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Twelfth Annual Report of Radiation Exposures for DOE & DOE Contractor Employees - 1979

December 1980

U.S. Department of Energy

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PREFACE

In 1968, the U.S. Atomic Energy Commission (AEC) established a program for reporting certain occupational radiation exposure* information to a central radiation records repository. Annual summaries (WASH-1350-R1 through WASH-1350-R6) were reported for the years 1968-1973 and included data on AEC contractor employees and visitors, as well as employees and visitors of companies in the private sector licensed by the AEC.

In January 1975, the operational functions of the AEC, including the maintenance of records on the occupational radiation exposure of contractor employees and visitors, were transferred to the Energy Research and Development Administration (ERDA). The AEC's regulatory functions, including the reporting of information on the occupational radiation exposure of licensees, were transferred to the Nuclear Regulatory Commission (NRC). Previous AEC licensees then reported to NRC while the contractors reported to ERDA. Radiation exposure data for AEC/ERDA and AEC/ERDA contractor employees and visitors for 1974 and 1975 were reported in ERDA 76/119 and ERDA 77-29. The 1976 data for ERDA and ERDA contractor employees and visitors were reported in DOE/EV-0011/9.

On October 1, 1977, the Department of Energy (DOE) was formed and assumed the responsibilities of ERDA. DOE and DOE contractor radiation exposure data for 1977 and 1978 are presented in DOE/EV-0066/10 and 11, respectively. This report contains the 1979 radiation exposure data for DOE and DOE contractors.

Previous reports for AEC/ERDA/DOE, AEC/ERDA/DOE contractor employees and visitors may be seen at the U.S. DOE Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

*The word "exposure" is herein synonymous with "dose equivalent".

STANDARDS FOR RADIATION PROTECTION

DOE (ERDA) Manual Chapter 0524, Standards for Radiation Protection, is applicable to DOE and DOE contractor operations not subject to Nuclear Regulatory Commission licensing.

Two basic requirements exist for all DOE operations. The first requirement is that all operations shall be conducted in a manner to assure that radiation exposure to individuals and population groups is limited to the lowest levels technically and economically practicable. The second requirement is that radiation exposure to individuals or population groups be maintained below prescribed limits. The DOE prescribed limits for occupationally exposed individuals are given in the following table as excerpted from DOE (ERDA) Manual Chapter 0524:

INDIVIDUALS IN CONTROLLED AREAS

RADIATION PROTECTION STANDARDS FOR EXTERNAL AND INTERNAL DOSE EQUIVALENTS

Type of Exposure	Exposure Period	Dose Equivalent (Dose or Dose Commitment* (rem))
Whole body, head and trunk, gonads, lens of the eye**, red bone marrow, active blood forming organs.	Year	5***
	Calendar Quarter	3
Unlimited areas of the skin (except hands and forearms). Other organs, tissues, and organ systems (except bone).	Year	15
	Calendar Quarter	5
Bone	Year	30
	Calendar Quarter	10
Forearms****	Year	30
	Calendar Quarter	10
Hands**** and feet	Year	75
	Calendar Quarter	25

*To meet the above dose commitment standards, operations must be conducted in such a manner that it would be unlikely that an individual would assimilate in a critical organ, by inhalation, ingestion, or absorption, a quantity of a radionuclide(s) that would commit the individual to an organ dose which exceeds the limits specified in the above table.

**A beta exposure below a maximum energy of 700 keV will not penetrate the lens of the eye; therefore, the applicable limit for these energies would be that for the skin (15 rem/year).

***In special cases with the approval of the Director, Operational and Environmental Safety Division, a worker may exceed 5 rem/year provided his/her average exposure per year since age 18 will not exceed 5 rem/year.

****All reasonable effort shall be made to keep exposure of forearms and hands to the general limit for the skin.

WHOLE BODY RADIATION EXPOSURES

a. General Trends

Radiation exposure data for AEC/ERDA/DOE and AEC/ERDA/DOE contractor* employees for 1975-1979 are plotted in Figure 1. This shows that approximately 50% of the total workers monitored do not receive measurable exposure.

Employee data obtained from DOE reports of occupational exposure for years 1965-1979 are presented in Table 1. The data from Table 1 were used to generate Table 2 and Figure 2. Figure 2, which displays the percent of employees monitored who received those equivalents greater than 1 rem and greater than 2 rem, demonstrates a significant decline in the percent of employees receiving the higher dose equivalents over the past 15 years.

Table 3 presents the collective dose equivalent (man-rem) for DOE and DOE contractor employees and visitors for 1975 through 1979. The collective dose equivalents have been estimated by using the midpoint of each dose equivalent range shown in Table 1.

A comparison, by field organization, of the number of employees and visitors monitored and the number of employees and visitors monitored who received less than a measurable dose is displayed in Figure 3. The variation portrayed in the percent of monitored individuals receiving no measurable dose is due to the types of projects at various facilities and to differences in policies of the various contractors in regards to monitoring non-radiation workers.

*Henceforth referred to as DOE and DOE contractor.

