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Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1988

Twenty First Annual Report

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

C. T. Raddatz, D. Hagemeyer



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PREVIOUS REPORTS IN SERIES

WASH-1311 A Compilation of Occupational Radiation Exposure from Light Water Cooled Nuclear Power Plants, 1969-1973, U.S. Atomic Energy Commission, May 1974.

NUREG-75/032 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1974, U.S. Nuclear Regulatory Commission, June 1975.

NUREG-0109 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1975, U.S. Nuclear Regulatory Commission, August 1976.

NUREG-0323 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1976, U.S. Nuclear Regulatory Commission, March 1978.

NUREG-0482 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1977, U.S. Nuclear Regulatory Commission, May 1979.

NUREG-0594 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1978, U.S. Nuclear Regulatory Commission, November 1979.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1979, Vol. 1, U.S. Nuclear Regulatory Commission, March 1981.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1980, Vol. 2, U.S. Nuclear Regulatory Commission, December 1981.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1981, Vol. 3, U.S. Nuclear Regulatory Commission, November 1982.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1982, Vol. 4, U.S. Nuclear Regulatory Commission, December 1983.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1983, Vol. 5, U.S. Nuclear Regulatory Commission, March 1985.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1984, Vol. 6, U.S. Nuclear Regulatory Commission, October 1986.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1985, Vol. 7, U.S. Nuclear Regulatory Commission, April 1988.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1986, Vol. 8, U.S. Nuclear Regulatory Commission, August 1989.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1987, Vol. 9, U.S. Nuclear Regulatory Commission, November 1990.

Previous reports in the NUREG-0714 series, which are now combined with NUREG-0713, are as follows:

WASH-1350-R1 through WASH-1350-R6 First through Sixth Annual Reports of the Operation of the U.S. AEC's Centralized Ionizing Radiation Exposure Records and Reporting System, U.S. Atomic Energy Commission.

NUREG-75/108 Seventh Annual Occupational Radiation Exposure Report for Certain NRC Licensees - 1974, U.S. Nuclear Regulatory Commission, October 1975.

NUREG-0119 Eighth Annual Occupational Radiation Exposure Report for 1975, U.S. Nuclear Regulatory Commission, October 1976.

NUREG-0322 Ninth Annual Occupational Radiation Exposure Report for 1976, U.S. Nuclear Regulatory Commission, October 1977.

NUREG-0463 Tenth Annual Occupational Radiation Exposure Report for 1977, U.S. Nuclear Regulatory Commission, October 1978.

NUREG-0593 Eleventh Annual Occupational Radiation Exposure Report for 1978, U.S. Nuclear Regulatory Commission, January 1981.

NUREG-0714 Twelfth Annual Occupational Radiation Exposure Report for 1979, Vol. 1, U.S. Nuclear Regulatory Commission, August 1982.

NUREG-0714 Occupational Radiation Exposure, Thirteenth and Fourteenth Annual Reports, 1980 and 1981, Vols. 2 and 3, U.S. Nuclear Regulatory Commission, October 1983.

NUREG-0714 Occupational Radiation Exposure, Fifteenth and Sixteenth Annual Reports, 1982 and 1983, Vols. 4 and 5, U.S. Nuclear Regulatory Commission, October 1985.

ABSTRACT

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission's Radiation Exposure Information and Reporting System (REIRS). The bulk of the information contained in the report was extracted from the 1988 annual statistical reports submitted by six of the seven categories[1] of NRC licensees subject to the reporting requirements of 10 CFR § 20.407. Since there are no geologic repositories for high level waste currently licensed, only six categories will be considered in this report. These six categories of licensees also submit personal identification and exposure information for terminating employees pursuant to 10 CFR § 20.408, and some analysis of this "termination" data is also presented in this report.

Annual reports for 1988 were received from a total of 429 NRC licensees, 113 of which were operators of nuclear power reactors. Compilations of the 429 reports indicated that 220,048 individuals were monitored, 107,019 of whom received a measurable dose (Table 3.1). The collective dose incurred by these individuals was calculated to be 43,906 person-rems (person-cSv)[2] which represents a decrease of 0.4% from the 1987 value. The number of workers receiving a measurable dose decreased as well as the collective dose, causing the average measurable dose to increase from 0.39 rem (cSv) in 1987, to 0.41 rem (cSv) in 1988. About 14% of the monitored individuals were found to have received doses greater than 0.50 rem (cSv), which is about the same as the value for 1987.

Some 113,072 termination reports (Table 5.1) were submitted to the NRC which contained personel identification and exposure information for 80,211 individuals who had completed their work assignment or employment with a covered category of NRC licensees during 1988. The total number of monitored individuals for whom personal identification and exposure information has been incorporated into REIRS during the 20 years that it has been operating is now 623,498, 548,253 of whom terminated from nuclear power facilities. Analyses of these termination data indicate that 8,760 individuals completed work assignments at two or more nuclear reactor facilities during calendar year 1988 and received an average dose of 0.64 rems (cSv). Approximately 3,622 of these individuals worked at two or more reactor facilities during one calendar quarter and received an average quarterly dose of 0.27 rem (cSv).

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1 Commercial nuclear power reactors; industrial radiographers; fuel processors, fabricators, and reprocessors; manufacturers and distributors of byproduct material; independent spent fuel storage installations; facilities for land disposal of low-level waste; and geologic repositories for high-level waste.

2 In the International System of Units the sievert (Sv) is the name given to the units for dose equivalent. One centisievert (cSv) equals one rem; therefore, person-rem becomes person-cSv.

EDITOR'S NOTE

In the fall of 1987, the NRC established a three-year contract with Science Applications International Corporation (SAIC) to assist the NRC Staff in the preparation of the NUREG-0713 series. In the future the designated contractor will be suggesting changes in the presentation of certain data in these reports. Readers should be alert to these changes, and the NRC welcomes responses, especially where these changes can be improved upon. Comments should be directed to Charleen T. Raddatz, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 (301)492-3745.

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PREFACE

A number of NRC Licensees have inquired as to how the occupational radiation exposure data that are extracted from the annual statistical summary reports required by § 20.407, the termination reports required by § 20.408, and the annual dose data reported by work function in accordance with Subsection 6.9.1.5 of the standard technical specifications for nuclear power plants are used by the NRC staff. This is a very appropriate inquiry that may be of importance to many affected licensees. In combination with other sources of information, the principal uses of the data are to provide facts regarding routine occupational exposures to radiation and radioactive material that occur in connection with certain NRC-licensed activities. These facts are used by the NRC staff as indicated below:

1. The data permit evaluation, from the viewpoint of trends, of the effectiveness of the overall NRC/licensee radiation protection and ALARA efforts by certain licensees. They also provide for the identification (and subsequent correction) of unfavorable trends.

2. The external dose data assist in the evaluation of the radiological risk associated with certain categories of NRC-licensed activities and are used for comparative analyses of radiation protection performance: US/foreign, BWRs/PWRs, civilian/military, plant/plant, nuclear industry/other industries, etc.

3. The data provide for the monitoring of transient workers who may affect dose distribution statistics through multiple counting, or who may exceed regulatory limits on radiation exposure due to the accumulation of exposure at multiple sites per calendar quarter or calendar year.

4. The data help provide facts for evaluating the adequacy of the current risk limitation system (e.g., are individual lifetime dose limits, worker population collective dose limits, and requirements for optimization needed?).

5. The data permit comparisons of occupational radiation risks with potential public risks when action for additional protection of the public involves worker exposures.

6. The data are used in the establishment of priorities for the utilization of NRC health physics resources: research, standards development, and regulatory program development.

7. The data provide facts for answering Congressional and Administration inquiries and for responding to questions raised by public interest groups, special interest groups, labor unions, etc.

8. The data provide information that may be used in the planning of epidemiological studies.

Occupational Radiation Exposure
at Commercial Nuclear Power Reactors and Other Facilities
Twenty-first Annual Report, 1988

1 INTRODUCTION

One of the basic purposes of the Atomic Energy Act and the implementing regulations in Title 10, Code of Federal Regulations, Chapter I, Part 20, is to protect the health and safety of the public, including the employees of the licensees conducting operations under those regulations. Among the regulations designed to ensure that the standards for protection against radiation set out in 10 CFR Part 20 are met, is a requirement that licensees provide individuals likely to be exposed to radiation with devices to monitor their exposure. Each licensee is also required to maintain indefinitely records of the results of such monitoring. However, there was no initial provision that these records or any summary of them be transmitted to a central location where the data could be retrieved and analyzed.

On November 4, 1968, the U.S. Atomic Energy Commission (AEC) published an amendment to Part 20 requiring the reporting of certain occupational radiation exposure information to a central repository at AEC Headquarters. This information was required of the four categories[3] of AEC licensees that were considered to involve the greatest potential for significant occupational doses and of AEC facilities and contractors exempt from licensing. A procedure was established whereby the appropriate occupational exposure data were extracted from these reports and entered into the Commission's Radiation Exposure Information Reporting System (REIRS), a computer system that was maintained at the Oak Ridge National Laboratory Computer Technology Center in Oak Ridge, Tennessee, until May 1990. At that time the data were transferred to a database management system at Science Applications International Corporation (SAIC) at Oak Ridge, Tennessee. The computerization of these data ensure that they are kept indefinitely and facilitate their retrieval and analysis. The data maintained in REIRS have been summarized and published in a report every year since 1969. Annual reports for each of the years 1969 through 1973 presented the data reported by both AEC licensees and contractors and were published in six documents designated as WASH-1350-R1 through WASH-1350-R6.

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[3] Commercial nuclear power reactors; industrial radiographers; fuel processors, fabricators, and reprocessors; manufacturers and distributors of specified quantities of byproduct material.

In January 1975, with the separation of the AEC into the Energy Research and Development Administration (ERDA) and the U.S. Nuclear Regulatory Commission (NRC), each agency assumed responsibility for collecting and maintaining occupational radiation exposure information reported by the facilities under its jurisdiction. The annual reports published by the NRC on occupational exposure for calendar year 1974 and subsequent years do not contain information pertaining to ERDA facilities or contractors. Comparable information for facilities and contractors under ERDA, now the Department of Energy (DOE), is collected and published by DOE's Division of Operational Safety at Germantown, Maryland.

In 1982 and 1983, paragraph 20.408(a) of Title 10 of the Code of Federal Regulations was amended to require three additional categories of NRC licensees to submit annual statistical exposure reports and individual termination exposure reports. The new categories are (1) geologic repositories for high-level radioactive waste, (2) independent spent fuel storage installations, and (3) facilities for the land disposal of low-level radioactive waste. Therefore, this document presents the exposure information that was reported by NRC licensees representing two of these new categories. (There are no geologic repositories for high-level waste currently licensed.)

This report and each of the predecessors summarizes information reported during previous years. However, more licensee-specific data, such as the annual reports submitted by each commercial power reactor pursuant to 10 CFR § 20.407 and their technical specifications, may be found in those documents listed on the inside of the front cover of this report. Additional operating data and statistics for each power reactor for the years 1973 through 1982 may be found in a series of reports, "Nuclear Power Plant Operating Experience" [Refs. 1-9]. These documents are available for viewing at all NRC public document rooms, or they may be purchased from the National Technical Information Service, as shown in the Reference section.

2 LIMITATIONS OF THE DATA

All of the figures compiled in this report relating to exposures and doses are based on the results and interpretations of the readings of various types of personnel monitoring devices employed by each licensee. This information obtained from routine personnel monitoring programs is sufficient to characterize the radiation environment in which individuals work and is used in evaluating the radiation protection program.

Monitoring requirements are based, in general, on 10 CFR § 20.202, which requires licensees to monitor individuals who receive or are likely to receive a dose in any calendar quarter in excess of 25% of the applicable quarterly limits. For most adults the quarterly limit for the whole body is 1.25 rems (cSv), so 0.312 rem (cSv) per quarter is the level above which monitoring is required. Depending on the administrative policy of each licensee, persons such as visitors and clerical workers may also be provided with monitoring devices for identification or convenience, although the probability of their being exposed to measurable levels of radiation is extremely small. Licensees are given the option of reporting the dose distribution of only those individuals for whom monitoring is required, or the dose distribution of all those for whom monitoring is provided. Many licensees elect to report the latter; however, this may increase the number of individuals that one could consider to be radiation workers. In an effort to account for this, the number of individuals reported as having "no measurable exposure" has been subtracted from the total number of individuals monitored in order to calculate an average dose per individual receiving a measurable dose, as well as the average dose per monitored individual (for example, see Table 3.1).

One source of error that is present in the calculation of the annual collective dose (i.e., the summation of each monitored person's whole body dose) incurred by workers is the assumption that the midpoint of the dose range is the mean dose of the individuals reported in each dose range (dose ranges are shown in Table 3.2). This allows the collective dose to be calculated without knowing each person's actual annual dose. Past experience has shown that the actual mean dose of the individuals reported in each range is usually less than the midpoint. Thus, the collective doses presented for categories of licenses shown in this report may be 10% higher than the sum of the actual individual doses. However, nearly 75% of the nuclear power reactors reported the actual collective dose in 1988 so the figure shown for this category is more accurate.

The average dose per individual, as well as the dose distributions shown for groups of licensees, also could have been affected by the multiple reporting of individuals who were monitored by two or more licensees during the year. Since individuals are not identified in the annual reports, an individual who was monitored by five different licensees would have been counted once on each report. Therefore, when the data were summed to determine the total number of individuals monitored by a group of licensees, this person would be counted as five individuals rather than as one. This could also affect the distribution of doses because the individual has been counted five times in the lower dose ranges rather than one time in the higher range corresponding to the actual accumulated dose (the sum of the doses incurred at each facility). This source of error has the greatest potential impact on the data reported by power reactor facilities since they employ many short-term workers. Further discussion of this point is provided in Section 5.

Another fact that should be kept in mind when examining the annual statistical data is that all of the personnel included in the report may not have been monitored throughout the entire year. Many licensees such as radiography firms and nuclear power facilities may monitor numerous individuals for periods much less than a year. The average doses calculated from these data, therefore, are less than the average dose that an individual would receive if involved in that activity for the full year.

Considerable attention should also be given when referencing the collective totals presented in this report. The differences between the totals presented for all licensees that reported versus only those licensees that are required to report should be noted. Likewise, one should pay close attention to the differences between all power reactors (including the high temperature gas reactor, HTGR), all pressurized water reactors (PWRs), all boiling water reactors (BWRs), and all light water reactors (LWRs). The totals may be inclusive or exclusive of those licensees that were in commercial operation for less than one full year. These parameters vary throughout the tables and appendices of this report in order to provide the most comprehensive analysis of all the data available. The apparent discrepancies among the various tables are a necessary side-effect of this endeavor.

Also, it should be again pointed out that this report contains information reported by NRC licensees only. Since the NRC licenses all commercial nuclear power reactors, fuel processors, fabricators and reprocessors, and independent spent fuel storage facilities, information shown for these categories reflects the U.S. experience. This is not the case, however, for the remaining categories of industrial radiography, manufacturing and distribution of specified quantities of by-product material, and low-level waste disposal.

Companies that conduct these types of activities in Agreement States[4] are licensed by the state and are not required to submit occupational exposure reports to the NRC. Therefore, information shown for these categories does not reflect the total U.S. experience.

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4 States that have entered into an agreement with the NRC that allows each state to license organizations using radioactive materials for certain purposes. There are now 29 Agreement States.

3 ANNUAL PERSONNEL MONITORING REPORTS - 10 CFR § 20.407

3.1 Definition of Terms and Sources of Data

3.1.1 Statistical Summary Reports

On February 4, 1974, 10 CFR § 20.407 was amended to require certain categories[5] of licensees to submit an annual statistical report indicating the distribution of the whole body doses incurred by individuals whom they monitored for exposure to radiation. Since the regulations do not require these licensees to report the collective dose incurred by the individuals shown on the statistical reports, the dose distributions are used as the basis for the staff's calculation of the collective dose (see Section 3.1.4).

3.1.2 Number of Monitored Individuals

This is the total number of individuals that the NRC licensees covered by 10 CFR § 20.407 reported as being monitored for exposure to external radiation during the year. This number must include all individuals for whom monitoring is required, and may include visitors, service representatives, contract workers, clerical workers and any other individuals for whom the licensee feels that monitoring devices should be provided. Most licensees submit the dose distribution of the total number of persons for whom monitoring was provided in their annual § 20.407 reports, but a few report only those for whom monitoring was required.

3.1.3 Number of Workers with Measurable Doses

The number of workers with measurable doses is obtained from the annual dose distribution reports submitted by NRC licensees pursuant to 10 CFR § 20.407 by subtracting the number of individuals having less than measurable doses from the total number of monitored individuals. This figure is used to calculate the average measurable dose per worker because it deletes those individuals who received exposures too small to be detected by personnel monitoring devices, many of whom probably did not routinely work in radiation areas (and were monitored for convenience or for identification purposes).

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5 Commercial nuclear power reactors; industrial radiographers; fuel processors, fabricators and reprocessors; manufacturers and distributors of by-product material; independent spent fuel storage installations; and facilities for land disposal of low-level radioactive waste.

