L_o - 0.25L_a) \leq L_c \leq (L_{am} + L_o + 0.25\ L_a)$$

where: L_{am} = Type A calculated leakage (computer)
(Lam-MP=0.0669%/day)
(Lam-TT=0.0747%/day)

L_o = Superimposed leakage rate developed from rotometer
(Lo=0.893%/day)

L_a = Maximum allowable leakage rate
(La=0.9%/day)

L_c = Composite leakage (computer)
(Lc-MP=0.955%/day)
(Lc-TT=0.953%/day)

a. Mass Point

$$(0.0669 + 0.893 - 0.225) \leq 0.955 \leq (0.0669 + 0.893 + 0.225)$$

$$0.7349 \leq 0.955 \leq 1.1849$$

b. Total Time

$$(0.0747 + 0.893 - 0.225) \leq 0.953 \leq (0.0747 + 0.893 + 0.225)$$

$$0.7427 \leq 0.953 \leq 1.1927$$

The Superimposed Leakage Verification Test met the requirements set forth in References 2 and 4.

3.3.2.4 Calculation of the superimposed leakage rate, L_o

a. Calculate Average Flow in scfm:

Time	Flow	Time	Flow	Time	Flow
25.9	52.57	27.417	53.82	28.917	52.28
26.1	52.95	27.667	52.76	29.1	51.99
26.417	52.49	27.917	52.86	29.417	51.67
26.667	53.07	28.1	52.25	29.667	52.02
26.917	52.57	28.417	52.41	29.917	52.64
27.1	53.59	28.667	52.86		260.60
	317.24		316.96		

Total Flow = 317.24 + 316.96 + 260.60 = 894.8 scfm

Average Flow = 894.8 ÷ 17 data sets = 52.635294

Average Flow = 52.64 scfm = Lo

b. $L_a = \frac{0.9}{100} (2.305E6) \frac{(39.4 + 14.696)}{14.696} = 76362.379$ scfd

$L_a = 53.02943 = 53.03$ scfm = 0.9 percent/day

c. Convert L_o to percent/day:

$$\frac{52.64}{53.03} = \frac{Lo}{0.9}$$

$L_o = 0.893386$ percent/day

use, $L_o = 0.893$ percent/day

ATTACHMENT 3.3A

INTEGRATED LEAKAGE RATE TEST

FROM 0628 on 7-13-85 TO 0634 HOURS ON 7-14-85

REDUCED INPUT VARIABLES

Time (hrs)	Air Pressure (psia)	Dewpoint (^{o}F)	Vapor Pressure (psia)	Absolute Temperature (^{o}R)
0.0	55.3378	65.183	.3081	552.002
0.25	55.3356	65.207	.3083	551.981
0.50	55.3347	65.194	.3082	551.974
0.75	55.3331	65.159	.3078	551.967
1.0	55.3310	65.257	.3089	551.934
1.25	55.3296	65.299	.3093	551.930
1.50	55.3287	65.192	.3082	551.921
1.817	55.3277	65.193	.3082	551.909
2.0	55.3263	65.325	.3096	551.913
2.25	55.3274	65.218	.3085	551.904
2.50	55.3246	65.392	.3103	551.905
2.75	55.3240	65.443	.3109	551.900
3.0	55.3248	65.369	.3101	551.887
3.25	55.3244	65.313	.3095	551.897
3.50	55.3237	65.379	.3102	551.886
3.75	55.3209	65.634	.3130	551.897
4.0	55.3202	65.700	.3137	551.900
4.25	55.3207	65.655	.3132	551.905
4.50	55.3206	65.664	.3133	551.890
4.75	55.3208	65.641	.3130	551.908
5.0	55.3188	65.827	.3151	551.892
5.25	55.3185	65.855	.3154	551.903
5.50	55.3181	65.893	.3158	551.912
5.75	55.3182	65.888	.3157	551.911
6.0	55.3175	65.945	.3164	551.917
6.25	55.3175	65.947	.3164	551.926
6.50	55.3189	65.915	.3160	551.919
6.75	55.3173	66.056	.3176	551.920
7.0	55.3175	66.035	.3174	552.931
7.25	55.3184	66.050	.3175	552.940
7.50	55.3190	65.994	.3169	552.943
7.75	55.3193	66.061	.3176	552.944
8.0	55.3183	66.145	.3186	552.955
8.25	55.3199	66.092	.3180	552.948
8.50	55.3195	66.131	.3184	552.966
8.75	55.3210	66.089	.3179	552.970
9.0	55.3180	66.352	.3209	552.975
9.25	55.3206	66.212	.3193	552.983
9.50	55.3192	66.336	.3307	552.977
9.75	55.3201	66.349	.3208	552.994
10.0	55.3211	66.349	.3208	552.993

ATTACHMENT 3.3A (Con't)

