

DUQUESNE LIGHT COMPANY  
Beavear Valley Unit No. 1

REACTOR CONTAINMENT BUILDING

INTEGRATED LEAK RATE TEST

September, 1983

TYPE 'B' AND 'C'

8312080040 831122  
PDR ADOCK 05000334  
P PDR

DUQUESNE LIGHT COMPANY  
Beaver Valley Power Station

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## INTRODUCTION - Containment Integrated Leakage Rate Test, 1983

This report contains a discussion of the Beaver Valley Power Station Unit No. 1 Type 'B' and Type 'C' Local Leak Rate Testing performed during the 1983 Refueling Outage. It has been prepared in accordance with the requirements of 10 CFR 50, Appendix J, Section V, Paragraph B.3. Part A summarizes the results of the Type 'B' Testing, and Part B summarizes the results of the Type 'C' Testing. It should be noted that Type 'A' Leak Testing was not performed during the 1983 Refueling Outage. Type 'A' Testing was last successfully completed during the 1982 Refueling Outage.

The combined leakage rate for all penetrations and valves subject to Type 'B' and 'C' Tests must be less than 60 percent of  $L_a$  (the maximum allowable leakage rate of Containment) in order to meet plant Technical Specifications.  $L_a$  is 0.10 percent by weight of the Containment air per 24 hours at  $P_a$  (53 psia).

$L_a$  equals 0.10 percent by weight of Containment air volume (1,800,000  $\text{Ft}^3$ ) at 53 psia ( $0.001 \times 1,800,000 \times 53/14.7$ ) = 6489.80 SCF/D; 60 percent of  $L_a$  equals 3893.88 SCF/D.

A. TYPE 'B' TEST RESULTS

Local Leakage Rate Testing for the Containment Electrical Penetrations (Type 'B' Testing) was performed during the months of August and September, 1983. The results were found to be acceptable.

The Local Leakage Rate Testing for the Containment Electrical Penetrations measures the leakage through the penetration O-ring seals on the bolt-on flanges and the leakage from the penetration canister. A summary sheet is included listing the electrical penetration leakage rates.

Other Type 'B' Leakage Rate Tests measure the leakage through the Personnel Airlock, the Emergency Personnel Airlock Flanges, the Fuel Transfer Tube, and Penetrations #111 and #112. The results of these tests are also included on the summary for reference.

A. TYPE 'B' TEST RESULTS (Continued)

Penetration Number	Leakage O-Ring Seal/Canister (SCCM)			Penetration Number	Leakage O-Ring Seal/Canister (SCCM)		
⊗1-B	2.0	/	0.0	5-B	2.0	/	2.0
⊗1-D	2.0	/	0.0	5-C	2.0	/	3.55
1-F	2.0/2.0*	/	N/A	5-D	2.0	/	2.0
⊗2-B	2.0	/	0.0	5-E	2.0	/	2.0
⊗2-D	2.0	/	0.0	5-F	2.0	/	2.0
⊗2-F	2.0	/	0.0	5-G	2.0	/	31.9
3-A	2.0	/	2.0	6-A	2.0	/	3.3
3-B	2.0	/	2.9	6-B	2.0/2.0*	/	N/A
3-C	2.0	/	22.0	6-C	2.0	/	2.0
3-D	2.0	/	2.0	6-D	2.0	/	2.0
3-E	2.0	/	2.0	6-E	2.0	/	3.0
3-F	2.0	/	2.0	6-F	2.0	/	2.0
3-G	2.0/2.0*	/	N/A	6-G	2.0	/	2.0
4-A	2.0	/	3.4	7-A	2.0/2.0*	/	N/A
4-B	2.0	/	2.0	7-B	2.0	/	2.0
4-C	2.0	/	66.0	7-C	2.0	/	3.4
4-D	2.0	/	47.5	7-D	2.0	/	2.0
4-E	2.0	/	2.0	7-E	2.0	/	2.0
4-F	2.0	/	2.4	7-F	2.0	/	2.0
4-G	2.0	/	4.5	7-G	2.0/2.0*	/	N/A
5-A	2.0	/	4.95	8-A	2.0	/	2.15
Totals Page 3	4.60	/	165.65		50.8	/	79.98