3.1.4 Collective Dose

The concept of collective dose is used in this report to denote the summation of the whole body external doses received by all monitored individuals and has the units person-rems (person-cSv)[6]. The collective dose is not usually provided in the annual dose distribution reports submitted pursuant to 10 CFR § 20.407, but NRC staff calculated it from the reports by summing the products obtained by multiplying the number of individuals reported in each of the dose ranges by the midpoint of the corresponding range. This assumes that the midpoint of the range is equal to the arithmetic mean of the individual doses in the range. Past experience has shown that the actual mean dose of individuals reported in each dose range is less than the midpoint of the range, and the collective doses shown in this report for these may be about 10% too high. In 1981, a few power reactor licensees began reporting the actual collective dose (as determined from official personnel dosimetry results) on the § 20.407 annual reports, and, when provided, the NRC staff used these doses instead of the above-described calculations. The staff would prefer to use the actual collective dose and encourages more licensees to make it available.

3.1.5 Average Individual Dose

The average individual dose is obtained by dividing the collective dose by the total number of individuals reported as being monitored. This figure is usually less than the average measurable dose because it includes the number of those individuals who received zero or less than measurable doses.

3.1.6 Average Measurable Dose

The average measurable dose is obtained by dividing the collective dose by the number of workers that received a measurable dose. This is the average most commonly used in this and other reports when examining trends and comparing doses received by workers in various segments of the nuclear industry because it reflects the deletion of those individuals receiving zero or minimal doses, many of whom were monitored for convenience.

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6 In the International Systems of Units, the sievert (Sv) is the name given to the units for dose equivalent. One centisievert (cSv) equals one rem; therefore person-rem becomes person-cSv.

3.1.7 Number of Licensees Reporting

This is the number of NRC licenses issued to companies to use radioactive material for certain activities that would place them in one of the six categories that are required to report pursuant to 10 CFR § 20.407. The third column in Table 3.1 shows the number of licensees that have filed such reports during the last several years. State licensees do not submit such reports to the NRC.

3.1.8 CR

One of the parameters that the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) recommends be calculated for occupational dose distributions to aid in the comparison of exposure data is a ratio "CR." CR is defined to be the ratio of the annual collective dose incurred by individuals whose annual doses exceed 1.5[7] rems to the total annual collective dose. One UNSCEAR report [Ref. 10] states that normal values of CR should be between 0.05 and 0.50. This means that, usually, no more than 50% of the collective dose should be due to individual doses that exceed 1.5 rems. The last column in Table 3.1 shows the values of CR for the different types of licensees; one can see that most categories now have a CR that is less than 0.50 and that 1988 is the third year in a row the CR for commercial LWRs and the grand total for all licensees has dropped below 0.50.

3.2 Annual Whole Body Dose Distributions

Table 3.2 is a compilation of the statistical summary reports currently being submitted by six categories of licensees. In nearly every category a large number of the doses are less than measurable, and very few doses exceed 4 or 5 rems (cSv). About 90% of the reported individuals continue to be monitored by nuclear power facilities where they receive about 90% of the total collective dose.

It should be pointed out that annual exposures that exceed five rems (cSv) are not necessarily classified as personnel overexposures. Although 1.25 rems (cSv) is the quarterly limit set forth in paragraph (a) of 10 CFR § 20.101, paragraph (b) permits licensees, under certain conditions, to allow a worker

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[7] The collective dose of workers with doses exceeding 1.5 rems (cSv) was calculated by assuming that half of the collective dose incurred by workers with doses between one and two rems (cSv) was due to doses greater than 1.5 rems (cSv). This value was then added to the collective dose incurred by workers in the higher ranges.

TABLE 3.1
ANNUAL EXPOSURE DATA FOR CERTAIN CATEGORIES OF LICENSEES
1979-1988

License Category+	Calendar Year	Number of Licensees Reporting	Number of Monitored Individuals	Number of Workers With Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Individual Dose (rems or cSv)	Average Measurable Dose per Worker (rems or cSv)	CR*
Industrial Radiography	1988	286	6,878	4,223	1,981	0.29	0.47	0.43
	1987	312	7,236	4,454	1,835	0.25	0.41	0.36
	1986	335	7,952	5,130	2,108	0.26	0.41	0.39
	1985	340	8,476	5,550	2,374	0.28	0.43	0.45
	1984	361	8,458	5,446	2,490	0.30	0.46	0.46
	1983	340	8,624	5,131	2,384	0.28	0.46	0.45
	1982	353	9,235	6,160	2,998	0.32	0.49	0.46
	1981	266	9,938	5,486	2,652	0.27	0.48	0.48
	1980	292	11,102	6,556	2,979	0.27	0.45	0.45
	1979	341	11,969	6,904	3,461	0.29	0.50	0.47
Manufacturing and Distribution	1988	16	2,177	868	343	0.16	0.40	0.62
	1987	24	3,589	2,317	716	0.20	0.31	0.54
	1986	33	4,042	2,065	745	0.18	0.36	0.49
	1985	33	3,958	2,250	755	0.19	0.34	0.50
	1984	40	5,076	1,977	671	0.13	0.34	0.46
	1983	33	5,051	2,003	824	0.16	0.41	0.54
	1982	34	5,453	2,199	890	0.16	0.40	0.51
	1981	29	4,846	2,395	904	0.19	0.38	0.52
	1980	29	5,119	2,460	1,033	0.20	0.42	0.61
	1979	28	3,937	2,219	888	0.23	0.40	0.55
Low-Level Waste Disposal	1988	2	864	171	27	0.03	0.16	0.06
	1987	2	778	173	24	0.03	0.14	0.00
	1986	2	996	175	31	0.03	0.18	0.05
	1985	2	1,240	252	70	0.06	0.28	0.24
	1984	2	925	297	72	0.08	0.24	0.16
	1983	1	612	358	71	0.12	0.20	0.14
	1982	1	680	251	53	0.08	0.21	0.20
Independent Spent Fuel Storage	1988	2	217	57	25	0.12	0.44	0.27
	1987	2	129	64	41	0.32	0.64	0.60
	1986	1	32	32	34	1.06	1.06	0.46
	1985	1	32	32	34	1.06	1.06	0.51
	1984	1	32	32	13	0.41	0.41	0.06
	1983	1	33	27	8	0.24	0.30	0.00
	1982	1	35	32	9	0.26	0.28	0.00
Fuel Fabrication and Processing	1988	10	11,994	3,869	455	0.04	0.12	0.01
	1987	10	10,370	3,994	514	0.05	0.13	0.01
	1986	10	8,017	3,790	466	0.06	0.12	0.01
	1985	11	8,596	5,032	643	0.07	0.13	0.05
	1984	14	9,488	5,772	818	0.09	0.14	0.04
	1983	15	9,023	5,013	835	0.09	0.17	0.19
	1982	16	9,808	5,433	831	0.08	0.15	0.20
	1981	18	10,552	5,942	940	0.09	0.16	0.09
	1980	18	10,204	5,900	1,111	0.11	0.19	0.12
	1979	21	9,946	5,365	1,268	0.13	0.24	0.16
Commercial Light Water Reactors***	1988	113	197,918**	97,831**	41,076	0.21	0.42	0.38
	1987	106	209,100**	99,493**	40,947	0.19	0.41	0.36
	1986	101	194,048**	99,502**	42,982	0.22	0.43	0.44
	1985	93	180,254**	94,873**	43,624	0.24	0.46	0.47
	1984	88	165,803**	95,224**	55,353	0.33	0.58	0.57
	1983	80	139,885**	83,546**	56,758	0.41	0.68	0.60
	1982	79	127,904**	80,871**	52,227	0.41	0.65	0.57
	1981	73	123,978**	80,664**	54,271	0.44	0.67	0.58
	1980	70	124,250**	77,903**	53,810	0.43	0.69	0.59
	1979	69	99,463**	62,316**	39,759	0.40	0.64	0.57
Grand Totals and Averages	1988	429	220,048**	107,019**	43,906	0.20	0.41	0.38
	1987	456	232,779**	112,097**	44,079	0.19	0.39	0.37
	1986	482	215,087**	110,694**	46,366	0.22	0.42	0.43
	1985	480	202,556**	107,989**	47,474	0.23	0.44	0.46
	1984	506	189,782**	108,748**	59,421	0.31	0.55	0.56
	1983	470	163,238**	96,878**	60,880	0.37	0.63	0.59
	1982	482	153,118**	94,946**	57,008	0.37	0.60	0.56
	1981	385	149,314**	94,490**	58,767	0.39	0.62	0.56
	1980	410	150,675**	92,819**	58,933	0.39	0.63	0.57
	1979	459	125,316**	76,804**	45,376	0.36	0.59	0.55

+ These categories consist only of NRC licensees. Agreement States license organizations conducting industrial radiography, manufacturing and distribution, and low-level waste disposal in those states do not report occupational exposure data to the NRC.

*CR is the ratio of the annual collective dose delivered at annual doses exceeding 1.5 rems to the total annual collective dose. (see Section 3.1.8)

**These figures are adjusted to account for the multiple counting of transient reactor workers (see Section 5).

***Includes all LWRs that reported, although all of them may not have been in commercial operation for a full year, and excludes the gas-cooled reactor.

TABLE 3.2
DISTRIBUTION OF ANNUAL WHOLE BODY DOSES BY LICENSE CATEGORY
1988

LICENSE CATEGORY (# reporting)	*Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)															TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (Person-rem)
	No Meas-urable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.00-6.00	6.00-7.00	7.00-8.00	8.00-9.00	9.00-12.00	>12.0			
INDUSTRIAL RADIOGRAPHY																		
Single Location (77)	787	283	61	25	14	3	8	1									1,182	395	60
Multiple Locations (209)	1,868	1,488	679	562	283	239	397	122	42	9	2	5					5,696	3,828	1,921
Total (286)	2,655	1,771	740	587	297	242	405	123	42	9	2	5					6,878	4,223	1,981
MANUFACTURING AND DISTRIBUTION																		
Broad (10)	1,282	570	69	46	25	18	51	35	17	6							2,119	837	340
Limited (6)	27	22	6	2	1												58	31	3
Total (16)	1,309	592	75	48	26	18	51	35	17	6							2,177	868	343
LOW-LEVEL WASTE DISPOSAL																		
Total (2)	693	110	31	20	3	5	2										864	171	27
INDEPENDENT SPENT FUEL STORAGE																		
Total (2)	160	28	6	3	7	4	9										217	57	25
FUEL FABRICATION																		
Total (10)	8,125	2,751	668	355	83	6	5	1									11,994	3,869	455
**COMMERCIAL POWER REACTORS																		
Boiling Water (38)	52,077	16,717	6,957	5,692	3,341	2,408	4,867	1,131	215	5							93,410	41,333	18,135
Pressurized Water (75)	55,147	27,901	11,205	9,316	5,575	3,545	5,405	829	127	4		1					119,055	63,908	22,940
High Tempurature Gas (1)	238	24															262	24	1
Total																			
GRAND TOTALS	120,404	49,894	19,682	16,021	9,332	6,228	10,744	2,119	401	24	2	6					234,857	114,453	43,906

*Dose values exactly equal to the values separating ranges are reported in the next higher range.

**Includes all reactors that reported although all of them may not have been in commercial operation for a full year, and these values have not been adjusted for the multiple counting of transient reactor workers.

to receive a whole body dose of three rems (cSv) per calendar quarter (up to 12 rems (cSv) annually.) The conditions are that the licensee must have determined and recorded the worker's prior accumulated occupational dose to the whole body and that the worker's whole body dose when added to his accumulated occupational dose does not exceed 5(N - 18) rems (cSv), where N equals the individual's age in years. Although there is no annual limit, annual exposures that exceed 12 rems (cSv) indicate that an over exposure has occurred. Any quarterly exposure in excess of the applicable quarterly limits must be reported. A discussion of various types of occurrences in which the limits have been exceeded is given in Section 6.

A summary of the annual whole body exposures reported to the Commission by certain categories of NRC licensees required to submit reports pursuant to 10 CFR § 20.407 is presented in Table 3.3, which shows that about 95% of the exposures have consistently remained less than two rems (cSv) between 1967 and 1984. For the past three years the percentage of workers with less than 2 rems (cSv) has been greater than 98%. The number of individuals receiving an annual exposure in excess of five rems (cSv) has been gradually declining since 1971 and has been less than 0.01% since 1986.

3.2.1 Log Probability Plots

Since personnel monitoring data has been found to have log-normal distributions [Ref. 11], trends in the data reported by licensees may be observed from log probability plots[8] of data. Figure 3.1 displays such a plot of the doses incurred by workers monitored by certain NRC licensees (see Section 3.1.1) for the year 1988. There are a few characteristics of these distributions readers should keep in mind. First, each single plotted point represents the total cumulative percent of all workers with measurable doses up to the plotted value. All measurable doses up to 0.1 rem are included in the value plotted at 0.1 rem, and the values shown on the "Annual Dose" axis are derived from the dose ranges specified in 10 CFR § 20.407(b). Second, because it is not possible to plot 100% on these figures, the data for the highest dose group are plotted at 99.99%, and can be said to account for all of the workers.

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8 If the data have a log-normal distribution, the data points will form a straight line when plotted on log probability paper on which cumulative probabilities are laid off on the vertical axis at distances proportional to the corresponding number of standard deviations above or below the median and the dose is plotted on the horizontal axis with a logarithmic scale.

TABLE 3.3
SUMMARY OF ANNUAL DOSE DISTRIBUTIONS FOR CERTAIN NRC LICENSEES

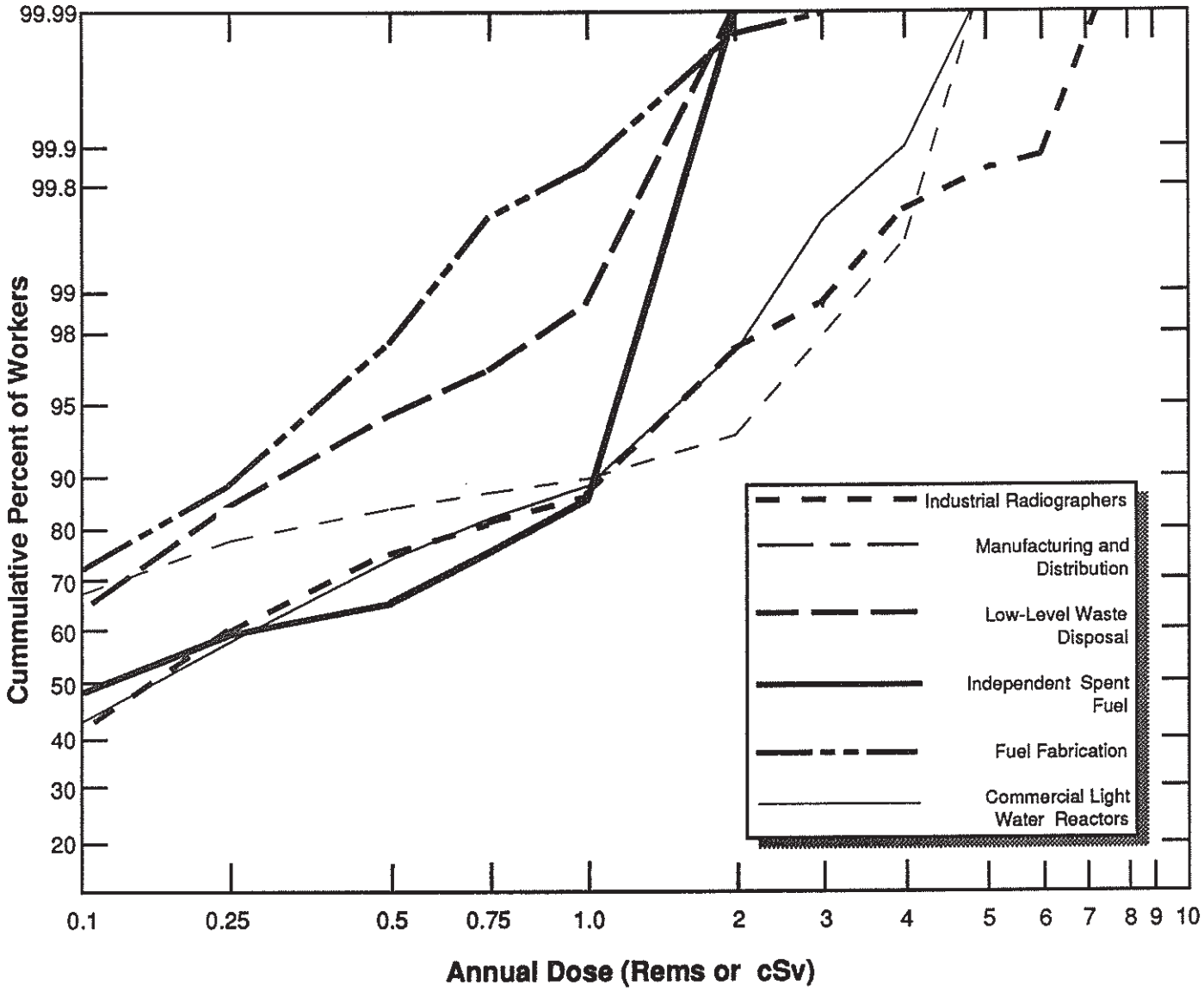
1968-1988

Year	Total Number of Monitored Persons: Reported Number	Total Number of Monitored Persons: Corrected Number*	Percent of Individuals With Doses <2 rems*	Percent of Individuals With Doses <5 rems*	Number of Individuals With Doses >12 rems*
1968	36,836		97.2%	99.5%	3
1969	31,176		96.5%	99.5%	7
1970	36,164		96.1%	99.4%	0
1971	36,311		96.3%	99.3%	1
1972	44,690		95.7%	99.5%	8
1973	67,862		95.0%	99.5%	1
1974	85,097		96.4%	99.7%	1
1975	78,713		94.8%	99.5%	1
1976	92,773		95.0%	99.6%	3
1977	98,212	93,438	93.8%	99.6%	1
1978	105,893	100,818	94.6%	99.8%	3
1979	131,027	125,316	95.2%	99.8%	1
1980	159,177	150,675	94.6%	99.7%	0
1981	157,874	149,314	94.6%	99.8%	1
1982	162,456	154,117	94.9%	99.9%	0
1983	172,927	164,239	94.6%	99.9%	0
1984	204,136	191,401	95.9%	99.9%	0
1985	215,197	204,319	96.9%	>99.99%	2
1986	227,943	215,378	98.0%	>99.99%	0
1987	246,953	231,404	98.8%	>99.99%	0
1988	233,857	219,310	98.6%	>99.99%	0

* Data for 1977-1988 are based on the distribution of individual doses after adjusting for the multiple counting of transient reactor workers (see Section 5).

