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A. Giambusso	1 signed			

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DESCRIPTION:

Ltr re their 3-19-74 letter trans the following...

ENCLOSURES:

Suppl Info to Integrated Leakage Rate Test

DO NOT REMOVE

ACKNOWLEDGED

(1 cy encl rec'd)

PLANT NAME: DUANE ARNOLD

FOR ACTION/INFORMATION 6-11-74 GMC

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General Office
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June 5, 1974
IE-74-468

CHARLES W. SANDFORD
EXECUTIVE VICE PRESIDENT

Mr. Angelo Giambusso
Deputy Director for Reactor Projects
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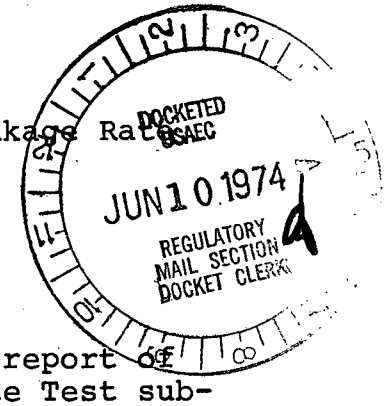

Re: Duane Arnold Energy Center #1
Subject: Reactor Containment Integrated Leakage Rate Test - Supplemental Information
Operating License No. DPR-49
File: T-23i

Dear Mr. Giambusso:

The purpose of this letter is to update the report of the DAEC #1 Reactor Containment Integrated Leakage Rate Test submitted to you on March 19, 1974 to include the results of tests performed on penetrations which were designated test "exceptions" in that report and also to provide information on work performed on containment penetrations subsequent to the completion of the ILRT, and prior to the phase of the startup program requiring containment integrity. This information is as follows:

1. ILRT Exceptions -

Identification	Description	Exception	Local Test Results cc/min@54psig
SV-4331A	CAD Isolation	Not installed for ILRT.	0
SV-4331B	CAD Isolation	Not installed for ILRT.	0.9
SV-4332A	CAD Isolation	Not installed for ILRT.	2.3
SV-4332B	CAD Isolation	Not installed for ILRT.	1.6
SV-4333A	CAD Isolation	Not installed for ILRT.	0
SV-4333B	CAD Isolation	Not installed for ILRT.	0
SV-4334A	CAD Isolation	Not installed for ILRT.	0
SV-4334B	CAD Isolation	Not installed for ILRT.	0
MO-2290A	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	8.8
MO-2290B	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	5.2

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Identification	Description	Exception	Local Test Results cc/min@54psig
V-22-63*	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	0
V-22-64*	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	0
V-24-46*	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	0
V-24-47*	HPCI/RCIC Exh. Vac. Breaker	Not installed for ILRT.	0
V-17-96**	Recirc. Pump Seal Purge	Not installed for ILRT.	0
V-17-83**	Recirc. Pump Seal Purge	Not installed for ILRT.	26.6
V-17-52	CRD Return	Valved out for ILRT.	0
V-17-53	CRD Return	Valved out for ILRT.	15.5
MO-1949A,B	RHR HXR Vent	Not installed for ILRT.	0
MO-2044A,B	RHR HXR Vent	Not installed for ILRT.	0
PSV-2043	RHR Relief	Blanked during ILRT.	0

*Although these check valves, which were not installed for ILRT, are containment boundary valves, any leakage past these valves would not be considered as containment outleakage as the downstream piping returns to the containment.

**Although these check valves, which were not installed for ILRT, are containment boundary valves, they would not increase the Type A test results as the outboard isolation valve leakage was limiting. Only Type C test results are affected by these valves.

As can be seen from the tabulation, the total additional leakage attributable to the ILRT exception items is less than 100 cc/min @ 54 psig (approx. 0.1% La). Accordingly, the affect on ILRT measured leakage is negligible.

2. Bypass Test Exceptions

After ILRT the eight (8) drywell vent/torus ring header intersection drains were extended to the same length as the downcomers. Each drain line was subsequently local leak rate tested with essentially zero leakage in each case.