FIGURE 1. COMPARISON OF NUMBER OF EMPLOYEES, NUMBER OF EMPLOYEES MONITORED, AND NUMBER OF EMPLOYEES MONITORED THAT RECEIVED NO MEASURABLE DOSE EQUIVALENT

TABLE 1
DISTRIBUTION OF WHOLE BODY RADIATION EXPOSURES FOR
DOE/DOE CONTRACTOR EMPLOYEES - 1965-1979

	Dose Equivalent Ranges (rem)														
Year	0-1*		1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12	Total Monitored
	<Meas.	Meas. - 1													
1965		128360	4158	1704	515	294	70	32	26	25	22	6	2		135214
1966		131522	3706	1630	593	313	88	47	24	6	2			1	137932
1967		102510	3472	1572	555	168	35	29	23	17	4	1			108386
1968		103206	2799	1408	425	144	3	1							107986
1969		98625	2554	1313	335	86	4					1			102918
1970		92185	2698	1329	279	158	5	4	2		1				96661
1971		90640	2380	888	275	118	8	3				1		2	94315
1972		86077	2130	929	219	95	8	2							89460
1973		89071	1944	727	172	60	2	1							91977
1974	43184	32500	1667	688	149	40	4								78232
1975	43310	42141	1846	753	232	142				1					88425
1976	40083	47886	1679	475	70	6	1								90200
1977	43017	49948	1579	545	103	23			1	2				2	95220
1978	44898	55296	1323	439	53	11									102020
1979	50003	53235	1286	416	33	10	1				1			1	104986

*Separation of data prior to 1974 is unavailable.

TABLE 2
DISTRIBUTION OF EMPLOYEES WHO RECEIVED ANNUAL WHOLE BODY
DOSE EQUIVALENTS GREATER THAN 1 REM AND GREATER
THAN 2 REM - 1965 - 1979

Year	Number Employees Monitored	Number of Employees With Annual Whole Body Dose Equivalents		Collective Dose Equivalent (man-rem)*
		> 1 rem	> 2 rem	
1965	135214	6854	2696	14918
1966	137932	6410	2704	14173
1967	108386	5876	2404	12583
1968	107986	4780	1981	9877
1969	102918	4293	1739	8706
1970	96661	4476	1778	9135
1971	94315	3675	1295	7357
1972	89460	3383	1253	6769
1973	91977	2906	962	5623
1974	78232	2548	881	4944
1975	88425	2974	1128	6111
1976	90200	2231	552	3984
1977	95220	2255	676	4251
1978	102020	1826	503	3317
1979	104986	1748	462	3157

*This column reflects the trend in high exposures since individuals with dose equivalents of less than 1 rem have been excluded. The annual collective dose equivalent has been estimated by using the midpoint of each dose equivalent range shown in Table 1.

FIGURE 2. PERCENT OF EMPLOYEES WITH WHOLE BODY DOSE EQUIVALENTS GREATER THAN 1 AND 2 REM

TABLE 3
COLLECTIVE DOSE EQUIVALENT* FOR DOE/DOE CONTRACTOR
EMPLOYEES AND VISITORS BY FIELD ORGANIZATION - 1975-1979

Field Organization	1975	1976	1977	1978	1979
Albuquerque	2324	1437	2300	2399	1873
Chicago	1638	1354	1373	1167	1061
Grand Junction	5	<1	<1	2	8
Idaho	611	790	929	899	876
Nevada	55	25	49	47	31
Oak Ridge	1284	1351	1300	1566	1332
Pittsburgh Naval Reactors	1876	1609	653	252	196
Richland	2257	2265	3197	2596	2571
San Francisco	283	285	334	307	264
Schenectady Naval Reactors	1022	203	148	111	114
Savannah River	1268	1278	1298	1289	1343
TOTAL	12622	10597	11581	10635	9665

*Throughout this report minor variations in collective dose equivalent values may occur due to computer rounding.

FIGURE 3. COMPARISON OF THE NUMBER AND PERCENT OF EMPLOYEES AND VISITORS MONITORED WHO RECEIVED LESS THAN A MEASURABLE DOSE EQUIVALENT – BY FIELD ORGANIZATION – 1979

WHOLE BODY RADIATION EXPOSURES (Cont'd)

b. Dose Equivalent Distributions

Table 4 provides a breakdown of the 1979 whole body dose equivalents according to facility type. Table 5 shows a distribution of collective man-rem and average man-rem by facility type.