\* Inside/Outside of Containment

⊗ Pressure Decay Test Used to Determine Leak Rate

A. TYPE 'B' TEST RESULTS (Continued)

Penetration Number	Leakage O-Ring Seal/Canister (SCCM)			Penetration Number	Leakage O-Ring Seal/Canister (SCCM)		
8-B	2.0	/	2.0	11-B	2.0	/	2.0
8-C	2.0	/	2.0	11-C	2.0/2.0*	/	N/A
8-D	2.0	/	2.0	11-D	2.0	/	2.0
8-E	2.0	/	2.0	11-E	2.0	/	13.6
8-F	2.0/2.0*	/	N/A	11-F	2.0	/	2.0
8-G	2.0	/	2.0	11-G	2.0	/	2.0
9-A	2.0	/	2.0	12-A	2.0	/	2.0
9-B	2.0	/	2.0	12-B	2.0	/	20.1
9-C	2.0	/	3.6	12-C	2.0	/	2.0
9-D	2.0	/	2.0	12-D	2.0	/	14.3
9-E	2.0	/	2.0	12-E	2.0	/	2.0
9-F	2.0	/	2.0	12-F	2.0	/	2.0
9-G	2.0	/	9.15	12-G	2.0	/	2.0
10-A	2.0	/	12.2	13-A	2.0/2.0*	/	N/A
10-B	2.0	/	32.6	13-B	2.0/2.0*	/	N/A
10-C	2.0	/	14.5	13-C	2.0	/	2.0
10-D	2.0	/	2.0	13-D	2.0/2.0*	/	N/A
10-E	2.0	/	2.0	13-E	2.0	/	5.98
10-F	2.0	/	2.0	13-F	2.0	/	2.0
10-G	2.0	/	39.8	13-G	2.0	/	2.0
11-A	2.0	/	3.8	14-A	2.0	/	2.0
Totals Page 4	44.0	/	141.65		50.0	/	79.98

\* Inside/Outside of Containment

⊗ Pressure Decay Test Used to Determine Leak Rate

A. TYPE 'B' TEST RESULTS (Continued)

Penetration Number	Leakage O-Ring Seal/Canister (SCCM)			Penetration Number	Leakage O-Ring Seal/Canister (SCCM)		
14-B	2.0	/	2.0	16-A	2.0	/	2.0
14-C	2.0	/	2.0	16-B	2.0	/	2.0
14-D	2.0	/	2.0	16-C	2.0	/	2.0
14-E	2.0	/	2.0	16-D	2.0	/	2.0
14-F	2.0	/	2.0	16-E	2.0	/	2.0
14-G	2.0	/	28.5	16-F	2.0	/	2.0
15-A	2.0	/	2.0	16-G	2.0/2.0*	/	N/A
15-B	2.0	/	2.0	⊗17-B	2.0	/	2.0
15-C	2.0	/	2.0	17-D	2.0	/	N/A
15-D	2.0	/	2.0	17-F	2.5/2.0*	/	N/A
15-E	2.0	/	2.0	⊗18-B	2.0	/	2.0
15-F	2.0	/	2.0	⊗18-D	2.0	/	2.0
15-G	2.0	/	2.0	18-F	2.0/2.0*	/	N/A
				111	2.0	/	2.0
Totals Page 5	26.0	/	52.5		34.5	/	20.0

\*Inside/Outside of Containment

⊗Pressure Decay Test Used to Determine Leak Rate

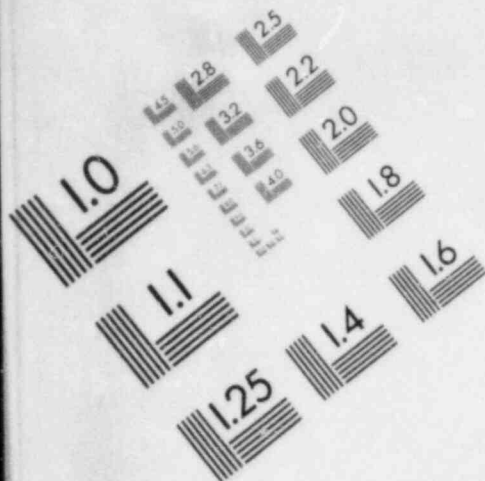


A. TYPE 'B' TEST RESULTS (Continued)

Totals	Leakage O-Ring Seal/Canister (SCCM)		
Page 3	94.0	/	236.95
Page 4	94.0	/	221.63
Page 5	60.5	/	72.5
Total Leakage (SCCM)	248.5	/	531.08
Total Leakage (SCF/D)	12.637	/	27.04