Another feature of these types of graphs is that several comparisons of various dose distributions can be quickly made. For example, one can easily see in Figure 3.1 that in 1988, about 85% of the workers monitored by firms licensed for independent spent fuel storage received doses that were less than 1.00 rem (cSv), while almost 99% of the workers monitored at low-level waste storage facilities received such doses. One should also note that the doses at which the 50 percentile line crosses the plot corresponds to the median

Figure 3.1
Annual Dose Distribution of Workers at Certain NRC Licensees
1988



License Category	Average Meas. Dose (Rem or cSv)	CR*
Industrial Radiographers	0.47	0.43
Manufacturing and Distribution	0.40	0.62
Low-Level Waste Disposal	0.16	0.06
Independent Spent Fuel	0.44	0.27
Fuel Fabrication	0.12	0.01
Commercial Light Water Reactors	0.39	0.34

*CR is the ratio of the dose delivered at individual doses exceeding 1.5 rems to the annual collective dose.

Note: Each point on the curves represents the cumulative percentage of workers with measurable doses who received doses less than the indicated annual dose.

dose, i.e. the dose below which half of the dose fell and above which half fell. For industrial radiography, independent spent fuel storage, and commercial light water reactors, the median dose is near 0.10 rem (cSv) while for manufacturing and distribution, low-level waste disposal, and fuel fabrication facilities, the median measurable dose is considerably less.

The relative positions and curvature of the graphs are indicative of certain characteristics of the dose distributions. The positions of the 1988 plots of the dose distribution of workers at fuel fabrication facilities above that of the other plots indicate smaller values of the average doses and CR (as shown in the chart at the bottom of the graph). This is due to the lower number of workers with doses that exceeded 1.5 rems (cSv) in 1988 as compared to other licensed activities.

The tendency of the plots to curve upward for doses greater than one rem (cSv) is typical of distributions having several workers with doses in the higher dose ranges [Refs. 10, 11], and indicates that the entire distribution is not a log-normal one. Another theoretical analysis of occupational dose distributions [Ref. 12] has found that these data may be fitted by a hybrid log-normal distribution. At low doses, this distribution is log-normal, but at higher doses, where radiation control programs very closely monitor each worker's total dose so that the frequency of doses approaching the dose limits is reduced, the distribution is normal.

An example of this "feedback" mechanism which reduces exposures reported at higher doses can be seen in the plot for independent spent fuel storage facilities. The relatively low points on the curve between 0.10 and 1.00 rem (cSv) indicate a large percentage of individuals receiving dose in this range, while the curve takes a steep upwards turn at 1.00 rem (cSv) indicating tighter controls limiting exposure above this level. This distribution characteristic is further reflected in the relatively high average measurable dose of 0.44 rem (cSv), but a relatively low CR value of 0.27.

3.3 Summary of Occupational Exposure Data by License Category

3.3.1 Industrial Radiography Licenses, Single and Multiple Locations

These licenses are issued to allow the use of sealed radioactive materials, usually in exposure devices or "cameras," that primarily emit gamma rays for nondestructive testing of pipeline weld joints, steel structures, boilers, air craft and ship parts, and other high-stress alloy parts. Some firms are licensed to conduct such activities in one location, usually in a permanent facility which was designed and shielded for radiography, and others perform

radiography at multiple, temporary sites in the field. The radioisotopes most commonly used are cobalt-60 and iridium-192. As shown in Table. 3.1, annual reports were received for 286 radiography licensees in 1988, which is about 26 (8%) less than that reporting in 1987.

Table 3.4 summarizes the reported data for the two types of radiography licenses for 1988 and for the previous two years for comparison purposes. For single location facilities, the table shows that in 1988, the number of workers receiving measurable doses (395) decreased by 5% over last year's value, while the collective dose increased to 60 person-rems (cSv). This resulted in the average measurable dose increasing from 0.11 in 1987 to 0.15 rem (cSv) in 1988.

TABLE 3.4
ANNUAL EXPOSURE INFORMATION FOR INDUSTRIAL RADIOGRAPHERS

1986-1988

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1988	Single location	77	1,182	395	60	0.15
	Multiple locations	209	5,696	3,828	1,921	0.50
	Total	286	6,878	4,223	1,981	0.47
1987	Single location	83	1,318	415	44	0.11
	Multiple locations	229	5,918	4,039	1,791	0.44
	Total	312	7,236	4,454	1,835	0.41
1986	Single location	95	1,345	371	44	0.12
	Multiple locations	240	6,607	4,759	2,064	0.43
	Total	335	7,952	5,130	2,108	0.41

At firms having multiple-location licenses in 1988, the number of monitored workers with measurable dose decreased by 5%, and the collective dose increased by 7% from the 1987 values. This resulted in the average measurable dose increasing to 0.50 rem (cSv). However, the average dose for workers performing radiography at a single location was one-third that amount. This was probably due to the fact that it is more difficult for workers to avoid exposure to radiation in the field, where conditions are not the best and may change every day. In order to see the contribution that each radiography licensee made to the total collective dose, a summary of the

information reported by each of these licensees in 1988 is presented in alphabetical order in Appendix A.

Figure 3.2 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for both types of industrial radiography facilities from 1973 through 1988. All three parameters have remained fairly stable since 1983 with a slight increase in 1988 due primarily to an increase in the total collective dose and a decrease in the number of licensees.

3.3.2 Manufacturer and Distributor Licenses, Broad and Limited

Manufacturer and distributor licenses are issued to allow the manufacture and distribution of radionuclides in various forms for a number of diverse purposes. The products are usually distributed to persons specifically licensed by the NRC or an Agreement State. Broad licenses are issued to larger organizations who may use many different radionuclides in many different ways and who have a comprehensive radiation protection program. The Limited licenses are usually issued to smaller firms requiring a more restrictive license. Some firms are medical suppliers that process, package, or distribute such products as diagnostic test kits, radioactive surgical implants, and tagged radiochemicals for use in medical research, diagnosis, and therapy. Limited firms are suppliers of industrial radionuclides and are involved in the processing, encapsulation, packaging, and distribution of the radionuclides that they have purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sealed sources for gauges and smoke detectors, and radiochemicals for nonmedical research. However, only those NRC licensees that possess or use at any one time specified quantities of the nuclides listed in paragraph 20.408(a)(6) are required to submit annual (10 CFR § 20.407) and termination (10 CFR § 20.408) reports.

Table 3.5 presents the annual data that were reported by the two types of licensees for 1988 and the previous two years. The total number of workers receiving measurable doses as reported by these types of licensees decreased dramatically by about 63% to 868 workers in 1988 as compared to 2,317 in 1987. The collective dose decreased also, but to a lesser extent, causing the average dose to increase to 0.40 rem (cSv). Looking at the information shown separately for the Broad and Limited licensees, one can see that the values of all of the parameters remain higher for the Broad licensees, probably because this type of license allows the possession of larger quantities of radioactive

Figure 3.2
Average Annual Values at Industrial Radiography Facilities 1973 – 1988

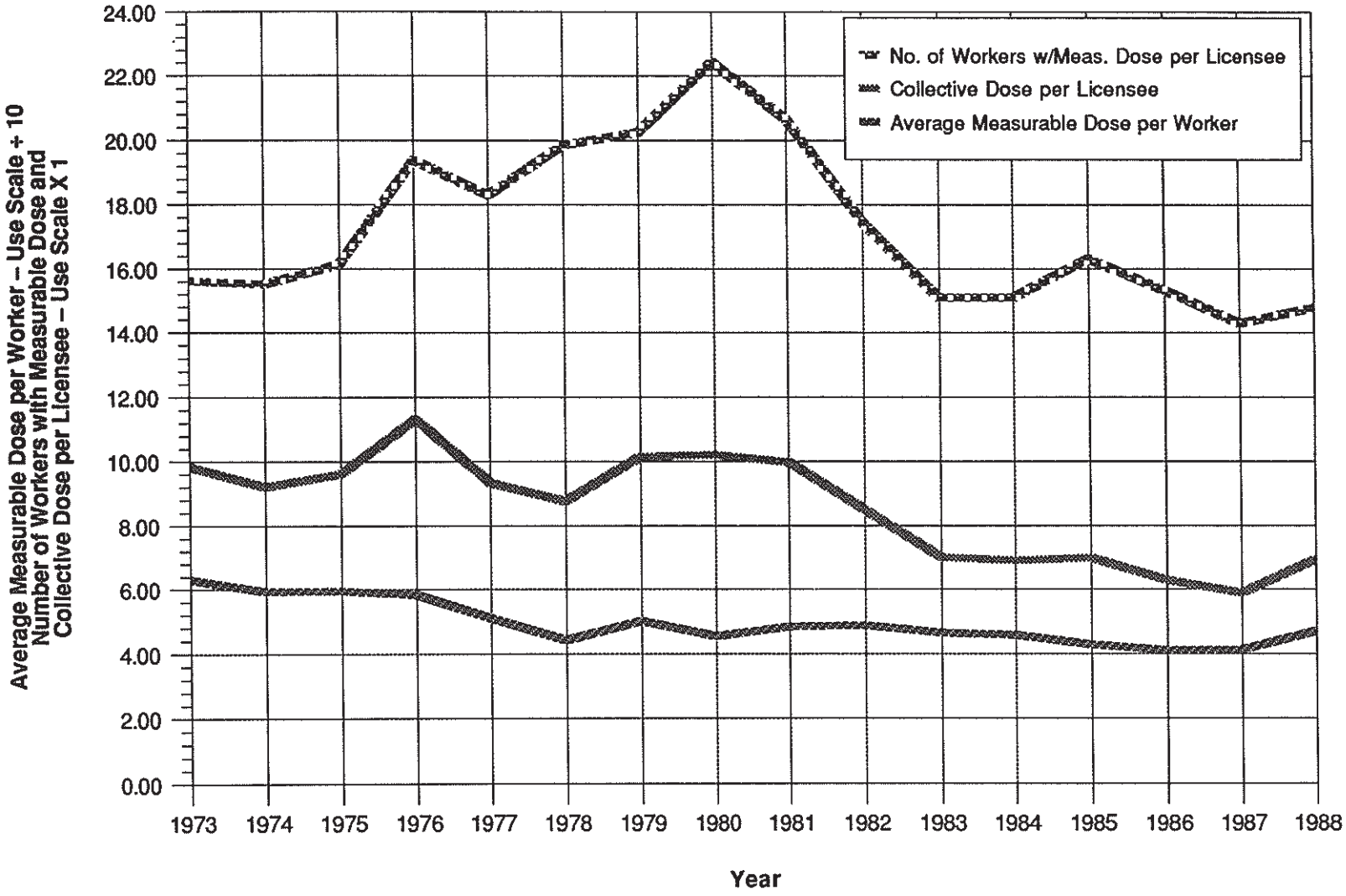


TABLE 3.5
ANNUAL EXPOSURE INFORMATION FOR MANUFACTURERS AND DISTRIBUTORS

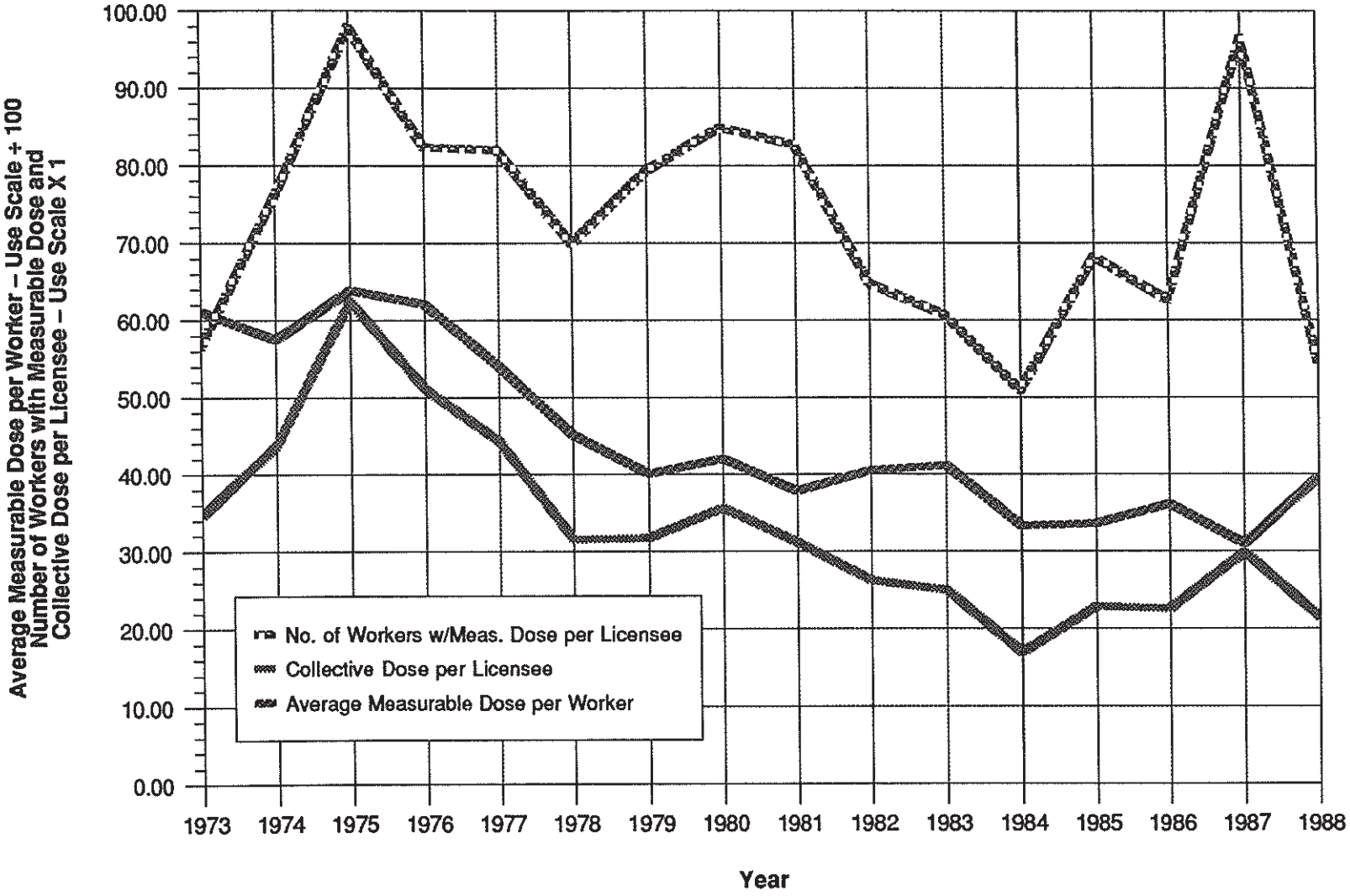
1986-1988

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1988	M & D-Broad	10	2,119	837	340	0.41
	M & D-Limited	6	58	31	3	0.10
	Total	16	2,177	868	343	0.40
1987	M & D-Broad	11	3,212	2,095	661	0.32
	M & D-Limited	13	377	222	55	0.25
	Total	24	3,589	2,317	716	0.31
1986	M & D-Broad	11	3,488	1,749	678	0.39
	M & D-Limited	22	554	316	67	0.21
	Total	33	4,042	2,065	745	0.36

materials than do the Limited licenses. However, when attempting to examine trends in the data presented for this category of licensees, one should note that the types and quantities of radionuclides may fluctuate from year to year, and even during the year, so that some licensees may report dose data one year and not the next and may be included as a Broad licensee one year and a Limited licensee at other times. Since the number of reporting licensees is quite small, these fluctuations may have a significant impact on the values of the parameters.

Figure 3.3 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for both Broad and Limited manufacturing and distribution facilities. While the collective dose per licensee has decreased considerably from a value of 62.5 person-rems (cSv) in 1975 to a value of 21.4 person-rems (cSv) in 1988, the number of workers with measurable dose per licensee has fluctuated greatly over the years with the largest yearly decrease occurring between 1987 and 1988. This decrease in the number of workers caused the average measurable dose to increase from 0.31 rem (cSv) in 1987 to 0.40 rem (cSv) in 1988.