3. Fail Closed Air Operated Containment Isolation Valves

Prior to ILRT air operated isolation valves were in general, "failed" closed by disconnecting the air supply at the valve diaphragm, allowing the action of the spring to close the valve. Subsequent to ILRT, during isolation valve closure time testing, it was determined that in some instances the valve diaphragm exhaust tubing and solenoid presented excessive resistance with the result that the diaphragm was not exhausted to atmosphere at a sufficient rate to allow the spring to drive the valve closed within the required closing time. This problem was corrected for the affected valves by changing tubing, fittings, and solenoid as required to achieve desired closing times. At the conclusion of this work local leak rate testing of all affected valves* was carried out with the result that in certain cases the observed valve leakage was slightly greater than that obtained prior to ILRT when the valves were "failed" closed by breaking the tubing connection at the operator. The incremental increase in leakage for valves in this category compared to the pre-ILRT leakage observed for the same valves is less than 150 cc/min @ 54 psig. It is concluded that any affect on ILRT measured leakage would be insignificant.

4. Nuclear Butterfly Valve "T" Ring Seals

During the containment ILRT, leak surveys of penetrations indicated that some leakage was occurring through drywell purge outlet valves CV-4302, CV-4303, CV-4310. Although the leakage was of no concern relative to the successful completion of the ILRT, previous local leak rate testing of these valves had indicated essentially zero leakage. Accordingly, after ILRT, it was decided to carry out additional local leak rate testing of these valves. This testing revealed that CV-4303 "T" ring seal was apparently defective and leaking air into the space between the isolation valves.

Disassembly of CV-4303 and inspection of the "T" ring indicated a failure of the cold vulcanized butt joint. Upon discovery of this failure, the investigation was extended to include other containment nuclear butterfly valves employing the same "T" ring design, namely: CV-4300, CV-4301, CV-4302, CV-4306, CV-4307, and CV-4308. This investigation was carried out with the assistance of a representative of the valve manufacturer. As a result of the investigation, it was determined that the vulcanization failure affected, in varying degree, all of the aforementioned valves. In some cases, partial separation of the butt joint had occurred. In other cases, the butt joint was observed to be intact upon removal but was easily separated by hand afterwards.

*Local leak rate results are shown on Table 1.

The valve manufacturer's engineering evaluation indicated that the probable cause of failure was due to the use of a brittle epoxy bond material which degraded under valve and seal system actuation. The valve manufacturer's recommended solution to the problem was replacement of "T" rings in the aforementioned valves with "T" rings employing an improved bonding method which utilizes a hot vulcanizing procedure.

In order to more thoroughly assess the affect of "T" ring splice degradation on valve leakage a special test was performed on CV-4300 whereby a "T" ring was completely severed at the splice and then installed in the valve. Subsequent testing revealed that valve leakage was insensitive to the loss of integrity of the splice.

Inboard vacuum breaker isolation valves CV-4304 and CV-4305 employ a "T" ring seal of somewhat different design than the aforementioned valves and are made from a different mold. Replacement "T" rings of this configuration employing the improved vulcanization method were not available from the manufacturer at the time the aforementioned repair effort was undertaken. Leakage measurements of seal air inleakage on CV-4304 showed zero leakage whereas CV-4305 had slight seal inleakage indicative of potential "T" ring joint degradation (valve leakage test results were essentially identical to pre-ILRT Type C tests.) CV-4305 was dismantled and the "T" ring butt joint was observed to be partially opened. A temporary repair was made to the splice using Eastman 910 adhesive. Subsequent reassembly and leaktesting indicated that valve leakage was essentially identical to that obtained prior to ILRT and seal inleakage was zero.

Review by the Operations Review Committee and Safety Committee of CV-4304 and CV-4305 leak testing results and the results of special testing on CV-4300 which indicated that valve leakage was not sensitive to "T" ring splice degradation resulted in concurrence that startup activities could safely proceed with the existing "T" rings installed. Replacement "T" rings for both CV-4304 and CV-4305 will be installed at the first outage of sufficient duration to accomplish the work.

In conclusion, all nuclear butterfly valves employing "T" ring seals have been demonstrated to have essentially the same level of leaktightness as recorded prior to ILRT.* In addition, "T" ring seal inleakage has been demonstrated to be essentially zero in all cases. During the first refueling outage "T" ring seal inleakage will be checked to assure that the integrity of the vulcanized joint is being maintained.

*Local leak rate test results are shown on Table 1.

5. Repair of Drywell Penetration X-44B

During the structural proof test leak survey at 70 psig, a miniscule leak was observed at the closure plate weld of X-44B spare penetration. The weld was repaired after ILRT with the concurrence of the authorized code inspector. The weld repair was tested by welding a temporary ASTM A-36 plate with test connection to the inside portion of the nozzle. After testing which confirmed that no leakage existed, the temporary plate was removed.

