

NUREG-0109

**OCCUPATIONAL RADIATION EXPOSURE
AT
LIGHT WATER COOLED POWER REACTORS
1969 - 1975**

Thomas D. Murphy
Nadia J. Dayem
J. Stewart Bland
Walter J. Pasciak

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Environmental Evaluation Branch
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(ABSTRACT)

This report presents an updated compilation of occupational radiation exposures at commercial light water cooled power reactors (LWR's) for the years 1969 through 1975. The information is derived from reports submitted to the United States Nuclear Regulatory Commission in accordance with requirements of individual plant Technical Specifications and Part 20.407 of Title 10, Chapter 1, Code of Federal Regulations (10 CFR Part 20.407).

The collective dose to personnel (man-rem per reactor year) at LWR's in 1975 was greater than in 1974. The average number of personnel receiving measurable exposure per reactor has increased in 1975 and the average exposure per individual has remained at 0.8 rem per person per year.

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OCCUPATIONAL RADIATION EXPOSURES
AT
LIGHT WATER COOLED POWER REACTORS
1969 - 1975

INTRODUCTION

This report contains a compilation of the occupational radiation exposures at light water nuclear power reactors for the years 1969-1975. It is an updating of the information contained in WASH-1311¹ and NUREG-75/032,² which provided data through 1974. Data from plants that were in commercial operation for a full year for the first time in 1975 have been added. We have also included the data submitted to the USNRC for all power reactors in accordance with the requirements of 10 CFR Part 20.407.

For the first time, this report contains data on overexposures at nuclear power plants for the years 1971-1975.

¹Murphy, T.D., A Compilation of Occupational Radiation Exposures from Light Water Cooled Nuclear Power Plants 1969-1973, USAEC, WASH-1311, May 1974.

²Murphy, T.D., Hinson, C.S., Occupational Radiation Exposures at Light Water Cooled Nuclear Power Reactors, 1969-1974, USNRC, NUREG-75/032, June 1975.

SOURCE OF DATA

The occupational radiation exposure data through 1973 used in this report for light water reactors (LWR's) in operation during the period 1969 through 1973 were obtained as a result of inquiries made to each reactor licensee. The 1974 and 1975 data for all plants were obtained from two sources, 1) reports submitted to the USNRC to meet the requirements of 10 CFR Part 20.407; and 2) annual, semiannual or monthly operating reports submitted in accordance with individual station Technical Specifications. Approximately twenty five percent of the licensees submitted information in accordance with Regulatory Guide 1.16, Rev. 4, Reporting of Operating Information - Appendix A Technical Specifications. Those reports are available in public document rooms (PDR) located near each licensed plant or in the U.S. Nuclear Regulatory Commission's Public Document Room at 1717 H Street, Washington, D.C.

The terminology man-rem is a unit of collective dose and, as used in this report, is the accumulation of the occupational radiation exposures of all individuals at the plant site including utility station personnel, other utility personnel brought in on a temporary basis, contractor personnel and visitors. For this report this accumulation of exposure is determined by either of the following methods:

1. Approximately one half of the licensees submitted the summation of the actual exposures of all of the individuals at their site.
2. For the remaining licensees we determined the accumulated exposures by summing the product of the numbers of individuals in each annual exposure range specified in 10 CFR Part 20.407 b(2) by the mid point exposure in each range.

In both cases the resulting accumulated exposure is expressed in man-rem. Where a comparison could be made, the two methods yielded a number of man-rem which were within fifteen percent of each other.

MAN-REM PER REACTOR PER YEAR

Appendix A presents the total annual man-rem received at each LWR power station for each year 1969-1975. If there is more than one reactor at each station, the data in Appendix A is the total for all units. The average exposure per reactor per year for all LWR's, also categorized by pressurized water reactor and boiling water reactor, is presented in Tables 1a, 1b, and 1c. For those stations which have multiple reactors, the total exposure for the station is arbitrarily divided by the number of reactors at the station to get the average exposures for each reactor at that station. The frequency distribution for the exposures of the reactors at each station for the years 1969-1975 is plotted in Figure 1. It indicates a