Figure 3.3
Average Annual Values at Manufacturing and Distribution Facilities 1973 – 1988



In order to see the contribution that each of these licensees made toward the total values of the number of persons monitored, number of workers, and collective dose, Appendix A lists the values of these parameters for each licensee in alphabetical order by licensee name for 1988.

3.3.3 Low-Level Waste Disposal Licenses

These licenses are issued to allow the receipt, possession, and disposal of low-level radioactive wastes at a land disposal facility. The licensee has the appropriate facilities to receive wastes from such places as hospitals and laboratories, store them for a short time and dispose of them in a properly prepared burial ground. The licensees in this category are located in and licensed by Agreement States that have primary regulatory authority over its activity. However, they also have an NRC license that covers certain special nuclear material they might receive. The annual dose reports submitted by these licensees include all doses received during the year regardless of whether they were due to NRC or Agreement State licensed material.

The requirement for this category of NRC licensee to file annual reports became effective in January 1983. While in 1982 and 1983 there was only one licensee in this category, there have been two licensees in this category since 1984. Table 3.1 summarizes the data reported for 1982 through 1988.

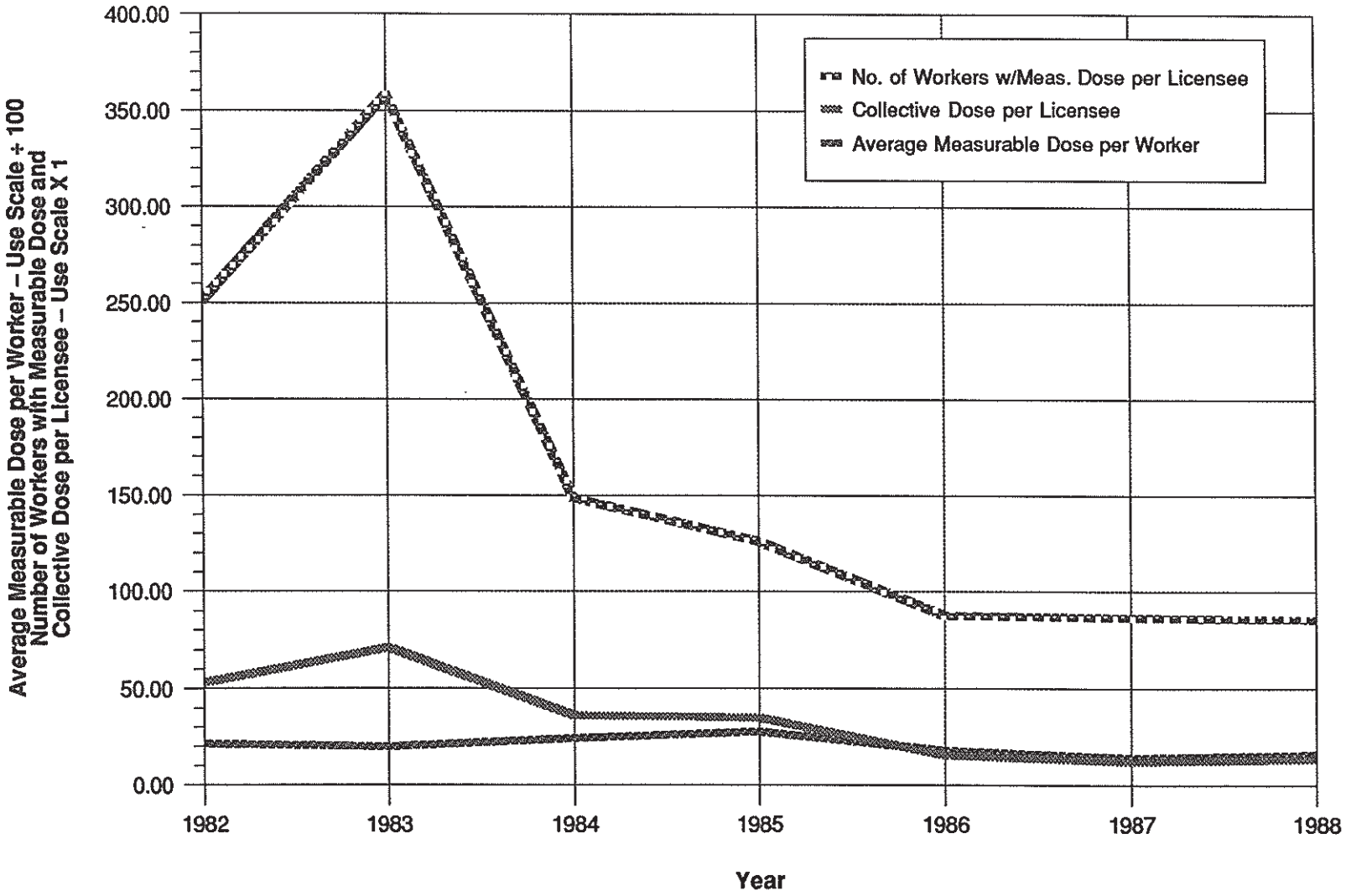
In 1988, the number of workers receiving measurable doses (171) remained about the same as last year (173), while the collective dose increased from 24 to 27 person-rem (-cSv). The average measurable dose, therefore, increased from 0.14 person-rem (-cSv) to 0.16 person-rem (-cSv). Appendix A summarizes the exposure information reported by these two licensees in 1988.

Figure 3.4 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for low-level waste disposal facilities from 1982 through 1988. As one would expect, since only two licensees have been involved in this activity over the past five years, the numbers have remained fairly stable with a moderate decreasing trend in all parameters from 1984 through 1988.

3.3.4 Independent Spent Fuel Storage Installation Licenses

These licenses are issued to allow the possession of power reactor spent fuel and other associated radioactive materials for the purpose of storage of such fuel in an independent spent fuel storage installation (ISFSI). Here, the spent fuel, which has undergone at least one year of decay since being used as a source of energy in a power reactor, is provided interim storage,

Figure 3.4
Average Annual Values at Low-Level Waste Disposal Facilities 1982 – 1988



protection, and safeguarding for a limited time pending its ultimate disposal. There have been three licenses issued for these activities, two at nuclear power plants and one at an independent facility. In 1987 and 1988, one reactor licensee reported the dose distribution information for the spent fuel storage activities separately, while the other reactor licensee combined the data with the report for all activities at the site. Only those two licensees (one reactor and one independent) that report dose distribution information separately are included in this analysis of independent spent fuel storage installation facilities.

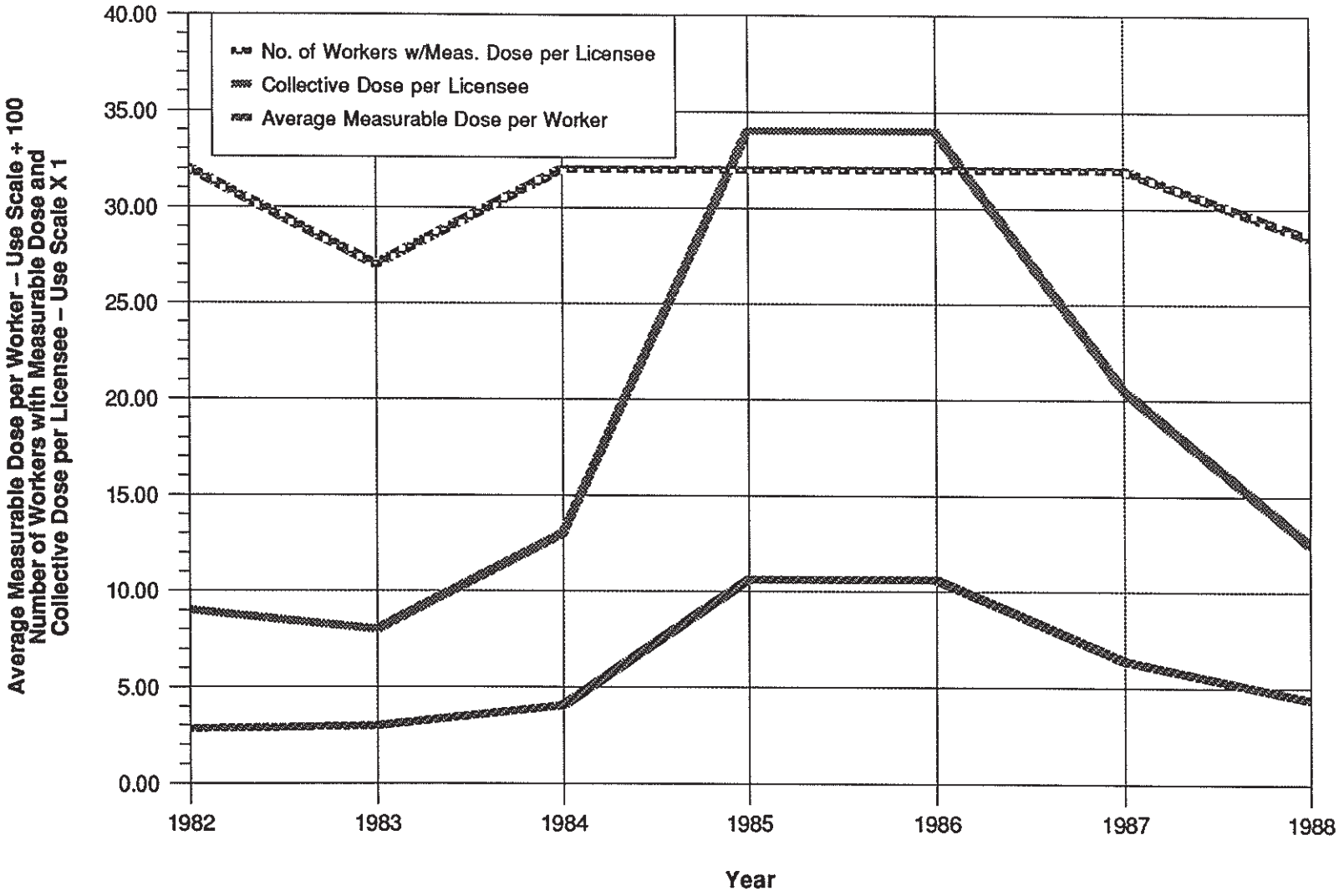
Table 3.1 summarizes the data submitted for 1982 through 1986 by the only ISFSI that is separate from a nuclear power plant and shows the sum of this facility with the two located at power plants in 1987 and 1988. For comparison purposes, if one examines the information reported by the separate facility (see Appendix A), one finds that 34 workers received a collective dose of 24 person-rems (-cSv). These values are lower than in previous years, as is the average measurable dose of 0.70 rem. A contributing factor to this relatively high average dose is that the licensee reports the doses of only those workers required to be monitored for exposure to radiation, unlike most other licensees which report the doses of all individuals for whom monitoring was provided. This has a tendency to result in the calculation of a higher average dose.

Figure 3.5 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for independent spent fuel storage facilities. All three parameters decreased for 1988 with a continued sharp decrease in the collective dose per licensee, down from 20.5 person-rems (cSv) in 1987 to 12.5 person-rem (cSv) in 1988. While the number of workers with measurable dose per licensee has remained at about 30, the decrease in collective dose caused a further reduction in the average measurable dose from 0.64 rem (cSv) in 1987 to 0.44 rem (cSv) in 1988. This is a significant improvement over the data for the years 1985 and 1986, where the average measurable dose for both years was 1.06 rems (cSv). Appendix A summarizes the exposure information reported by the two installations that reported separately in 1988.

3.3.5 Fuel Fabrication and Reprocessing Licenses

The fuel fabrication licenses are issued to allow the processing and fabrication of reactor fuels. In most uranium facilities where light water reactor fuels are processed, uranium hexafluoride enriched in the isotope U-235 is converted to solid uranium dioxide pellets and inserted into zirconium alloy tubes. The tubes are fabricated into fuel assemblies which are shipped

Figure 3.5
Average Annual Values at Independent Spent Fuel Storage Facilities 1982 – 1988



to nuclear power plants. Some facilities also perform chemical operations to recover the uranium from scrap and other off-specification materials. On a much smaller scale, fuel assemblies containing plutonium oxide pellets can be similarly fabricated and used in reactors for experimental purposes. However, there are no NRC licensees engaged in this activity at this time.

Table 3.6 shows that the number of fuel fabrication facilities has remained constant at 10 over the past three years. A number of licensees were involved in decontamination and decommissioning of their plutonium facilities, and for several years, the data for these licensees were shown in the "Decommissioning" category in Table 3.1. Since these facilities have ceased to fabricate plutonium fuel, they are not required to file annual reports and are no longer shown in the tables.

Table 3.6 shows that while the number of licensees involved in uranium fuel fabrication has remained at 10 since 1986, the collective dose decreased by about 11% to the lowest dose yet reported, down from 514 in 1987 to 455 person-rems (cSv) in 1988. The number of workers with measurable external doses also decreased slightly so that the average dose has remained at about 0.12 rem (cSv) since 1985.

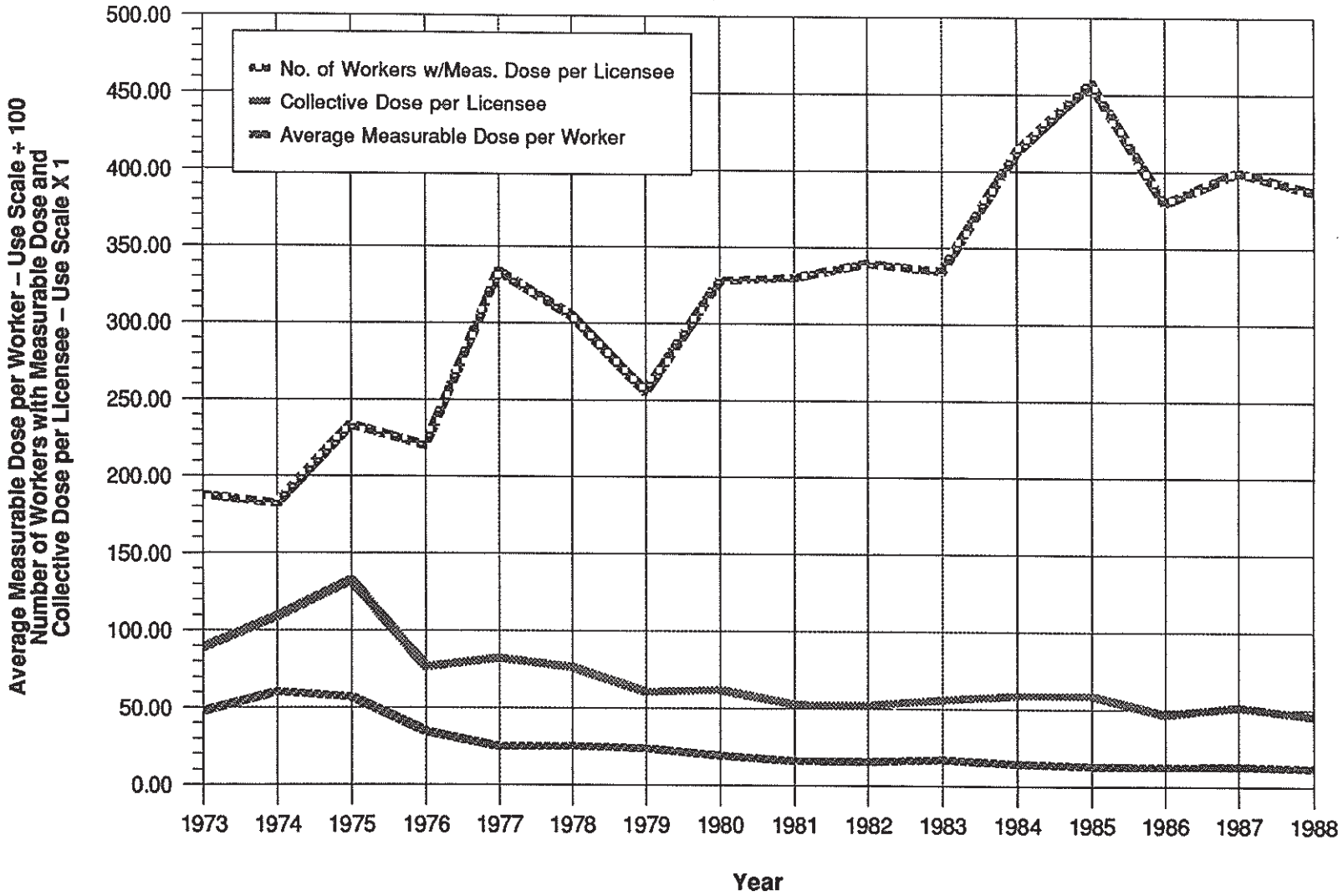
TABLE 3.6
ANNUAL EXPOSURE INFORMATION FOR FUEL FABRICATORS

1986-1988

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1988	Uranium Fuel Fab	10	11,994	3,869	455	0.12
1987	Uranium Fuel Fab	10	10,370	3,994	514	0.13
1986	Uranium Fuel Fab	10	8,077	3,790	466	0.12

Figure 3.6 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for fuel fabrication licensees. The graph shows the overall increase over the years in the number of personnel with measurable dose per licensee, while the

Figure 3.6
Average Annual Values at Fuel Fabrication and Processing Facilities 1973 – 1988



collective dose per licensee and average measurable dose has experienced a gradual decreasing trend. Appendix A lists alphabetically each of the ten licensees reporting in 1988, with the number of persons monitored, the number of workers receiving measurable external doses, and the collective dose for each licensee.