6. Replacement of Recirc Pump Seal Purge Piping

Prior to ILRT it had been determined that the two 3/4" DCA-20 lines between the containment nozzles on X-32E and X-32F and up to, but not including CV-1804A and CV-1804B had been provided to Nuclear Class II instead of the required Nuclear Class I classification.

Subsequent to ILRT this piping was replaced and passed a successful hydro and local leak rate test*.

7. Penetration X-29 and N-209B Piping Revision

The drywell and torus pressure sensing lines serving the subject penetrations were modified after ILRT to accommodate the on line pressure sensors to be used for continuous leak rate monitoring. The sensing lines and instruments were local leak rate tested after installation with zero leakage observed.

8. Other

Other minor alterations and/or retesting of containment penetrations subsequent to ILRT are included in Table 1.

9. Summary Conclusions

Containment ILRT and Bypass Test "exceptions" have been cleared with the result that additional leakage to be added to ILRT results is insignificant.

Subsequent to ILRT and prior to the phase of the startup program requiring containment integrity, work has been performed on various containment penetrations as outlined in Table 1. In each case, local leak rate testing has been performed and leakage documented. Tables 2 and 3 provide a revised summary of test results for Type B and Type C tests required by the Technical Specifications. These results indicate that reactor containment leaktightness is at essentially the same level as demonstrated by the ILRT.

*Local leak rate results are shown on Table 1.

Please advise us if you should desire additional information or clarification regarding this matter.

Very truly yours,

Larry D. Root for
C. W. Sandford
Executive Vice President

DMF:CWS:hh

cc: Mr. J. A. Wallace
Mr. G. G. Hunt
Mr. L. D. Root
Mr. H. W. Rehrauer
Mr. D. M. Flanagan
Mr. J. N. Ward
Mr. G. A. Cook
Mr. G. Rhodes
Mr. T. M. Broad
Mr. E. L. Hammond
Mr. J. G. Keppler

TABLE 1

Summary of Local Leak Rate Testing Subsequent

To ILRT and Prior to Startup Phase Requiring Containment Integrity

Pen. #	Description	Reason For Test	Local Leak Rate Test Results cc/min@54 psig *	**
1	Personnel Lock & Doors	See Note 1	472.0	
2	Equipment Access	See Note 1		0
-	Drywell Head Flange	See Note 1		0
7	Main Steam Isolation Valve CV-4420	Valve Stem Replacement	132.0***	
9B	Feedwater Swing Check V-14-1	Bonnet Gasket Replacement	3.4	
9B	Expansion Bellows	Leak Test of Test Connection Manifold		0
10	RCIC Steam	See Note 2	38.9	
15	Expansion Bellows	Leak Test of Test Connection Manifold		0
19	Drywell Floor Drain Discharge CV-3704, CV-3705	See Note 3	4.6	
22	Containment Compressor Discharge CV-4371A,B,C	See Note 3	82.7	
23A	Well Cooling Water Supply CV-5718A, CV-5719A	See Note 3	0.0	
23B	Well Cooling Water Supply CV-5718B, CV-5719B	See Note 3	8.8	
24A	Well Cooling Water Return CV-5703A, CV-5704A	See Note 3	32.2	
24B	Well Cooling Water Return CV-5703B, CV-5704B	See Note 3	66.1	
25	Drywell Purge Outlet CV-4302, CV-4303, CV-4310	See Note 4	40.7	

* Calculated leakage from pressure decay data.

** Leakage from flowmeter data.

*** Combined Leakage of CV-4420, CV-4421 = 1.31 scfh @ 24 psig.

Table 1 (Cont'd)

Pen #	Description	Reason For Test	Local Leak Rate Test Results cc/min@54 psig *	**
25	CV-4302, Inboard Flange "O" Ring	See Note 4		0
26	Drywell/Torus N_2 Makeup CV-4311, CV-4312, CV-4313	See Note 3	126.2	
26	Drywell/Torus Purge Supply CV-4306, CV-4307, CV-4308	See Note 4	0.0	
26	CV-4307 Inboard Flange "O" Ring	See Note 4		0
26	CV-4308 Inboard Flange "O" Ring	See Note 4		0
26	PS-4346	See Note 5		0
29	PI-4368A	See Note 6		0
29	PT-4365B, PS-4365B	See Note 2		0
32D	Containment Compressor Suction, CV-4378A, CV-4378B, CV-4378C	See Note 3	29.3	
32E	Recirc. Pump "A" Seal Purge	See Note 7	3.9	
32E	Recirc Pump "A" Seal Purge V-17-96	See Note 8	0.0	
32F	Recirc Pump "B" Seal Purge	See Note 7	14.8	
32F	Recirc Pump "B" Seal Purge V-17-83	See Note 8	26.6	
36	CRD Return, V-17-52	See Note 8	0.0	
36	CRD Return, V-17-53	See Note 8	15.6	
39	CAD Isolation, SV-4331A	See Note 8	0.0	
39	CAD Isolation, SV-4331B	See Note 8	0.9	
39	CAD Isolation, SV-4332A	See Note 8	2.3	
39	CAD Isolation, SV-4332B	See Note 8	1.6	

