MASTER

DUQUESNE LIGHT COMPANY
SHIPPINGPORT ATOMIC POWER STATION

TEST RESULTS

DLCS 1840205
T-612076

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN

"I" SURVEY

CORE I SEED 1

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Section 2 of 5 Sections

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TEST RESULTS

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PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN

"I" SURVEY

CORE I SEED 1

Purpose

To measure the radiation level and its decay at expected "hotspots" in the Reactor Container, 1AC and 1BD Boiler Containers, and Pressurizer Cubicle after the Plant shutdown for Refueling of Core I. A total of 5886 EFPH had been accumulated on Seed 1, Core I.

Conclusions

Initial radiation measurements indicated relatively high radiation levels in certain areas. Maximum initial readings were 500 mr/hr, 400 mr/hr, 530 mr/hr and 195 mr/hr in the Reactor Container, 1AC Boiler Container, 1BD Boiler Container and Purification Cubicle respectively. Over a 100 hour period, radiation levels showed a general decrease, although a few points maintained a relatively high level. Radiation measurements made 1000 hours after a shutdown indicated an increase in activity at most points. Also the measured levels at selected points, as plotted in Figures 1, 2 and 3, seem to indicate lower radiation levels at this performance than those obtained in previous surveys. These anomalies are probably attributable to the survey meters used. Draining a reactor coolant loop seemed to have no effect on the radiation level.

The decay curves indicate that the radiation level is due to the decay of more than one isotope and that there is a build-up of long-lived decay products.

The results of other tests indicate that the primary source of activity during the 1000 hour and 2000 hour surveys is Co^{60} (half life = 5.2 yrs.)

Description of Test Equipment and Test Procedure

Portable Jordan survey meters were used throughout the test to determine the radiation levels at expected "hotspots" in the Reactor Container, Boiler Containers, and Pressurizer Cubicle at specified intervals over a 2000 hour period following Plant shutdown. At most survey points there was a metal can in which the probe of the survey meter could be inserted to insure consistent readings. The test began approximately two (2) hours after all rods were bottomed. The 1D reactor coolant loop was not monitored because it was out of service prior to Plant shutdown.

TEST RESULTS DLCS 1840205

T-612076

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY, (cont'd)

Results

DLCS 1840205, "I" Survey, was performed on October 7 thru December 30, 1959. The EFPH during the test was 5806.1. The control rods were bottomed at 0818 hours on October 7, 1959. The average reactor coolant temperature and pressure were 475 F and 1200 psig respectively for surveys made on October 7, 8 and 10, 1959. The 1B and 1D reactor coolant loops were drained prior to the November 18 and December 30 surveys.

The test began approximately two hours after all the control rods were bottomed (CB-14 open). The survey data are presented in Tables I thru IX. The locations of some of the survey points are shown in Figures 4 and 5. The locations of all other survey points can be found in Sections II and V of the Test Procedure. The highest initial radiation level, 520 mr/hr, was measured at the first elbow from the tube side outlet of the BD Purification System regenerative heat exchanger. A high radiation level reading of approximately 500 mr/hr was measured in the reactor container. It was obtained between the fuel ports and rod mechanism housings in contact with the reactor vessel head (See Figure 4 and Table VI). Rather high readings, approximately 200 mr/hr, were obtained in the vicinity of the FEDAL multipoint valve and its associated piping. These readings were found to be higher than the radiation level obtained at any other general location in the containers. This could be due to the reduced flow velocity in the FEDAL piping resulting in a greater crud build-up than in the 18 inch reactor coolant piping.

Radiation level readings which were obtained in the 1A, 1B, and 1C Boiler Chambers at the emergency injection line penetration of the 18 inch reactor coolant line, immediately adjacent to the reactor coolant piping, are plotted in Figures 1, 2 and 3. In addition, readings which were obtained during other performances of this test at these locations are plotted on these figures. The curves which are plotted in these figures indicate that the radiation level is due to the decay of more than one isotope and that there is a build-up of long-lived decay products with increasing EFPH.

The data obtained 100 hours and 200 hours after shutdown indicates that there was an increase in the radiation level at most points which were surveyed. (See Tables I thru IV). It is considered that this increase is a result of using different survey meters for this portion of the test. It is also considered that the increase in radiation level nine hours after shutdown at survey point B-11-II, at 5806 EFPH, as shown in Figure 2, is a result of using different survey meters. Survey meter calibration data are tabulated in Table XII.