Electrical Penetrations	(8/21/83)	39 680 SCF/D
Personnel Airlock	(9/17/83)	119.3 SCF/D
Equipment Hatch Outer Flange	(9/13/83)	0.459 SCF/D
Equipment Hatch Inner Flange	(9/13/83)	0.471 SCF/D
Emergency Personnel airlock	(9/15/83)	89.560 SCF/D
Fuel Transfer Tube	(9/12/83)	0.0 SCF/D
Penetration #111	(7/15/83)	0.462 SCF/D
Penetration #112	(7/15/83)	0.462 SCF/D
TOTAL Type 'B' Leakage		<u>250.894 SCF/D</u>





# IMAGE EVALUATION TEST TARGET (MT-3)

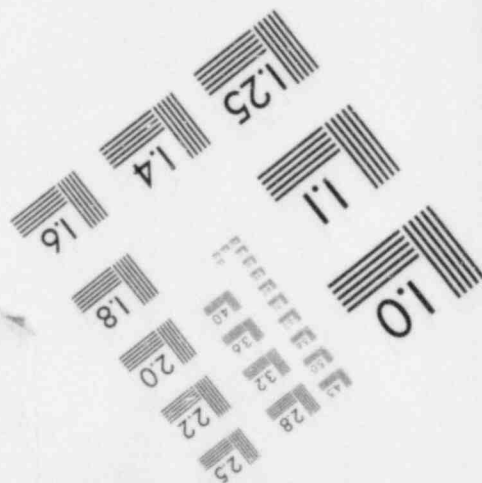