* Calculated leakage from pressure decay data.

** Leakage from flowmeter data.

Table 1 (Cont'd)

Pen #	Description	Reason For Test	Local Leak Rate Test Results cc/min@54 psig *	**
40D	PS-4313B	See Note 2		0
41	Recirc Sample, CV-4639, CV-4640	See Note 3	0.0	
42	Standby Liquid Control XS-2618A, XS-2618B	See Note 2		0
44B	Spare Penetration Closure Plate	See Note 9	-	-
48	Drywell Equipment Drain Discharge CV-3728, CV-3729	See Note 3	8.8	
51	PS-4365A, PS-4315C	See Note 2		0
200A	Torus Access Hatch	See Note 1		0
200B	Torus Access Hatch	See Note 1		0
205	Torus Purge Outlet CV-4300, CV-4301, CV-4309	See Note 4	89.7	
205	Inboard Flange "O" Ring CV-4300	See Note 4		0
207A-H	Drywell Vent/Torus Ring Header Intersection Drains (8)	See Note 10	-	-
209B	PI-4368B	See Note 6		0
211	CAD Isolation SV-4333A	See Note 8	0.0	
211	CAD Isolation SV-4333B	See Note 8	0.0	
211	CAD Isolation SV-4334A	See Note 8	0.0	
211	CAD Isolation SV-4334B	See Note 8	0.0	
212	RCIC Exhaust Vacuum Breaker V-24-46	See Note 8		0
212	RCIC Exhaust Vacuum Breaker V-24-47	See Note 8		0
214	HPCI Exhaust Vacuum Breaker V-22-63	See Note 8		0

* Calculated leakage from pressure decay data.

** Leakage from flowmeter data.

Table 1 (Cont'd)

Pen #	Description	Reason For Test	Local Leak Rate Test Results cc/min@54 psig *	**
214	HPCI Exhaust Vacuum Breaker V-22-64	See Note 8		0
219	RHR HXR Vent MO-2044A	See Note 8		0
219	RHR HXR Vent MO-2044B	See Note 8		0
219	HPCI/RCIC Exhaust Vacuum Breaker MO-2290A	See Note 8	8.6	
219	HPCI/RCIC Exhaust Vacuum Breaker MO-2290B	See Note 8	5.2	
219	RHR Relief PSV-2043	See Note 8		0
223	RHR HXR Vent MO-1949A	See Note 8		0
223	RHR HXR Vent MO-1949B	See Note 8		0
231	Torus/Rx Building Vacuum Breaker CV-4305	See Note 11	39.5	
231	Inboard Flange "O" Ring CV-4305	See Note 11		0
231	PDIS-4304, PDIS-4305	See Note 5		0

* Calculated leakage from pressure decay data.

** Leakage from flowmeter data.

NOTES FOR TABLE 1

Note 1 - Retest of containment accesses and hatches opened subsequent to ILRT and closed prior to startup phase requiring containment integrity.

Note 2 - Leak test after performing routine maintenance.

Note 3 - Testing performed after modification or adjustment of air operated valve diaphragm exhaust path.

Note 4 - Testing performed after replacement of "T" ring seal.

Note 5 - Locally mounted instrument was inadvertently left off containment ILRT instrument valve lineup checklist and local tested as a precaution.

Note 6 - Local testing performed after revision to instrument line.

Note 7 - Retest after modification of piping between containment penetration and outboard isolation valve.

Note 8 - Test performed to clear containment ILRT Test "Exception".

Note 9 - Testing performed after repair of X44B spare penetration closure plate weld. Zero leakage by soap bubble method.

Note 10- Testing performed to clear bypass test "exception". All eight drains showed essentially zero leakage @ 1.7 psig using the same precision gage in use for original bypass test.