FIGURE 1
Frequency Distribution (man-rem/reactor/year)
for all LWR's from 1963-1976
Median 270 man-rem/reactor/year

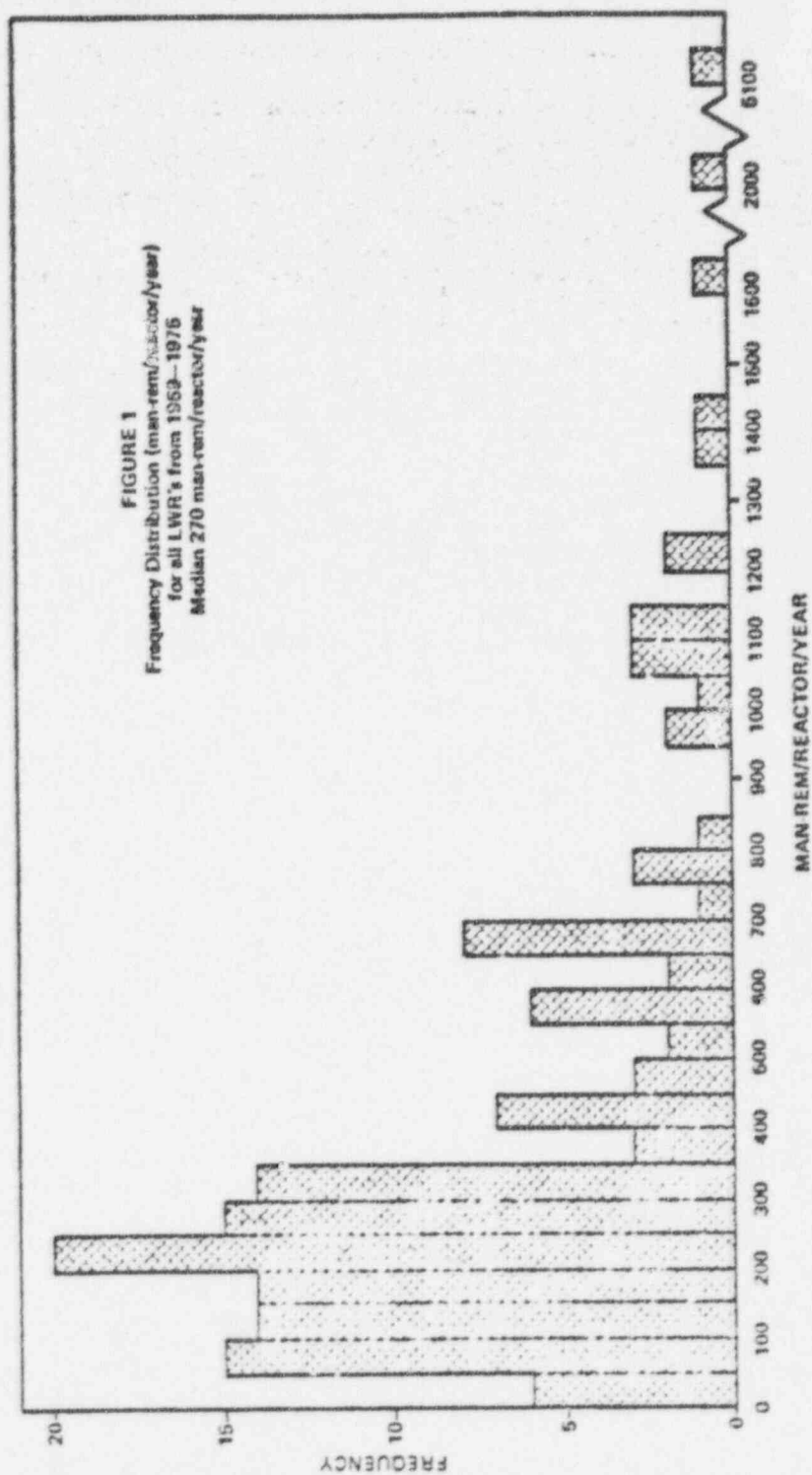


TABLE 1
MAN-REM SUMMARY

a. ALL LIGHT WATER REACTORS			
	Number of Reactors	Average Rated Capacity (MWe)	Yearly Average Man-Rem/ Reactor-Year
1969	7	267	178
1970	10	362	365
1971	13	401	294
1972	18	472	364
1973	26	546	534
1974	32	581	427
1975	44	640	457