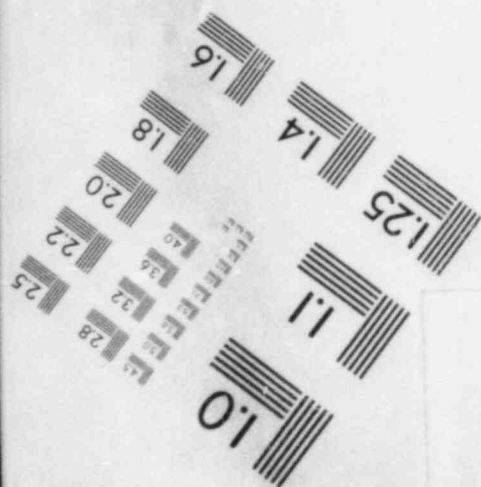
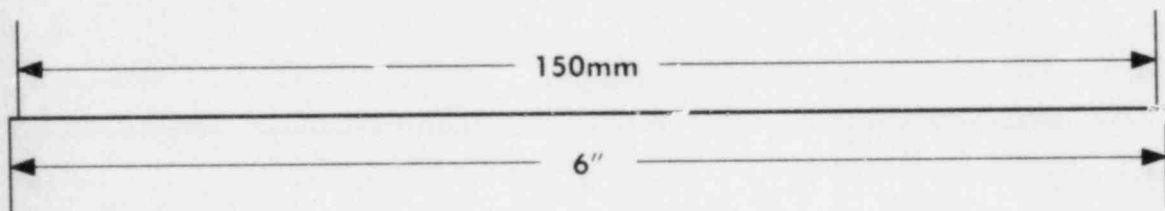
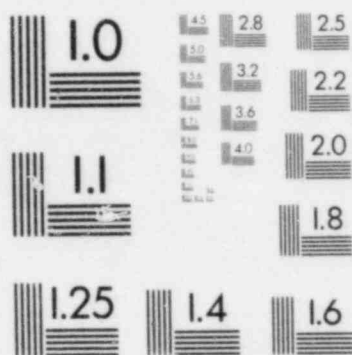
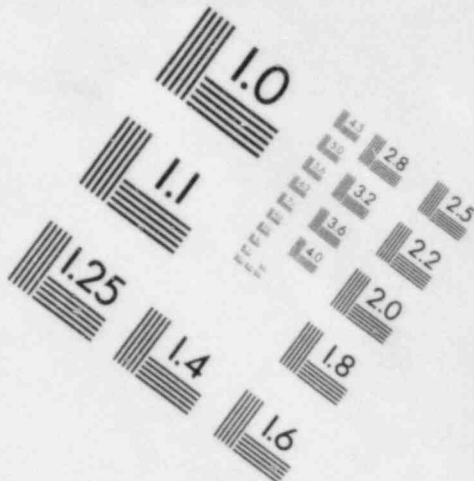
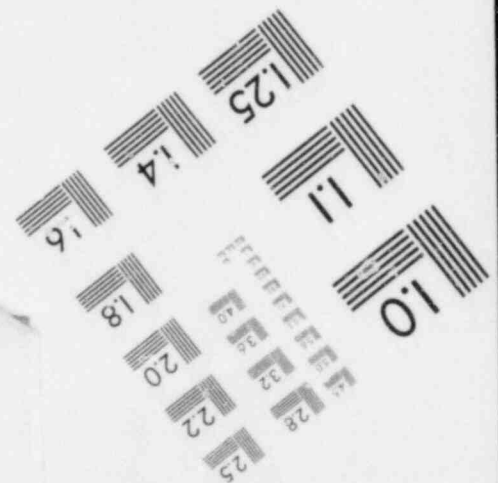
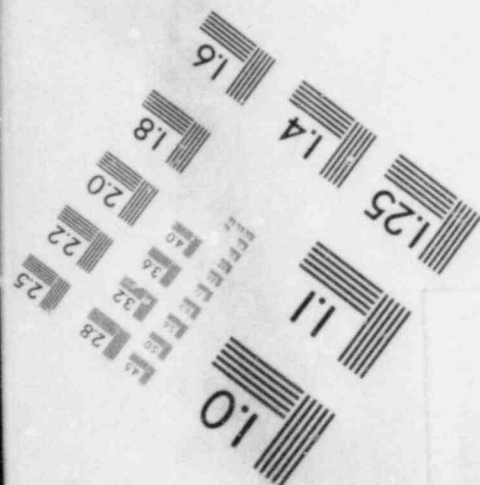
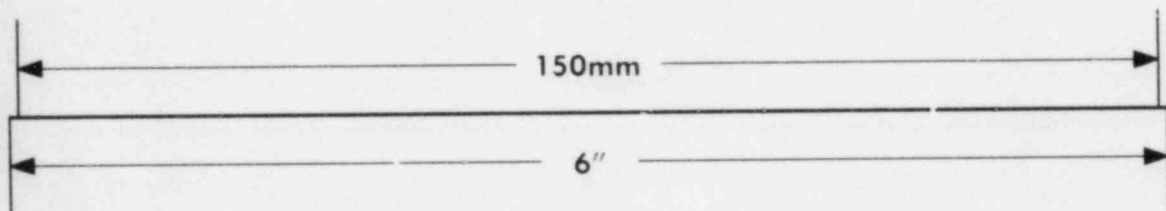
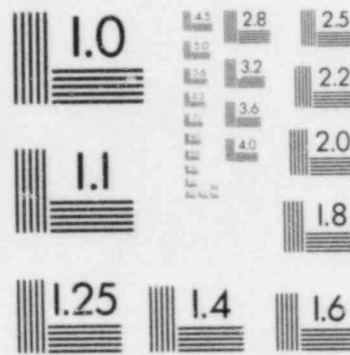
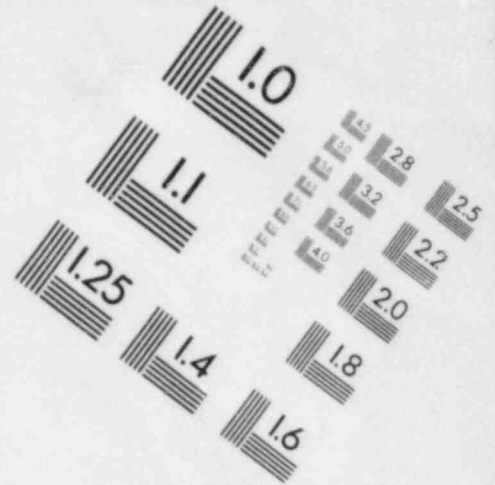
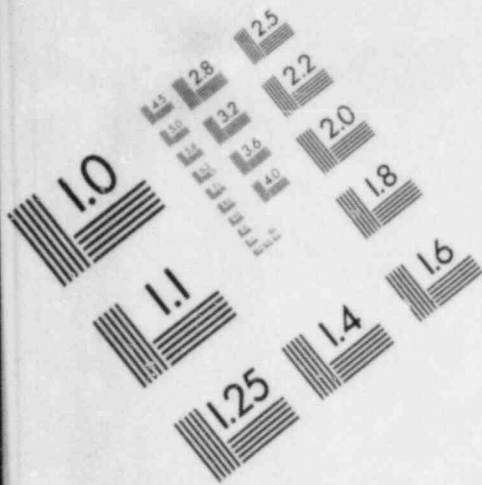