INTEGRATED LEAKAGE RATE TEST

FROM 0628 on 7-13-85 TO 0634 HOURS ON 7-14-85

REDUCED INPUT VARIABLES

Time (hrs)	Air Pressure (psia)	Dewpoint (^{o}F)	Vapor Pressure (psia)	Absolute Temperature (^{o}R)
10.25	55.3199	66.454	.3220	552.007
10.50	55.3227	66.296	.3202	552.010
10.75	55.3224	66.411	.3215	552.024
11.0	55.3213	66.595	.3236	552.032
11.25	55.3219	66.548	.3230	552.032
11.50	55.3230	66.537	.3229	552.040
11.75	55.3231	66.620	.3238	552.043
12.0	55.3237	66.652	.3242	552.065
12.25	55.3261	66.525	.3228	552.069
12.50	55.3231	66.791	.3258	552.073
12.75	55.3258	66.647	.3242	552.083
13.0	55.3250	66.806	.3259	552.083
13.25	55.3253	66.865	.3266	552.094
13.50	55.3264	66.854	.3265	552.110
13.75	55.3249	66.988	.3280	552.112
14.0	55.3251	67.059	.3288	552.114
14.25	55.3257	67.095	.3292	552.124
14.50	55.3263	67.129	.3296	552.137
14.75	55.3260	67.154	.3299	552.148
15.0	55.3286	67.016	.3283	552.150
15.25	55.3288	67.084	.3291	552.153
15.50	55.3291	67.153	.3299	552.169
15.75	55.3298	67.171	.3301	552.179
16.0	55.3316	67.109	.3294	552.188
16.25	55.3309	67.252	.3310	552.195
16.50	55.3322	67.227	.3307	552.208
16.75	55.3311	67.322	.3318	552.207
17.0	55.3321	67.321	.3318	552.208
17.25	55.3332	67.314	.3317	552.221
17.50	55.3336	67.371	.3324	552.225
17.767	55.3336	67.459	.3334	552.238
18.0	55.3344	67.474	.3335	552.247
18.267	55.3371	67.322	.3318	552.257
18.517	55.3371	67.410	.3328	552.270
18.767	55.3377	67.450	.3333	552.283
19.067	55.3374	67.559	.3345	552.289
19.267	55.3393	67.485	.3337	552.292
19.517	55.3394	67.560	.3345	552.308
19.767	55.3399	67.601	.3350	552.320
20.016	55.3390	67.680	.3359	552.331
20.267	55.3416	67.541	.3343	552.341

ATTACHMENT 3.3A (Con't)

INTEGRATED LEAKAGE RATE TEST

FROM 0628 on 7-13-85 TO 0634 HOURS ON 7-14-85

REDUCED INPUT VARIABLES

Time (hrs)	Air Pressure (psia)	Dewpoint (°F)	Vapor Pressure (psia)	Absolute Temperature (°R)
20.517	55.3421	67.588	.3349	552.354
20.767	55.3423	67.658	.3357	552.353
21.016	55.3424	67.735	.3365	552.351
21.267	55.3445	67.641	.3355	552.364
21.517	55.3427	67.886	.3383	552.382
21.767	55.3441	67.851	.3379	552.391
22.016	55.3455	67.811	.3374	552.406
22.267	55.3465	67.815	.3375	552.409
22.517	55.3478	67.789	.3372	552.417
22.767	55.3469	67.954	.3391	552.445
23.283	55.3491	67.937	.3389	552.447
23.300	55.3467	68.143	.3413	552.442
23.567	55.3466	68.233	.3424	552.449
23.850	55.3323	69.510	.3576	552.464
24.100	55.3494	68.163	.3415	552.471

ATTACHMENT 3.3B

INTEGRATED LEAKAGE RATE TEST

FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - MASS POINT ANALYSIS

Time (hrs)	Mass (lbm)	Leakage (pct/day)	UCL (pct/day)
0.000	623835	0.0000	0.0000
.250	623834	0.0000	0.0000
.500	623831	.0271	0.0000
.750	623822	.0650	.1300
1.000	623835	.0184	.0885
1.250	623823	.0290	.0726
1.500	623824	.0279	.0570
1.817	623826	.0222	.0435
2.000	623806	.0385	.0631
2.250	623829	.0258	.0497
2.500	623796	.0408	.0659
2.750	623794	.0487	.0711
3.000	623819	.0398	.0607
3.250	623803	.0396	.0575
3.500	623808	.0369	.0525
3.750	623763	.0493	.0679
4.000	623752	.0601	.0798
4.250	623752	.0669	.0855
4.500	623767	.0668	.0834
4.750	623750	.0696	.0847
5.000	623745	.0717	.0856
5.250	623730	.0753	.0884
5.500	623715	.0797	.0924
5.750	623717	.0820	.0938
6.000	623703	.0851	.0963
6.250	623692	.0881	.0989
6.500	623716	.0870	.0970
6.750	623697	.0876	.0969
7.000	623686	.0885	.0973
7.250	623686	.0888	.0969
7.500	623690	.0881	.0957
7.750	623692	.0869	.0941
8.000	623669	.0872	.0941
8.250	623695	.0851	.0918
8.500	623669	.0848	.0911
8.750	623682	.0833	.0895
9.000	623643	.0842	.0901
9.250	623663	.0834	.0890
9.500	623654	.0829	.0883
9.750	623645	.0827	.0878
10.000	623656	.0817	.0866

ATTACHMENT 3.3B (Con't)