b. PRESSURIZED WATER REACTORS			
	Number of Reactors	Average Rated Capacity (MWe)	Yearly Average Man-Rem/ Reactor-Year
1969	4	381	165
1970	5	403	599
1971	6	459	340
1972	8	500	463
1973	12	575	772
1974	18	625	364
1975	26	650	309

c. BOILING WATER REACTORS			
	Number of Reactors	Average Rated Capacity (MWe)	Yearly Average Man-Rem/ Reactor-Year
1969	3	116	195
1970	5	322	130
1971	7	351	255
1972	10	450	286
1973	14	521	330
1974	14	521	507
1975	18	526	670

median of approximately 270 man-rem per reactor per year for 1975. The number of man-rem per reactor per year for pressurized water reactors shows a drop from the 1974 value. For boiling water reactors, the number of man-rem per reactor per year increased.

EXPOSURE TO INDIVIDUALS

In 1975 an average of 578 persons per reactor received measurable exposure. This number has increased from the 1974 value of 515. The average exposure per individual was 0.8 rem in 1975.

TABLE 2
AVERAGE OCCUPATIONAL RADIATION EXPOSURE PER INDIVIDUAL

<u>Year</u>	<u>Average Exposure Per Individual (rem)</u>	<u>Average Number of Personnel Per Reactor</u>
1969	1.1	141
1970	1.0	305
1971	1.0	302
1972	1.2	344
1973	0.9	584
1974	0.8	515
1975	0.8	578

Table 3 is a summary of the number of annual whole body exposures for LWR's in each exposure increment of 10 CFR Part 20.407 b(2) for the years 1969 through 1975. The total number of personnel receiving more than one rem exposure in 1975 increased from 1974. The number of persons receiving

TABLE 3

SUMMARY OF ANNUAL WHOLE BODY EXPOSURES BY INCREMENT - LWR's⁽³⁾

(For those Personnel at Licensee Stations Included in Appendix A)

Year	Total Monitored	Number of Individuals Exposure Increment - rems											
		Not Measurable	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
1969	2836	2607			144	70	26	5	2	0	0	0	0
1970	7513	6953			184	175	92	102	11	1	0	0	0
1971	10,245	9660			328	146	107	17	11	0	0	0	0
1972	15,713	14,783			536	205	114	47	23	10	6	6	0
1973	35,918	20,717	10,249	2449	1585	432	237	117	71	38	16	7	0
1974	32,965	16,475	12,079	2348	1313	437	210	76	25	2	0	0	0
1975	45,659	20,188	18,277	3892	1903	707	426	169	60	24	12	0	1

³Brooks, B.G., Seventh Annual Occupational Radiation Exposure Report 1974, USNRC, NUREG-75/1u8, November 1975.

exposures in excess of the limits established by 10 CFR Part 20 at commercial reactors are reported for the years 1971 through 1975 in Table 4. This data shows that most of the exposures only slightly exceeded the quarterly limits and that the total number of overexposures is a very small fraction of the number of persons monitored for radiation exposure at commercial reactors.

TABLE 4
OVEREXPOSURES AT COMMERCIAL POWER REACTORS

<u>Year</u>	<u>Number of Overexposures to External Radiation</u>	<u>Whole Body man-rem Involved</u>	<u>Whole Body Maximum Exp. (rems)</u>	<u>Number of Reports of Exposure to Excessive Concentration of Radioactive Material</u>	<u>Maximum Exposure</u>
1971	2	4.5	3.1	21	6.052 rem (thyroid)
1972	16	49.7	5.1	2	2000 MPC-hr
1973	19	61.2	4.0	0	
1974	43	155.9	6.1	12	433 MPC-hr
1975	14	44.2	3.8	7	13.5 rems (lung)

EXPOSURE BY WORK FUNCTION

Table 5 presents data on personnel and radiation exposure categorized in six work functions. This information only accounts for approximately one half of the total exposure received at LWR's during 1975 because not all licensees submitted the information in a format adequate to categorize the exposure by work function. Routine reactor operations and surveillance accounts for approximately eleven percent of the exposure, down slightly from fourteen percent in 1974. Routine and special maintenance continue to account for approximately seventy percent of the exposure at commercial reactors. The percentage of personnel associated with specific work functions and the exposure for each work function is presented in Table 6. Utility employees account for approximately 41 percent of the number of personnel and approximately 54 percent of the exposure.

