SUMMARY REPORT
REACTOR CONTAINMENT BUILDING INTEGRATED LEAK RATE TEST
POINT BEACH NUCLEAR PLANT UNIT 2, 1989

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REPORT OF REACTOR CONTAINMENT BUILDING INTEGRATED LEAKAGE RATE TEST FOR POINT BEACH UNIT 2

1.0 GENERAL DATA

1.1 Owner - Wisconsin Electric Power Company

1.2 Docket Number - 50-301

1.3 Location - Two Rivers, Wisconsin

1.4 Containment Description - 3½ foot pre-stressed post-tensioned concrete cylinder with ¼ inch welded ASTM A-442 steel liner

1.5 Date Test Was Completed - September 29, 1989

2.0 TECHNICAL DATA

2.1 Containment Net Free Volume - 1,000,000 cubic feet

2.2 Design Pressure - 60 psig

2.3 Design Temperature - 286°F

2.4 Calculated Accident Peak Pressure (Pac) - 53 psig

2.5 Calculated Accident Peak Temperature (Tac) - 278°F

3.0 TEST DATA

3.1 Test Method - Absolute

3.2 Data Analysis Technique - Total Time

3.3 Test Pressure 30.7 psig

3.4 Maximum Allowable Leak Rate, L_a - 0.400%/Day

3.5 Reduced Pressure Allowable Leak Rate, L_t - 0.268%/Day

3.6 Allowable Operational Leak Rate, .75 L_t - 0.201%/Day

3.7 Integrated Leakage Rate Test Results

Total Time Leak Rate	0.064%/Day
95% Upper Confidence Level	0.115%/Day

3.8 Verification Test Results

3.8.1	Imposed Verification Leak Rate	0.265%/Day (5.66 scfm)
3.8.2	Total Time Analysis	0.299%/Day
3.8.3	Verification Test Limits	
	Lower Limit	0.262%/Day
	Upper Limit	0.396%/Day

3.9	Penalties	
	Containment Volume Changes	0.0000%/Day
	Penetrations Not Aligned	0.0003%/Day
	Air Additions	0.0006%/Day
	Total	0.001%/Day
3.10	As-found Leak Rate Corrected for penalties at 95% upper confidence level	0.116%/Day

4.0 ANALYSIS AND INTERPRETATION

The fifth periodic Type A integrated leakage rate test (ILRT) of the Point Beach Nuclear Plant Unit 2 containment was performed September 28 to September 29, 1989 with satisfactory results. The testing program was conducted in accordance with the requirements of the Point Beach Technical Specifications, Section 15.4.4, "Containment Tests."

During the ILRT, the ten penetrations listed in Section 5.0 of this report were not in a post-LOCA alignment. This requires us to add the results of their local leak rate tests to our ILRT result. The addition to the ILRT result for these local leak rate tests is 0.0003%/day.

The pressurizer, safety injection accumulators, reactor coolant drain tank, pressurizer relief tank and containment sump A were all vented to the containment during the ILRT. Water level changes in these tanks resulted in an increase in the containment net free volume of 18.8±9.9 cubic feet during the test. The correction to the ILRT result for this volume change is 0.0000%/day.

Air additions to the containment from accumulators for the inner purge supply and purge exhaust valve seals were 0.058 lbm/hour. The correction to the ILRT result for this air addition is 0.0006%/day.

The total leakage rate correction for penetrations not in post-LOCA alignment, water volume changes and air additions is 0.001%/day.

The calculated leakage rate during the ILRT was 0.064%/day (total time). The calculated 95% upper confidence level was 0.115%/day (total time). Adding the total leakage rate corrections for penetrations not in post-LOCA alignment, containment water level changes and air additions, yields the corrected leakage rates as follows:

	Total Time Leakage Rates, %/day	
	Leakage Rate	UCL
Calculated	0.064	0.115
Corrections	0.001	0.001
As-Found	0.065	0.116

Since the corrected 95% upper confidence level for total time is less than $0.75L_t$ (0.201%/day), the test results demonstrate the leakage through the primary containment and systems and components penetrating primary

containment does not exceed the allowable leakage rates specified in the Point Beach Nuclear Plant Unit 2 FSAR and Technical Specifications.