TABLE 4
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES FOR DOE/DOE CONTRACTOR
EMPLOYEES AND VISITORS
1979

		Dose Equivalent Ranges (rem)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor	6995	2627	2415	734	534	239	100	174	160	12								1389
Fuel Fab	1095	147	502	152	118	76	40	50	10									278
Fuel Proc	3730	1119	1021	460	380	236	138	276	97	3								1209
Uran Enrich	11144	2464	8474	184	18	2	2											466
Weapon F&T	18409	7582	9249	781	379	152	83	144	29	1	7	1				1		1247
Gen Research	41711	28157	10438	1658	715	340	171	198	25	6	2						1	1845
Accelerator	3402	1787	878	299	182	76	52	95	24	8	1							492
Other	16180	4460	8674	1329	677	389	229	348	71	3								2074
Visitors	89585	79841	9333	243	83	46	13	23	3									622
DOE Offices	2320	1660	615	33	8	2	1	1										43
Total Exposures	194571	129844	51599	5873	3094	1558	829	1309	419	33	10	1				1	1	9665
Total Man-Rem			2580	1028	1160	974	725	1963	1048	115	45	5				9	13	9665

TABLE 5
COLLECTIVE DOSE EQUIVALENT (MAN-REM) PER FACILITY TYPE
DOE/DOE CONTRACTOR EMPLOYEES AND VISITORS - 1979

Facility Type	Total No. Individuals Monitored	No. Individuals With Measurable Exposure	Total No. Man-Rem	Average Dose Equivalent (rem) Per Individual Monitored	Average Dose Equivalent (rem) Per Individual Monitored With Measurable Exposures
Reactor	6995	4368	1389	.20	.32
Fuel Fab	1095	948	278	.25	.29
Fuel Proc	3730	2611	1209	.32	.46
Uran Enrich	11144	8680	466	.04	.05
Weapon F&T	18409	10827	1247	.07	.12
Gen Research	41711	13554	1845	.04	.14
Accelerator	3402	1615	492	.15	.31
Other	16180	11720	2074	.13	.18
Visitors	89585	9744	622	.01	.06
DOE Offices	2320	660	43	.02	.07
TOTAL	194571	64727	9665	.05	.15

WHOLE BODY RADIATION EXPOSURES (Cont'd)

c. Average Dose Equivalent Ratios

It is known that dose equivalent data are inadequate in assessing whether radiation exposures are reduced to as low as practicable. Variables such as facility age and design, along with all the other factors which enter into accomplishing the program objectives may far outweigh the efforts of management, radiation workers, and safety personnel in reducing personnel exposures to the levels that exist at similar facilities elsewhere.

In some instances, it might be desirable to compare average radiation dose equivalent associated with the same facility type but at different locations. Average dose equivalent ratios have been calculated for each facility type under a field organization and are presented in Table 6. The average dose equivalent ratio is defined as the ratio of the average personnel dose equivalent for a facility type within a field organization to the average personnel dose equivalent for that facility type. The numbers in Table 6 are derived by discarding all dose equivalents less than 0.5 rem. By discarding numbers less than 0.5 rem, it is intended to include only those people working in the radiation areas. No interpretation of these numbers is possible other than those numbers less than 1 indicate low average dose equivalent relative to the average for that facility type while those ratios greater than 1 indicate a higher average dose equivalent.

TABLE 6
AVERAGE DOSE EQUIVALENT RATIOS FOR 1979

Field Organization	Type of Facility									DOE Offices
	Reactor	Fuel Fab	Fuel Process	Uran Enrich	Weapons Fab&Test	General Research	Accel	Other	Visitors	
Albuquerque					0.99	1.09			1.33	1.10
Chicago	0.67					0.95	1.01	1.41	0.96	
Grand Junction								0.56		
Idaho	0.62		1.06							0.69
Nevada					2.96					
Oak Ridge		0.83		1.00	0.52	1.01		0.61	1.08	
Pittsburgh Naval Reactors	0.46					0.84				
Richland	1.31	1.00				0.97		0.99		
San Francisco						0.86	0.54	1.37	1.55	
Schenectady Naval Reactors	0.57								0.65	
Savannah River	0.51	1.10	0.94		1.14	0.90		0.84		

*The average dose equivalent ratio is defined as the average personnel dose equivalent for a facility type within a field organization divided by the average personnel dose equivalent for that facility type with DOE and DOE contractors.

INTERNAL EXPOSURES

DOE (ERDA) Manual Chapter 0525 required DOE contractors to submit a report on personnel with an internal body deposition of radioactive materials. A report was required when:

1. any uptake of radioactive material occurring during the reporting year, that either independently or when added to a current burden, was estimated to result in a dose commitment to the critical organ in excess of 50 percent of the pertinent annual dose equivalent standard set forth in Appendix 0524; or when
2. any previously unreported uptake of radioactive material was determined to have been reportable according to the above criteria by reason of more recent dose equivalent estimates.

The annual dose equivalent limit for the lungs, liver, and kidneys is 15 rem each, while the bone limit is 30 rem.

Table 7 gives a 3-year comparison of new internal body depositions. Included are those cases occurring within the respective year. Excluded from this table are those cases where the effects of prior years' depositions are continuing or where a new uptake is not clearly identified.

Of 16 reported body deposition cases for 1979, two are considered new and are included in Table 7. The 14 cases not included are described as follows: Five cases were reported where the current burden has decreased from the measured level of previous years. These instances are judged as continued tracking of a previous uptake. In eight other cases, the reported current burden was slightly higher than was previously measured, indicating either a fluctuation in the body release rate or a possible new uptake. In one final case, a 1979 dose commitment of 33.75 rem to the bone was noted to be a translocation of a reported 1977 lung deposition.