TABLE 5
TABULATION OF NUMBER OF PERSONNEL AND MAN-REM BY
WORK FUNCTION (1975)

a. NUMBER OF EMPLOYEES (>100 millirem/yr)				
<u>Work Function</u>	<u>Station Employees</u>	<u>Utility Employees</u>	<u>Contract Workers and Others</u>	<u>Total</u>
Reactor Operations	1105	81	143	1329
Routine Maintenance	2118	198	6330	8646
Inservice Inspection	250	99	251	600
Special Maintenance	752	429	1204	2385
Waste Processing	520	63	521	1104
Refueling	306	10	156	472
TOTALS	5051	880	8605	14536

b. TOTAL MAN-REM				
<u>Work Function</u>	<u>Station Employees</u>	<u>Utility Employees</u>	<u>Contract Workers and Others</u>	<u>Total</u>
Reactor Operations	1126	13	60	1209
Routine Maintenance	2134	267	3466	5867
Inservice Inspection	60	63	207	330
Special Maintenance	705	423	999	2127
Waste Processing	635	19	120	774
Refueling	449	127	289	365
TOTALS	5119	912	5141	11172

TABLE 6

PERCENTAGES OF PERSONNEL AND EXPOSURE BY WORK FUNCTION (1975)

<u>Work Function</u>	<u>Personnel</u>			<u>Exposure</u>		
	<u>Utility</u>	<u>Contractor</u>	<u>Total</u>	<u>Utility</u>	<u>Contractor</u>	<u>Total</u>
Reactor Operations and Surveillance	8.2	1.0	9.2	10.3	0.5	10.8
Routine Maintenance	16.0	43.5	59.5	21.5	31.1	52.6
Inservice Inspection	2.4	1.7	4.1	1.2	1.8	3.0
Special Maintenance	8.1	8.2	16.3	10.1	8.9	19.0
Waste Processing	4.7	3.6	7.6	5.8	1.1	6.9
Refueling	<u>2.3</u>	<u>1.0</u>	<u>3.3</u>	<u>5.1</u>	<u>2.6</u>	<u>7.7</u>
TOTAL	41	59	100	54	46	100

APPENDIX A
EXPOSURE, PERSONNEL AND POWER GENERATION SUMMARY

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	MAN-REM per MW-YR
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	UTILITY		
ARKANSAS 1 Docket 50-313, DPR-51 1st commercial operation 8/74 Type - PWR Capacity - 850 MWe	75	588.0	147			46					0.31	0.1
BIG ROCK POINT Docket 50-155, DPR-6 1st commercial operation 3/63 Type - BWR Capacity - 72 MWe	69 70 71 72 73 74 75	43.2 43.5 44.4 43.5 50.9 40.7 35.1	165 290 260 195 119 281 216			136 194 184 181 336 276 180					0.82 0.67 0.7 0.7 0.92 2.8 0.98 0.83	3.1 4.5 4.1 4.1 6.6 6.6 5.1
BROWN'S FERRY 1 Docket 50-259, DPR-33 1st commercial operation 8/74 Type - BWR Capacity - 1065 MWe	75	328.9	2380			325					0.14	1.0
HADDAM NECK Docket 50-213, DPR-61 1st commercial operation 1/68 Type - PWR Capacity - 575 MWe	69 70 71 72 73 74 75	397.6 424.7 502.2 515.6 293.1 519.1 494.3	138 734 289 355 841 550 795	75 657 216 285 770	63 77 73 70 71	106 689 342 325 673 201 569			27 463 166 181 525	79 226 176 144 148	0.77 0.94 1.18 .91 0.80 0.37 0.84	.5 1.7 .6 .7 2.1 1.4 1.4
COOPER CANTON Docket 50-298, DPR-46 1st commercial operation 7/73 Type - BWR Capacity - 770 MWe	75	456.4	175	71	104	96	25	71	16	80	0.55	0.2