The total number of hours of operation, with pump running, of each reactor coolant loop, at the time of the test, were as follows:

<u>1A Loop</u>	<u>1B Loop</u>	<u>1C Loop</u>	<u>1D Loop</u>
13,614 Hrs.	11,562 Hrs.	11,857 Hrs.	17,672 Hrs.

TEST RESULTS DLCS 1840205

T-612076

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN,
"I" SURVEY, (cont'd)

Miscellaneous reactor coolant system data, and purification loop flow data are tabulated in Table X.

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (T-612076)

TABLE OF CONTENTS

Table

I	Reactor Container Survey
II	1A Reactor Coolant Loop Survey
III	1B Reactor Coolant Loop Survey
IV	1C Reactor Coolant Loop Survey
V	Multiport Valve Survey
VI	Reactor Vessel Head Survey
VII	Neutron Shield Tank Walkway Survey
VIII	Pressurizer Cubicle Survey
IX	Control Rod Drive Mechanism Survey
X	Miscellaneous Reactor Plant Data
XI	Reactor Coolant Chemistry Data
XII	EFPH for 24 Hours Prior to Shutdown
XIII	Survey Meter Calibration Data

FIGURE 4

DIAGRAM OF REACTOR
VESSEL HEAD

Not To Scale

Key

1. Between fuel ports; in contact with reactor vessel head.
2. Between fuel ports; distance above reactor head equal to height of rod mechanism housing.
3. Between fuel ports and rod housing; in contact with reactor vessel head.
4. Between fuel ports and rod housing; in a height equal to that of the drive motor mechanism housing.

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POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN,
"I" SURVEY,
DLCS 1840205