IMAGE EVALUATION  
TEST TARGET (MT-3)



A. TYPE 'B' TEST RESULTS (Continued)

Corrective Actions Summary

The following electrical penetrations required maintenance due to high leak rates:

<u>Penetration No.</u>	<u>MWR No.</u>	<u>Initial Leakage</u>	<u>Final Leakage</u>
3-C Canister	837362	90.0 SCCM	22.0 SCCM
7-G O-Ring	837369	167.0 SCCM	2.0 SCCM
12-A O-Ring	837363	125.0 SCCM	2.0 SCCM
17-F O-Ring	837368	>2000.0 SCCM	2.0 SCCM
18-F O-Ring	837367	>2000.0 SCCM	2.0 SCCM

In the course of repairing these penetrations, 17-F and 18-F were determined to be missing O-Rings. (See LER 83-23-OSC for further information.) Penetration 3-C could not be repaired following the normal torquing procedure. After pressurizing the canister with freon, the leak was traced to a wire bundle gasket using a freon detector. This wire bundle gasket was sealed with epoxy per EM 60800. The two remaining penetrations, 7-G and 12-A, were repaired using the normal torquing procedure.

## B. TYPE 'C' TEST RESULTS

The purpose of Type 'C' Testing is to demonstrate the integrity of Containment Isolation Valves in accordance with Appendix J of the Title 10 Code of Federal Regulations Part 50 and BVPS Technical Specification 3.6.1.2.

A complete series of Type 'C' Tests together with the appropriate Type 'B' Tests were performed during the period of June 14, 1983, through September 17, 1983. The results of these tests met the applicable acceptance criteria and are reviewed on the accompanying tables.

It should be noted that VS-153 (Containment Airlock Flow Control Valve) was Type 'C' Tested during the 1983 Refueling Outage. Because the inlet piping was plugged during the 1982 Refueling Outage, we feel that there is no longer a need to continue Type 'C' Testing this valve. If for some reason the plug is removed from the inlet piping of valve VS-153 and it becomes a potential leakage path, we will then put the valve back in our Type 'C' Testing program.

## Type C Test Results

1983 Performance

Pene- tration Number	Valve Tested	Date Tested	"As Found" Valve Leakage (SCF/D)	"As Left" Valve Leakage (SCF/D)	Penetration Leakage (SCF/D)
1	MOV-CC-112A2 CCR-247	8-1-83	0.464 95.773	0.464 95.773	95.773
2	MOV-CC-112B3 CCR-252	7-19-83	* 78.066	14.841 78.066	78.066
4	MOV-CC-112A3 CCR-251	8-11-83	2.832 169.012	2.832 169.012	169.012
5	MOV-CC-112B2 CCR-248	7-8-83	0.458 15.570	0.458 15.570	15.570
8	TV-CC-107D1 TV-CC-107D2	6-23-83	1.743 1.781	1.743 1.781	1.781
9	TV-CC-111D1 TV-CC-111D2	6-23-83	0.457 3.608	0.457 3.608	3.608
11	TV-CC-110D TV-CC-110F2 TV-CC-110F1 +	6-21-83	0.460 1671.231	0.460 0.520	0.520
13	FP-827 TV-FP-107	6-24-83	3.656 0.457	3.656 0.457	3.656
14	TV-CC-110E3 TV-CC-110E2	6-28-83	* 4.599	0.965 4.599	4.599
16	TV-CC-111A2 TV-CC-111A1	7-5-83	2.851 6.754	2.851 6.754	6.754
17	TV-CC-103B1 TV-CC-103B	7-6-83	0.460 15.628	0.460 15.628	15.628
18	TV-CC-103C1 TV-CC-103C	7-23-83	32.215 198.306	32.215 198.306	198.306
19	CH-369 + MOV-CH-378 MOV-CH-381	9-10-83	835.615 0.464	78.258 0.464	78.258
20	SI-42 SI-41	6-28-83	0.459 0.463	0.459 0.463	0.463
Page 9 Total					671.994