TABLE 7
DOSE DISTRIBUTIONS FROM INTERNAL BODY DEPOSITIONS

Radionuclide	Critical Organ	Dose Equivalent Ranges (rem)					
		7.5-10	10-15	15-25	25-50	50-100	100-200
1977 Depositions PU-238	Lung	1		1	1		
1978 Depositions PU-239 PU-240, PU-241 I-125	Lung Thyroid	1 1					
1979 Depositions U-234 U-235, U-238	Lung	2					

WORKER TERMINATIONS

There were 8968 monitored workers in 1979 who terminated their employment with DOE or DOE contractors. Table 8 gives the length of employment as well as the average cumulative dose equivalent for the workers in each time interval. These data indicate that the average dose equivalent for workers terminating in 1979 was a small fraction of the 5-rem-per-year limit.

TABLE 8
LENGTH OF EMPLOYMENT FOR INDIVIDUALS TERMINATING IN 1979

	1-90 Days	90-180 Days	180-365 Days	1-2 Years	2-4 Years	4-6 Years	>6 Years
Total Number	2229	1003	970	1240	1019	490	2017
Total Cumulative Dose Equivalent (rem)	1066	222	180	364	404	332	4829
Average Cumulative Dose Equivalent (rem)	0.48	0.22	0.19	0.29	0.40	0.68	2.39

**WHOLE BODY DOSE EQUIVALENTS
GREATER THAN 5 REM**

Three DOE contractor employees in three separate facilities received whole body dose equivalents greater than 5 rem during 1979. These dose equivalents ranged from 5 rem to 13 rem.

APPENDIX A
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
FOR EACH DOE FIELD ORGANIZATION
1979

TABLE A-1
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
ALBUQUERQUE FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor																		
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T	7940	847	5802	594	303	136	83	140	26	1	7	1						981
Gen Research	9685	6753	2111	385	204	102	46	72	4	5	2						1	511
Accelerator																		
Other	46	35	11															1
Visitors	11642	4755	6834	40	9	1		3										357
DOE Offices	797	470	303	15	6	1	1	1										23
TOTAL	30110	12860	15061	1034	522	240	130	216	30	6	9	1					1	1873
TOTAL MAN-REM			753	181	196	150	114	324	75	21	41	5					13	1873

TABLE A-2
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
CHICAGO FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor	314	75	94	79	38	12	9	7										59
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T																		
Gen Research	5259	2976	1697	315	131	67	39	25	8	1								326
Accelerator	3205	1642	843	293	175	73	51	95	24	8	1							484
Other	887	678	144	30	8	6	5	6	10									58
Visitors	10413	9636	508	144	59	40	9	14	3									134
DOE Offices	23	16	7															
TOTAL	20101	15023	3293	861	411	198	113	147	45	9	1							1061
TOTAL MAN-REM			165	151	154	124	99	221	112	31	4							1061

TABLE A-3
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
GRAND JUNCTION FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor																		
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T																		
Gen Research																		
Accelerator																		
Other	148	101	18	20	8	1												8
Visitors	8	8																
DOE Offices	1	1																
TOTAL	157	110	18	20	8	1												8
TOTAL MAN-REM			1	3	3	1												8

TABLE A-4
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
IDAHO FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor	3024	1780	691	257	155	84	33	21	3									256
Fuel Fab																		
Fuel Proc	2066	910	421	193	173	98	68	142	58	3								609
Uran Enrich																		
Weapon F&T																		
Gen Research																		
Accelerator																		
Other																		
Visitors	35929	35922	6	1														
DOE Offices	237	92	133	10	1	1												9
TOTAL	41256	38704	1251	461	329	183	101	163	61	3								876
TOTAL MAN-REM			63	81	123	114	88	245	152	10								876

TABLE A-5
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
NEVADA FIELD ORGANIZATION
1979

Facility Type	Total Monitored	Dose Equivalent Ranges (rems)																Total Man-Rem
		< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Reactor																		
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T	6747	6613	99	20	12	2										1		24
Gen Research																		
Accelerator																		
Other	197	195	2															
Visitors	11306	11192	105	7	2													7
DOE Offices	844	838	6															
TOTAL	19094	18838	212	27	14	2										1		31
TOTAL MAN-REM			11	5	5	1										9		31

TABLE A-6
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
OAK RIDGE FIELD ORGANIZATION
1979

Facility Type	Total Monitored	Dose Equivalent Ranges (rems)																Total Man-Rem
		< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Reactor																		
Fuel Fab	600	90	315	85	60	32	8	9	1									96
Fuel Proc																		
Uran Enrich	11144	2464	8474	184	18	2	2											466
Weapon F&T	3463		3266	140	48	9												211
Gen Research	7706	6014	1177	245	117	75	23	46	9									304
Accelerator																		
Other	4059	83	3797	144	26	7	2											231
Visitors	593	448	118	8	6	4	4	5										23
DOE Offices	19	4	15															1
TOTAL	27584	9103	17162	806	275	129	39	60	10									1332
TOTAL MAN-REM			858	141	103	81	34	90	25									1332