INTEGRATED LEAKAGE RATE TEST

FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - MASS POINT ANALYSIS

Time (hrs)	Mass (lbm)	Leakage (pct/day)	UCL (pct/day)
10.250	623628	.0819	.0866
10.500	623655	.0805	.0852
10.750	623636	.0800	.0845
11.000	623616	.0802	.0845
11.250	623621	.0799	.0840
11.500	623625	.0793	.0833
11.750	623622	.0786	.0825
12.000	623605	.0785	.0823
12.250	623628	.0774	.0812
12.500	623589	.0776	.0812
12.750	623608	.0770	.0805
13.000	623599	.0765	.0799
13.250	623591	.0763	.0796
13.500	623586	.0760	.0792
13.750	623566	.0762	.0793
14.000	623566	.0763	.0792
14.250	623561	.0763	.0792
14.500	623553	.0764	.0792
14.750	623538	.0768	.0795
15.000	623564	.0763	.0790
15.250	623564	.0758	.0784
15.500	623548	.0756	.0781
15.750	623546	.0754	.0778
16.000	623554	.0749	.0773
16.250	623540	.0746	.0770
16.500	623539	.0743	.0776
16.750	623528	.0741	.0763
17.000	623539	.0736	.0759
17.250	623536	.0732	.0754
17.500	623536	.0727	.0749
17.767	623521	.0724	.0745
18.000	623520	.0720	.0742
18.267	623539	.0713	.0735
18.517	623525	.0708	.0730
18.767	623516	.0705	.0726
19.067	623507	.0701	.0723
19.267	623524	.0696	.0717
19.517	623508	.0692	.0713
19.767	623500	.0689	.0710
20.016	623478	.0688	.0709
20.267	623495	.0685	.0705

ATTACHMENT 3.3B (Con't)

INTEGRATED LEAKAGE RATE TEST

FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - MASS POINT ANALYSIS

Time (hrs)	Mass (lbm)	Leakage (pct/day)	UCL (pct/day)
20.517	623485	.0683	.0703
20.767	623489	.0680	.0699
21.016	623492	.0676	.0695
21.267	623502	.0670	.0690
21.517	623461	.0670	.0689
21.767	623467	.0668	.0687
22.016	623466	.0666	.0684
22.267	623473	.0663	.0681
22.517	623478	.0658	.0677
22.767	623437	.0659	.0677
23.283	623459	.0655	.0673
23.300	623437	.0655	.0672
23.567	623429	.0654	.0671
23.850	623251	.0671	.0695
24.100	623436	.0669	.0692

ATTACHMENT 3.3C

INTEGRATED LEAKAGE RATE TEST

FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - TOTAL TIME ANALYSIS

Time (hrs)	Mass (lbm)	Measured Leakage (pct/day)	Estimated Leakage (pct/day)	UCL (pct/day)
0.000	623835	0.0000	0.0000	0.000
.250	623834	.0139	0.0000	0.000
.500	623831	.0271	.0271	0.000
.750	623822	.0678	.0632	.172
1.000	623835	-.0006	.0266	.208
1.250	623823	.0366	.0325	.147
1.500	623824	.0277	.0308	.118
1.817	623826	.0193	.0257	.098
2.000	623806	.0560	.0376	.105
2.250	623829	.0096	.0285	.093
2.500	623796	.0605	.0394	.103
2.750	623794	.0569	.0460	.105
3.000	623819	.0209	.0404	.098
3.250	623803	.0374	.0406	.094
3.500	623808	.0299	.0388	.090
3.750	623763	.0736	.0478	.101
4.000	623752	.0793	.0563	.109
4.250	623752	.0753	.0623	.114
4.500	623767	.0577	.0635	.113
4.750	623750	.0685	.0665	.114
5.000	623745	.0689	.0691	.115
5.250	623730	.0770	.0727	.117
5.500	623715	.0839	.0768	.120
5.750	623717	.0791	.0795	.121
6.000	623703	.0848	.0827	.123
6.250	623692	.0879	.0858	.125
6.500	623716	.0705	.0860	.125
6.750	623697	.0788	.0873	.126
7.000	623686	.0816	.0888	.126
7.250	623686	.0790	.0897	.127
7.500	623690	.0744	.0899	.127
7.750	623692	.0710	.0896	.127
8.000	623669	.0797	.0904	.127
8.250	623695	.0653	.0893	.127
8.500	623669	.0749	.0895	.127
8.750	623682	.0674	.0887	.126
9.000	623643	.0820	.0896	.127
9.250	623663	.0717	.0893	.126
9.500	623654	.0734	.0892	.126
9.750	623645	.0750	.0892	.126
10.000	623656	.0687	.0887	.125

ATTACHMENT 3.3C (Con't)