TABLE I
REACTOR CONTAINER SURVEY

Date	10-7-59	10-7-59	10-7-59	10-7-59	10-7-59	10-7-59	10-7-59	10-7-59	10-8-59	10-10-59	10-18-59	11-30-59
Meter No.	732	732	732	732	732	732	732	732	732	773	669	668
Hrs. After Shutdown	3	5	7	9	11	13	15	30	100	1000	2000	
Code	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)	Time (MR/HR)
A1-III*	1046 50	1258 43	1449 20	1648 23	1851 23	2044 27	2254 14	1339 15	1438 22	1107 30	1432 29	
A2-III*	1047 125	1259 90	1447 70	1649 60	1854 55	2045 50	2255 23	1339 43	1439 43	1109 63	1435 83	
A5-III	1046 125	1258 95	1449 70	1648 60	1851 60	2044 60	2254 30	1338 43	1440 55	1107 75	1431 95	
A6-III	1047 100	1300 75	1448 70	1649 50	1833 45	2045 42	2255 40	1339 33	1441 33	1109 50	1434 70	
A7-III	1037 45	1243 33	1440 35	1636 23	1834 15	2035 25	2243 22	1327 21	1437 23	1051 21	1406 42	
A8-III	1037 40	1243 24	1440 30	1636 20	1834 20	2035 20	2243 18	1327 16	1438 20	1051 20	1408 25	
B1-III	1052 60	1303 60	1445 55	1652 40	1839 35	2040 35	2249 24	1334 33	1439 33	1101 29	1423 37	
B2-III	1050 125	1301 145	1445 140	1650 85	1855 50	2046 70	2248 65	1340 75	1440 60	1111 175	1422 120	
B5-III	1052 240	1302 250	1444 225	1651 200	1838 150	2040 130	2249 90	1333 110	1441 140	1101 75	1423 85	
B6-III	1051 125	1201 125	1445 95	1650 85	1855 55	2046 75	2248 70	1340 85	1442 65	1110 110	1443 115	
C1-III*	1044 70	1255 55	1450 45	1647 25	1850 30	2044 28	2253 15	1337 23	1435 23	1106 51	1431 43	
C2-III*	1045 65	1257 45	1451 35	1645 30	1848 14	2043 25	2252 13	1337 23	1436 25	1105 32	1429 47	
C5-III	1045 130	1256 110	1450 90	1646 50	1850 70	2043 65	2253 35	1337 55	1436 45	1106 85	1430 99	
C6-III	1044 85	1255 70	1452 30	1645 45	1848 40	2043 40	2252 21	1336 20	1437 35	1105 48	1430 60	
D1-III	1055 33	1251 43	1455 40	1643 25	1846 33	2040 30	2249 24	1335 11	1434 125	1102 65	1425 70	
D2-III	1053 35	1253 30	1453 15	1644 23	1846 12	2041 20	2251 12	1336 14	1434 20	1103 28	1426 36	
D4-III												
D5-III	1053 150	1250 210	1454 150	1643 125	1845 125	2040 120	2249 110	1335 60	1434 125	1102 65	1425 70	
D6-III	1054 55	1252 35	1453 25	1645 23	1846 12	2042 20	2251 12	1336 15	1435 22	1103 30	1426 36	
R1-III	1038 100	1244 70	1440 80	1637 60	1834 35	2035 50	2245 50	1328 40	1442 48	1053 70	1410 65	
R2-III	1038 300	1244 175	1440 225	1637 140	1834 100	2035 140	2245 115	1328 125	1435 125	1053 135	1410 180	
R3-III	1040 100	1247 60	1442 60	1640 45	1836 23	2038 30	2247 30	1333 28	1437 30	1100 43	1415 54	
R4-III	1039 45	1249 20	1441 25	1640 20	1837 17	2038 16	2248 15	1332 14	1435 14	1058 18	1417 29	
R5-III	1039 70	1248 42	1441 35	1640 24	1836 20	2038 20	2247 18	1332 15	1442 18	1058 25	1416 37	
R6-III	1040 25	1248 22	1442 20	1640 15	1836 10	2038 12	2247 11	1331 10	1437 10	1059 14	1416 22	
R7-III	1040 12	1247 6.5	1442 7	1640 3.5	1836 2.5	2038 4	2247 3	1331 2	1439 2.5	1100 4.5	1415 9.3	
R8-III	1055 4	1245 3	1510 2	1638 2	1835 2	2038 1.8	2245 2	1329 1.3	1440 1.5	1055 3.8	1411 5.3	
R9-III	1055 5.5	1246 7	1510 3.5	1638 2.5	1835 2.0	2036 2.5	2245 2	1329 1.4	1434 2	1056 13	1412 13	
R10-III	1055 30	1246 23	1510 15	1638 14	1835 11	2036 12	2246 12	1330 10	1436 13	1056 3.7	1413 5	
R11-III	1055 12	1246 9	1510 9	1638 9	1835 7	2036 9	2246 8	1330 7	1437 7	1057 18	1414 17.0	
P1-III	1033 23	1240 23	1437 25	1633 18	1830 15	2031 13	2241 15	1323 12	1426 17	1120 55	1355 40	
P2-III	1033 33	1240 25	1437 28	1633 20	1830 13	2031 13	2241 18	1323 13	1428 18	1120 35	1354 30	
P3-III10	1031 40	1238 32	1435 30	1632 24	1829 15	2030 23	2239 20	1322 15	1427 20	1117 27	1355 32	
P4-III	1031 13	1239 10	1435 12	1632 9	1829 5	2030 7	2239 6.5	1321 5	1428 6	1118 23	1355 30	
P5-III	1031 18	1239 14	1435 14	1632 9	1829 6.5	2030 9	2239 8	1322 7	1429 9	1118 12	1356 18	
P6-III	1031 15	1239 15	1435 13	1632 11	1830 8	2030 9.5	2239 10	1322 8	1430 9	1119 12	1356 17	
P7-III	1032 130	1240 110	1436 115	1633 80	1830 55	2031 50	2240 70	1323 60	1431 70	1123 110	1400 110	
P8-III	1032 125	1239 100	1436 100	1633 75	1830 55	2031 50	2240 65	1323 60	1432 6.5	1123 130	1400 110	

* Can Missing

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PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN,
"I" SURVEY,
DLCS 1840205