TABLE A-7
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
PITTSBURGH NAVAL REACTORS FIELD ORGANIZATION
1979

Facility Type	Total Monitored	Dose Equivalent Ranges (rems)																Total Man-Rem
		< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Reactor	798	134	530	87	42	5												61
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T																		
Gen Research	1487	192	1050	153	65	11	12	4										127
Accelerator																		
Other	44	29	12	1	2													2
Visitors	219	142	77															4
DOE Offices	48	8	38	2														2
TOTAL	2596	505	1707	243	109	16	12	4										196
TOTAL MAN-REM			85	43	41	10	11	6										196

TABLE A-8
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
RICHLAND FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor	667	13	85	88	85	46	41	140	157	12								761
Fuel Fab	84	1	6	20	17	16	12	9	3									52
Fuel Proc																		
Uran Enrich																		
Weapon F&T																		
Gen Research	2205	90	1525	367	109	45	31	36	2									296
Accelerator																		
Other	4913	248	2607	709	481	319	195	300	53	1								1391
Visitors	1807	566	1206	30	5													67
DOE Offices	53	4	42	6	1													4
TOTAL	9729	922	5471	1220	698	426	279	485	215	13								2571
TOTAL MAN-REM			274	213	262	266	244	728	538	46								2571

TABLE A-9
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
SAN FRANCISCO FIELD ORGANIZATION
1979

Facility Type	Total Monitored	Dose Equivalent Ranges (rems)																Total Man-Rem
		< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Reactor	2	2																
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T	106	98	6	1	1													1
Gen Research	13352	11340	1801	127	55	18	5	5	1									159
Accelerator	197	145	35	6	7	3	1											8
Other	1054	680	280	37	18	10	4	15	8	2								86
Visitors	15508	15366	134	6	1			1										10
DOE Offices	52	47	5															
TOTAL	30271	27678	2261	177	82	31	10	21	9	2								264
TOTAL MAN-REM			113	31	31	19	9	32	22	7								264

TABLE A-10
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
SAVANNAH RIVER FIELD ORGANIZATION
1979

		Dose Equivalent Ranges (rems)																
Facility Type	Total Monitored	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Reactor	981	232	331	133	182	85	13	5										180
Fuel Fab	411	56	181	47	41	28	20	32	6									131
Fuel Proc	1664	209	600	267	207	138	70	134	39									600
Uran Enrich																		
Weapon F&T	153	24	76	26	15	5		4	3									31
Gen Research	994	438	425	51	32	22	15	10	1									87
Accelerator																		
Other	4791	2387	1787	387	134	46	23	27										297
Visitors	1891	1614	272	5														14
DOE Offices	223	172	51															3
TOTAL	11108	5132	3723	916	611	324	141	212	49									1343
TOTAL MAN-REM			186	161	229	203	123	318	123									1343

TABLE A-11
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY FACILITY TYPE
SCHENECTADY NAVAL REACTORS FIELD ORGANIZATION
1979

Facility Type	Total Monitored	Dose Equivalent Ranges (rems)																Total Man-Rem
		< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Reactor	1209	391	684	90	32	7	4	1										71
Fuel Fab																		
Fuel Proc																		
Uran Enrich																		
Weapon F&T																		
Gen Research	1023	354	652	15	2													36
Accelerator																		
Other	41	24	16	1														1
Visitors	269	192	73	2	1	1												5
DOE Offices	23	8	15															1
TOTAL	2565	969	1440	108	35	8	4	1										114
TOTAL MAN-REM			72	19	13	5	4	1										114

APPENDIX B
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
FOR EACH DOE FIELD ORGANIZATION
1979

TABLE B-1
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
ALBUQUERQUE FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Albuquerque Misc.																	
Employees		1739	29	5	1	1											95
Visitors																	
Total		1739	29	5	1	1											95
General Electric Co.																	
Employees	190	110	19	7													11
Visitors	4																
Total	194	110	19	7													11
Inhalation Toxicology																	
Employees	270	76	8	1	2												7
Visitors	236																
Total	506	76	8	1	2												7
Mason & Hanger—Silas																	
Employees	27	347	172	61	21	9	28	10	1	4	1						185
Visitors	678	322															16
Total	705	669	172	61	21	9	28	10	1	4	1						201
Monsanto Research Co.																	
Employees	439	881	73	40	15	2	6										92
Visitors	610	39															2
Total	1049	920	73	40	15	2	6										94

TABLE B-1 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
ALBUQUERQUE FIELD ORGANIZATION
1979

			Dose Equivalent Ranges (rem)														
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Rockwell International																	
Employees		2725	301	190	99	71	106	16		3							597
Visitors		6019															301
Total		8744	301	190	99	71	106	16		3							898
Ross Aviation, Inc.																	
Employees	35	11															1
Visitors																	
Total	35	11															1
Sandia Laboratories, NM																	
Employees	1587	733	90	30	15	5	8	1	4	2							115
Visitors	1843	374	23	5	1												25
Total	3430	1107	113	35	16	5	8	1	4	2							140
Sandia Laboratories, CA																	
Employees	796	98	2														5
Visitors	176	2					1										2
Total	972	100	2				1										7
The Bendix Corp.																	
Employees	191																
Visitors	1																
Total	192																