5.0 TYPE C LEAKAGE CORRECTIONS

Due to the test configuration of the containment, ten penetrations were not subjected to the Type A test pressure. These penetrations, justification, and as-found Type C test results are identified below:

Penetration	Justification	Type C Results (Minimum Pathway)
CVCS Supply Line (#26)	In use for reactor coolant system purification	51 sccm
CVCS Letdown Line (#10)	In use for reactor coolant system purification	0 sccm
RCP "A" Seal Injection Line (#29A)	Maintain flow of clean water through RCP seals	34 sccm
RCP "B" Seal Injection Line (#29B)	Maintain flow of clean water through RCP seals	5 sccm
Service Air Line (#33C)	Modified to allow for containment depressurization	1 sccm
Containment Pressure Sensing Line (#31A)	Modified to provide a pressure sensing point for Type A test purposes	1 sccm
Auxiliary Charging Line (#32C)	Proper venting of line is not possible when seal injection lines are in use	1 sccm
PACVS Supply Line (#31C)	Modified to provide a flow verification patch	18 sccm
Sump A Drain (#71)	Line was not vented in order to maintain the ability to pump Sump A during the ILRT	25 sccm
RCDT Pump Suction (#9)	Line was not vented in order to maintain the ability to pump the RCDT	3 sccm

Penetrations 31A, 31C and 33C were modified as part of the Type A test line-up. Type C leakage tests were performed on these penetrations prior to modification to ensure an as-found condition. The remainder, which were not disturbed by the line-up, were tested in the as-found condition following the Type A test. All values are ±2 sccm.

6.0 TYPE B TESTS PERFORMED BETWEEN REFUELINGS

Procedure	Component	Date	Leak Rate
TS-10	Lower Personnel Hatch	5/1/87	578 sccm
TS-10	Upper Personnel Hatch	5/1/87	1787 sccm
TS-35	Purge Exhaust (V1)	5/15/87	0 sccm
TS-35	Purge Supply (V2)	5/15/87	12000 sccm
TS-10	Upper Personnel Hatch	5/3/88	138 sccm
TS-10	Lower Personnel Hatch	5/4/88	39 sccm
*TS-36	Purge Exhaust (V1)	5/27/88	3 sccm
*TS-36	Purge Supply (V2)	5/27/88	991 sccm
ORT-71	Electrical Penetration E58 (Pre-maintenance)	1/12/89	5 sccm
ORT-71	Electrical Penetration E58 (Post maintenance)	1/12/89	1 sccm
TS-10	Lower Personnel Hatch	5/2/89	1660 sccm
TS-10	Upper Personnel Hatch	5/2/89	591 sccm
TS-36	Purge Exhaust (V1)	5/19/89	34 sccm
TS-36	Purge Supply (V2)	5/19/89	1940 sccm

*TS-36, a Unit 2 specific procedure was implemented in late 1987 to test V1 and V2. TS-35 is still used for Point Beach Unit 1.

7.0 TYPE C TESTS PERFORMED BETWEEN REFUELINGS

Procedure	Penetration	Date	Valve(s) Tested	Leak Rate
*ORT-25	9	4/6/88	2-1698	80 sccm
*ORT-25	9	4/7/88	2-1698	135 sccm

*ORT-25 was modified to perform a pre- and post-maintenance test on valve 2-1698 only.

8.0 TYPE B AND C TEST SUMMARY

The following tables are the as-found and as-left leakage rates for the Type B and C tests conducted between the 1986 and 1989 ILRT's.