TABLE II

IAC Boiler Container Survey, 1A Loop

Date Meter No. Hrs. After Shutdown Code	10-7-59 850 2	10-7-59 850 5	10-7-59 850 7	10-7-59 850 9	10-7-59 850 11	10-7-59 850 13	10-7-59 850 15	10-7-59 850 30	10-10-59 100	11-18-59 733 1000	12-30-59 669 2000
	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR	Time MR/HR
A1-I	1010 17	1250 12	1518 10	- -	1907 6	2104 5	2304 5	1336 5.5	1406 4.5	1026 12	1418 18
A2-I	1017 150	1316 150	1529 110	- -	1915 60	2112 60	2312 60	1346 65	1410 58	1022 130	1435 200
A3-I	1018 90	1314 80	1529 60	- -	1915 35	2112 36	2311 38	1344 37	1410 35	1022 75	1433 85
A4-I	1019 50	1258 35	1517 25	- -	1907 15	2104 14	2304 13	1336 13	1405 12	1026 23	1510 20
A5-I	1013 16	1258 15	1516 11	- -	1906 6	2102 6	2303 5.5	1335 5.5	1405 5.5	1027 13	1425 18
A6-I	1017 25	1309 18	1526 12	- -	1913 7.5	2110 7.5	2310 7	1342 7	1409 7	1050 20	1542 13
A7-I	1016 17	1314 15	1530 10	- -	1916 6	2113 5.5	2313 6	1348 5.5	1409 5.5	1024 10	1427 12
A8-I	1021 16	1322 13	1514 12	- -	1904 5	2101 5	2302 45	1332 4.5	1403 4.5	1029 13	1422 12
A9-I	1014 110	1310 100	1526 75	- -	1913 45	2111 41	2311 45	1343 50	1410 50	1115 125	1500 40
A10-I	1013 400	1310 300	1526 200	- -	1913 100	2111 110	2310 110	1343 110	1409 120	1020 325	1501 125
A11-I	1003 25	1257 16	1518 13	- -	1908 7	2104 7	2304 7	1337 7	1406 6.5	1025 13	1510 15
A12-I	0958 20	1349 13	1516 14	- -	1906 7.5	2102 7	2303 7	1334 7	1404 7	1027 15	1410 28
A13-I	0959 8	1253 7	1516 7	- -	1905 4	2101 3.5	2303 3.5	1334 3.5	1403 3	1028 11	1421 15
A14-I								1347 5	1410 5	1025 6	1426 13
A15-I								1331 7	1400 6.3	1031 17	1516 14
A1-II	1004 50	1301 41	1521 35	1710 19	1909 19	2106 17	2306 17	1337 18	1407 16	1016 45	1454 25
A2-II	1005 80	1259 58	1519 50	1709 25	1909 27	2105 28	2305 25	1338 25	1407 25	1013 55	1455 28
A3-II	1020 75	1256 60	1515 45	1707 25	1905 25	2101 25	2303 25	1333 37	1403 25	1029 65	1424 52
A4-II	1016 14	1313 9	1531 6	1718 4	1915 3.5	2114 3	2313 3.5	1346 3.3	1409 3.5	1023 4	1502 4
A5-II	1001 22	1303 17	1522 14	1710 8.5	1909 8	2106 8	2307 8	1339 7	1407 8.5	1017 13	1450 8
A6-II	1000 22	1302 17	1521 14	1710 8.0	1909 9	2106 8	2306 7.5	1338 7	1407 7.5	1017 14	1452 9
A7-II	1009 21	1308 16	1524 12	1713 7.0	1911 7	2108 7	2309 6.5	1341 6.5	1408 6	1018 12	1442 12
A8-II	1008 16	1307 12	1524 8.5	1713 5.0	1911 5	2108 5.5	2309 5	1341 4.5	1408 5	1018 9	1444 12
A9-II	1012 40	1308 32	1525 20	1714 14	1912 14	2110 13	2310 14	1341 14	1408 14	1019 23	1446 18
A10-II	1006 25	1306 21	1523 16	1712 11	1910 10	2107 10	2308 10	1340 10.5	1408 9.5	1018 20	1448 20
A11-II	1007 100	1305 80	1522 55	1711 35	1910 35	2106 32	2307 31	1339 35	1407 30	1017 75	1450 51
A12-II	1022 23	1300 19	1520 15	1708 10	1908 10	2105 10	2305 10	1337 9.5	1407 9	1014 20	1459 9
A13-II	1018 40	1315 15	1531 25	1719 16	1916 15	2114 15	2314 15	1348 15	1410 14	1024 24	1506 12
A14-II	1015 16	1313 15	1529 10	1717 6	1915 7	2113 6	2312 6	1345 5.5	1410 6	1023 10	1430 16
A15-II	1015 35	1312 70	1528 55	1716 32	1914 30	2112 30	2311 30	1356 10	1409 31	1020 65	1431 17
A16-II	1016 150	1311 140	1528 100	1715 60	1914 60	2112 55	2311 60	1343 60	1409 60	1020 130	1432 145
A17-II	0957 250	1250 190	1514 180	1705 85	1902 90	2057 80	2300 80	1331 80	1401 90	1032 190	1515 140
A18-II	0958 45	1250 40	1514 35	1703 18	1901 18	2057 16	2259 17	1331 16	1400 15	1030 35	1514 22
A19-II	0959 15	1251 14	1512 12	1700 7	1900 7	2057 7	2259 6.5	1330 6	1400 6	1030 23	1513 12
A20-II	0958 95	1251 80	1512 70	1702 35	1900 35	2057 33	2259 35	1330 35	1400 34	1031 70	1514 32