Fuel reprocessing licenses are issued to allow the separation of usable uranium and plutonium from spent nuclear fuel. There was only one commercial facility that was ever licensed to reprocess fuel, and it has been shut down since 1972. However, the licensee did some decontamination work and stored radioactive waste at the facility for several years, and the annual report that was submitted each year was usually grouped with those of the fuel fabricators. In February 1982, the Department of Energy assumed possession and control of the reprocessing facility to conduct waste solidification activities necessary for final decommissioning. During this period, the NRC license will, in effect, be suspended, and no reports will be filed with the NRC.

3.3.6 Light Water-Cooled Power Reactor (LWR) Licenses

These licenses are issued to utilities to allow them to use special nuclear material in a reactor which produces heat and generates electricity to be sold to consumers. There are two major types of commercial LWRs in the United States - pressurized water reactors (PWRs) and boiling water reactors (BWRs) - each of which uses water as the primary coolant.

As shown in Table 3.1, annual reports were received from nuclear power facilities for 113 licensed LWRs where 197,918 individuals were monitored for exposure to radiation in 1988. Of this number, 97,831 workers received a measurable dose and incurred a collective dose of 41,075 person-rems (person-cSv). This is slightly higher than the collective dose of 40,947 reported for 1987. The number of workers with measurable doses has also continued to increase somewhat which has resulted in the average measurable dose of 0.42 rem (cSv) in 1988. It is important to note that these figures have been adjusted for the multiple counting of transient reactors workers (see Section 5). The reported dose distribution of workers monitored at each plant site is presented in alphabetical order by site name in Appendix B.

More detailed presentations and analyses of the annual exposure information reported by nuclear power facilities can be found in Sections 4 and 5.

3.3.7 High-Temperature Gas-Cooled Power Reactor (HTGR) Licenses

A license to operate a power reactor is issued to utilities to allow them to use special nuclear material in a reactor to produce heat to generate electricity to be sold to consumers. In the HTGR, a gas, usually helium, is used as the primary coolant. Fort St. Vrain near Greeley, Colorado, was the only such reactor in operation in the U.S. in 1988. As shown in Table 3.7, annual whole body doses incurred by workers at the plant have been minimal.

No one exceeded an annual dose of 0.25 rem (cSv) until 1985 when the highest annual dose was between 1 and 2 rems (cSv). In 1986 the average dose per worker dropped back down to 0.03 rem (cSv) along with a large decrease in the number of workers at the site. This trend continued through 1988 with the number of workers with measurable doses falling to 24 with an average measurable dose of 0.03 rem. The reactor has not operated near full power for significant periods of time since July, 1984, with most of the collective dose in 1986 resulting from maintenance activities. Although these activities resulted in the largest collective and average annual doses in the history of the plant, these doses remain much smaller than those for PWRs and BWRs.

TABLE 3.7
ANNUAL EXPOSURE INFORMATION FOR FORT ST. VRAIN

1974-1988

Year	No. of Individuals with Annual Doses in Ranges (rems or cSv)				Total No. of Individuals Monitored	Annual Collective Dose (person-rems or person-cSv)	Gross Electricity Generated (MW-yr)	Average Measurable Dose per Worker (rem or cSv)
	No Meas'ble Dose	Meas'ble Dose <0.10	0.10-0.25	0.25-2.00				
1974	1,597	63	1	0	1,661	3.3	0.0	0.05
1975	1,263	0	0	0	1,263	0.0	0.0	0.00
1976	1,362	25	0	0	1,387	1.3	2.8	0.05
1977	946	55	1	0	1,002	2.9	29.8	0.05
1978	896	34	0	0	930	1.7	75.7	0.05
1979	1,149	120	2	0	1,271	6.4	28.6	0.05
1980	902	57	1	0	960	3.0	83.2	0.05
1981	1,096	31	0	0	1,127	1.0	93.6	0.03
1982	978	22	0	0	1,000	0.4	72.6	0.02
1983	965	48	0	0	1,013	1.0	94.4	0.02
1984	1,616	62	8	0	1,686	3.0	10.9	0.04
1985	1,929	370	40	33	2,372	35.0	3.8	0.08
1986	221	66	4	0	291	1.8	9.7	0.03
1987	155	52	2	0	209	1.2	23.8	0.02
1988	238	24	0	0	262	0.7	81.8	0.03

4 COMMERCIAL LIGHT WATER REACTORS - FURTHER ANALYSIS

4.1 Introduction

General trends in occupational radiation exposures at nuclear power reactors are best evaluated within the context of other pertinent information. In this chapter, some of the tables and appendices that summarize exposure data also show the type, capacity, and age of the reactor; the amount of electricity generated; the type of workers being exposed; and the sort of tasks being performed. Exposure data is then presented as a function of these data.

4.2 Definitions of Terms and Sources of Data

4.2.1 Number of Reactors

The number of reactors shown in Tables 4.1, 4.2, and 4.3 is the number of BWRs, PWRs, and LWRs, respectively, that had been in commercial operation for at least one full year as of December 31 of each of the indicated years. This is the number of reactors on which the average number of workers and average collective dose per reactor is based. Excluded are those reactors that may have been in commercial operation for only a few months during the first year and reactors that have been defueled and declared that they will not be commercially operated again. This yields conservative values for many of the averages shown in the tables. The date that each reactor was declared to be in commercial operation was found in Reference 14.

4.2.2 Electric Energy Generated

The electric energy generated in gross megawatt-years (MW-yr) each year by each facility is shown in Appendix C and graphically represented in Appendix E. This number was obtained by dividing the gross megawatt-hours of electricity annually produced by each facility by 8,760, the number of hours in the year, except for leap years when the number is 8,784 hours. The gross megawatt-years of generated electricity that are presented in Tables 4.1, 4.2, and 4.3 are the sums of that produced by the number of reactors included in each year. These sums are divided by the number of those reactors included in each year to yield the average amount of electric energy generated (MW-yr) per reactor, which is also shown in Tables 4.1, 4.2, and 4.3. The number of gross megawatt-hours of electricity produced each year was found in Reference 14.

TABLE 4.1

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL BOILING WATER REACTORS+

1973-1988

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-rem /MW-yr)	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)
1973	12	4,564	5,340	3,393.9	0.85	380	445	1.3	283	438
1974	14	7,095	8,769	4,060.2	0.81	507	626	1.7	290	485
1975	18	12,611	14,607	5,786.4	0.86	701	812	2.2	321	595
1976	23	12,626	17,869	8,435.1	0.71	549	777	1.5	367	637
1977	23	19,041	21,388	9,102.5	0.89	828	930	2.1	396	637
1978	25	15,273	20,278	11,856.0	0.75	611	811	1.3	474	660
1979	25	18,325	25,245	11,671.0	0.73	733	1,010	1.6	467	660
1980	26	29,530	34,094	10,868.2	0.87	1,136	1,311	2.7	418	663
1981	26	25,471	34,755	10,899.2	0.73	980	1,337	2.3	419	663
1982	26	24,437	32,235	10,614.6	0.76	940	1,240	2.3	408	663
1983	26	27,455	33,473	9,730.1	0.82	1,056	1,287	2.8	374	663
1984	27*	27,097	41,105	10,019.2	0.66	1,004	1,522	2.7	371	754
1985	29**	20,573	38,237	12,284.0	0.54	709	1,319	1.7	424	775
1986	30	19,570	37,928	12,102.1	0.52	652	1,264	1.6	403	786
1987	32***	16,870	41,737	15,109.0	0.40	527	1,304	1.1	472	832
1988	34	17,986	40,305	16,665.4	0.45	529	1,185	1.1	490	845

+Includes only those reactors that had been in commercial operation for at lease one full year as of December 31 of each of the indicated years, and all figures are uncorrected for multiple reporting of transient individuals.

*In 1984 it was decided that Humboldt Bay, a plant that has been shut down since 7/76, would not be put in commercial operation again, and it is no longer included in the count of reactors.

**In 1985 it was decided that Dresden 1, a plant that has been shut down since 10/78, would not be put in commercial operation again, and it is no longer included in the count of reactors.

***In 1987 it was decided that LaCrosse, a plant that has been shut down since 4/30/87, would not be put in commercial operation again, and it is no longer included in the count of reactors.

TABLE 4.2

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL PRESSURIZED WATER REACTORS+

1973-1988

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-rem /MW-yr)	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)
1973	12	9,398	9,440	3,770.2	1.00	783	787	2.5	314	544
1974	19	6,555	9,370	6,530.7	0.70	345	493	1.0	344	591
1975	26	8,268	10,884	11,982.5	0.76	318	419	0.7	461	647
1976	30	13,807	17,588	13,325.0	0.79	460	586	1.0	444	701
1977	34	13,467	20,878	17,345.8	0.65	396	614	0.8	510	688
1978	39	16,528	25,700	19,840.5	0.64	424	659	0.8	509	706
1979	42	21,657	38,828	18,255.0	0.56	516	924	1.2	435	746
1980	42	24,265	46,237	18,289.3	0.52	578	1,101	1.3	435	746
1981	44	28,673	47,351	20,553.7	0.61	652	1,076	1.4	467	752
1982	48	27,753	52,146	22,140.6	0.53	578	1,086	1.3	461	777
1983	49	29,017	52,173	23,195.5	0.56	592	1,065	1.3	473	785
1984	51	28,138	56,994	26,478.4	0.49	552	1,118	1.1	519	809
1985	53*	22,469	54,633	29,470.7	0.41	424	1,031	0.8	556	820
1986	59	23,083	62,994	33,095.9	0.37	391	1,068	0.7	561	873
1987	64	23,720	62,593	37,007.3	0.38	371	978	0.6	578	862
1988	68	22,854	62,922	42,929.7	0.36	336	925	0.5	631	885

+Includes only those reactors that had been in commercial operation for at least one full year as of December 31 of each of the indicated years, and all figures are uncorrected for multiple reporting of transient individuals.

*In 1984 it was decided that Indian Point 1, a plant that has been shut down since 10/78, would not be put in commercial operation, and it is no longer included in the count of reactors.

TABLE 4.3

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL LIGHT WATER COOLED REACTORS+

1973-1988

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-rem /MW-yr)	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)
1973	24	13,962	14,780	7,164.1	0.94	582	616	1.9	299	491
1974	33	13,650	18,139	10,590.9	0.75	414	550	1.3	321	546
1975	44	20,879	25,491	17,768.9	0.82	475	579	1.2	404	626
1976	53	26,433	35,457	21,760.1	0.75	499	669	1.2	411	673
1977	57	32,508	42,266	26,448.3	0.77	570	742	1.2	464	667
1978	64	31,801	45,978	31,696.5	0.69	497	718	1.0	495	688
1979	67	39,982	64,073	29,926.0	0.62	597	956	1.3	447	714
1980	68	53,795	80,331	29,157.5	0.67	791	1,181	1.8	429	714
1981	70	54,144	82,106	31,452.9	0.66	773	1,173	1.7	449	719
1982	74	52,190	84,381	32,755.2	0.62	705	1,140	1.6	443	737
1983	75	56,472	85,646	32,925.6	0.66	753	1,142	1.7	439	743
1984	78*	55,235	98,099	36,497.6	0.56	708	1,258	1.5	468	790
1985	82**	43,042	92,870	41,754.7	0.46	525	1,133	1.0	509	804
1986	89	42,653	100,922	45,198.0	0.42	479	1,134	0.9	508	844
1987	96***	40,590	104,330	52,116.3	0.39	423	1,087	0.8	543	852
1988	102	40,840	103,227	59,595.1	0.40	400	1,012	0.7	584	871

+Includes only those reactors that had been in commercial operation for at least one full year as of December 31 of each of the indicated years, and all figures are uncorrected for multiple reporting of transient individuals.

*In 1984 it was decided that Humboldt Bay and Indian Point 1 would not be put in commercial operation again, and they are no longer included in this count of reactors.

**In 1985 it was decided that Dresden 1, a plant that has been shut down since 10/78, would not be put in commercial operation again, and it is no longer included in this count of reactors.

***In 1987 it was decided that LaCrosse, a plant that has been shut down since 4/30/87, would not be put in commercial operation again, and it is no longer included in this count of reactors.

4.2.3 Collective Dose per Megawatt-Year

The number of megawatt-years of electricity generated was used in determining the ratio of the average value of the annual collective dose to the number of megawatt-years of electricity generated. The ratio was calculated by dividing the total collective dose in person-rem (cSv) by the total gross electric energy generated in megawatt-years and is a figure that is a measure of the dose incurred by workers at power plants in relation to the gross electric energy produced. This ratio was also calculated for each reactor site and is presented in Tables 4.1, 4.2, and 4.3 and Appendix C.

4.2.4 Average Maximum Dependable Capacity

Average maximum dependable capacity, shown in Tables 4.1, 4.2, and 4.3 was found by dividing the sum of the net maximum dependable capacities of the reactors in megawatts (net MWe) by the number of reactors included each year. The net maximum dependable capacity is defined to be the gross electrical output as measured at the output terminals of the turbine generator during the most restrictive seasonal conditions, less the normal station service loads. This "capacity" of each plant was found in Reference 14, and it is shown for each site in Appendix C.

4.3 Annual Whole Body Dose Distributions

Table 4.4 summarizes the distribution of the annual whole body doses received by workers at all commercial LWRs during each of the years 1977 through 1988. This distribution is the sum of the annual dose distributions reported by each licensed LWR each year. As previously mentioned, the distribution reported by each LWR site for 1988 is shown in Appendix B. Table 4.4 shows that the number of monitored individuals continues to increase while the collective dose, after leveling off through the years 1980-1984, declined sharply in 1985. The collective dose continued to decline to a value of 40,590 in 1987, but rose slightly in 1988 to a value of 40,840. The values of CR show that the fraction of the collective dose due to individual doses greater than 1.5 rems (cSv) has also decreased, remaining at a value of 0.38, less than 0.50 for the fourth year in a row. The distributions shown in Table 4.4 for 1977-1988 have been corrected for the number of individuals that may have been reported by more than one site (see Section 5). Appendix F provides uncorrected dose distributions for BWRs and PWRs separately for the years 1982 through 1988.

TABLE 4.4

SUMMARY DISTRIBUTION OF ANNUAL WHOLE BODY DOSES AT COMMERCIAL LIGHT WATER REACTORS*

1977 - 1988

			Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																	
Year	No Meas'ble Exposure	Meas'ble <0.10	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	10.0-12.0	>12.0	Total Number Monitored	Number with Measurable Exposure	**Collective Dose (person-rems or cSv)	CR***
1977	23,562	12,395	6,030	4,518	2,890	2,220	5,649	2,856	1,288	661	186	89	47	23	6			62,420	38,858	32,508	0.65
1978	28,372	15,101	6,342	4,998	3,088	2,247	5,995	3,034	1,197	514	109	37	9	0	1	0	2	71,046	42,674	31,801	0.61
1979	43,330	22,508	8,985	7,469	4,797	3,259	7,572	3,404	1,400	545	117	42	17	3	1			103,449	60,119	39,982	0.57
1980	50,873	26,903	10,676	8,904	5,570	4,134	10,671	4,607	1,816	831	235	119	29	7	1			125,376	74,503	53,795	0.59
1981	39,265	26,836	11,226	9,330	6,042	4,497	11,170	4,811	1,999	533	103	93	9	3	1	0	1	115,919	76,654	54,144	0.57
1982	41,713	29,225	11,713	9,903	6,229	4,420	10,220	4,716	2,066	596	97	31	5	0	1	1		120,936	79,223	52,190	0.58
1983	47,048	29,107	11,195	9,344	5,851	4,276	11,345	5,332	2,269	716	121	38	8	2				126,652	79,604	56,472	0.60
1984	54,670	36,296	13,427	10,275	6,336	4,804	11,283	5,206	2,122	487	52	22						144,980	90,310	55,235	0.57
1985	59,634	36,831	13,008	11,041	6,627	4,547	10,040	3,575	1,001	157	1							146,462	86,828	43,042	0.48
1986	68,050	41,463	14,573	11,843	7,016	4,692	10,241	3,062	868	146								161,954	93,904	42,653	0.45
1987	85,959	41,222	15,833	12,838	7,586	5,331	10,611	2,191	477	69								182,117	96,158	40,590	0.38
1988	89,621	39,882	15,999	13,231	7,966	5,495	10,293	2,422	506	22		1						185,438	95,817	40,840	0.38

*Summary of reports submitted in accordance with 10 CFR 20.407 by plants that had been in commercial operation for at least one full year as of December 31 of each of the indicated years. Figures shown have been adjusted for the muliple reporting of transient individuals (see Section 5).

**Not all plants' collective dose and no values of CR were reported by the utilities; they were calculated by the NRC staff using methods described in this document.

***CR is the ratio of annual collective dose delivered at individual doses exceeding 1.5 rems (cSv) to the total annual collective dose.