INTEGRATED LEAKAGE RATE TEST

FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - TOTAL TIME ANALYSIS

Time (hrs)	Mass (lbm)	Measured Leakage (pct/day)	Estimated Leakage (pct/day)	UCL (pct/day)
10.250	623628	.0776	.0889	.125
10.500	623655	.0658	.0881	.125
10.750	623636	.0710	.0878	.124
11.000	623616	.0767	.0879	.124
11.250	623621	.0731	.0878	.124
11.500	623625	.0703	.0874	.124
11.750	623622	.0696	.0870	.123
12.000	623605	.0738	.0869	.123
12.250	623628	.0649	.0861	.122
12.500	623589	.0756	.0862	.122
12.750	623608	.0684	.0858	.122
13.000	623599	.0697	.0854	.121
13.250	623591	.0709	.0852	.121
13.500	623586	.0711	.0849	.121
13.750	623566	.0753	.0850	.120
14.000	623566	.0739	.0850	.120
14.250	623561	.0738	.0850	.120
14.500	623553	0748	.0850	.120
14.750	623538	0775	.0852	.120
15.000	623564	0694	.0848	.119
15.250	623564	.0684	.0844	.119
15.500	623548	.0712	.0842	.118
15.750	623546	.0706	.0840	.118
16.000	623554	.0675	.0836	.118
16.250	623540	.0699	.0833	.117
16.500	623539	.0690	.0830	.117
16.750	623528	.0704	.0828	.117
17.000	623539	.0670	.0824	.116
17.250	623536	.0666	.0820	.116
17.500	623536	.0658	.0815	.115
17.767	623521	.0680	.0813	.115
18.000	623520	.0673	.0810	.114
18.267	623539	.0623	.0804	.114
18.517	623525	.0645	.0800	.113
18.767	623516	.0654	.0796	.113
19.067	623507	.0661	.0793	.113
19.267	623524	.0620	.0787	.112
19.517	623508	.0644	.0784	.112
19.767	623500	.0652	.0780	.111
20.016	623478	.0687	.0779	.111
20.267	623495	.0645	.0776	.111

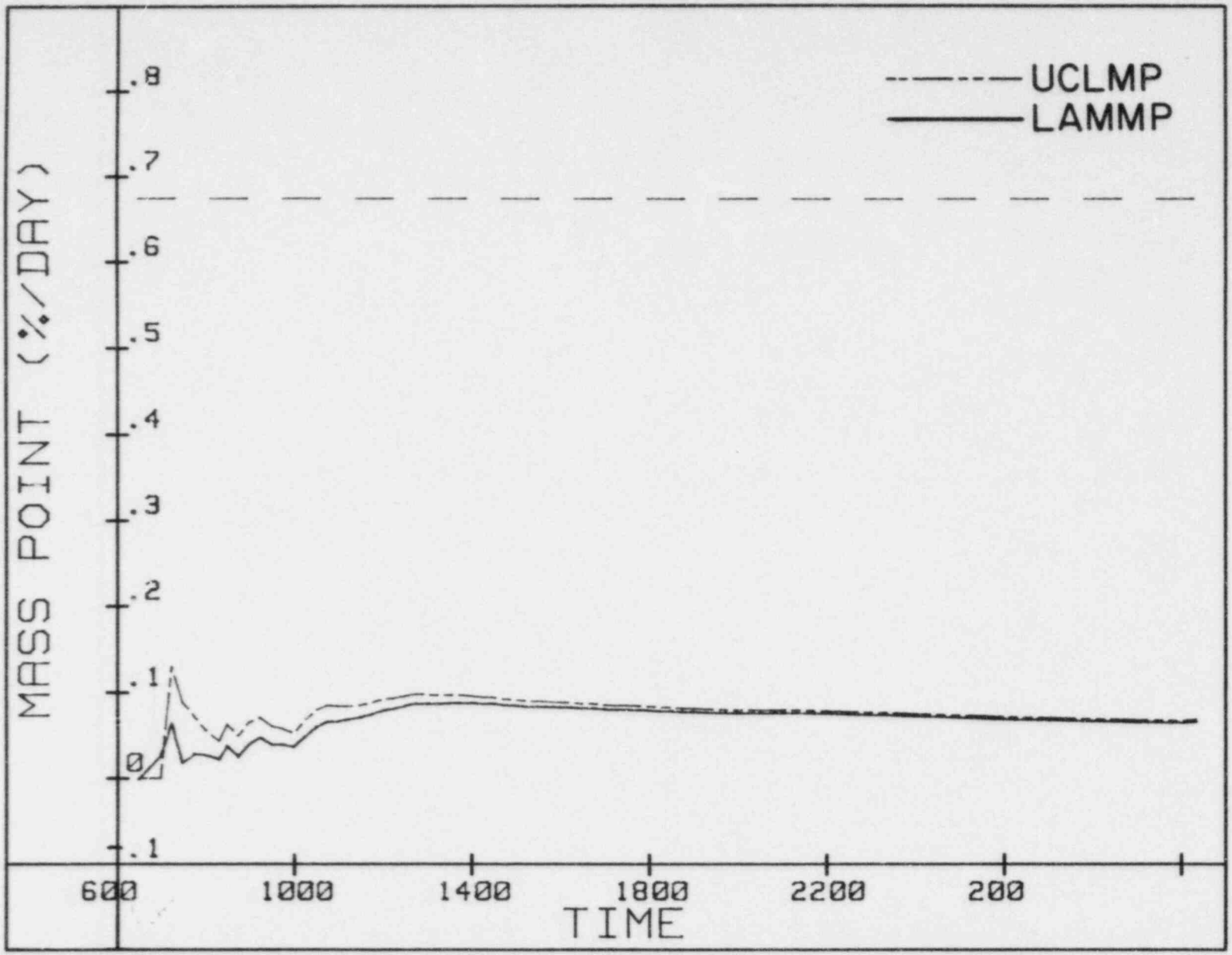
ATTACHMENT 3.3C (Con't)