TABLE B-1 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
ALBUQUERQUE FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
The Zia Company																	
Employees	1238	144	54	19	1												24
Visitors																	
Total	1238	144	54	19	1												24
U. of California/LASL																	
Employees	2862	1060	231	154	84	41	64	3	1							1	360
Visitors	1207	78	17	4			2										11
Total	4069	1138	248	158	84	41	66	3	1							1	371
TOTAL ALBUQUERQUE	12390	14758	1019	516	239	129	215	30	6	9	1					1	1849

TABLE B-2
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
CHICAGO FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Ames Laboratory																	
Employees	39	30	9	3	1	1	1	6	1								26
Visitors	150	13	3	1	2												3
Total	189	43	12	4	3	1	1	6	1								29
Argonne National Lab.																	
Employees	2302	439	220	123	67	37	23	2									220
Visitors	5081	72	47	47	29	6	5										60
Total	7383	511	267	170	96	43	28	2									281
Brookhaven National Lab.																	
Employees	191	1201	287	138	53	38	75	19	8	1							421
Visitors	92	233	68	9	7	2	7	2									49
Total	283	1434	355	147	60	40	82	21	8	1							469
Chicago Miscellaneous																	
Employees	394	224	52	11	4	3	7	10									65
Visitors	388	19	5														2
Total	782	243	57	11	4	3	7	10									67
Fermi National Accel.																	
Employees	1320	375	121	61	26	23	19	5									140
Visitors	2005	168	21	2	2	1	2	1									20
Total	3325	543	142	63	28	24	21	6									161

TABLE B-2 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
CHICAGO FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Massachusetts Inst.																	
Employees	154	149	18	16	7	2	8										35
Visitors	1916	3															35
Total	2070	152	18	16	7	2	8										
Princeton University																	
Employees	892	348	3														18
Visitors																	18
Total	892	348	3														
TOTAL CHICAGO	14924	3274	854	411	198	113	147	45	9	1							1059

TABLE B-3
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
GRAND JUNCTION FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Bendix Field Eng.																	
Employees	101	18	20	8	1												8
Visitors	2																
Total	103	18	20	8	1												8
TOTAL GRAND JUNCTION	103	18	20	8	1												8

TABLE B-4
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
IDAHO FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Allied Chemical Corp.																	
Employees	499	117	65	64	44	26	73	42	3								316
Visitors	5412																
Total	5911	117	65	64	44	26	73	42	3								316
Arrington Const.																	
Employees	1	10	2		1												1
Visitors																	
Total	1	10	2		1												1
Biggers Const.																	
Employees		5			1												1
Visitors																	
Total		5			1												1
Bingham Mechanical																	
Employees	3	11	6	3	2		1										5
Visitors																	
Total	3	11	6	3	2		1										5
C-L Electric Company																	
Employees		2		1													
Visitors																	
Total		2		1													

TABLE B-4 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
IDAHO FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
EG&G, Idaho, Inc.																	
Employees	1316	523	181	105	55	25	10										168
Visitors	26942		1														
Total	28258	523	182	105	55	25	10										169
Exxon Nuclear Co.																	
Employees	588	116	79	74	38	30	55	9									202
Visitors	3111	6															
Total	3699	122	79	74	38	30	55	9									203
Idaho Miscellaneous																	
Employees	203	156	63	51	26	8	11	3									85
Visitors																	
Total	203	156	63	51	26	8	11	3									85
Jones — Boecon																	
Employees	6	23		1	1	1											3
Visitors																	
Total	6	23		1	1	1											3
Lehigh Design Co.																	
Employees	27	7															
Visitors																	
Total	27	7															

TABLE B-4 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
IDAHO FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Morrison-Knudsen																	
Employees	46	116	46	29	13	11	13	7									79
Visitors																	
Total	46	116	46	29	13	11	13	7									79
Ormond Construction																	
Employees	1	24	8		1												3
Visitors																	
Total	1	24	8		1												3
Waters Asbestos																	
Employees		2															
Visitors																	
Total		2															
TOTAL IDAHO	38155	1118	451	328	182	101	163	61	3								867

TABLE B-5
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
NEVADA FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Air Resources Lab.																	
Employees	48																
Visitors	6																
Total	54																
CER Geonuclear																	
Employees	3																
Visitors																	
Total	3																
Defense Nuclear Agency																	
Employees	192	2															2
Visitors	2998	32	1														2
Total	3190	34	1														
EG&G, Inc.																	
Employees	865	35	1		1												3
Visitors	98																
Total	963	35	1		1												3
EPA/NERC																	
Employees	225	2															
Visitors	54																
Total	279	2															

TABLE B-5 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
NEVADA FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Fenix & Scisson, Inc.																	
Employees	215	10		2													1
Visitors	273																
Total	488	10		2													1
Holmes & Narver, Inc.																	
Employees	285	5															
Visitors	122																
Total	407	5															
Nevada Miscellaneous																	
Employees	249	2															
Visitors	244	1															
Total	493	3															
Reynolds Electrical																	
Employees	4192	36	19	10	1										1		19
Visitors	3256																
Total	7448	36	19	10	1										1		19
U.S. Dept. of Interior																	
Employees	149	5															
Visitors	20																
Total	169	5															