\* Could Not Pressurize (See LER 83-23-03L)

## Type C Test Results

1983 Performance

Pene- tration Number	Valve Tested	Date Tested	"As Found" Valve Leakage (SCF/D)	"As Left" Valve Leakage (SCF/D)	Penetration Leakage (SCF/D)
24	RH-14 + RH-16 RH-15	7-13-83	5.056 0.557	5.056 0.557	5.056
25	TV-CC-105D1 TV-CC-105D2	6-22-83	87.142 41.187	87.142 41.187	87.142
26	TV-CC-107E1 TV-CC-107E2	6-23-83	0.457 0.555	0.457 0.555	0.555
27	TV-CC-105E1 TV-CC-105E2	5-22-83	27.060 0.557	27.060 0.557	27.060
28	TV-CH-200A,B,C MOV-CH-142 + RV-CH-203 TV-CH-204	7-16-83	16.078 * 68.987	16.078 8.026 68.987	68.987
29	TV-DG-108A TV-DG-108B	7-9-83	0.462 1.386	0.462 1.386	1.386
31	FP-804 TV-FP-105	6-24-83	0.458 0.687	0.458 0.687	0.687
32	FP-800 TV-FP-106	6-24-83	0.823 1.738	0.823 1.738	1.738
38	TV-DA-100A TV-DA-100B	8-4-83	74.417 0.558	74.488 0.558	74.488
42	SA-14 SA-15	8-24-83	389.954 4.631	134.302 4.631	134.302
43	TV-CV-102 TV-CV-102-1	9-9-83	920.677 161.119	0.462 161.871	161.871
44	TV-CV-101A TV-CV-101B	6-15-83	92.496 76.311	92.498 76.311	92.498
45	RC-72 TV-RC-519	6-28-83	54.835 27.854	54.835 1.113	54.835
47	IA-90 IA-91	7-11-83	8.812 22.262	8.812 22.262	22.262
Page 10 Total					732.867

\*Could Not Pressurize (See LER 83-23-03L)



## Type C Test Results

1983 Performance

Pene- tration Number	Valve Tested	Date Tested	"As Found" Valve Leakage (SCF/D)	"As Left" Valve Leakage (SCF/D)	Penetration Leakage (SCF/D)
48	TV-DG-109A1 TV-DG-109A2	7-6-83	2.811 0.461	2.811 0.461	2.811
49	RC-68 TV-RC-101	7-5-83	29.028 3.271	29.028 3.271	29.028
53	TV-SI-101-1 TV-SI-101-2	7-6-83	16.371 16.371	16.371 16.371	16.371
55-1	TV-SS-109A1 TV-SS-109A2	6-18-83	0.462 0.462	0.462 0.462	0.462
55-2 57-1 57-2 97-3	TV-LM-100A1 TV-LM-100A2	6-15-83	0.461 0.461	0.461 0.461	0.461
55-4	TV-SS-111A1 TV-SS-111A2	8-2-83	3.157 0.462	0.464 0.462	0.464
56-1	TV-SS-100A1 TV-SS-100A2	6-18-83	0.462 1.571	0.462 1.571	1.571
56-2	TV-SS-102A1 TV-SS-102A2	6-20-83	0.462 0.462	0.462 0.462	0.462
56-3	TV-SS-105A1 TV-SS-105A2	6-22-83	2.481 24.812	2.481 24.812	24.812
57-3	CV-35 TV-LM-101A	6-15-83	0.459 3.216	0.459 3.216	3.216
57-4	CV-36 TV-LM-101B	6-15-83	0.459 2.757	0.459 2.757	2.757
58	TV-CC-103A TV-CC-103A1	9-4-83	6.151 7.372	6.151 7.372	7.372
63	QS-4 MOV-QS-101B	6-28-83	382.081 139.269	382.081 184.135	382.081
64	QS-3 MOV-QS-101A	6-28-83	138.102 278.538	138.102 2.343	138.102
Page 11 Total					609.970