INTEGRATED LEAKAGE RATE TEST

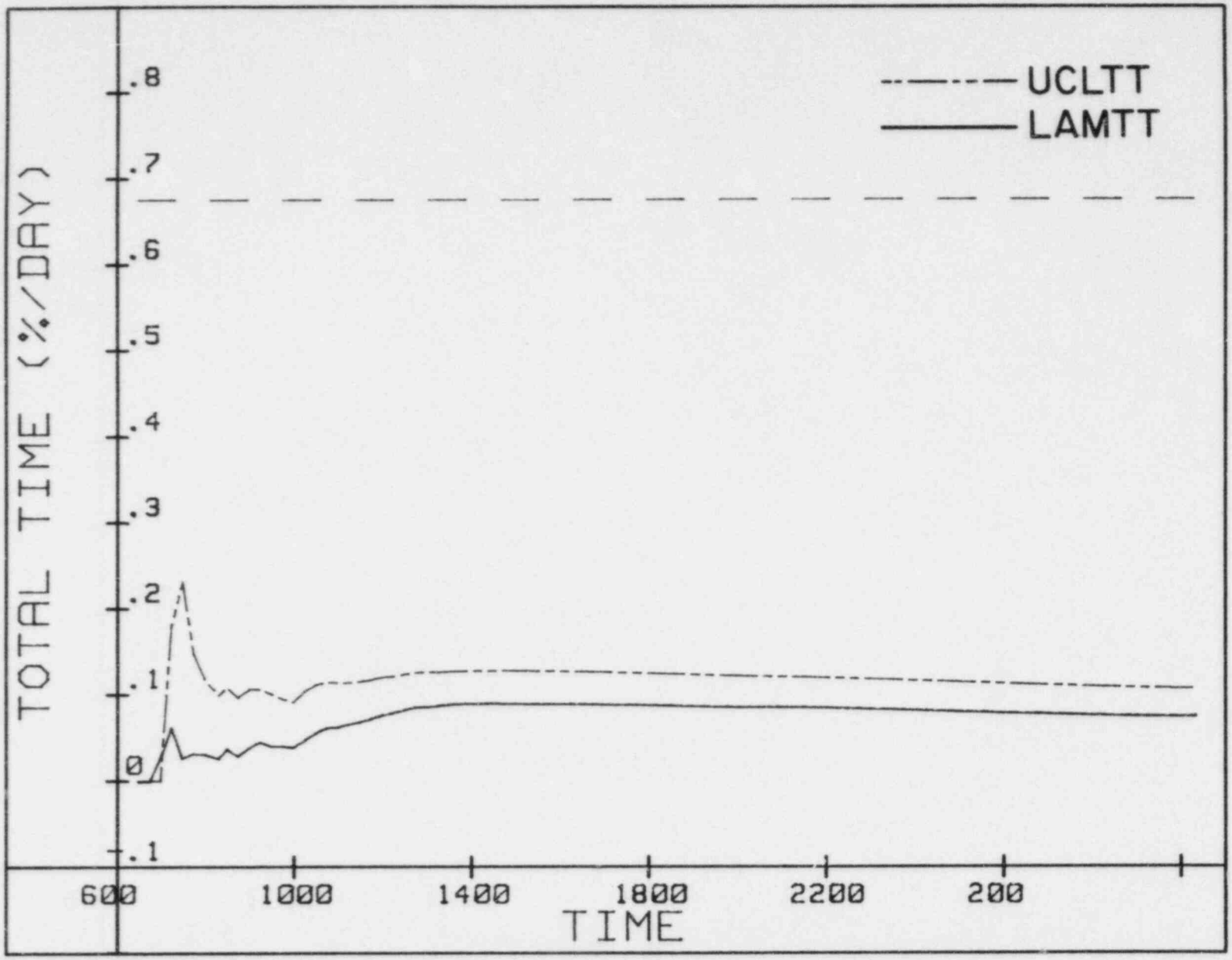
FROM 0628 ON 7-13-85 TO 0634 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - TOTAL TIME ANALYSIS

Time (hrs)	Mass (lbm)	Measured Leakage (pct/day)	Estimated Leakage (pct/day)	UCL (pct/day)
20.517	623485	.0655	.0773	.110
20.767	623489	.0640	.0769	.110
21.016	623492	.0627	.0766	.109
21.267	623502	.0602	.0761	.109
21.517	623461	.0668	.0759	.108
21.767	623467	.0651	.0757	.108
22.016	623466	.0645	.0754	.108
22.267	623473	.0625	.0751	.107
22.517	623478	.0609	.0747	.107
22.767	623437	.0673	.0746	.107
23.283	623459	.0620	.0744	.106
23.300	623437	.0656	.0741	.106
23.567	623429	.0662	.0739	.106
23.850	623251	.0941	.0750	.107
24.100	623436	.0636	.0747	.106



ATTACHMENT 3.3D
UCL & LAM VS. TIME
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST



ATTACHMENT 3.3E
UCL & LAM VS. TIME
MILLSTONE NUCLEAR POWER STATION
UNIT 3
INTEGRATED LEAKAGE RATE TEST

ATTACHMENT 3.3F
INTEGRATED LEAKAGE RATE TEST
SUPERIMPOSED LEAKAGE VERIFICATION TEST

FROM 0822 HOURS TO 1223 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - MASS POINT ANALYSIS

Time (hrs)	Mass (lbm)	Leakage (pct/day)	UCL (pct/day)
0.00	623341	0.000	0.0
.200	623265	0.000	0.0
.517	623231	.823	0.0
.767	623195	.712	1.0
1.017	623093	.857	1.1
1.200	623036	.903	1.06
1.517	622977	.920	1.03
1.767	622771	1.11	1.34
2.017	622873	1.03	1.23
2.200	622831	.962	1.13
2.517	622729	.954	1.09
2.767	622682	.940	1.05
3.017	622632	.927	1.02
3.200	622585	.912	.996
3.517	622482	.919	.992
3.767	622309	.963	1.04
4.017	622370	.955	1.02

ATTACHMENT 3.3G
INTEGRATED LEAKAGE RATE TEST
SUPERIMPOSED LEAKAGE VERFICATION TEST

FROM 0822 HOURS TO 1223 HOURS ON 7-14-85

ABSOLUTE TEST METHOD - TOTAL TIME ANALYSIS

Time (hrs)	Mass (lbm)	Estimated Leakage (pct/day)	UCL (pct/day)
0.000	623341	0.0000	0.00
.200	623265	0.0000	0.00
.517	623231	0.820	0.00
.767	623195	.698	1.42
1.017	623093	.810	1.67
1.200	623036	.857	1.45
1.517	622977	.881	1.34
1.767	622771	1.04	1.57
2.017	622873	.998	1.48
2.200	622831	.958	1.40
2.517	622729	.954	1.35
2.767	622682	.944	1.31
3.017	622632	.934	1.28
3.200	622585	.922	1.24
3.517	622482	.926	1.23
3.767	622309	.957	1.25
4.017	622370	.953	1.23

SECTION 4

LOCAL LEAKAGE RATE TESTS (TYPES B AND C)

Attachment 4A summarizes the Local Leakage Rate Tests (LLRT's) data that was established to support the overall containment leakage testing program. These LLRT's were performed by pressurizing the listed penetrations with air or nitrogen and either measuring leakage across the containment isolation valves (Type C) or across the resilient seals (Type B). Each penetrations leakage rate can be obtained from site reference material.

Containment isolation valves and other leakage barriers that are in the bypass leakage program are designated "BP" under TYPE TEST.

The acceptance criteria for Types B and C testing is in accordance with 10CFR50, Appendix J. The combined leakage rate for all penetrations and valves, subject to Types B and C tests, is well below the acceptable leakage rate of 0.6 L_a.

The total leakage rates for all containment isolation valves and leakage barriers subject to Types B, C, and Type B and C Bypass Leakage tests are 2697.4 SCCM, 39,625.9 SCCM, and 2817.8 SCCM, respectively.

The Attachment for this section is:

Attachment No.	Title
4A	Local Leakage Rate Test Data

ATTACHMENT 4A

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
12A - Reactor Coolant Hot Legs Sample	C	3SSR*CTV26 (IC)	5.0	
	C	3SSR*CTV27 (OC)	5.0	
12B - Pressurizer Liquid Sample	C	3SSR*CTV22 (IC)	5.0	
	C	3SSR*CTV23 (OC)	5.0	
12C - Pressurizer Vapor Space Sample	C	3SSR*CTV20 (IC)	5.0	
	C	3SSR*CTV21 (OC)	18.9	
12D - Pressurizer Relief Tank	C	3SSR*CTV8026 (IC)	28.6	
(PRT) Gas Sample	C	3SSR*CTV8025 (OC)	5.0	
13A - Reactor Coolant Cold Legs Sample	C	3SSR*CTV29 (IC)	5.0	
	C	3SSR*CTV30 (OC)	5.0	
13B - Safety Injection Accumulators Sample	C	3SSR*CTV32 (IC)	68.7	
	C	3SSR*CTV33 (OC)	28.9	
14 - N_2 to Safety Injection Accumulators	C,BP	3SIL*CV8968 (IC) 3SIL*CV8880 (OC)	45.7	Note 2
15 - Primary Grade Water to PRT	C,BP	3PGS*CV8046 (IC)	192.0	
	C,BP	3PGS*CV8028 (OC)	492.2	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
16 - Seal Water Injection	C	3CHS*V394 (IC)	5.0	
to Reactor Coolant Pumps	C	3CHS*MV8109A (OC)	37.8	
17 - Seal Water Injection	C	3CHS*V434 (IC)	43.8	
to Reactor Coolant Pumps	C	3CHS*MV8109B (OC)	67.6	
18 - Seal Water Injection	C	3CHS*V467 (IC)	154.4	
to Reactor Coolant Pumps	C	3CHS*MV8109C (OC)	151.7	
19 - Seal Water Injection	C	3CHS*V501 (IC)	62.9	
to Reactor Coolant Pumps	C	3CHS*MV8109D (OC)	5.0	
23 - Seal Water Return from	C	3CHS*MV8112 (IC)	95.3	
Reactor Coolant Pumps	C	3CHS*MV8100 (OC)	5.0	Note 2
		3CHS*RV8113 (IC)		
24 - Reactor Coolant Letdown	C	3CHS*CV8160 (IC)	105.6	Note 3
		3CHS*RV8117 (IC)		
		3CHS*CV8152 (OC)		
26 - Reactor Coolant Charging	C	3CHS*V58 (IC)	38.5	
	C	3CHS*MV8105 (OC)	257.9	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
27 - PRT & Containment Drains Transfer Pumps Discharge	C	3DGS*CTV24 (IC) 3DGS*CTV25 (OC)	67.2	Note 2
28 - Containment Drains Sump Pump Discharge	C,BP C,BP	3DAS*CTV24 (IC) 3DAS*CTV25 (OC)	5.0 28.9	
29 - PRT & Containment Drains Transfer Tank Vent	C,BP C,BP	3VRS*CTV20 (IC) 3VRS*CTV21 (OC)	5.0 123.1	
32 - Containment Atmosphere Monitor Suction	C C	3CMS*CTV20 (OC) 3CMS*CTV21 (OC)	414.2 790.7	
35 - Containment Vacuum Pump Suction	C,BP C,BP	3CVS*CTV20A (OC) 3CVS*CTV21A (OC)	86.1 66.5	
36 - Containment Vacuum Pump Suction	C,BP C,BP	3CVS*CTV20B (OC) 3CVS*CTV21B (OC)	28.7 67.0	
37 - Containment Vacuum Ejector Suction	C,BP C,BP	3CVS*AOV23 (IC) 3CVS*V20 (OC)	459.2 47.9	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
38 - Chilled Water Supply	C,BP	3CDS*CTV91A (IC)	5.0	
	C,BP	3CDS*CTV38A (OC)	5.0	
39 - Reactor Plant Component Cooling Supply Header	C	3CCP*MOV45A (OC)	76.7	
40 - Reactor Plant Component Cooling Supply Header	C	3CCP*MOV45B (OC)	220.5	
41 - Reactor Plant Component Cooling Return Header	C	3CCP*MOV49A (OC)	5.0	
42 - Reactor Plant Component Cooling Return Header	C	3CCP*MOV49B (OC)	5.0	
45 - Chilled Water Return	C,BP	3CDS*CTV40B (IC)	38.1	
	C,BP	3CDS*CTV39B (OC)	57.1	
51 - High Pressure Boron Injection to Cold Legs	C	3SIH*CV8843 (IC)	5.0	
	C	3SIH*V5 (IC)	763.1	
	C	3SIH*MV8801A (OC) 3SIH*MV8801B (OC)	5.0	Note 2
52 - Service Air	C,BP	3SAS*V875 (IC)	19.0	
	C,BP	3SAS*V50 (OC)	19.0	
54 - Instrument Air	C,BP	3IAS*MOV72 (IC) 3IAS*PV15 (OC)	19.2	Note 2

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
56 - Fire Protection	C,BP	3FPW*CTV49 (IC) 3FPW*V661 (IC)	5.0	Note 2
	C,BP	3FPW*CTV48 (OC) 3FPW*V666 (OC)	5.0	Note 2
59 - Refueling Cavity Purfication Inlet	C	3SFC*V991 (IC)	67.4	
	C	3SFC*V992 (OC)	57.4	
60 - Refueling Cavity Purification Outlet	C	3SFC*V990 (IC)	1212.3	
	C	3SFC*V989 (OC)	76.5	
62 - Reactor Coolant Loop Fill	C	3CHS*V372 (IC)	5.0	
	C	3CHS*V371 (OC)	5.0	
63 - Containment Atmoshere Monitor Discharge	C	3CMS*MOV24 (IC)	28.5	
	C	3CMS*CTV23 (OC)	1317.9	
70 - Demineralized Water Supply Inside Containment	C,BP	3CCP*V886 (IC)	5.0	
	C,BP	3CCP*V887 (OC)	29.3	
72 - Chilled Water Supply	C,BP	3CDS*CTV91B (IC)	231.1	
	C,BP	3CDS*CTV38B (OC)	229.1	
85 - Containment Purge Air Supply	C,BP	3HVU*CTV33B (IC) 3HVU*CTV32B (OC)	95.7	Note 2