4.4 Average Annual Whole Body Doses

Some of the data presented in Tables 4.1, 4.2, and 4.3 are graphically displayed in Figure 4.1, where it can be seen that the average collective dose and average number of workers per BWR have been higher than those for PWRs since 1974 and that the values of both parameters, in general, continued to rise at both types of facilities until 1983. At that time, the average collective dose per reactor appeared to begin leveling off or decreasing slightly. After a sharp decrease in 1985, the collective dose has continued the more moderate decreasing trend in 1988 with collective doses per reactor of 529 person-rem (-cSv) and 336 person-rem (-cSv) at BWRs and PWRs, respectively. The number of workers per reactor has decreased to 1185 for BWRs and 925 for PWRs in 1988.

Figures 4.2 and 4.3 are plots of most of the other information that is given in Tables 4.1, 4.2, and 4.3. The value for the total collective dose rose slightly from a relative low of 40,590 person-rem (-cSv) in 1987 to 40,840 person-rem (-cSv) in 1988. Together with the drop in the number of workers with measurable dose, this created a slight increase in the average measurable dose from 0.39 rem (cSv) in 1987 to 0.40 rem (cSv) in 1988. Power generation indicators such as gross electricity and average maximum dependable capacity net continued to increase for the eighth straight year, while the average collective dose per reactor, average number of personnel with measurable dose per reactor, and average collective dose per megawatt-year were all seen to decrease in 1988.

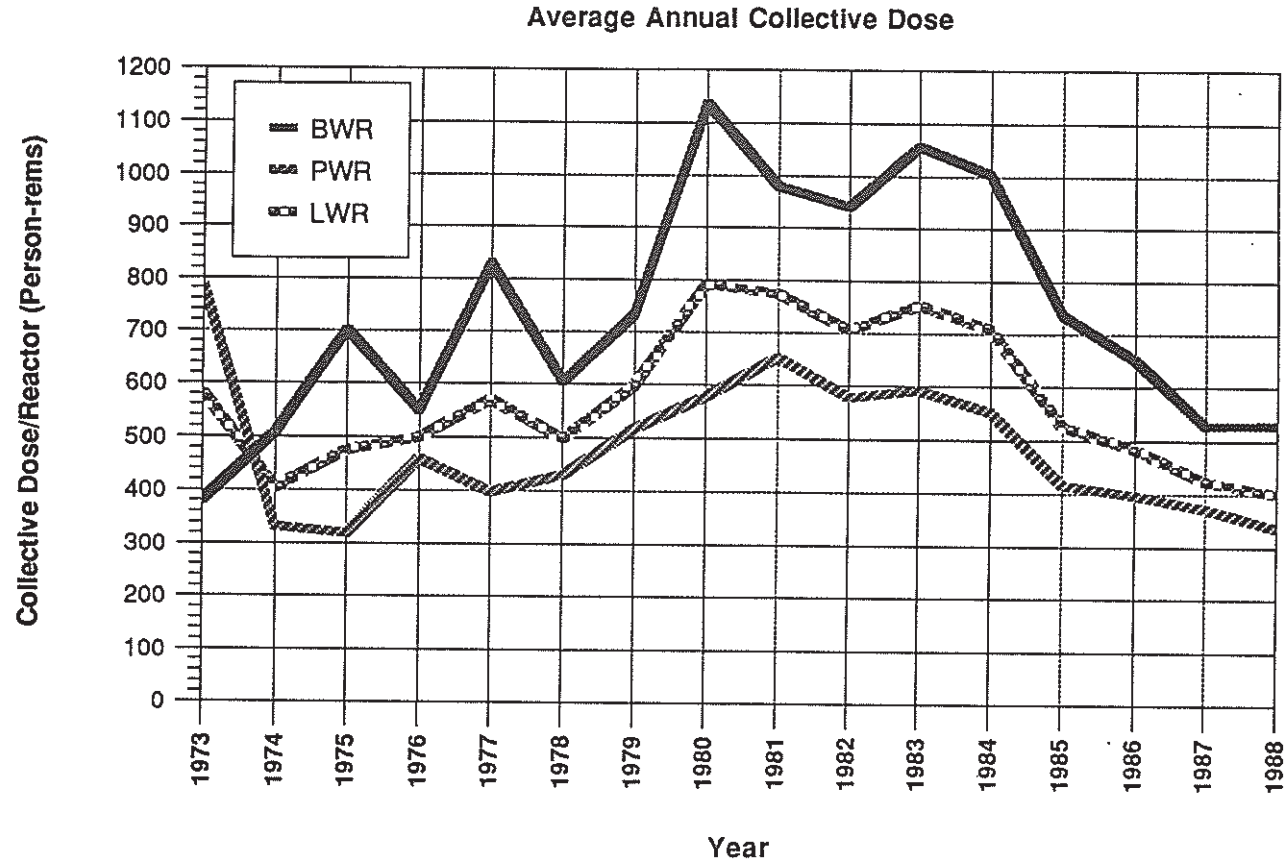
The fluctuations in the parameters for the years following the accident at the Three Mile Island plant in 1979 may reflect some of the impact that this incident had on the nuclear power industry. The decrease seen in dose trends since 1983 may be attributable to several factors. Utilities have completed most of the tasks initiated as a result of the lessons learned from the Three Mile Island accident and they are increasing efforts to avoid and reduce exposure. The importance of exposure control and the concept of keeping exposures as low as reasonably achievable (ALARA) is continually being stressed, and programs to collect and share information relative to tasks, techniques, and exposures have been established.

To further assist in the identification of any trends that might exist, Figure 4.4 displays the average and median[9] values of the collective dose per reactor for BWRs and for PWRs for the years 1973 through 1988. The ranges of

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9 The value at which 50% of the reactors reported greater collective doses and the other 50% reported smaller collective doses.

Figure 4.1
Average Collective Dose and Number of Workers per Reactor
1973 – 1988



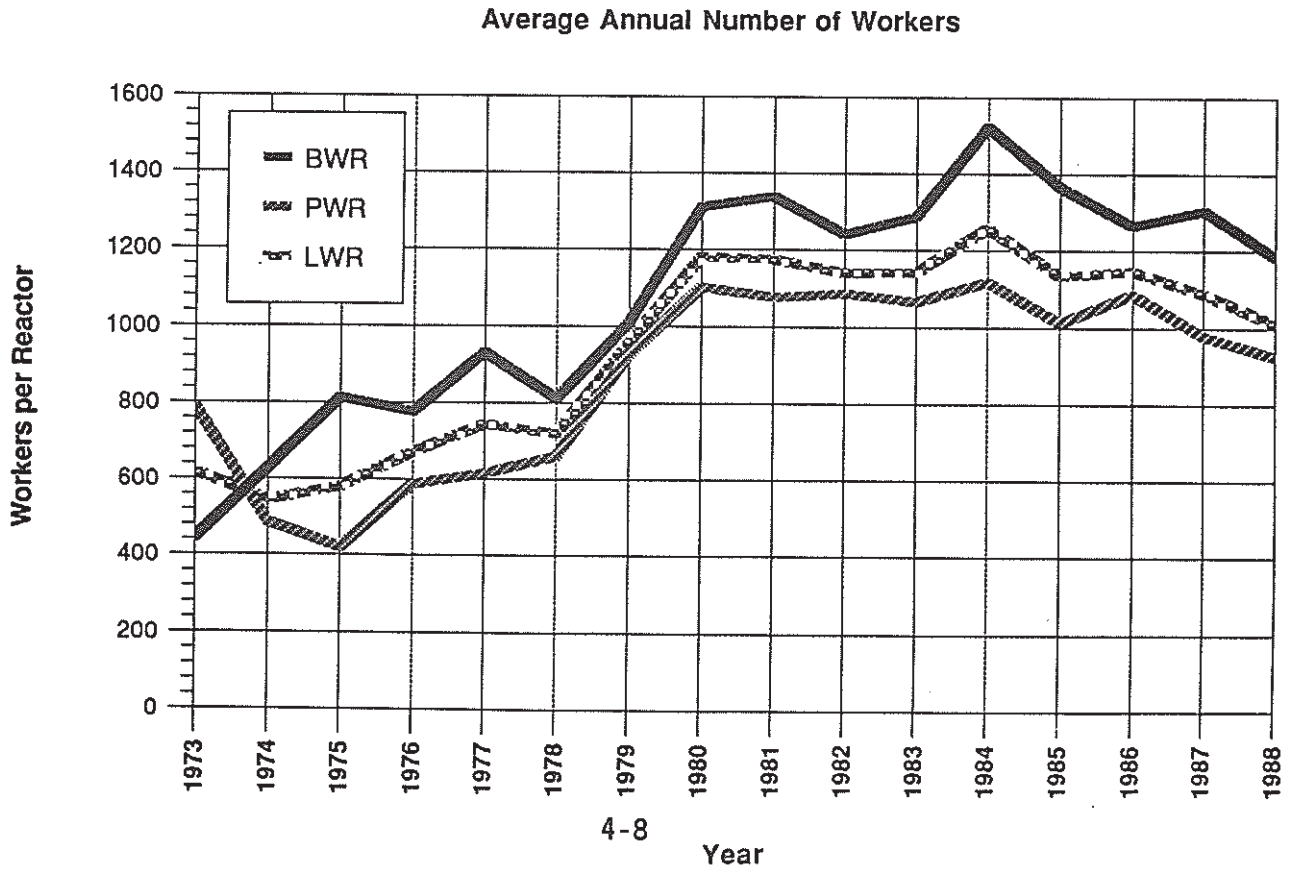


Figure 4.2
Annual Values at BWRs and PWRs
1973 - 1988

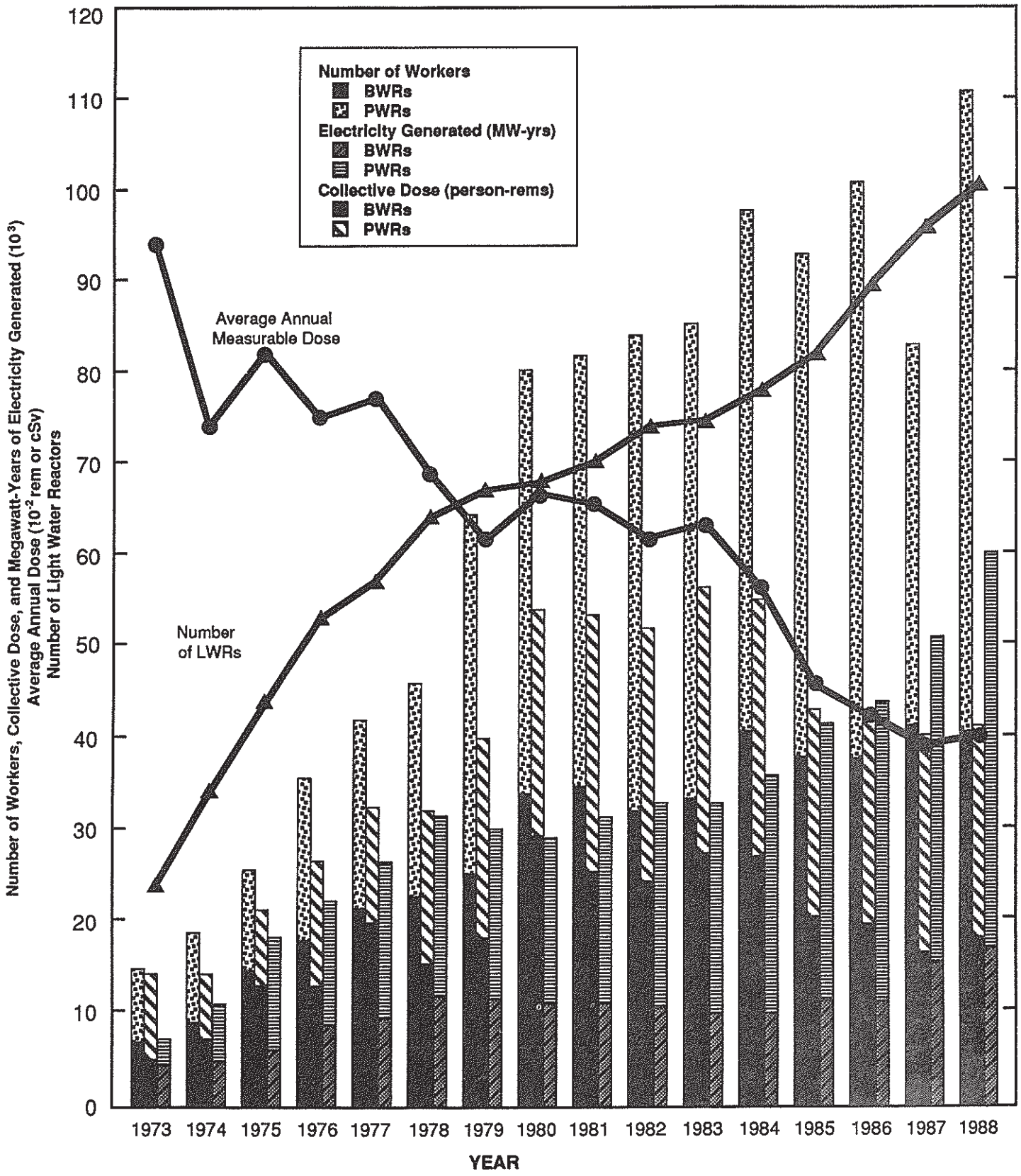


Figure 4.3
Average Annual Values at LWRs 1973 – 1988

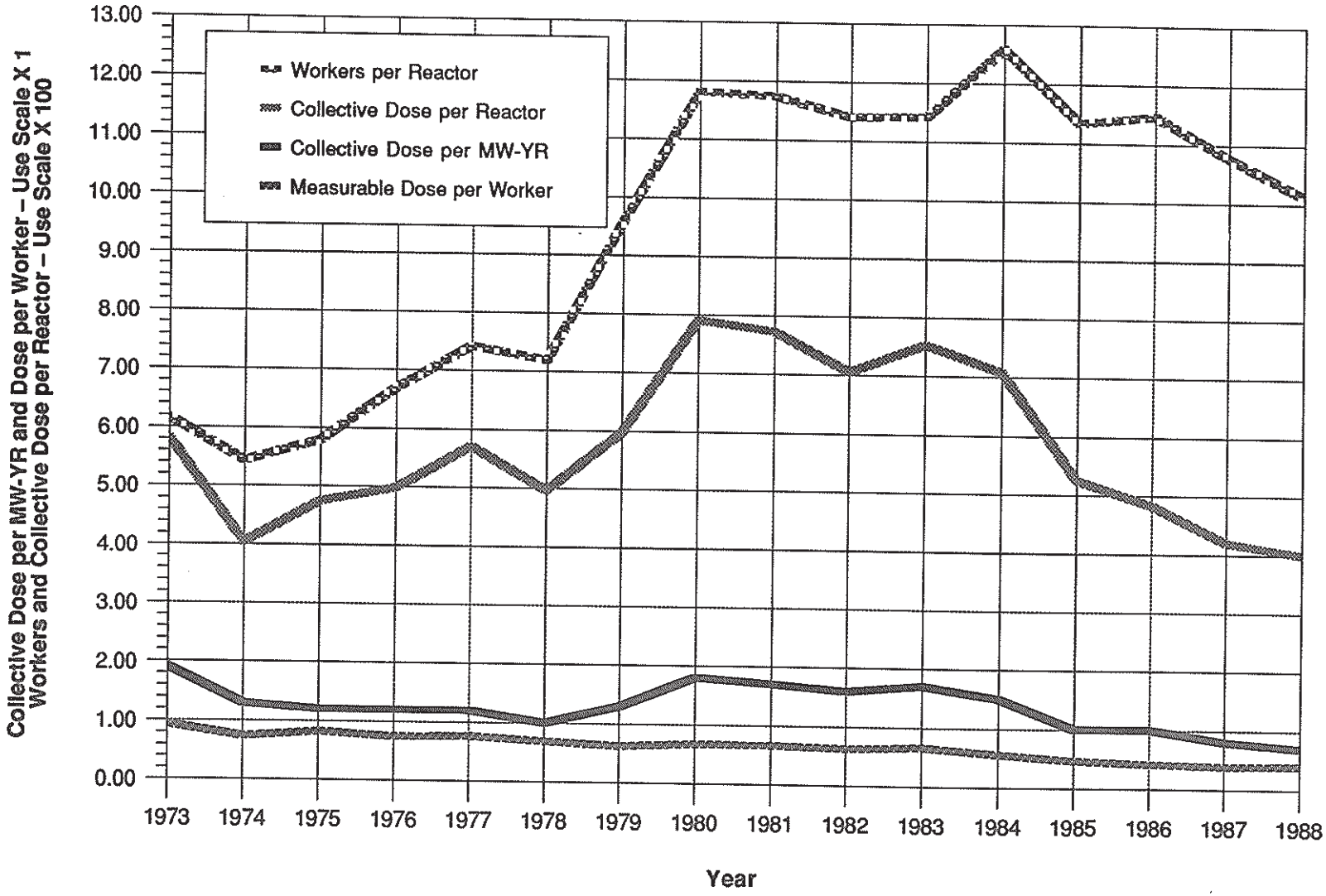
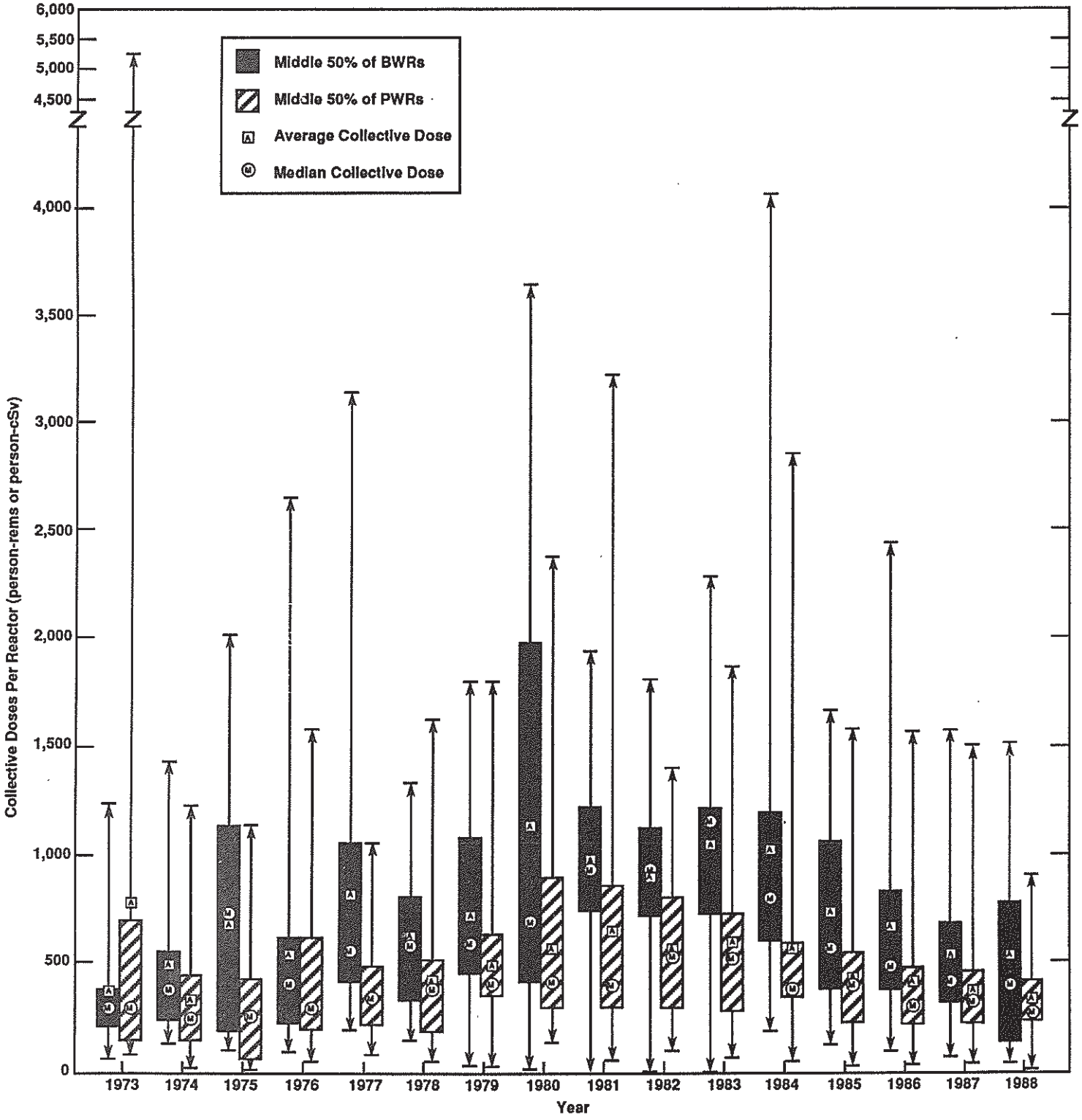