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY

DLCS 1840205

TABLE III
1B0 BOILER CONTAINER SURVEY 1B LOOP

Date	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/8/59	10/10/59	11/18/59	11/30/59					
Meter No.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	733	669	669					
Hrs. After Shutdown	2	3	5	7	9	11	13	15	30	100	1000	2000												
Code	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)					
B1-I	1032	28	1142	14	1343	17	1537	17	1735	21	-	-	2135	21	-	-	1335	14	1358	13	1028	15	1459	23
B2-I	1035	81	1145	10	1347	28	1542	23	1740	45	-	-	2138	45	-	-	1338	31	1402	27	1031	48	1508	58
B3-I	1034	33	1145	13	1347	17	1542	13	1740	18	-	-	2138	23	-	-	1338	17	1402	15	1031	27	1506	32
B6-I	1036	50	1146	24	1349	14	1543	14	1741	18	-	-	2140	30	-	-	1339	22	1403	20	1032	40	1535	43
B7-I	1338	12	1146	7.5	1350	5	1544	4	1742	7	-	-	2141	7	-	-	1339	7	1404	5.5	1033	14	1537	15
B8-I	1027	40	1140	25	1339	19	1535	24	1731	30	-	-	2132	32	-	-	1333	15	1356	19	1024	30	1459	38
B9-I	1023	5.8	1134	6	1350	7	1545	5.2	1744	7	-	-	2143	8	-	-	1346	6	1355	4	1017	5.2	1451	8.2
B10-I	1025	12	1135	9.5	1356	8	1545	7	1744	12	-	-	2143	13	-	-	1328	7	1354	8	1017	7	1454	8
B11-I	1024	8.3	1136	10	1352	7.5	1544	7	1743	9	-	-	2142	12	-	-	1330	5	1409	5	1018	5.5	1454	8.5
B12-I	1023	9	1137	9	1357	8.5	1544	6.5	1743	11	-	-	2141	11	-	-	1346	6.5	1355	6	1019	11	1455	12
B13-I	1033	18	1143	8.2	1344	9	1540	6	1737	13	-	-	2136	16	-	-	1335	10	1359	9.5	1029	12	1543	14
B14-I	1046	13			1402	12	1548	11	1747	16	-	-	2144	20	-	-	1325	9	1350	9	1046	14	1523	11
B1-II	1026	170	1138	290	1340	110	1532	130	1731	150	1930	150	2132	150	2331	160	1334	100	1357	110	-	125	-	-
B2-II	1027	64	1139	38	1358	22	1534	22	1732	45	1930	45	2132	42	2330	40	1333	27	1356	28	1044	60	1458	63
B3-II	1035	22	1147	18	1348	6	1543	6	1741	12	1936	12	2140	15	2335	18	1338	11	1403	9.5	1030	11	1505	19
B4-II	1025	36	1140	18	1339	15	1533	12	1733	20	1931	23	2132	18	2331	17	1334	11	1357	14	Lead Shielded			
B5-II	1031	35	1141	22	1342	22	1536	19	1734	23	1931	22	2133	23	2332	23	1334	17	1358	18	1024	16	1501	27
B6-II	1031	31	1141	21	1342	18	1536	15	1734	20	1931	20	2133	19	2332	25	1334	15	1357	14	1024	15	1501	30
B7-II	1033	38	1143	18	1345	21	1540	13	1737	29	1934	23	2137	28	2334	30	1335	19	1359	18	1029	16	1514	20
B8-II	1034	54	1144	17	1346	55	1540	25	1738	43	1935	45	2138	47	2334	45	1336	35	1401	32	1030	30	1514	32
B9-II	1032	90	1142	33	1342	60	1537	70	1736	70	1932	100	2135	90	2333	70	1334	45	1358	45	1027	60	1500	50
B10-II					1346	18	1541	12	1738	21	1935	20	2137	22	2335	24	1336	24	1359	13	1030	12	1510	29
B11-II	1031	160	1141	110	1343	80	1538	45	1735	100	1932	110	2134	110	2332	110	1334	85	1407	80	1026	80	1501	115
B12-II			1150	20	1357	17	1545	15	1743	26	1928	26	2142	25	2336	25	1332	16	1354	16	1019	16	1451	19
B14-II			1151	20	1354	22	1538	22	1736	30	1934	35	2136	35	2333	40	1343	23	1410	22	1041	28	-	-
B15-II	1029	58	1139	37	1340	38	1535	32	1732	43	1930	40	2132	45	2330	43	1332	28	1356	31	1020	50	1451	59
B16-II	1048	530	1155	500		150	1548	230	1748	550	1940	450	2144	500	2338	650	1323	310	1352	320	1047	250	1527	250
B17-II	1047	17	1155	10	1401	8.5	1547	8	1746	11	1938	15	2144	13	2337	12	1323	18	1352	12	1045	11	1522	15
B18-II	1046	14	1156	8.5	1401	6.5	1547	6.5	1746	12	1938	10	2144	11	2337	11	1324	10	1352	8.5	1045	8.5	1526	30
B19-II	1046	88	1156	40	1401	35	1547	30	1746	50	1938	45	2144	55	2337	55	1323	72	1353	55	1045	30	1526	32

