1985 REFUELING OUTAGE TYPE B AND C
LOCAL LEAK RATE TEST SUMMARY

As part of the 1985 refueling outage, local leak rate tests were performed on the reactor containment building penetrations in accordance with the Fort Calhoun Station Technical Specifications (Section 3.5) and 10 CFR 50, Appendix J. The testing is performed to identify, measure and, if required, initiate maintenance on potential reactor containment leakage paths; and to ensure the total measured leakage does not exceed the Technical Specification limit of 0.6 La, (La = Leakage allowable and .6La = 62,951 standard cubic centimeters per minute). The initial "as found" local leakage which contributes toward the .6 La limit and as measured from all local leakage paths was 42,449 sccm. (The individual lead rates for each penetration are tabulated on attached TABLES I through VI). The final "after maintenance" leak rate was 7,443 sccm.

The Type B tests were conducted by pressurizing the local containment penetration boundaries with air or nitrogen (air for the mechanical penetrations - nitrogen for the electrical penetrations) to Pa, 60 psig accident pressure, and measuring the flow rate which is required to maintain the test volume at Pa. This flow rate is assumed to be the local containment leak rate. The leak rate measurement system uses a series of calibrated rotameters to determine the leakage.

The Type B tests are conducted to measure the leakage through the containment mechanical and electrical penetration seals, and containment building resilient sealed penetrations. These tests are conducted as part of the Fort Calhoun Station surveillance test program. All tests by which the following leak rate data was obtained, are filed at the Fort Calhoun Station as Q. A. documents.

The fuel transfer tube leak rate test (ST-CONT-2, F.4) was conducted on 10-05-85 and on 12-23-85. The measured results are tabulated on TABLE I (attached) and do contribute to the .6La leakage limit.

The equipment hatch leak rate was tested as outlined in surveillance test ST-CONT-2, F.1 (the reduced pressure test); these daily tests are on file at the Fort Calhoun Station. The personnel air lock (PAL) was also tested four times since the previous refueling outage (once each six months per ST-CONT-2, F.2). Leakage is tabulated in TABLE III and does contribute towards the .6La leakage limit.

The personnel air lock was leak checked on 1-24-86 per the Technical Specification requirement 3.5(2). The "as found" leakage rate of 29,453 sccm was a large contributing factor in the total "as found" leakage rate of 43,449 sccm.

Using snoop, excessive leakage was detected around the packing rings. M.O. 860008 was generated to repack the inner and outer PAL door packing rings. On 1-29-86 the PAL door was retested and left at 1,000 sccm.

The "as found" leakage condition of the PAL doors was used during the Type "A" integrated leak rate test. The "as left" leakage of the PAL doors would decrease the actual 1985 operating cycle leak rate.

The electrical penetrations were leak tested per ST-CONT-2, F.5. The measured results of the electrical penetrations are tabulated on TABLE IV (attached) and these do contribute to the .6La leakage limit.

The mechanical penetration sleeving was leak tested in accordance with ST-CONT-2, F.2. M-49 and M-95 were both found to have bad test connectors. M.O. 853426 was generated to replace fittings. Both M-49 and M-95 were retested and found at "0" leakage. The test fitting leakage would not have affected the containment Type "A" test. Results are tabulated on TABLE V (attached) and these do contribute to the .6La maximum allowable leakage limit.

Type C tests were performed to measure the leakage of containment isolation

valves. (Refer to surveillance tests ST-CONT-3, F.1, F.2, F.3, and F.4.) These tests are conducted using air as the test medium; with the exception of penetrations M-9, M-12, M-16, M-91, M-93, M-94, M-95, M-96, and M-97, which use water as the test medium. Results of leak rates performed are tabulated on TABLE VI (attached). Leak rates which do not contribute toward the .6La leakage limit are also outlined in TABLE VI.

The containment isolation valves which required significant maintenance are as follows: M-45, M-87 and M-88. The work completed on each of the penetrations is described below.

M-45 (Reactor Coolant System Sample Line): Initial leak rate measured through this penetration on 10-04-85 was found to be 3,7000 sccm. Crud under the valve seat was suspected as the leading contributor, so HCV-2504A and 2504B were cycled several times and the sample line flushed. A retest on 1-7-86 determined a leak rate of 500 sccm.

M-87 (Containment Purge Inlet): Initial leak rate measure through this penetration on 9-26-85 was determined to be 3,100 sccm. M.O. 858161 was written to adjust seating surfaces to reduce leakage through PCV-742A and PCV-742B. M-87 was retested on 12-31-85 and a leak rate of 650 sccm determined.

M-88 (Containment Purge Inlet): The initial test on penetration M-88 was 1050 sccm. M.O. 854115 was generated to replace the valve seat on PCV-742C and PCV-742D. The penetration was retested and a leak rate of 1350 sccm determined.