TABLE B-5 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
NEVADA FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Wackenhut Services																	
Employees	244	4															
Visitors	67																
Total	311	4															
Westinghouse Electric																	
Employees	141																
Visitors	91																
Total	232																
TOTAL NEVADA	14037	134	21	12	2										1		26

TABLE B-6
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
OAK RIDGE FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Comp. Animal Res. Lab.																	
Employees	107	19															1
Visitors	12																
Total	119	19															1
Goodyear Atomic Corp.																	
Employees	735	180	57	12	2												25
Visitors																	
Total	735	180	57	12	2												25
National Lead Co.																	
Employees	90	314	85	60	32	8	9	1									96
Visitors																	
Total	90	314	85	60	32	8	9	1									96
Oak Ridge Assoc. Univ.																	
Employees	412	153	12	2													11
Visitors																	
Total	412	153	12	2													11
Puerto Rico Nuclear Ctr.																	
Employees	123	49	25	1	2												8
Visitors	379	87															4
Total	502	136	25	1	2												13

TABLE B-6 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
OAK RIDGE FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
RMI Company																	
Employees	14	45	19	2													6
Visitors																	
Total	14	45	19	2													6
Rust Engineering Co.																	
Employees		1374	97	1													86
Visitors																	
Total		1374	97	1													86
Union Carbide Corp./ORGDP																	
Employees		7578	88	4		2											398
Visitors																	
Total		7578	88	4		2											398
Union Carbide Corp./Y-12																	
Employees		6132	173	53	14	1											366
Visitors																	
Total		6132	173	53	14	1											366
Union Carbide Corp./ORNL																	
Employees	5441	468	202	112	68	22	46	9									254
Visitors	57	31	8	6	4	4	5										19
Total	5498	499	210	118	72	26	51	9									273

TABLE B-6 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
OAK RIDGE FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																	
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem	
Union Carbide Corp.																		
Employees	1729	716	39	2													43	
Visitors																		
Total	1729	716	39	2													43	
Woven Structures, Inc.																		
Employees			1	20	7	2											14	
Visitors																		
Total			1	20	7	2											14	
TOTAL OAK RIDGE	9099	17146	806	275	129	39	60	10									1331	

TABLE B-7
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
PITTSBURGH NAVAL REACTORS FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Duquesne Light Co.																	
Employees	1	204	72	37	5												40
Visitors	14	40															2
Total	15	244	72	37	5												42
Westinghouse Electric/BAPL																	
Employees	180	863	71	27	4	11	4										84
Visitors	76	20															1
Total	256	883	71	27	4	11	4										85
Westinghouse Electric/NRF																	
Employees	145	513	97	43	7	1											64
Visitors	52	17															1
Total	197	530	97	43	7	1											65
Westinghouse Plant Appa.																	
Employees	29	12	1	2													2
Visitors																	
Total	29	12	1	2													2
TOTAL PITTSBURGH	497	1669	241	109	16	12	4										193

TABLE B-8
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
RICHLAND FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																	
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem	
Automation Industries																		
Employees	28	218	16	1	1												15	
Visitors	2	2																
Total	30	220	16	1	1												15	
Battelle Memorial Inst.																		
Employees	40	783	147	54	14	5	10	2									118	
Visitors	40	53															3	
Total	80	836	147	54	14	5	10	2									121	
BCS Richland Inc.																		
Employees	4	4	1															
Visitors	1	2																
Total	5	6	1															
Hanford Eng. Dev. Lab.																		
Employees	50	742	220	55	31	26	26										177	
Visitors	32	40	5														3	
Total	82	782	225	55	31	26	26										180	
Hanford Environ. Health Found.																		
Employees		4																
Visitors		1																
Total		5																

TABLE B-8 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
RICHLAND FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
J.A. Jones Const. Co.																	
Employees	145	814	197	210	204	129	189	26	1								746
Visitors		3															
Total	145	817	197	210	204	129	189	26	1								746
Rockwell Hanford Oper.																	
Employees	71	1567	495	270	114	66	111	27									629
Visitors	435	958	21	3													53
Total	506	2525	516	273	114	66	111	27									682
United Nuclear Ind, Inc.																	
Employees	14	91	108	102	62	53	149	160	12								812
Visitors	3	47	4	2													4
Total	17	138	112	104	62	53	149	160	12								816
TOTAL RICHLAND	865	5329	1214	697	426	279	485	215	13								2561