* Survey meter used was not recorded.

141

13

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY
DLCS 1840205

TABLE IV

IAC BOILER CHAMBER SURVEY 1C LOOP

Date	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/7/59	10/8/59	10/10/59	11/18/59	12/30/59		
Meter No.	850	850	850	850	850	850	850	850	850	-	733	669		
Hrs. After Shutdown	2	6	7	9	11	13	15	30	100	1000	2000			
Code	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)	Time (mr/hr)		
C1-I	1034	9	1401	6.6 1543	2.8 -	-	1933	3 2126	3 2326	3.5 1403	2.7 1421	3.2 1046	4 1539	5
C2-I	1039	30	1357	20 1547	10 -	-	1934	11 2129	9 2329	9 1357	8.8 1425	9.1 1047	14 1541	15
C3-I	1040	13	1358	10.5 1358	5.5 -	-	1933	4.5 2129	4.5 2329	5 1358	4.9 1425	4 1051	9 1542	9
C6-I	1041	30	1356	18 1548	8.9 -	-	1934	11 2130	10 2330	9 1400	7.8 1425	8 1050	20 1542	13
C7-I	1042	11	1357	8 1548	3.7 -	-	1935	3 2130	6 2330	3 1400	3 1425	2.9 1048	7 1543	12
C8-I	1032	21	1354	13.3 1540	6 -	-	1928	6.3 2123	6 2323	6.5 1357	6.5 1419	7.2 1044	13 1522	22
C9-I	1028	7.5	1350	5 1535	3.5 -	-	1927	2.3 2121	1.8 2319	1.9 1351	2.1 1416	2 1042	3 1518	6
C10-I	1026	2	1348	2 1535	1.2 -	-	1926	0.7 2119	0.7 2318	0.7 1351	0.7 1416	0.7 1039	3 1519	2
C11-I	1028	4	1350	3.3 1536	2 -	-	1926	1.3 2120	1.3 2320	1.4 1352	1.2 1416	1.3 1040	1.0 1520	3
C12-I	1027	2.5	1349	2.8 1536	1.8 -	-	1941	1.3 2120	1.3 2320	1.4 1353	1.2 1416	1.3 1040	1.0 1521	4
C13-I	1002	12	1401	4.3 1544	2 -	-	1932	2 2127	2 2326	2.2 1403	1.9 1422	2 -	- 1545	2
C1-II	1032	63	1352	85 1539	62 1728	19 1929	19 2135	18 2324	18 1353	38 1417	40 1045	30 1525	30	
C2-II	1031	25	1353	18 1541	7 1722	8 1928	8.5 2122	7 2323	8 1355	7.9 1430	7.8 1044	13 1523	16	
C3-II	1041	17	1403	15.5 1548	7.5 1731	8 1936	7.5 2133	7 2331	8 1359	7.8 1425	8 1104	25 -	-	
C4-II	1032	20	1352	16 1536	11.5 1723	7.5 1929	7 2122	5 2324	6.5 1354	6 1417	7 1043	9.5 1524	10	
C5-II	1034	22	1403	19 1542	9.2 1724	9 1930	10 2125	10 2325	9 1408	10 1420	9.8 1045	9 1529	6	
C6-II	1037	30	1350	32 1546	10 1727	11 1938	11 2124	10 2327	10 1402	9.5 1423	10 1053	17 1534	15	
C7-II	1034	18	1404	15 1541	6.2 1723	6 1929	7 2124	7 2325	7 1409	7.1 1419	7.9 1045	8 1529	8	
C8-II	1038	30	1400	29 1544	10 1735	9 1931	8 2126	8 2328	5 1401	8.5 1429	9 1059	13 1533	11	
C9-II	1036	50	1359	35 1543	19 1725	19 1931	20 2126	18 2325	18 1404	19.5 1420	20 1046	25 1532	30	
C10-II	1038	16	1359	14 1545	6 1726	6 1933	6 2128	5.5 2327	5 1402	5.4 1422	5.4 1052	9 1535	7	
C11-II	1035	90	1402	60 1542	19 1724	30 1930	29 2126	25 2325	26 1407	25 1420	27 1045	50 1531	30	
C12-II	1036	25	1403	20 1543	10 1740	10 1936	9.5 2134	9.5 2331	9 1406	7 1430	10 1053	20 1550	8	
C13-II	1033	42	1351	15 1537	12 1740	7.5 1940	7 2121	6.5 2324	6 1352	7.9 1417	7.8 1043	9 1541	8	
C14-II*	-	-	-	-	-	-	-	-	-	1410	6 1109	65 -	-	
C15-II	1030	35	1353	20.5 1539	8.8 1730	11 1928	11 2123	10 2329	9 1356	10 1409	60 1100	20 1547	18	
C16-II	1000	7.5	1345	8 1533	6.2 1720	3.8 1920	4 2117	3.8 2317	3.8 1349	3.5 1416	3.9 1034	6 1517	7	
C17-II	1000	3.5	1345	3.9 1534	3 1720	1.8 1920	2 2117	1.8 2316	2 1350	2.1 1416	1034	3 1517	5	