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE B TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
12	No Number	Fuel Transfer Tube Flange	65	N/A	81	N/A
13	No Number	Equipment Hatch Flange	20	N/A	5	N/A
71	E58	Electrical Penetration	1	N/A	42	N/A
72	E20, 22	Electrical Penetration	10	N/A	46	N/A
73	E1	Electrical Penetration	4	N/A	5	1
75	P-50, 51 P-52 & 53	Mechanical Penetration Test	898	N/A	788	N/A
76	P-58	Mechanical Penetration Test	1	N/A	6	N/A
77	P-57	Mechanical Penetration Test	2	N/A	8	N/A
78	P-69, 70 & 71	MPT (Sump "A" & "B" Drain Lines)	4	N/A	219	N/A
79	No Number	MPT (Fuel Transfer Tube Penetration)	11	N/A	9	N/A
80	P-13, 27 & 29	Mechanical Penetration Test	1	N/A	2	N/A

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE B TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
81	P-37, 38 P-36, 40 P-48, 45 P-44, 46	Mechanical Penetration Test	14	N/A	36	N/A
82	P-5 & 6 P-47, 43 P-39, 35 P-55, 54	Mechanical Penetration Test	34	N/A	16	N/A
83	P-15, 16 17, 18 10, 11	Mechanical Penetration Test	12	N/A	6	N/A
84	P-7, 3, 9 & 22	Mechanical Penetration Test	76	N/A	27	N/A
TS-10		Upper Personnel Hatch	1787	N/A	225	N/A
TS-10		Lower Personnel Hatch	578	N/A	5510	N/A
TS-36	V-1	Purge Exhaust	132	88	131	508
TS-36	V-2	Purge Supply	365	49	961	197
		END OF TYPE B TESTS				

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE C TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
25	9	RCDT Pump Suction Line (Enter highest test)	5	N/A	16	N/A
26	10	Letdown Line (Enter highest test)	283	N/A	32	N/A
27	11	RCP Seal Water Return Line ((Enter highest test)	254	N/A	138	N/A
28	12A	DI Water Line	7	17	0	N/A
30	12C	RCDT and PRT Vent (Note 1) (Add tests together)	7250	316	20	12
31	14A	Nitrogen Supply to PRT	299	N/A	22	N/A
32	14C	Nitrogen Supply to the Accumulator	635	N/A	488	N/A
33	42	PACVS Return Line	1	N/A	0	N/A
34	26	Charging Line Check Valve	2	169	189	N/A
35	28A	Hot Leg Sample	51	3	48	N/A
36	28B	Pressurizer Liquid Space Sample	2720	35	69	N/A
37	28C	Pressurizer Steam Space Sample	16	18	140	N/A

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE C TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
39	29A	Seal Injection Supply RCP "A"	6	N/A	22	N/A
40	29B	Seal Injection Supply RCP "B"	1	N/A	21	N/A
42	30C	Reactor Makeup Water Supply (Enter highest test)	5	4	16	N/A
43	31B	Containment Sample Line (Enter highest test)	11	N/A	0	N/A
44	31C	PACVS Vent Line (Enter highest test)	0	N/A	0	N/A
46	32C	Auxiliary Charging Line	1467	N/A	85	N/A
47	33A	Instrument Air Supply 3047 (Enter highest test)	5	N/A	365	N/A
48	33B	Instrument Air Supply 304B (Enter highest test)	78	N/A	60	N/A
49	33C	Service Air Supply	145000	1	12	75
50	34A	Sample Line PRT to Gas Analyzer (Add tests together)	4	N/A	3	N/A
51	34C	"A" SG Sample Line	29	N/A	31	N/A

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE C TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
52	34B	"B" SG Sample Line	29	N/A	15	N/A
53	34D	Sample Line RCDT to Gas Analyzer (Enter highest test)	5	N/A	4	N/A
54	50	"B" SG Blowdown	705	N/A	24	N/A
55	51	"A" SG Blowdown	317	N/A	84	N/A
56	52	Heating Steam Supply	683	N/A	218	N/A
57	53	Condensate Return from Containment	15430	1135	0	116
58	56	Containment Test Connection	43	N/A	0	N/A
59	54	P14A Spray Pump Discharge Check Valve	4000	112	753	N/A
60	55	P14B Spray Pump Discharge Check Valve	879	1220	2039	67
61	71	Sump "A" Drain to Auxiliary Building	8	N/A	33	N/A
64	X1	R11/R12 Suction Supply (Enter highest test)	184	N/A	185	N/A