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	MAN-REM per MW-YR
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	Utility		
DRESDEN 1, 2, 3	69	89.4				286						3.2
Docket 50-10, 50-237, 50-249	70	304.0				143						.5
DPR-10, 19, 25	71	394.5				715						1.8
1st commercial operation 7/60, 6/72, 11/71	72	1243.7				728						.6
Type - BWR	73	1112.2	1341			909	138	771	333	576	0.68	.8
Capacity MWe 200, 809, 809	74	842.5	1594	318	1276	1662			57	1605	1.04	2.0
	75	708.1	3671	3076	595	3209	254	2955	2111	1098	0.87	4.5
FOOT CALHOUN	75	252.3	469	369	100	298			93	205	0.63	1.2
Docket 50-285, DPR-40												
1st commercial operation 6/74												
Type - PWR												
Capacity - 457 MWe												
GINNA	70	268.5	170	56	114	207	94	113	15	192	1.21	.8
Docket 50-244, DPR-18	71	327.8	340	134	206	430	69	361	108	322	1.26	1.3
1st commercial operation 3/70	72	295.6	677	266	411	1032	71	961	278	754	1.52	3.4
Type - PWR	73	409.5	421			244	60	184	91	153	0.58	.6
Capacity - 490 MWe	74	253.7	884			1224					1.58	4.8
	75	365.2	558			496					0.89	1.4
HICKLEDT BAY	69	40.6	125	41	84	164	69	95	12	152	1.31	4.0
Docket 50-133, DPR-7	70	49.3	115	35	80	209	130	79	37	172	1.61	4.3
1st commercial operation 2/63	71	59.6	140	53	87	252	114	178	65	227	2.1	7.7
Type - BWR	72	43.1	127	54	73	253	81	172	57	196	1.99	5.9
Capacity - 65 MWe	73	50.1	235			261	59	202			1.11	5.3
	74	43.4	296	221	75	318	103	215			1.07	.1
	75	45.3	303	230	73	332	128	204	110	222	1.10	7.3
INDIAN POINT 1, 2	69	103.3				298						1.6
Docket 50-3, 50-247, DPR-5, 26	70	43.3				1639						33.0
1st commercial operation 10/62, 8/73	71	154.0				768						5.0
Type - PWR	72	142.3				967						6.6
Capacity - 265 MWe, 873 MWe	73	0	2998			5134	692	4442	7778	2356	1.71	
	74	556.1	1019	114	905	910					0.89	1.6
	75	504.4	400	73	407	626	147	479	42	584	1.3	1.1

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	MAN-REM per MW-YR
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	Utility		
KEWAUNEE Docket 50-305, DPR-43 1st commercial operation 6/74 Type - PWR Capacity - 560 MWe	75	401.9	54	23	41	25	1	24	11	14	.5	.06
LACROSSE Docket 50-409, DPR-45 1st commercial operation 9/69 Type - BWR Capacity - 50 MWe	71	33.1	218			158					0.72	5.0
	72	29.2	151			172					1.13	5.9
	73	24.4	157			221					1.41	9.1
	74	37.9	115	21	94	139	89	50	6	133	1.21	3.7
	75	32.0	165			234					1.42	7.3
MAINE YANKEE Docket 50-209, DPR-36 1st commercial operation 12/72 Type - PWR Capacity - 790 MWe	73	408.7	422	309	113	121			61	60	0.29	.3
	74	432.6	620	485	135	420	64	356	188	232	0.68	1.0
	75	542.9	577	418	159	347	16	331	197	150	0.60	0.6
MILLSTONE POINT 1 Docket 50-245, DPR-21 1st commercial operation 3/71 Type - BWR Capacity - 690 MWe	72	377.6	612	487	125	596	50	546	340	256	0.97	1.6
	73	225.1	1152	982	170	620	117	503	395	225	0.54	2.7
	74	430.3	2477			1430					0.58	3.3
	75	465.4	2587			2022					0.78	4.3
MONTICELLO Docket 50-363, DPR-22 1st commercial operation 7/71 Type - BWR Capacity - 545 MWe	72	424.4	99	9	90	61	40	21	1	60	0.61	.1
	73	389.5	276	145	131	154	42	112	59	95	0.56	.4
	74	349.3	842	477	365	349			91	258	0.41	1.0
	75	344.8	1353			1353					1.0	3.9
NINE MILE POINT Docket 50-220, DPR-63 1st commercial operation 12/69 Type - BWR Capacity - 610 MWe	70	227.0	821	660	161	44	12	32	17	27	0.05	.2
	71	346.5	1006	738	268	195	43	152	63	89	0.19	.6
	72	381.8	735	450	285	285	59	226	28	198	0.38	.8
	73	411.0	550	318	232	517	127	390	108	409	0.94	1.3
	74	385.9	740	463	277	824	42	782	279	545	1.11	2.1
	75	359.0	649	329	320	681	68	613	203	478	1.04	1.9