TABLE B-9
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
SAN FRANCISCO FIELD ORGANIZATION
1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Rockwell International Energy Systems Group																	
Employees	680	280	37	18	10	4	15	8	2								86
Visitors	545	67	2	1													4
Total	1225	347	39	19	10	4	15	8	2								91
Stanford Linear Accel. Ctr																	
Employees	145	35	6	6	1												6
Visitors																	
Total	145	35	6	6	1												6
U. of California/LBL																	
Employees	3557	1065	72	19	7		1										79
Visitors																	
Total	3557	1065	72	19	7		1										79
U. of California/LLL																	
Employees	7473	708	52	32	10	5	4	1									76
Visitors	14821	67	4				1										6
Total	22294	775	56	32	10	5	5	1									81
U. of California/LEHR																	
Employees	162	14	1	2													2
Visitors																	
Total	162	14	1	2													2

TABLE B-9 (Continued)
 DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
 SAN FRANCISCO FIELD ORGANIZATION
 1979

Contractor	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
U. of California/LNM																	
Employees	122	14	2	3	3	1											5
Visitors																	
Total	122	14	2	3	3	1											5
U. of California/MC																	
Employees	26																
Visitors																	
Total	26																
U. of California/NTS																	
Employees	100	6	1	1													1
Visitors																	
Total	100	6	1	1													1
TOTAL SAN FRANCISCO	27631	2256	177	82	31	10	21	9	2								264

TABLE B-10
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
SAVANNAH RIVER FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																	
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem	
E.I. du Pont/SRP-OPNS																		
Employees	2212	2324	622	501	283	123	193	49									1109	
Visitors	1614	272	5														14	
Total	3826	2596	627	501	283	123	193	49									1124	
E.I. du Pont/SRP-CONST.																		
Employees	1060	1046	289	110	41	18	19										214	
Visitors																		
Total	1040	1046	289	110	41	18	19										214	
Savannah River Ecol. Lab.																		
Employees	38	28															1	
Visitors																		
Total	38	28															1	
Southern Bell Tel.																		
Employees	36	2																
Visitors																		
Total	36	2																
TOTAL SAVANNAH RIVER																		
	4960	3672	916	611	324	141	212	49									1339	

TABLE B-11
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY CONTRACTOR
SCHENECTADY NAVAL REACTORS FIELD ORGANIZATION
1979

	Dose Equivalent Ranges (rem)																
Contractor	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
General Electric Co.																	
Employees	745	1336	105	34	7	4	1										107
Visitors	192	73	2	1	1												5
Total	937	1409	107	35	8	4	1										112
General Electric/MAO																	
Employees	24	16	1														1
Visitors																	
Total	24	16	1														1
TOTAL SCHENECTADY	961	1425	108	35	8	4	1										113
TOTAL DOE CONTRACTORS	123622	50799	5827	3084	1556	828	1308	419	33	10	1				1	1	9610

APPENDIX C
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY DOE FIELD ORGANIZATION
DOE GOVERNMENT EMPLOYEES AND VISITORS
1979

TABLE C-1
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY DOE FIELD ORGANIZATION
DOE GOVERNMENT EMPLOYEES AND VISITORS – 1979

Organization	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Albuquerque Operations	196	120	2	1													7
Amarillo Area Office	1	22	11			1											4
Dayton Area Office 01-03-0000-00	5	17															1
Kansas City Area Office	9																
Los Alamos Area Office 01-05-0000-00	252	79		3			1										7
Pinellas Area Office	6	2															
Rocky Flats Area Office		61	2	2	1												5
Sandia Area Office	1	2															
TOTAL	470	303	15	6	1	1	1										23

TABLE C-1 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY DOE FIELD ORGANIZATION
DOE GOVERNMENT EMPLOYEES AND VISITORS – 1979

	Dose Equivalent Ranges (rem)																
Organization	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	Total Man-Rem
Chicago Operations	16	7															
Environmental Meas. Lab.	28	3	4														1
New Brunswick Lab.	55	9	3														1
TOTAL	99	19	7														2
Grand Junction	7																
TOTAL	7																
Idaho Operations	549	133	10	1	1												9
TOTAL	549	133	10	1	1												9
Nevada Operations	4801	78	6	2													6
TOTAL	4801	78	6	2													6

TABLE C-1 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY DOE FIELD ORGANIZATION
DOE GOVERNMENT EMPLOYEES AND VISITORS – 1979

Organization	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Oak Ridge Operations	3	16															1
Paducah Area Office	1																
TOTAL	4	16															1
Pittsburgh Naval Reactors	8	38	2														2
TOTAL	8	38	2														2
Richland Operations	57	142	6	1													9
TOTAL	57	142	6	1													9
San Francisco Operations	47	5															
TOTAL	47	5															

TABLE C-1 (Continued)
DISTRIBUTION OF ANNUAL WHOLE BODY EXPOSURES BY DOE FIELD ORGANIZATION
DOE GOVERNMENT EMPLOYEES AND VISITORS – 1979

Organization	Dose Equivalent Ranges (rem)																Total Man-Rem
	< Meas.	Meas. 0.10	0.10 0.25	0.25 0.50	0.50 0.75	0.75 1.00	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	
Schenectady Naval Reactor	8	12															1
West Milton Field Office		3															
TOTAL	8	15															1
Savannah River Operations	172	51															3
TOTAL	172	51															3
TOTAL DOE GOVERNMENT	6222	800	46	10	2	1	1										56