## Type C Test Results

1983 Performance

Pene- tration Number	Valve Tested	Date Tested	"As Found" Valve Leakage (SCF/D)	"As Left" Valve Leakage (SCF/D)	Penetration Leakage (SCF/D)
70	RS-101	6-27-83	1.836	1.836	1.836
71	RS-100	6-27-83	0.457	0.475	0.457
87	HY-111 HY-120	6-16-83	13.337 2.392	13.337 2.392	13.337
88	HY-110 HY-119	6-16-83	0.459 4.040	0.459 4.040	4.040
89	AS-278 TV-SV-100A	6-18-83	27.595 0.460	27.595 0.460	27.595
90	VS-D-5-3A + VS-D-5-3B	7-10-83	24.881	24.881	24.881
91	VS-D-5-5A VS-D-5-5B + VS-D-5-6	6-25-83	*	0.462	0.462
92	HY-102 + TV-CV-150C HY-104 + TV-CV-150D	6-15-83	0.462 9.250	0.462 9.250	9.250
93	HY-101 + TV-CV-150B HY-103 + TV-CV-150A	6-15-83	0.462 0.832	0.462 0.832	0.832
94	HCV-CV-151 HCV-CV-151-1	6-21-83	15.637 34.493	15.637 34.493	34.493
95-64	SOV-HY-102B1 SOV-HY-102B2	6-14-83	0.456 0.456	0.456 0.456	0.456
95-69	SOV-HY-103B1 SOV-HY-103B2	6-14-83	0.456 0.456	0.456 0.456	0.456
95-72	SOV-HY-104B1 SOV-HY-104B2	6-14-83	0.456 0.456	0.456 0.456	0.456
97-1	TV-SS-104A1 TV-SS-104A2	6-22-83	0.459 0.459	0.459 0.459	0.459
Page 12 Total					119.010

\*Could Not Pressurize (See LER 83-23-03L)

## Type C Test Results

1983 Performance

Pene- tration Number	Valve Tested	Date Tested	"As Found" Valve Leakage (SCF/D)	"As Left" Valve Leakage (SCF/D)	Penetration Leakage (SCF/D)
97-2	TV-SS-103A1 TV-SS-103A2	6-22-83	0.459 0.459	0.459 0.459	0.459
103	PC-37 PC-38	7-12-83	1.439 51.065	1.439 51.065	51.065
104	PC-9 PC-10	7-13-83	0.464 12.534	0.464 12.534	12.534
105-2	TV-SS-112A1 TV-SS-112A2	6-18-83	0.462 0.462	0.462 0.462	0.462
106	MOV-SI-842 TV-SI-889	6-25-83	0.458 0.458	0.458 0.458	0.458
109-44	SOV-HY-102A1 SOV-HY-102A2	6-14-83	0.456 0.456	0.456 0.456	0.456
109-49	SOV-HY-103A1 SOV-HY-103A2	6-14-83	0.456 0.456	0.456 0.456	0.456
109-52	SOV-HY-104A1 SOV-HY-104A2	6-14-83	0.456 0.456	0.456 0.456	0.456
110-1	RC-277 RC-278	6-15-83	0.461 0.461	0.461 0.461	0.461
Cnmt. Side Iso. Valve	VS-153	7-15-83	*	7.414	7.414
Page 13 Total					74.221

\*Could Not Pressurize

TOTAL, PAGE 9	671.994	SCF/D
TOTAL, PAGE 10	732.867	SCF/D
TOTAL, PAGE 11	609.970	SCF/D
TOTAL, PAGE 12	119.010	SCF/D
TOTAL, PAGE 13	74.221	SCF/D

TOTAL TYPE C LEAKAGE 1983 PERFORMANCE	2208.062	SCF/D
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Total Leak Rate

Total Type B Tests	250.894 SCF/D
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Total Type C Tests	2208.062 SCF/D
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TOTAL Local Leakage Rate Tests	2458.956 SCF/D
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Acceptance Criteria: Total Leak Rate (Type 'B' and 'C') <3893.88 SCF/D

CORRECTIVE ACTIONS SUMMARYPenetration #2

The initial leak test was performed July 8, 1983. Valve [MOV-CC-112B3] would not hold the applied pressure. Maintenance Work Request MWR 836348 was initiated and the motor operation limit switch setpoint adjusted. The retest was performed July 19, 1983, with a leakage of 14.841 SCF/D.