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	MAN-REM per MW-YR
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	Utility		
OCONEE 1, 2, 3 Docket 50-269, 270, 287 DRP-38, 47, 55 1st commercial operation 7/73, 9/74, 12/74 Type - PWR Capacity - 886, 886, 886 MWe	74	724.3	844	253	591	517	18	499	144	373	0.61	.7
	75	1838.3	541	112	429	457	66	391	83	3/4	0.24	.3
OYSTER CREEK Docket 50-219, DPR-16 1st commercial operation 12/69 Type - BWR Capacity - 650 MWe	69	40.1										
	70	413.6	95	32	63	63	21	42	11	62	0.66	.2
	71	448.9	249	164	85	240	50	190	92	148	0.96	.5
	72	515.0	339	242	97	582	150	432	167	415	1.71	1.1
	73	424.6	782	635	147	1236	195	1041	683	553	1.58	2.9
	74	434.5	935	346	589	984	166	818	162	822	1.05	2.3
	75	373.6	1210			1132	168	964	269	863	0.94	3.0
PALISADES Docket 50-255, DPR-20 1st commercial operation 12/71 Type - FWR Capacity - 821 MWe	72	216.8				78						
	73	285.8	901	608	293	1109	16	1093	647	462	1.23	3.8
	74	10.5	774			627					0.81	60
	75	300.2	474			292					0.62	0.97
PEACH BOTTOM 2, 3 Docket 50-277, 278, DPR 44, 56 1st commercial operation 12/74 Type - BWR Capacity - 1065, 1065 MWe	75	1234.3	971			228					0.24	0.18
PILGRIM Docket 50-293, DPR-35 1st commercial operation 12/72 Type - BWR Capacity - 655 MWe	73	484.0	53			74	29	45			1.4	.2
	74	234.1	454			415					0.91	1.8
	75	308.1	473			744	32	612	384	360	1.6	2.4

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	MAN-REM per MW-YR
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	Utility		
POINT BEACH 1 & 2 Docket 50-266, 361, DPR-24, 27 1st commercial operation 12/70, 4/73 Type - PWR Capacity - 497 MWe, 497 MWe	72	378.3				580						1.5
	73	693.7	729			570	70	500			0.78	.8
	74	760.2	400			295	70	225	81	214	0.74	.4
	75	801.2	339			456					1.3	0.6
PRAIRIE ISLAND 1, 2 Docket 50-282, 306, DPR-42, 60 1st commercial operation 12/73, 12/74 Type - PWR, PWR Capacity - 530 MWe, 530	74	181.9	150	56	94	18			5	13	0.12	.1
	75	836.0	477			123					0.26	0.15
QUAD CITIES 1 & 2 Docket 50-254, 265, DPR-29, 30 1st commercial operation 2/73, 3/73 Type - BWR Capacity - 809 MWe, 609 MWe	73	1209.6	533			201	28	173	59	142	0.37	.2
	74	958.1	678	488	190	482			36	446	0.71	.5
	75	833.6	1972	1418	554	1385	98	1287	592	793	0.70	1.7
ROBINSON Docket 50-261, DPR-23 1st commercial operation 3/71 Type - PWR Capacity - 707 MWe	71	295.3	283	242	41	364	7	357	351	13	1.28	1.2
	72	580.0	245	147	98	215	42	173	137	78	0.87	.4
	73	455.1	831			695					0.83	1.5
	74	578.1	853			672	185	487			0.78	1.2
	75	501.8	849			1142					1.35	2.3
SAN ONOFRE 1 Docket 50-205, DPR-13 1st commercial operation 1/63 Type - PWR Capacity - 450 MWe	69	289.8	123	32	91	42	10	32	5	37	0.34	.2
	70	365.9	251	92	159	155	13	142	59	96	0.61	.4
	71	362.1	121	12	109	50	12	38	3	47	0.41	.1
	72	372.2	326	141	185	256	29	227	117	139	0.74	.7
	73	273.7	878	547	331	329	37	292	157	172	0.37	1.2
	74	377.8	219			71					0.32	.2
	75	589.0	424			292					0.75	0.7