REFUELING CONTAINMENT PENETRATION LEAKAGE RECORD

Unit # 2
Date 1986-1987

TYPE C TESTS

ORT NO.	PENETRATION	TITLE	Refueling U2R12 Sept to Nov 1986 AS-FOUND LEAKAGE sccm	Refueling U2R12 Sept to Nov 1986 LEAKAGE AFTER REPAIR sccm	Refueling U2R13 Oct to Nov 1987 AS-FOUND LEAKAGE sccm	Refueling U2R13 Oct to Nov 1987 LEAKAGE AFTER REPAIR sccm
65	X2	R11/R12 Discharge Return (Enter highest test)	323	N/A	253	N/A
66A	31A	Pressure Test of PT-945 and 946	17	N/A	0	N/A
66B	14B	Pressure Test of PT-947 and 948	7	N/A	0	N/A
66C	32A	Pressure Test of PT-949, 950 and 969	3	N/A	0	N/A
67	19 & 20	CCW to and from Excess Letdown HEX (Add tests together)	(Note 2)	860	4006	87
68	15 & 17	CCW to and from "A" RCP (Add tests together)	(Note 2)	498	3172	192
69	16 & 18	CCW to and from "B" RCP (Add tests together)	13225	1383	11868	520
		END OF TYPE C TESTS				

REFUELING CONTAINMENT PENETRATION LEAKAGE RECORD

Unit # 2
Date 1988

TYPE B TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
12	No Number	Fuel Transfer Tube Flange	101	N/A
13	No Number	Equipment Hatch Flange	60	N/A
71	E58	Electrical Penetration	2	N/A
72	E20, 22	Electrical Penetration	4	N/A
73	E1	Electrical Penetration	1	N/A
75	P-50, 51 P-52 & 53	Mechanical Penetration Test	310	N/A
76	P-58	Mechanical Penetration Test	7	N/A
77	P-57	Mechanical Penetration Test	4	N/A
78	P-69 & 70	MPT (Sump "A" & "B" Drain Lines)	8	N/A
79	No Number	MPT (Fuel Transfer Tube Penetration)	0	N/A
80	P-13, 27 & 29	Mechanical Penetration Test	4	N/A

REFUELING CONTAINMENT PENETRATION LEAKAGE RECORD

Unit # 2
Date 1988

TYPE B TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
81	P-37, 38 P-36, 40 P-48, 45 P-44, 46	Mechanical Penetration Test	27	N/A
82	P-5 & 6 P-47, 43 P-39, 35 P-55, 54	Mechanical Penetration Test	29	N/A
83	P-15, 16 17, 18 10, 11	Mechanical Penetration Test	23	N/A
84	P-7, 8, 9 & 22	Mechanical Penetration Test	12	N/A
TS-10		Upper Personnel Hatch	3450	N/A
TS-10		Lower Personnel Hatch	2450	N/A
TS-36	V-1	Purge Exhaust	155	571
TS-36	V-2	Purge Supply	364	494
		END OF TYPE B TESTS		

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1988

TYPE C TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
25	9	RCDT Pump Suction Line (Enter highest test)	3	N/A
26	10	Letdown Line (Enter highest test)	94	N/A
27	11	RCP Seal Water Return Line ((Enter highest test)	120	N/A
28	12A	DI Water Line	0	N/A
30	12C	RCDT and PRT Vent (Add tests together)	1	N/A
31	14A	Nitrogen Supply to PRT	14	N/A
32	14C	Nitrogen Supply to the Accumulator	480	
33	42	PACVS Return Line	0	N/A
34	26	Charging Line Check Valve	523	N/A
35	28A	Hot Leg Sample	135	N/A
36	28B	Pressurizer Liquid Space Sample	4630	1
37	28C	Pressurizer Steam Space Sample	68	N/A