* Can missing

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (T-612076)

TABLE V

Multiport Valve Survey

(Survey Meter: Jordan No. 732)

20 MR/HR

200 MR/HR

175 MR/HR

Probe one inch from top of valve.
Probe in contact with valve midway
between top and bottom of valve.
Probe in contact with valve at
intersection of valve with Reactor
vessel head flange.

DATE: 10-7-59

TABLE VI

Reactor Head Survey

(Survey Meter: Jordan No. 732)

Code	1	2	3	4
	MR/HR	MR/HR	MR/HR	MR/HR
North	125	125	200	90
South	60	100	500	125
East	100	100	150	125
West	100	110	200	150

For Code No. See Figure 4

DATE: 10-7-59

TABLE VII

Neutron Shield Tank Upper Walkway Survey

North	125 MR/HR
South	15 MR/HR
East	30 MR/HR
West	15 MR/HR

DATE: 10-7-59

Readings obtained at waist height.

Survey meter: Jordan No. 732

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
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DLCS-1840205 (T-612076)

TABLE VIII

Pressurizer Cubicle Survey

Point Within One Inch of Pressurizer
Spray Line Near Solenoid Valve, 06-H12-1
(Pressurizer Cubicle)

Time	Reading (MR/HR)	Hours After Shutdown	Date	Survey Meter
1030	70	3	10-7-59	Jordan No. 732
1238	195	5	10-7-59	Jordan No. 732
1436	150	7	10-7-59	Jordan No. 732
1633	125	9	10-7-59	Jordan No. 732
1830	95	11	10-7-59	Jordan No. 732
2030	120	13	10-7-59	Jordan No. 732
2240	105	15	10-7-59	Jordan No. 732
1322	90	30	10-8-59	Jordan No. 732
1125	175	1000	11-18-59	Jordan No. 669
1358	150	2000	12-30-59	Jordan No. 668

Point located near FEDAL piping at West Wall
Initial reading = 200 MR/HR
Survey Meter - Jordan No. 732

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (T-612076)

TABLE IX.