Reporting Organization	Year	Mega-watt year (MW-YR)	PERSONNEL			ANNUAL MAN-REM					Average Exposure REM per person	
			Total	Contractor	Utility	Total	Operations	Maintenance	Contractor	Utility	per person	MAN-REM per MW-YR
SURREY 1 & 2 Docket 50-280, 281, DPR-32, 37 1st commercial operation 12/72, 5/73 Type - PWR Capacity - 123 MWe, 823 MWe	73	829.4	936			152					0.16	.2
	74	717.4	1715			884	72	812			0.52	1.2
	75	1079.7	808			1549	25	1524	1000	549	1.91	1.5
THREE MILE ISLAND 1 Docket 50-209, DPR-50 1st commercial operation 9/74 Type - PWR Capacity - 819 MWe	75	675.9	168			83			21	62	0.49	0.1
TURKEY POINT 3 & 4 Docket 50-250, 251, DPR-31, 41 1st commercial operation 12/72, 9/73 Type - PWR Capacity - 745 MWe	73	565.9	444			78					0.18	.1
	74	966.4	794			454	88	366	32	222	0.57	.5
	75	1003.7	1175			875	270	605	558	317	0.74	0.87
VERMONT YANKEE Docket 50-271, DPR-28 1st commercial operation 11/77 Type - BWR Capacity - 514 MWe	73	222.1	244			85					0.35	.4
	74	303.5	357			216	20	192	103	113	0.61	.7
	75	429.0	247	164	83	139	7	75	57	53	0.56	.3
YANKEE ROWE Docket 50-29, DPR-3 1st commercial operation 7/61 Type - PWR Capacity - 175 MWe	69	123.1	193	117	76	215	46	169	78	91	1.1	1.8
	70	146.1	355	280	75	255	60	195	98	97	0.71	1.8
	71	173.5	155	60	95	90	44	46	19	71	0.58	.5
	72	78.7	282	210	72	255	60	195	147	108	0.90	3.2
	73	127.1	263	158	105	146			70	76	0.56	1.1
	74	111.3	243	149	94	205			99	106	0.84	1.8
	75	145.1	210	134	76	138	62	76	78	60	0.66	1.0
ZION 1, 2 Docket 50-295, 304, DPR-39, 48 1st commercial operation 12/73, 9/74 Type - PWR Capacity - 1050 MWe	74	425.3	306	87	219	56			13	43	0.18	.2
	75	1181.5	1433	938	495	117	16	101	45	72	.08	0.1

APPENDIX B

LICENSED NUCLEAR POWER FACILITIES
CY 1975 Whole Body Exposures (per 10 CFR 20.407 Reports)

Exposure Ranges (Rems)

Plant Name and License No.	No Measurable Exposure	Measurable <100	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	TOTALS
Dresden 1, 2, 3 DPR's-2, 19, 25	1,687	403	210	156	125	153	629	306	166	109	29	24				3,997
Yankee-Rowe DPR-3	1,572	95	19	42	21	48	23	1								1,821
Big Rock Point DPR-6	34	137	60	26	12	7	23	24	6	4	1					334
Humboldt Bay DPR-7	38	100	28	10	15	9	25	29	22	27						303
Peach Bottom 1, 2, 3 DPR's-12, 44, 56	1,527	511	209	148	41	19	39	4								2,498
San Onofre 1 DPR-13	393	124	63	72	43	27	51	34	9	1						517
Oyster Creek DPR-16	264	439	157	119	69	59	202	56	43	26	25	10	4	1		1,474
R. E. Ginna DPR-18	151	127	93	93	66	74	206	20	4							836
Paisades DPR-20	149	204	70	51	36	29	57	38	9	1						644
Millstone 1, 2 DPR's-21, 65	908	686	629	354	212	99	317	130	70	48	22	10	7	3		3,895
Monticello DPR-22	434	246	140	228	124	92	369	79	37	25	7	1	2			1,787