Penetration #11

The initial leak test was performed June 20, 1983. Valve [TV-CC-110F1] leaked at 1671.231 SCF/D. Maintenance Work Request MWR 837010 was initiated and the valve positioner was reset. The retest was performed June 21, 1983, with a leakage of 0.520 SCF/D.

Penetration #14

The initial leak test was performed June 21, 1983. Valve [TV-CC-110E3] would not hold the applied pressure. Maintenance Work Request MWR 837011 was initiated and the seat and plug replaced. The retest was performed June 20, 1983, with a leakage of 0.965 SCF/D.

Penetration #19

The initial leak test was performed August 18, 1983. Valve [MOV-CH-378] leaked at 835.615 SCF/D. Maintenance Work Request MWR 837543 was initiated and the bonnet, bonnet gasket, packing, and wedges replaced. The retest was performed September 10, 1983, with a leakage of 78.258 SCF/D.

Penetration #28

The initial leak test was performed July 7, 1983. Valve [MOV-CH-142] would not hold the applied pressure. Maintenance Work Request MWR 837508 was initiated and the torque switch changed and the Limitorque Modutronic adjusted. The retest was performed July 16, 1983, with a leakage of 8.026 SCF/D.

Penetration #38

The initial leak test was performed August 3, 1983. Valve [TV-DA-100A] leaked at 74.417 SCF/D. Maintenance Work Request MWR 830493 was initiated to repair a limit switch failure. The retest was performed August 4, 1983, with a leakage of 74.488 SCF/D.

CORRECTIVE ACTIONS SUMMARYPenetration #42

The initial leak test was performed July 14, 1983. Valve [SA-14] leaked at 389.954 SCF/D. Maintenance Work Request MWR 837512 was initiated and the plug was cleaned. The retest was performed August 24, 1983, with a leakage of 134.302 SCF/D.

Penetration #43

The initial leak test was performed June 15, 1983. Valve [TV-CV-102] leaked at 920.677 SCF/D. The valve was removed and reinstalled in the opposite direction under Design Change Package DCP 320. The retest was performed September 9, 1983, with a leakage of 0.462 SCF/D.

Penetration #45

The initial leak test was performed June 24, 1983. Valve [TV-RC-519] leaked at 27.854 SCF/D. Maintenance Work Request MWR 831185 was initiated to repair an air regulator failure. The retest was performed June 28, 1983, with a leakage of 1.113 SCF/D.

Penetration #55-4

The initial leak test was performed June 18, 1983. Valve [TV-SS-111A1] leaked at 3.157 SCF/D. Maintenance Work Request MWR 830495 was initiated to repair a limit switch failure. The retest was performed August 2, 1983, with a leakage of 0.464 SCF/D.

Penetration #63

The initial leak test was performed June 17, 1983. Valve [MOV-QS-101B] leaked at 139.269 SCF/D. Maintenance Work Request MWR 830643 was initiated to change the bonnet gasket and repack the valve. The retest was performed June 28, 1983, with a leakage of 184.135 SCF/D.

Penetration #64

The initial leak test was performed June 18, 1983. Valve [MOV-QS-101A] leaked at 278.538 SCF/D. Maintenance Work Request MWR 836586 was initiated to change the bonnet gasket, to change the valve, and to adjust the limits. The retest was performed June 28, 1983, with a leakage of 2.343 SCF/D.

CORRECTIVE ACTIONS SUMMARYPenetration #91

The initial leak test was performed June 16, 1983. Valve [VS-D-5-5A] would not hold the applied pressure. Maintenance Work Request MWR 837014 was initiated and the valve was cleaned and limits adjusted. The retest was performed June 25, 1983, with a leakage of 0.462 SCF/D.

Containment Side Isolation Valve

The initial leak test was performed July 11, 1983. Valve [VS-153] would not hold the applied pressure. Maintenance Work Request MWR 837511 was initiated and the valve was replaced. The retest was performed July 15, 1983, with a leakage of 7.414 SCF/D.