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
86 - Containment Purge Air Exhaust	C,BP	3HVU*33A (IC) 3HVU*32A (OC) 3HVU*V5	382.9	Note 3
91 - RHS Pumps Suction from Hot Legs	C	3RHS*MV8701A (IC)	5.0	
	C	3RHS*MV8701B (OC) 3RHS*RV8708A (IC)	114.3	Note 2
92 - RHS Pumps Suction From Hot Legs	C	3RHS*MV8702B (IC)	5.0	
	C	3RHS*MV8702A (OC) 3RHS*RV8708B (IC)	5.0	Note 2
93 - RHS Pumps Discharge to Cold Legs	C	3SIL*V6 (IC)	1071.53	
	C	3SIL*CV8890A (IC)	5.0	
	C	3SIL*V7 (IC)	268.3	
	C	3SIL*MV8809A(OC)	276.9	
94 - RHS Pumps Discharge to Cold Legs	C	3SIL*V12 (IC)	1541.3	
	C	3SIL*CV8890B (IC)	84.7	
	C	3SIL*V13 (IC)	4400.0	
	C	3SIL*MV8809B (OC)	344.4	
95 - RHS Pumps Discharge to Hot Legs	C	3SIL*V26 (IC)	1251.4	
	C	3SIL*CV8825 (IC)	38.4	
	C	3SIL*V28 (IC)	378.8	
	C	3SIL*MV8840 (OC)	230.5	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
96 - Safety Injection Pumps Discharge to Hot Legs	C	3SIL*V29 (IC)	341.3	
	C	3SIL*V27 (IC)	1251.1	
	C	3SIH*CV8881 (IC)	94.5	
	C	3SIH*MV8802A (OC)	170.6	
97 - Safety Injection Pumps Discharge to Hot Legs	C	3SIL*V112 (IC)	28.7	
	C	3SIH*CV8824 (IC)	67.0	
	C	3SIL*V110 (IC)	5.0	
	C	3SIH*MV8802B (OC)	5.0	
98 - Safety Injection Pumps Discharge to Cold Legs	C	3SIH*V22 (IC)	268.3	
	C	3SIH*V28 (IC)	1056.0	
	C	3SIH*CV8823 (IC)	76.4	
	C	3SIH*V24 (IC)	4400.0	
	C	3SIH*V26 (IC)	1541.3	
	C	3SIH*MV8835 (OC)	1936.0	
99 - Safety Injection Test and NE Accumulator Fill Line	C	3SIH*CV8871 (IC)	5.0	
	C	3SIH*CV8964 (OC)	48.1	Note 2
		3SIH*CV8888 (OC)		
100 - Quench Spray Pumps Discharge	C	3QSS*V4 (IC)	265.2	
	C	3QSS*MOV34A (OC)	262.6	
101 - Quench Spray Pumps Discharge	C	3QSS*V8 (IC)	418.9	
	C	3QSS*MOV34B (OC)	192.5	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
102 - Containment Recirc. Pump Suction	C	3RSS*MOV23A (OC)	5.0	
103 - Containment Recirc. Pump Suction	C	3RSS*MOV23C (OC)	306.2	
104 - Containment Recirc. Pump Suction	C	3RSS*MOV23B (OC)	76.6	
105 - Containment Recirc. Pump Suction	C	3RSS*MOV23D (OC)	96.0	
107 - Containment Recirc. Pump Discharge	C	3RSS*V3 (IC)	1235.2	
	C	3RSS*MOV20D (OC)	767.0	
108 - Containment Recirc. Pump Discharge	C	3RSS*V6 (IC)	720.7	
	C	3RSS*MOV20B (OC)	5.0	
109 - Containment Recirc. Pump Discharge	C	3RSS*V9 (IC)	2310.0	
	C	3RSS*MOV20C (OC)	114.8	
110 - Containment Recirc. Pump Discharge	C	3RSS*V12 (IC)	67.4	
	C	3RSS*MOV20A (OC)	29.0	
111 - DBA Hydrogen Recombiner Suction	C	3HCS*V2 (OC)	229.1	
	C	3HCS*V3 (OC)	228.8	

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

PENETRATION NO. - SYSTEM	TYPE TEST	VALVES/EQUIPMENT TESTED (NOTE 1)	LEAKAGE (SCCM)	REMARKS
112 - DBA Hydrogen Recombiner Suction	C	3HCS*V9 (OC)	5.0	
	C	3HCS*V10 (OC)	5.0	
113 - DBA Hydrogen Recombiner Discharge	C	3HCS*V7 (IC)	1265.4	
	C	3HCS*V6 (OC)	5.0	
114 - DBA Hydrogen Recombiner Discharge	C	3HCS*V14 (IC)	85.8	
	C	3HCS*V13 (OC)	5.0	
115 - Post Accident Sample	C	3SSP*CTV7 (IC)	38.0	
	C	3SSP*V13 (OC)	18.9	
116 - Chilled Water Return	C,BP	3CDS*CTV40A (IC)	5.0	
	C,BP	3CDS*CTV39A (OC)	5.0	
120 - Post Accident Sample Return	C	3SSP*CTV8 (IC)	142.5	
	C	3SSP*V14 (OC)	47.7	
121 - Containment Vacuum Pump Discharge	C	3CVS*MOV25 (IC)	140.1	
	C	3CVS*V13 (OC)	5.0	
124 - Nitrogen Supply Header	C	3GSN*CTV105 (IC) 3GSN*CV8033 (OC)	76.9	Note 2
Personnel Air Lock	B	O-ring	2268.29	
Equipment Hatch	B,BP	O-ring	5.0	
Equipment Hatch Manway	B,BP	O-ring	5.0	
Fuel Transfer Tube	B,BP	O-ring	5.0	
Electrical Penetrations	B	O-ring	414.11	Note 4

ATTACHMENT 4A (Con't)

LOCAL LEAKAGE RATE TEST DATA

NOTES

1. The local leakage rate test program commenced approximately 6 months prior to the Type A test.

2. Combination of two valves.

3. Combination of three valves.

4. All (80) electrical penetrations were tested prior to the performance of the ILRT with a combined total leakage of 414.11 SCCM.