The Fort Calhoun Station Unit No. 1 reactor containment building was subjected to a fourth integrated leak rate test (Type A) during the period 10-7-85 to 10-10-85. The purpose of this test was to demonstrated the acceptability of the containment building leakage rate at a design basis accident internal pressure of 60.0 psig. Testing was performed in

conformance with the requirements of 10 CFR Part 50, Appendix J, and Fort Calhoun Station Unit No. 1 Technical Specifications. In addition, the recommendation of ANSI 56.8-1981 and ANSI N45.4-1972 were considered, where appropriate. The results of the Type A test were forwarded to the NRC on 3-6-86 in letter LIC-86-056.

Leakage rate testing was accomplished at the pressure level of 60.0 psig for a period of 10 hours. The 10 hour period was followed by a 4 hour supplemental test for a verification of test instrumentation. The Type A integrated test results = 0.044%/day (acceptance limit = 0.075%/day).

TABLE I

TYPE B TEST

Fuel Transfer Tube Leak Rate Test - (ST-CONT-2, F.4)

As found leakage measured 10-05-85	-	2 sccm
As found leakage measure 12-23-85	-	2 sccm

TABLE II

TYPE B TEST

Equipment Hatch "O" Seal Test - (ST-CONT-2, F.3)

As Found	As Left
10-03-85 - 0 sccm	0 sccm
12-27-85 - 0 sccm	0 sccm

TABLE III

TYPE B TEST

Personnel Air Lock Leak Rate Test - (ST-CONT-2, F.2)

Date Test	Leakage Measured
01-23-85	3560 sccm
06-06-85	3600 sccm
01-24-86	29,453 sccm (1.04 scfm)
01-29-86	1,000 sccm

TABLE IV

TYPE B TEST

Electrical Penetrations - (ST-CONT-2, F.5)

Penetration	As Found (sccm)	As Left (sccm)
A-1	0	0
A-2	0	0
A-4	0	0
A-5	0	0
A-6	0	0
A-7	0	0
A-8	0	0
A-9	0	0
A-10	0	0
A-11	0	0
B-1	0	0
B-2	0	0
B-4	0	0
B-5	0	0
B-6	0	0
B-7	0	0
B-8	0	0
B-9	0	0
B-10	0	0
B-11	0	0

TABLE IV (Continued)

TYPE B TEST

Electrical Penetrations - (ST-CONT-2, F.5)

Penetration	As Found (sccm)	As Left (sccm)
C-1	0	0
C-2	0	0
C-4	0	0
C-5	0	0
C-6	0	0
C-7	0	0
C-8	0	0
C-9	0	0
C-10	8	0
C-11	0	0
D-1	0	0
D-2	0	0
D-4	0	0
D-5	0	0
D-6	0	0
D-7	0	0
D-8	0	0
D-9	0	0
D-10	0	0
D-11	0	0

TABLE IV (Continued)

TYPE B TEST

Electrical Penetrations - (ST-CONT-2, F.5)

Penetration	As Found (sccm)	As Left (sccm)
E-1	0	0
E-2	0	0
E-4	0	0
E-5	0	0
E-6	0	0
E-7	0	0
E-8	0	0
E-9	0	0
E-10	0	0
E-11	0	0
F-1	0	0
F-2	0	0
F-4	0	0
F-5	0	0
F-6	0	0
F-7	0	0
F-8	0	0
F-9	0	0
F-10	0	0
F-11	0	0
G-1	0	0
G-2	0	0
G-3	0	0
G-4	0	0

TABLE IV (Continued)

TYPE B TEST

Electrical Penetrations - (ST-CONT-2, F.5)

Penetration	As Found (sccm)	As Left (sccm)
H-1	0	0
H-2	0	0
H-3	0	0
H-4	0	0
E-HCV-383-3A	0	0
E-HCV-383-3B	1	0
E-HCV-383-4A	1	0
E-HCV-383-4B	213	0
TOTALS =	223	0

TABLE V

TYPE B TEST

Mechanical Sleeve Leak Rate (ST-CONT-2, F.6)

Penetration	As Found (sccm)	As Left (sccm)
M-1	0	0
M-2	0	0
M-3	0	0
M-4	0	0
M-5	0	0
M-6	0	0
M-7	0	0
M-8	0	0
M-9	0	0
M-10	0	0
M-11	0	0
M-12	0	0
M-13	0	0
M-14	0	0
M-15	0	0
M-16	0	0
M-17	0	0
M-18	0	0
M-19	0	0
M-20	0	0
M-21	0	0
M-22	0	0

TABLE V (Continued)

TYPE B TEST

Mechanical Sleeve Leak Rate (ST-CONT-2, F.6)

Penetration	As Found (sccm)	As Left (sccm)
M-23	0	0
M-24	0	0
M-25	0	0
M-26	0	0
M-27	0	0
M-28	0	0
M-29	0	0
M-30	0	0
M-31	0	0
M-32	0	0
M-33	0	0
M-34	0	0
M-35	0	0
M-36	0	0
M-37	0	0
M-38	0	0
M-39	0	0
M-40	0	0
M-41	0	0
M-42	0	0
M-43	0	0
M-44	0	0