Figure 4.4
Average, Median and Extreme Values of the Collective Dose Per Reactor 1973-1988



the values reported each year are shown by the vertical lines with a small bar at each end marking the two extreme values. The rectangles indicate the range of values of the collective dose exhibited by those plants ranked in the twenty-fifth through the seventy-fifth percentiles. Since the median values usually are not as greatly affected by the extreme values of the collective doses, they do not normally fluctuate as much from year to year as do the average values. The median collective dose for PWRs experienced a slight decrease from 333 person-rems (-cSv) in 1987 to 278 person-rems (-cSv) in 1988. At BWRs the median fluctuates more from year to year, and in 1988 the median collective dose continued on a downward trend, falling to 392 person-rems (-cSv). Figure 4.4 also shows that in 1988 fifty percent of the PWRs reported collective doses between 227 and 402 person- rems (-cSv) while fifty percent of the BWRs reported collective doses between 170 and 786 person-rems (-cSv). Nearly every year, the median collective dose is less than the average, which indicates that the collective dose for most plants is less than the average collective dose per reactor (the value that is widely quoted).

4.5 Plant Rankings by Collective Dose per Reactor

The number of reactors from which data have been collected is still rather small, and the information reported by a few reactors where unusual conditions or problems may have occurred could have a large impact on some of the statistics presented in this report. In an effort to identify those plants, Tables 4.5 and 4.6 list the BWRs and PWRs in ascending order of collective dose per reactor for each of the five years from 1984 through 1988. Two other parameters, dose per worker and collective dose per megawatt-year, are also given for each plant and could have been used in ranking the plants as well. Also shown is a parameter "CR" which is defined to be the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rems (cSv) to the total annual collective dose. In 1988 the value of CR continued to decline for most plants so that 85% (down from 95% in 1987) of the U.S. LWRs fell between 0.05 to 0.50, the range recommended by the UNSCEAR [Ref. 10]. Of the sites having values of CR greater than 0.50, two were BWRs and two were PWRs, the highest value being 0.66 at Three Mile Island 2.

In 1988, the five BWR sites with the highest collective doses all exceeded 850 person-rems (person-cSv) per reactor (Table 4.5). Although the eight reactors at these five sites represented only 24% of the 34 BWRs, they contributed nearly 50% of the total collective dose incurred at BWRs in 1988. Much of the collective dose accumulated at the BWR site with the highest collective dose per reactor (1,504 person-rems (person-cSv)) was attributed to drywell

TABLE 4.5
BOILING WATER REACTORS LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER REACTOR
1984 – 1988

1984

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Big Rock Point	155	0.52	3.1	0.52
Duane Arnold	189	0.31	0.6	0.19
La Crosse	252	0.88	6.5	0.87
La Salle 1	252	0.20	0.4	0.07
Susquehanna	308	0.11	0.4	0.02
Dresden 1, 2, 3	1,774	0.78	2.2	0.54
Vermont Yankee	626	0.66	1.6	0.37
Browns Ferry 1, 2, 3	1,940	0.65	1.4	0.51
Quad Cities 1, 2	1,579	0.94	1.6	0.63
Cooper Station	799	0.50	1.9	0.53
Millstone Point 1	836	0.42	1.6	0.31
Nine Mile Point 1	890	0.58	2.1	0.50
Fitzpatrick	971	0.60	1.7	0.57
Hatch 1,2	2,218	0.54	3.4	0.44
Peach Bottom 2,3	2,450	0.74	2.1	0.57
Brunswick 1,2	3,260	0.65	4.3	0.62
Oyster Creek	2,054	0.87	55.4	0.60
Monticello	2,462	1.32	73.1	0.79
Pilgrim	4,082	0.90	15.7	0.65

1985

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Washington Nuclear 2	119	0.16	0.2	0.11
La Crosse	173	0.46	4.4	0.68
Nine Mile Point 1	265	0.26	0.5	0.25
Big Rock Point	291	0.67	6.6	0.61
Monticello	327	0.56	0.6	0.42
La Salle 1, 2	685	0.42	0.7	0.35
Browns Ferry 1, 2, 3	1,159	0.42	3.1	0.30
Hatch 1, 2	818	0.29	0.7	0.19
Quad Cities 1, 2	990	0.84	0.8	0.58
Susquehanna 1, 2	1,106	0.30	0.8	0.20
Millstone Point 1	608	0.83	1.1	0.64
Oyster Creek	748	0.32	1.7	0.33
Dresden 2,3	1,685	0.60	1.9	0.39
Pilgrim	893	0.40	1.5	0.39
Fitzpatrick	1,051	0.57	2.1	0.53
Vermont Yankee	1,051	0.76	2.9	0.42
Duane Arnold	1,112	0.79	4.7	0.56
Cooper Station	1,333	0.67	10.5	0.59
Brunswick 1,2	2,804	0.69	3.4	0.65
Peach Bottom 2,3	3,354	0.80	4.9	0.59

1986

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Big Rock Point	84	0.42	1.4	0.33
Millstone Point 1	150	0.39	0.2	0.30
Duane Arnold	187	0.39	0.5	0.22
Washington Nuclear 2	222	0.22	0.4	0.14
La Crosse	290	1.12	14.8	0.89
Cooper Station	320	0.36	0.7	0.34
Browns Ferry 1,2,3	1,050	0.35	–	0.30
Fitzpatrick	411	0.35	0.6	0.32
Susquehanna 1,2	828	0.28	0.6	0.16
Grand Gulf	436	0.29	0.9	0.23
La Salle 1,2	949	0.59	1.0	0.37
Quad Cities 1,2	992	0.68	0.9	0.44
Peach Bottom 2,3	1,080	0.44	0.8	0.36
Monticello	596	0.67	1.5	0.40
Hatch 1,2	1,497	0.43	1.7	0.32
Pilgrim	874	0.33	7.2	0.31
Brunswick 1,2	1,909	0.57	1.8	0.52
Vermont Yankee	1,188	0.86	4.8	0.56
Nine Mile Point 1	1,275	0.68	3.4	0.58
Dresden 2,3	2,796	0.90	3.8	0.59
Oyster Creek	2,436	0.65	15.5	0.58

1987

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Cooper Station	103	0.19	0.2	0.17
Hope Creek 1	117	0.20	0.1	0.31
Nine Mile Point 1	141	0.12	0.3	0.04
Limerick 1	174	0.08	0.3	0.00
Big Rock Point	222	0.88	4.9	0.57
Vermont Yankee	303	0.37	0.7	0.17
Susquehanna 1,2	621	0.24	0.4	0.07
River Bend 1	378	0.30	0.6	0.17
Quad Cities 1,2	775	0.54	0.7	0.31
Browns Ferry 1,2,3	1,181	0.38	–	0.31
Washington Nuclear 2	406	0.34	0.6	0.25
Hatch 1,2	816	0.37	0.6	0.30
Grand Gulf	420	0.31	0.5	0.14
Oyster Creek	522	0.27	1.4	0.31
Monticello	568	0.60	1.3	0.32
Dresden 2,3	1,245	0.61	1.3	0.35
Duane Arnold	667	0.61	2.2	0.37
Millstone Point 1	684	0.43	1.3	0.28
La Salle 1,2	1,394	0.80	1.4	0.54
Brunswick 1,2	1,419	0.46	1.2	0.43
Fitzpatrick	940	0.60	1.9	0.50
Peach Bottom 2,3	2,195	0.50	6.0	0.35
Pilgrim	1,579	0.34	–	0.34

1988

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Limerick 1	52	0.05	0.1	0.00
Perry	105	0.13	0.1	0.02
River Bend 1	107	0.21	0.1	0.08
Monticello	110	0.29	0.2	0.27
Vermont Yankee	124	0.33	0.3	0.15
Clinton	130	0.17	0.2	0.14
Millstone Point 1	144	0.44	0.2	0.36
Grand Gulf	147	0.21	0.1	0.28
Big Rock Point	170	0.56	3.7	0.45
Cooper Station	251	0.27	0.5	0.17
Susquehanna 1,2	516	0.27	0.2	0.06
Hope Creek	287	0.17	0.3	0.08
Washington Nuclear 2	353	0.34	0.5	0.29
Browns Ferry 1,2,3	1,155	0.35	–	0.26
Pilgrim	392	0.19	–	0.16
Quad Cities 1,2	827	0.56	0.4	0.34
Duane Arnold	614	0.54	1.6	0.29
Hatch 1,2	1,401	0.56	0.7	0.41
Dresden 2,3	1,409	0.58	0.7	0.40
Fitzpatrick	786	0.51	1.5	0.44
Nine Mile Point	854	0.33	–	0.48
Brunswick 1,2	1,747	0.66	0.9	0.51
Peach Bottom 2,3	2,330	0.55	–	0.44
Lasalle 1,2	2,471	0.90	0.9	0.58
Oyster Creek	1,504	0.52	3.6	0.49

* For sites with more than one operating reactor, the collective dose per reactor is obtained by dividing the collective dose for the site by the number of reactors.

** CR is the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rems (cSv) to the total collective dose.

TABLE 4.6
PRESSURIZED WATER REACTORS LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER REACTOR
1984 – 1988

1984

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Crystal River	49	0.09	0.1	0.00
Prairie Island 1, 2	147	0.27	0.2	0.16
Millstone Point 2	120	0.42	0.2	0.33
Kewaunee	139	0.29	0.3	0.15
Davis Besse	177	0.16	0.3	0.07
Rancho Seco	222	0.28	0.5	0.22
Indian Point 3	230	0.35	0.3	0.22
Calvert Cliffs 1, 2	479	0.35	0.3	0.33
Summer 1	295	0.26	0.6	0.11
Salem 1, 2	681	0.49	1.0	0.39
Three Mile Island 1, 2	688	0.64	–	0.45
Yankee Rowe	348	0.53	2.8	0.44
Oconee 1, 2, 3	1,106	0.53	0.5	0.39
Cook 1, 2	762	0.49	0.5	0.32
Zion 1, 2	786	0.71	0.6	0.47
Ginna	395	0.55	1.0	0.39
Point Beach 1, 2	789	0.58	1.0	0.50
Arkansas 1, 2	806	0.46	0.6	0.37
Trojan	433	0.42	0.8	0.34
Farley 1, 2	902	0.44	0.6	0.38
San Onofre 2	473	0.15	0.7	0.14
Beaver Valley	504	0.36	0.9	0.32
McGuire 1	507	0.30	0.7	0.28
San Onofre 1	513	0.12	14.8	0.13
Sequoyah 1, 2	1,117	0.47	0.8	0.34
Fort Calhoun	563	0.62	2.0	0.47
Palisades	573	0.43	5.8	0.41
Turkey Point 3, 4	1,255	0.62	1.3	0.53
St. Lucie 1, 2	1,263	0.60	1.1	0.49
Maine Yankee	884	0.70	1.5	0.47
North Anna 1, 2	1,945	0.64	1.9	0.59
Surry 1, 2	2,247	0.70	2.2	0.61
Haddam Neck	1,216	0.85	3.0	0.66
Indian Point 2	2,844	0.91	6.3	0.61
Robinson 2	2,880	0.70	–	0.69

1985

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Callaway 1	36	0.04	0.0	0.00
Beaver Valley	60	0.10	0.1	0.00
Davis-Besse	71	0.10	0.3	0.04
Haddam Neck	101	0.26	0.2	0.28
Salem 1, 2	204	0.18	0.1	0.15
Arkansas 1, 2	286	0.23	0.2	0.10
Kewaunee	176	0.34	0.4	0.15
San Onofre 1	189	0.07	0.6	0.06
Indian Point 2	192	0.27	0.2	0.20
Prairie Island 1, 2	416	0.38	0.5	0.31
Yankee-Rowe	211	0.32	1.5	0.24
Point Beach 1, 2	482	0.72	0.6	0.43
San Onofre 2, 3	533	0.17	0.5	0.18
Robinson 2	311	0.23	0.5	0.28
Calvert Cliffs 1, 2	694	0.43	0.6	0.37
Trojan	363	0.43	0.4	0.26
Fort Calhoun 1	373	0.38	1.0	0.92
Summer 1	379	0.32	0.6	0.34
McGuire 1, 2	771	0.35	0.5	0.29
Farley 1, 2	799	0.31	0.6	0.30
North Anna 1, 2	838	0.34	0.6	0.31
Ginna	426	0.50	1.0	0.37
Three Mile Island 1, 2	857	0.45	8.3	0.50
Oconee 1, 2, 3	1,304	0.48	0.6	0.42
Cook 1, 2	945	0.48	1.0	0.31
Palisades	507	0.37	0.8	0.27
Sequoyah 1, 2	1,071	0.58	0.9	0.47
Indian Point 3	570	0.52	1.0	0.33
Zion 1, 2	1,166	0.78	1.0	0.55
Turkey Point 3, 4	1,253	0.66	1.2	0.48
St. Lucie 1, 2	1,344	0.68	0.9	0.50
Crystal River 3	689	0.35	2.0	0.20
Maine Yankee	700	0.69	1.1	0.49
Rancho Seco	756	0.43	3.2	0.27
Surry 1, 2	1,815	0.57	1.6	0.58
Millstone 2	1,581	0.83	3.8	0.64