APPENDIX B (Cont'd)

Exposure Ranges (Rems)

Plant Name and License No.	No Measurable Exposure	Measurable <100	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	TOTALS
N. B. Robinson 2 DPR-23	599	230	56	55	52	67	138	172	33	30	21	1				1,446
Point Beach 1, 2 DPR's-24, 27	274	65	32	32	27	17	79	46	19	16	5	1				613
Vermont Yankee DPR-28	773	60	37	42	24	27	27	13	2							1,055
Turkey Point 3, 4 DPR's-31, 41	849	361	173	117	130	71	211	82	22	8	1					2,025
Surry 1, 2 DPR's-32, 37	580	813	145	158	108	98	314	247	33	16	7	6	1			2,528
Grand Cliffs 1, 2 DPR's-29, 30	1,225	113	64	108	74	92	337	143	56	33	23					2,308
Brown's Ferry 1, 2 DPR's-33, 52	2,085	1,638	457	180	57	20	28									4,465
Ft. St. Vrain DPR-34	1,263															1,263
Pilgrim DPR-35	324	102	57	29	30	17	83	65	42	13	12	4	10	8	(10-11) 1	797
Maine Yankee DPR-36	233	168	44	32	38	30	84	39	5							673
Oconee 1, 2, 3 DPR's-38, 47, 55	255	275	163	117	61	47	102	47	15	2						1,084

APPENDIX B (Cont'd)

Exposure Ranges (Rems)

Plant Name and License No.	No Measurable Exposure	Measurable <100	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	TOTALS
Zion 1, 2 DPR's-39, 48	1,260	147	118	98	35	26	12									1,696
Ft. Calhoun DPR-40	153	192	63	54	26	20	73	34	7							622
Prairie Island 1, 2 DPR-42	234	316	57	33	17	14	38	2								711
Kewaunee DPR-43	143	55	18	16	6	2	5	1								247
LaCrosse DPR-45	60	40	20	17	4	5	25	23	19	12						225
Cooper Station DPR-46	407	404	73	40	23	12	23	4								966
Duane Arnold DPR-49	1,409	105	75	24	8	6	5									1,632
Indian Point 1, 2 DPR's-5, 26	744	330	141	88	57	53	110	49	29	27	7					1,635
Three Mile Island DPR-50	0*	0*	0*	78	31	15	6	1								131
Arkansas 1 DPR-51	488	87	44	8	5	3										635

* Did not report those personnel not required to be monitored.

APPENDIX B (Cont'd)

Plant Name and License No.	No Measurable Exposure	Measurable <100	Exposure Ranges (Rams)											TOTALS	
			0.10- 0.25	0.25- 0.50	0.50- 0.75	0.75- 1.0	1.0- 2.0	2.0- 3.0	3.0- 4.0	4.0- 5.0	5.0- 6.0	6.0- 7.0	7.0- 8.0		8.0- 9.0
Calvert Cliffs 1 DPR-53	570	670	41	43	22	6	1								1,353
Rancho Seco DPR-54	1,655	149	43	19	3	1	1								1,271
Edwin Hatch 1 DPR-57	477	231	88	37	27	11	9	1	1	1					851
D. C. Cook 1 DPR-58	590	100	32	23	7	5	3								760
Fitzpatrick DPR-59	754	47	74	29	17	9	9								1,059
Haddam Neck DPR-61	370	181	91	90	87	54	193	93	6						1,165
Brunswick DPR-62	1,787	343	54	23	11	7	6								2,231
Nine Mile Point DPR-63	641	193	99	59	27	33	119	56	37	23	9				1,290

END
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