Radiation Level of Area Between Rod Drive
Mechanism Housings 24 and 34.
10-7-59

Point	Reading (MR/HR)	Remarks
1	200	1. The location of these points is only approximate. (See Figure 5)
2	65	
3	45	
4	40	
5	30	2. Survey Instrument: Jordan No. 732
6	30	

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (10-6-1976)

TABLE X

Miscellaneous Reactor Plant Data*

Date	Avg. Coolant Temp. F	Primary Loop Flow			Purification Loop Flow		Non-Regenerative Heat Exchanger				Regenerative Heat Exchanger	
		1A lb/hr X10 ⁺⁶	1B lb/hr X10 ⁺⁶	1C lb/hr X10 ⁺⁶	1AC lb/hr X10 ⁺³	1BD lb/hr X10 ⁺³	Tube Side In F	Tube Side Out F	Tube Side In F	Tube Side Out F	Shell Side Out F	Shell Side Out F
10-6-59	475	7.8	7.5	7.7	20.5	22.2	159	93	158	90	422	421
10-7-59	475	7.8	7.5	7.6	20.3	21.3	159	93	157	89	424	424
10-8-59	482	7.8	7.4	7.6	20.1	20.5	160	93	156	89	434	435
10-9-59	503	7.7	7.3	7.5	19.3	19.8	163	93	159	89	455	457
10-10-59	508	7.6	7.3	7.5	19.3	19.9	163	90	160	88	462	464
10-11-59	511	7.7	7.3	7.5	19.2	19.9	163	90	161	86	467	470
10-12-59	525	7.6	7.3	7.4	18.9	20.0	160	86	157	84	471	467
10-13-59	522	7.6	7.3	7.5	19.0	20.6	159	84	155	82	466	463
10-14-59	500	7.6	7.3	7.6	19.4	20.3	157	85	153	81	451	452
10-15-59	500	7.7	7.3	7.6	19.0	20.3	154	83	149	79	444	441
10-16-59	500	7.7	7.3	7.6	18.9	20.3	153	82	151	77	449	449
10-17-59	362	5.9	5.5	5.9	14.5	15.7	137	79	135	75	328	331
10-18-59	208	4.1	3.9	4.2	14.5	OOS	104	74	101	83	187	175
10-19-59	130	No Flow Essentially for Remainder of Test.										

Station remained shutdown throughout test for refueling.

* Average values

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER
AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (T-612076)

TABLE XI

Coolant Chemical Conditions

Specific Crud Activity (Sample Train C):

20.05 MR/HR from 10-6-59 through 10-19-59

No data recorded after 10-19-59

H₂ Concentration: 25 to 30 cc/KG from 10-16-59 through 10-8-59. (Before demineralizer)

No data recorded after 10-8-59 from coolant before demineralizer.

No pH recorded during test performance.

Crud Concentration: 1.7 ppb (10-5-59, last analysis prior to test)

10-12-59:

25 ft. H₂ added to Reactor Coolant System.

Gross activity of reactor coolant:

10-6-59, 42.2 cpm/ml x 10³ - counted after 15 minutes

No further measurements made throughout remainder of test, except on reactor coolant which had passed through demineralizer.

DUQUESNE LIGHT COMPANY
POWER STATIONS DEPARTMENT
SHIPPINGPORT ATOMIC POWER STATION

PERIODIC RADIATION SURVEY OF REACTOR PLANT CON-
TAINER AND COMPONENTS AFTER SHUTDOWN, "I" SURVEY,
DLCS-1840205 (T-612076)

TABLE XII

Survey Meter Calibration Data

Survey Meter: Jordan No. 732
Calibration Date: 10-2-59
Source: Co⁶⁰, 38 μ c

Calc.	10	100	500	250	50	0.5	1R	1.5R
Meas.	10	110	500	250	55	0.5	1R	1.5R

Survey Meter: Jordan No. 669
Calibration Date: 11-17-59
Source: Co⁶⁰, 38 μ c

Calc.	5	15	250	500	1R
Meas.	5	15	250	500	1R

Survey Meter: Jordan No. 668
Calibration Date: 12-30-59
Source: Co⁶⁰, 38 μ c

Calc.	10	100	250	500
Meas.	12	105	245	500

Survey Meter: Jordan No. 773
Calibration Date: 11-18-59
Source: Co⁶⁰, 38 μ c

Calc.	5	15	50	100	250	1R
Meas.	5	17	55	100	250	1R

TEST RESULTS DLCS 1840205

T-612076

PERIODIC RADIATION SURVEY OF REACTOR PLANT CONTAINER AND COMPONENTS AFTER SHUTDOWN,
"I" SURVEY, (cont'd)

Results Prepared By

John F. Garrow

Results Reviewed By

John Shanks

Approved (Duquesne Light Company)

[Signature]

Date

10-17-60