Note 11- Testing performed after repair of "T" ring seal.

TABLE 2

TYPE B TEST SUMMARY

Date	Pen. #	Type	Flow cc/min @ 54 psig	Description
12/16/73	1	Testable Gaskets	0	Personnel Lock Equipment Door
4/25/74	1	Personnel Lock	472.0	Personnel Lock Doors & Penetrations
3/28/74	2	Testable Gaskets	0	Equipment Access
12/21/73	4	Testable Gaskets	0	Head Access
11/03/73	6	Testable Gaskets	0	CRD Removal Hatch
09/15/73	35A	Testable Gaskets	0	TIP Drives
09/15/73	35B	Testable Gaskets	0	TIP Drives
09/17/73	35C	Testable Gaskets	0	TIP Drives
09/17/73	35D	Testable Gaskets	0	TIP Drives
09/18/73	53	Testable Gaskets	0	Spare
4/25/74	---	Testable Gaskets	0	Drywell Head
10/02/73	58A	Testable Gaskets	0	Stabilizer Access Ports
10/02/73	58B	Testable Gaskets	0	Stabilizer Access Ports
10/02/73	58C	Testable Gaskets	0	Stabilizer Access Ports
10/02/73	58D	Testable Gaskets	0	Stabilizer Access Ports
10/02/73	58E	Testable Gaskets	0	Stabilizer Access Ports
10/03/73	58F	Testable Gaskets	0	Stabilizer Access Ports
10/02/73	58G	Testable Gaskets	0	Stabilizer Access Ports
10/03/73	58H	Testable Gaskets	0	Stabilizer Access Ports
3/27/74	200A	Testable Gaskets	0	Access Hatch
4/25/74	200B	Testable Gaskets	0	Access Hatch
09/20/73	100B	Electrical Canister	0	Neutron Monitoring
09/29/73	100C	Electrical Canister	0	Neutron Monitoring
09/29/73	100E	Electrical Canister	0	Neutron Monitoring
09/29/73	100F	Electrical Canister	0	Neutron Monitoring
09/20/73	100G	Electrical Canister	0	RPV Vibration Monitoring
09/20/73	101A	Electrical Canister	0	Recirc Pump Power
10/05/73	101C	Electrical Canister	0	Recirc Pump Power

TABLE 2 (Cont'd)

Date	Pen. #	Type	Flow cc/min @ 54 psig	Description
09/28/73	103	Electrical Canister	0	Thermocouples
09/28/73	104A	Electrical Canister	0	CRD Rod Position Ind.
09/20/73	104B	Electrical Canister	0	CRD Rod Position Ind.
09/20/73	104C	Electrical Canister	0	CRD Rod Position Ind.
09/24/73	104D	Electrical Canister	0	CRD Rod Position Ind.
09/20/73	105B	Electrical Canister	0	Power & Control
09/21/73	105D	Electrical Canister	0	Power & Control
09/20/73	106A	Electrical Canister	0	Power & Control
09/21/73	106C	Electrical Canister	0	Power & Control
09/28/73	230B	Electrical Canister	0	Vacuum Breakers Electrical Cables
10/09/73	7A	Expansion Bellows	0	Steam to Turbine
10/06/73	7B	Expansion Bellows	0	Steam to Turbine
10/06/73	7C	Expansion Bellows	0	Steam to Turbine
10/06/73	7D	Expansion Bellows	0	Steam to Turbine
10/06/73	9A	Expansion Bellows	0	RPV Feedwater
1/03/74	9B	Expansion Bellows	0	RPV Feedwater
08/28/73	10	Expansion Bellows	0	Steam to RCIC Turbine
08/28/73	11	Expansion Bellows	0	Steam to HPCI Turbine
08/28/73	12	Expansion Bellows	0	Shutdown Pump Supply RHR
08/28/73	13A	Expansion Bellows	0	RHR Pump Discharge
08/29/73	13B	Expansion Bellows	0	RHR Pump Discharge
1/07/74	15	Expansion Bellows	0	RWCU Supply
09/07/73	16A	Expansion Bellows	0	Core Spray Pump Discharge
09/06/73	16B	Expansion Bellows	0	Core Spray Pump Discharge
09/12/73	17	Expansion Bellows	0	RPV Head Spray
12/12/73	201A	Expansion Bellows	0	Vent Line
12/13/73	201B	Expansion Bellows	0	Vent Line
12/12/73	201C	Expansion Bellows	0	Vent Line
12/13/73	201D	Expansion Bellows	0	Vent Line