REFUELING CONTAINMENT PENETRATION LEAKAGE RECORD

Unit # 2
Date 1988

TYPE C TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
39	29A	Seal Injection Supply RCP "A"	123	N/A
40	29B	Seal Injection Supply RCP "B"	1	N/A
42	30C	Reactor Makeup Water Supply (Enter highest test)	1	N/A
43	31B	Containment Sample Line (Enter highest test)	3	N/A
44	31C	PACVS Vent Line (Enter highest test)	20	13
46	32C	Auxiliary Charging Line	2	N/A
47	33A	Instrument Air Supply 3647 (Enter highest test)	365	1001
48	33B	Instrument Air Supply 304B (Enter highest test)	98	492
49	33C	Service Air Supply	1	32
50	34A	Sample Line PRT to Gas Analyzer (Add tests together)	2	N/A
51	34C	"A" SG Sample Line	67	N/A

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1988

TYPE C TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
52	34B	"B" SG Sample Line	14	N/A
53	34D	Sample Line RCDT to Gas Analyzer (Enter highest test)	2	N/A
54	50	"B" SG Blowdown	1085	N/A
55	51	"A" SG Blowdown	89	N/A
56	52	Heating Steam Supply	82	N/A
57	53	Condensate Return from Containment	3270	432
58	56	Containment Test Connection	84	N/A
59	54	P14A Spray Pump Discharge Check Valve	155	20
60	55	P14B Spray Pump Discharge Check Vaive	90	0
61	71	Sump "A" Drain to Auxiliary Building	4	N/A
64	X1	R11/R12 Suction Supply (Enter highest test)	202	N/A

REFUELING CONTAINMENT PENETRATION
LEAKAGE RECORD

Unit # 2
Date 1988

TYPE C TESTS

Refueling U2R14
Oct to Nov 1988

ORT NO.	PENETRATION	TITLE	AS-FOUND LEAKAGE sccm	LEAKAGE AFTER REPAIR sccm
65	X2	R11/R12 Discharge Return (Enter highest test)	317	N/A
66A	31A	Pressure Test of PT-945 and 946	0	N/A
66B	14B	Pressure Test of PT-947 and 948	0	N/A
66C	32A	Pressure Test of PT-949, 950 and 969	0	N/A
67	19 & 20	CCW to and from Excess Letdown HEX (Add tests together)	225	N/A
68	15 & 17	CCW to and from "A" RCP (Add tests together)	99	376
69	16 & 18	CCW to and from "B" RCP (Add tests together)	3894	81
		END OF TYPE C TESTS		

Notes for Type B and C Test Summary Tables

1. Modification 87-143, completed October 1987, cut and capped the nitrogen supply to the Reactor Coolant Drain Tank (RCDT). The isolation valve in this line, check valve 2-1713, had a poor leakage test history and other means were available to supply nitrogen to the RCDT, so a section of the line was removed and caps were welded in its place.

2. Valve leak rate was not determined. The test volume could not be pressurized due to excessive leakage.

9.0 COMMENTS ON VALVES WITH LEAKAGE APPROACHING OR EXCEEDING 0.6La AT STANDARD TEMPERATURE AND PRESSURE

ORT 49 (1986)

Check valve, SA-2C, service air supply to Unit 2 containment, was discovered leaking at 145,000 sccm. Investigation revealed that the clapper arm bracket was out of alignment preventing the disc from seating properly. The clapper was adjusted and shimmed to allow proper closing. The bracket was pinned to hold the clapper in the proper position. Post-repair leakage was 1 sccm. This item was not reportable.

ORT 67 (1986)

Check valve, 2-767, excess letdown heat exchanger supply, would not seat properly during the initial Type C test. The required test pressure could not be achieved which precluded quantification of the leakage rate. The valve was disassembled and the disk O-ring and spring were replaced. Post-repair leakage was 2 sccm. (Licensee Event Report No. 86-005-01, 2/9/87)

ORT 68 (1986)

Check valve, 2-755A, "A" RCP component cooling water supply would not seat properly during the initial Type C test. The required test pressure could not be achieved which precluded quantification of the leakage rate. An investigation revealed that the valve disc did not contact the valve seat evenly due to wear which had caused excessive clearance in the disc-to-hanger arm joint. The valve was replaced and the post-repair leakage was 30 sccm. (Licensee Event Report Nos. 86-005-00, 10/31/86 and 86-005-01, 2/9/87)