TABLE V (Continued)

TYPE B TEST

Mechanical Sleeve Leak Rate (ST-CONT-2, F.6)

Penetration	As Found (sccm)	As Left (sccm)
M-45	0	0
M-46	0	0
M-47	0	0
M-48	7	7
M-49	0	0
M-50	0	0
M-51	0	0
M-52	9	9
M-53	0	0
M-54	0	0
M-55	0	0
M-56	0	0
M-57	0	0
M-58	0	0
M-59	0	0
M-60	0	0
M-61	0	0
M-62	0	0
M-63	0	0
M-64	0	0
M-65	0	0
M-66	0	0

TABLE V (Continued)

TYPE B TEST

Mechanical Sleeve Leak Rate (ST-CONT-2, F.6)

Penetration	As Found (sccm)	As Left (sccm)
M-67	0	0
M-68	0	0
M-69	0	0
M-70	0	0
M-71	0	0
M-72	0	0
M-73	0	0
M-74	0	0
M-75	0	0
M-76	0	0
M-78	0	0
M-79	0	0
M-80	0	0
M-81	0	0
M-82	0	0
M-83	0	0
M-84	0	0
M-85	2	2
M-86	0	0
M-87	0	0
M-88	0	0

TABLE V (Continued)

TYPE B TEST

Mechanical Sleeve Leak Rate (ST-CONT-2, F.6)

Penetration	As Found (sccm)	As Left (sccm)
M-89	0	0
M-90	0	0
M-91	0	0
M-92	0	0
M-93	0	0
M-94	0	0
M-95	70	0
M-96	0	0
M-97	0	0
M-98	0	0
M-99	0	0
M-383-3	0	0
M-383-4	900	0
TOTALS =	988	18

TABLE VI

TYPE C TEST

Piping

Penetration	As Found (sccm)	As Left/ After Maintenance (sccm)
M-2	0	0
M-7	0	0
M-8	0	0
** M-9	1	1
** M-10	220	220
M-11	0	0
** M-12	0	0
** M-13	23	23
M-14	5	5
M-15	19	19
M-16	23	23
M-18	0	0
M-19	0	0
M-20	0	0
M-22	0	0
M-24	0	0
M-25	2	2
M-30	0	0
M-31-1	0	0
M-31-2	0	0
M-38-1	0	0
M-38-2	0	0
M-39	11	11
M-40-1	2	2
M-40-2	0	0
M-42	0	0

** Penetration leak rates referenced to this mark
do not contribute toward the .6La maximum allowable leakage.

TABLE VI (Continued)

TYPE C TEST

Piping

Penetration	As Found (sccm)	As Left/ After Maintenance (sccm)
M-43	0	0
M-45	3700	500
M-46-1	2	2
M-46-2	0	0
M-47-1	0	0
M-47-2	2	2
M-48-1	0	0
M-48-2	0	0
** M-49	0	0
M-50-1	0	0
M-50-2	9	9
M-51-1	0	0
M-51-2	13	13
M-52-1	0	0
M-52-2	330	330
M-53	0	0
M-57-1	6	6
M-57-2	0	0
M-58-1	1	1
M-58-2	0	0
** M-63	132	132
M-69	0	0
M-72	0	0
M-73	0	0
M-74	0	0
M-79	0	0

** Penetration leak rates referenced to this mark do not contribute toward the .6La maximum allowable leakage.

TABLE VI (Continued)

TYPE C TEST

Piping

Penetration	As Found (sccm)	As Left/ After Maintenance (sccm)
M-80	0	0
M-86	3500	3500
M-87	3100	650
M-88	1050	1350
M-89	0	0
** M-91	67	67
** M-93	10	10
** M-94	4930	4930
** M-95	.400(SCFM)	.400 (SCFM)
** M-96	0	0
** M-97	30	30
HCV-383-3	0	0
HCV-383-4	0	0
TOTALS =	11,773	6,423

** Penetration leak rates referenced to this mark do not contribute toward the .6La maximum allowable leakage.

NOTE: The totals listed above only include those leakages contributing toward the .6La leakage limit.

AS FOUND

Fuel Transfer Tube Leak Rate Test	2 SCCM
Equipment Hatch	0 SCCM
PAL	29,453 SCCM
Electrical Pen.	223 SCCM
Mechanical Sleeve	988 SCCM
Penetration	11,773 SCCM
TOTAL AS FOUND	42,439 SCCM

AS LEFT

Fuel Transfer Tube Leak Rate Test	2 SCCM
Equipment Hatch	0 SCCM
PAL	1,000 SCCM
Electrical Pen.	0 SCCM
Mechanical Sleeve	18 SCCM
Penetration	6,423 SCCM
TOTAL AS LEFT	7,443 SCCM