TABLE 2 (Cont'd)

Date	Pen. #	Type	Flow cc/min @ 54 psig	Description
12/14/73	201E	Expansion Bellows	0	Vent Line
12/13/73	201F	Expansion Bellows	0	Vent Line
12/14/73	201G	Expansion Bellows	0	Vent Line
12/13/73	201H	Expansion Bellows	0	Vent Line
2/20/74	25	Flange "O" Rings[1]	0	Drywell Purge Outlet CV-4302
2/22/74	26	Flange "O" Rings	0	Drywell & Torus Purge Supply CV-4307
2/20/74	220	Flange "O" Rings	0	Drywell & Torus Purge Supply CV-4308
3/23/74	205	Flange "O" Rings	0	Torus Purge Outlet CV-4300
3/15/74 10/23/73	231	Flange "O" Rings	0	Torus Vacuum Breakers CV-4304, CV-4305

SUBTOTAL TYPE B TESTS = 472.0 cc/min @ 54 psig

[1] Test on inboard flange only of designated valves.

TABLE 3

TYPE C TEST SUMMARY

Date	Pen. #	Description	Leakage cc/min @ 54 psig
11/11/73	7A	Main Steam Line	63.4
11/11/73	7B	Main Steam Line	135.1
11/11/73	7C	Main Steam Line	143.8
01/25/74	7D	Main Steam Line	132.0
11/21/73	8	Main Steam Line Drain	3.0
12/12/73	9A	Feedwater & HPCI Feed	27.6
11/13/73	9B	Feedwater & RCIC Feed & RWCU Return	4.1
04/24/74	10	Steam to RCIC Turbine	38.9
08/09/73	11	Steam to HPCI Turbine	11.5
12/05/73	12	RHR Shutdown Cooling Supply	0.0
11/09/73	15	RWCU Supply	18.0
12/01/73	16A	Core Spray Pump Discharge	5.2
12/13/73	16B	Core Spray Pump Discharge	1.0
3/09/74	19	Drywell Floordrain Discharge	4.6
3/11/74	22,229	Containment Compressor Discharge	82.7
4/02/74	23A	Well Cooling Water Supply	0.0
3/06/74	23B	Well Cooling Water Supply	8.8
2/08/74	24A	Well Cooling Water Return	32.2
2/13/74	24B	Well Cooling Water Return	66.1
3/21/74	25	Drywell Purge Outlet	40.7
3/23/74	26,220	Drywell and Torus Purge Supply	0.0
4/02/74	26,220	Drywell and Torus Nitrogen Makeup	126.2
2/28/74	32D	Containment Compressor Suction	29.3
2/03/74	32E*	Recirc Pump "A" Seal Purge	3.9
3/25/74	32F*	Recirc Pump "B" Seal Purge	26.6
2/14/74	36	CRD Return	15.6

Table 3 (Cont'd)

Date	Pen. #	Description	Leakage cc/min. @ 54 psig
2/15/74	41	Recirc Loop Sample	0.0
12/18/73	46E	O_2 Analyzer	2.9
4/25/74	48	Drywell Equipment Drain Discharge	8.8
12/17/73	50B	O_2 Analyzer	0.0
12/17/73	50E	O_2 Analyzer	4.3
12/18/73	50D	O_2 Analyzer	2.1
12/03/73	54	Reactor Bldg Closed Cooling Water Return	69.6
11/14/73	55	Reactor Bldg Closed Cooling Water Supply	4.0
12/18/73	56C	O_2 Analyzer	4.1
12/18/73	56D	O_2 Analyzer	0.0
3/26/74	205	Torus Purge Outlet	89.7
12/20/73	229B	O_2 Analyzer	0.7
12/19/73	229C	O_2 Analyzer	2.1
12/21/73	229G	O_2 Analyzer	4.2
12/19/73	229F	O_2 Analyzer	1.4
4/16/74 12/11/73	231	Torus Vacuum Breakers	78.9
3/06/74	219**	HPCI/RCIC Exhaust Vacuum Breaker	8.6

	SUBTOTAL TYPE C TESTS	1303.3	cc/min @ 54 psig
+	SUBTOTAL TYPE B TESTS	472.0	cc/min @ 54 psig
	TOTAL TYPE B + TYPE C	1775.3	cc/min @ 54 psig
	60% La	48060.0	cc/min @ 54 psig