1986

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Summer 1	23	0.06	0.0	0.00
Yankee-Rowe	45	0.12	0.3	0.05
Fort Calhoun	74	0.10	0.2	0.17
Maine Yankee	100	0.20	0.1	0.17
Byron 1	104	0.10	0.1	0.04
Davis-Besse	124	0.13	37.6	0.03
Prairie Island 1,2	255	0.31	0.3	0.27
Wolf Creek 1	142	0.21	0.2	0.03
Kewaunee	169	0.34	0.4	0.21
Calvert Cliffs 1,2	347	0.27	0.2	0.19
Point Beach 1,2	402	0.61	0.5	0.33
Indian Point 3	202	0.34	0.3	0.20
Three Mile Island 1	213	0.16	0.4	0.10
Waterford 3	223	0.18	0.3	0.17
Callaway 1	225	0.21	0.3	0.04
St. Lucie 1,2	491	0.38	0.3	0.23
Zion 1,2	498	0.51	0.3	0.27
Sequoyah 1,2	526	0.30	–	0.24
San Onofre 1,2,3	824	0.23	0.5	0.15
Catawba 1	286	0.17	0.4	0.04
Salem 1,2	599	0.17	0.4	0.21
Diablo Canyon	304	0.24	0.5	0.16
Oconee 1,2,3	949	0.38	0.5	0.30
Ginna	357	0.40	0.8	0.27
North Anna 1,2	722	0.26	0.5	0.40
Cook 1,2	745	0.42	0.6	0.27
Trojan	381	0.29	0.4	0.15
Rancho Seco	402	0.27	–	0.22
Farley 1,2	858	0.37	0.6	0.35
Crystal River 3	472	0.45	1.5	0.38
Turkey Point 3,4	946	0.52	1.3	0.36
McGuire 1,2	1,015	0.44	0.7	0.37
Robinson 2	539	0.34	0.9	0.26
Arkansas 1,2	1,141	0.53	1.1	0.47
Beaver Valley	627	0.40	1.1	0.35
Palisades	672	0.47	6.6	0.44
Three Mile Island 2	915	0.61	–	0.59
Millstone Point 2	993	0.41	1.2	0.30
Surry 1,2	2,356	0.63	2.2	0.64
Indian Point 2	1,250	0.65	2.7	0.45
Haddam Neck	1,567	0.81	5.3	0.53

1987

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Davis-Besse	47	0.08	0.1	0.00
Prairie Island 1,2	135	0.23	0.1	0.09
Wolf Creek 1	134	0.20	0.2	0.05
Three Mile Island 1	149	0.12	0.2	0.05
Waterford 3	156	0.16	0.2	0.05
Diablo Canyon 1,2	336	0.29	0.2	0.15
Arkansas 1,2	382	0.34	0.3	0.23
Calvert Cliffs 1,2	412	0.30	0.3	0.22
Beaver Valley	210	0.16	0.3	0.04
Sequoyah 1,2	420	0.20	–	0.12
Yankee Rowe	217	0.37	1.6	0.22
Catawba 1,2	449	0.24	0.3	0.10
Kewaunee	226	0.30	0.5	0.17
San Onofre 1,2,3	696	0.33	0.4	0.21
Millstone Point 2,3	505	0.35	0.3	0.34
Point Beach 1,2	554	0.77	0.6	0.46
Farley 1,2	598	0.32	0.4	0.23
Rancho Seco	300	0.20	–	0.10
Salem 1,2	600	0.24	0.4	0.25
Cook 1,2	666	0.39	0.6	0.21
Palo Verde 1,2	669	0.37	0.4	0.41
Ginna	344	0.45	0.7	0.29
Zion 1,2	693	0.66	0.5	0.37
Surry 1,2	712	0.27	0.6	0.38
Trojan	363	0.30	0.7	0.13
Oconee 1,2,3	1,142	0.43	0.6	0.29
Fort Calhoun	388	0.31	1.1	0.35
Callaway 1	393	0.36	0.5	0.22
Palisades	456	0.41	1.4	0.24
St. Lucie 1,2	951	0.47	0.7	0.35
Crystal River 3	488	0.35	1.1	0.21
Robinson 2	499	0.36	1.0	0.29
Indian Point 3	500	0.38	0.9	0.20
McGuire 1,2	1,043	0.36	0.6	0.31
Summer 1	560	0.52	0.9	0.42
Turkey Point 3,4	1,371	0.69	3.2	0.42
Maine Yankee	722	0.66	1.5	0.39
Haddam Neck	750	0.43	2.5	0.38
North Anna 1,2	1,521	0.58	1.4	0.54
Byron 1	769	0.42	1.2	0.33
Three Mile Island 2	977	0.71	–	0.59
Indian Point 2	1,217	0.61	2.0	0.37

1988

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Callaway 1	27	0.08	0.0	0.00
North Anna 1,2	112	0.11	0.1	0.05
Crystal River 3	64	0.11	0.1	0.00
Rancho Seco	78	0.11	0.2	0.03
Indian Point 3	93	0.21	0.1	0.10
Prairie Island 1,2	199	0.27	0.2	0.16
Vogtle 1	138	0.12	0.2	0.01
Calvert Cliffs 1,2	291	0.22	0.2	0.14
Harris	169	0.23	0.3	0.08
Point Beach 1,2	410	0.56	0.5	0.31
Kewaunee	210	0.30	0.4	0.17
Three Mile Island 1	210	0.21	0.3	0.11
Yankee-Rowe	227	0.31	1.7	0.20
Byron 1,2	459	0.38	0.3	0.17
Indian Point 2	235	0.26	0.3	0.19
Haddam Neck	237	0.32	0.6	0.28
Salem 1,2	503	0.31	0.3	0.02
Waterford 3	259	0.21	0.3	0.06
San Onofre 1,2,3	781	0.34	0.4	0.28
Beaver Valley 1,2	530	0.30	0.4	0.21
Fort Calhoun	272	0.17	0.9	0.12
Farley 1,2	552	0.30	0.4	0.24
Catawba 1,2	558	0.28	0.3	0.15
Oconee 1,2,3	871	0.33	0.4	0.16
Ginna	295	0.33	0.7	0.18
Wolf Creek 1	297	0.29	0.4	0.19
St. Lucie 1,2	611	0.42	0.4	0.20
Davis-Besse	307	0.26	2.1	0.14
Sequoyah 1,2	678	0.28	1.4	0.14
Palo Verde 1,2	688	0.32	0.4	0.29
Turkey Point 3,4	738	0.40	0.9	0.17
Trojan	401	0.28	0.5	0.14
Millstone Point 2,3	804	0.44	0.5	0.36
Diablo Canyon 1,2	877	0.48	0.6	0.33
Cook 1,2	935	0.41	0.8	0.31
Summer 1	511	0.45	0.8	0.28
Mcguire 1,2	1,104	0.39	0.6	0.28
Robinson 2	584	0.42	1.5	0.25
Zion 1,2	1,260	0.65	0.8	0.40
Arkansas 1,2	1,387	0.57	1.3	0.46
Maine Yankee	725	0.69	1.2	0.40
Palisades	730	0.50	1.8	0.44
Surry 1,2	1,542	0.48	2.1	0.50
Three Mile Island 2	917	0.74	–	0.66

* For sites with more than one operating reactor, the collective dose per reactor is obtained by dividing the collective dose for the site by the number of reactors.

** CR is the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rems (cSv) to the total collective dose.

maintenance including weld crown reduction, shielding, and drywell shell cathodic protection. Feedwater nozzle inspection and control rod drive exchange also contributed to the collective dose.

At PWRs, the five sites with the highest collective doses all exceeded 690 person-rems (person-cSv) per reactor (Table 4.6). Although representing 10% of the 68 PWRs included in 1988, they contributed 23% of the total collective dose at PWRs. The collective dose accumulated at the plant with the highest dose per reactor (917 person-rems (person-cSv)) in 1988 was attributed to the continued defueling and decommissioning operations at Three Mile Island 2.

Tables 4.7a&b list the sites that had been in commercial operation for at least five years as of December 31, 1988, and show the values of several parameters for each of the sites. They also give a number of averages for the two types of reactors. Based on the 134 reactor-years of operation accumulated by the 27 BWRs listed, the average annual collective dose per reactor was found to be 731 person-rems (person-cSv), the average measurable dose was 0.54 rem (cSv), and the average collective dose per megawatt-year was 1.8.

Based on the 269 reactor-years of operation at the 54 PWRs listed, the average annual collective dose per reactor, average measurable dose, and average collective dose per megawatt-year were found to be 421 person-rems (person-cSv), 0.41 rem (cSv) and 0.8 person-rem/megawatt-year, respectively. All of these values, at both types of facilities, are lower than those found for the five year period ending in 1987.

In general, the plants having the lower values of most of the parameters shown are usually the newer plants. Some of the older, smaller plants also appear near the top of the listings since they report small collective doses; however, the ratio of their collective dose to the number of megawatt-years of electricity generated will be higher because of their limited power generation capacity. In the case of PWRs, this generalization does not always apply. For example, Prairie Island 1 and 2 and Kewaunee, three reactors that have been operating for 14 or 15 years, continued to experience lower collective doses than many newer reactors.

Usually, the combination of a large annual collective dose and a large collective dose to megawatt-year ratio for a plant indicates that extensive maintenance or modifications were undertaken during the year. For example, maintenance jobs that were large contributors to BWR doses in 1988 included recirculation pipe replacement/modification, snubber-related work, installation and removal of scaffolding and shielding, and drywell

TABLE 4.7a

FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER BWR

1984-1988

BWRs **Site name	*Total Collective Dose per Site	Workers with Measurable Doses	Average Dose per Worker (rem or cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
BIG ROCK POINT	922	1,488	0.62	246.5	3.7
SUSQUEHANNA 1,2	3,379	13,944	0.24	6,957.4	0.5
BROWNS FERRY 1,2,3	6,485	15,159	0.43	1,800.1	3.6
MILLSTONE POINT 1	2,422	5,028	0.48	2,873.6	0.8
QUAD CITIES 1,2	5,163	7,228	0.71	5,656.1	0.9
DUANE ARNOLD	2,769	4,731	0.59	1,626.0	1.7
COOPER STATION	2,806	5,964	0.47	2,164.9	1.3
LASALLE 1,2	5,751	8,975	0.64	4,942.8	1.2
VERMONT YANKEE	3,269	4,941	0.66	1,923.3	1.7
HATCH 1,2	6,750	15,148	0.45	5,038.4	1.3
NINE MILE POINT 1	3,425	8,231	0.42	1,921.3	1.8
DRESDEN 2,3	8,910	12,655	0.70	4,381.9	2.0
MONTICELLO	4,063	4,669	0.87	1,911.2	2.1
FITZPATRICK	4,159	7,771	0.54	2,789.9	1.5
BRUNSWICK 1,2	11,139	18,173	0.61	4,778.0	2.3
PEACH BOTTOM 2,3	11,409	18,543	0.62	3,609.2	3.2
OYSTER CREEK	7,264	13,258	0.55	1,431.1	5.1
PILGRIM	7,820	16,169	0.48	710.6	11.0
Grand Totals and Averages	97,905	182,075	0.54	54,762.3	1.8
Averages per Reactor-year	731	1,359		408.7	

*For sites with more than one operating reactor, the collective dose per reactor is obtained by dividing the collective dose for the site by the number of reactors.

**Sites where not all reactors had completed five full years of commercial operation as of 12/31/88 are not included.

TABLE 4.7b

FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER PWR

1984-1988

PWRs **Site name	*Total Collective Dose per Site	Workers with Measurable Doses	Average Dose per Worker (rem or cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
PRAIRIE ISLAND 1,2	1,152	3,764	0.31	4,687.2	0.2
DAVIS-BESSE	726	4,595	0.16	1,522.2	0.5
CALLAWAY 1	681	3,451	0.20	3,699.4	0.2
KEWAUNEE	920	2,963	0.31	2,307.6	0.4
YANKEE-ROWE	1,049	3,022	0.35	713.9	1.5
CALVERT CLIFFS 1,2	2,223	6,943	0.32	6,714.2	0.3
SALEM 1,2	2,587	10,213	0.25	6,861.9	0.4
POINT BEACH 1,2	2,637	4,161	0.63	4,235.9	0.6
THREE MILE ISLAND 1	1,345	5,116	0.26	1,960.5	0.7
SAN ONOFRE 2,3	4,009	21,312	0.19	7,715.6	0.5
INDIAN POINT 3	1,595	4,098	0.39	3,303.3	0.5
BEAVER VALLEY	1,931	6,633	0.29	3,945.9	0.5
FORT CALHOUN	1,670	5,492	0.30	1,759.5	0.9
CRYSTAL RIVER 3	1,762	5,535	0.32	2,564.1	0.7
RANCHO SECO	1,758	6,305	0.28	1,054.5	1.7
SUMMER 1	1,768	4,915	0.36	3,210.0	0.6
OCONEE 1,2,3	5,372	12,657	0.42	10,466.3	0.5
GINNA	1,817	4,129	0.44	2,130.2	0.9
FARLEY 1,2	3,709	10,622	0.35	7,162.0	0.5
SEQUOYAH 1,2	3,812	10,481	0.36	3,124.0	1.2
TROJAN	1,941	5,832	0.33	3,532.6	0.5
ARKANSAS 1,2	4,002	8,683	0.46	5,988.1	0.7
COOK 1,2	4,053	9,279	0.44	6,118.4	0.7
ZION 1,2	4,403	6,547	0.67	6,925.9	0.6
ST. LUCIE 1,2	4,660	8,800	0.53	7,265.0	0.6
NORTH ANNA 1,2	5,138	11,945	0.43	6,908.0	0.7
MCGUIRE 1,2	4,440	11,879	0.37	6,537.9	0.7
TURKEY POINT 3,4	5,563	9,544	0.58	3,976.8	1.4
MILLSTONE POINT 2,3	4,003	7,851	0.51	5,236.5	0.8
PALISADES	2,938	6,731	0.44	1,572.8	1.9
MAINE YANKEE	3,131	4,924	0.64	3,048.7	1.0
THREE MILE ISLAND 2	3,582	5,607	0.64	0.0	---
HADDAM NECK	3,871	6,257	0.62	1,956.9	2.0
SURRY 1,2	8,672	16,026	0.54	5,156.7	1.7
ROBINSON 2	4,793	9,806	0.49	2,129.7	2.3
INDIAN POINT 2	5,538	8,423	0.66	2,996.3	1.8
Grand Totals and Averages	113,251	274,541	0.41	148,488.5	0.8
Averages per Reactor-year	421	1,021		552.0	

*For sites with more than one operating reactor, the collective dose per reactor is obtained by dividing the collective dose for the site by the number of reactors.

**Sites where not all reactors had completed five full years of commercial operation as of 12/31/88 are not included.

decontamination. At PWR facilities, the major contributors to the collective dose were steam generator related work, refueling operations, installation and removal of scaffolding and shielding, and area/equipment decontamination. Even with the use of better techniques and robots, these tasks continue to be responsible for a major percentage of the collective dose. It should be noted that the differences in nuclear plant designs and the ages of the plants [Ref. 15], even between plants of a given type, affect the nature of these parameters. Therefore, care should be exercised when attempting to draw conclusions from these data.

4.6 Collective Dose by Work Function and Employee Type

A second type of annual statistical report that is required by each plant's technical specifications provides the collective dose of workers monitored at each plant site by employee type (plant, utility, or contractor) and by work and job functions. A copy of the report submitted for each reactor site is provided in Appendix D, and much of the data are graphically represented for each site in Appendix E. Tables 4.8 and 4.10 summarize the 1988 data for BWRs, PWRs and LWRs. Table 4.8 shows that at both BWR's and PWR's about 65-70% of the collective dose is incurred during routine and special maintenance activities. Also, the portion of the collective dose incurred during most of the other activities is similar at the two types of plants. One should note that the collective doses obtained from these reports are not used in any other tables in this document for the following reasons: the technical specifications of each plant requires only 80% of the plant's collective dose be accounted for, and some utilities may use the results of self-reading pocket dosimeters instead of the results of the official dosimeter (usually thermoluminescent dosimeters) in compiling the data. Also, when examining the number of personnel shown on these reports, it should be kept in mind that individuals who perform tasks in more than one category may be counted more than once.

Table 4.9 shows that workers performing special maintenance have historically incurred the largest portion (35%-45%) of the collective dose and that workers performing routine maintenance activities usually incurred between 30% and 35% of the total each year since 1979. However, for the past two years in a row, the percentage of collective dose attributed to routine maintenance has been greater than that of special maintenance. This may be indicative of a trend showing a reduction in TMI-related activities and a greater emphasis on steady-state routine maintenance. Overall, figures have been fairly stable over the years with these two categories, special maintenance and routine maintenance, always accounting for the majority of the collective dose. Some of the fluctuations shown in the percentage of the dose incurred during

TABLE 4.8
ANNUAL COLLECTIVE DOSE
BY WORK FUNCTION AND PERSONNEL TYPE
1988

WORK AND JOB FUNCTION	STATION EMPLOYEES PERSON-REM	% OF TOTAL	UTILITY EMPLOYEES PERSON-REM	% OF TOTAL	CONTRACT WORKERS PERSON-REM	% OF TOTAL	TOTAL PER WORK FUNCTION PERSON-REM	% OF TOTAL
BOILING WATER REACTORS								
REACTOR OPS & SURV	1,509	8.4%	88	0.5%	811	4.5%	2,409	13.4%
ROUTINE MAINTENANCE	2,813	15.6%	355	2.0%	4,203	23.4%	7,370	41.0%
IN-SERVICE INSPECTION	143	0.8%	43	0.2%	1,518	8.4%	1,704	9.5%
SPECIAL MAINTENANCE	773	4.3%	241	1.3%	4,231	23.5%	5,244	29.1%
WASTE PROCESSING	264	1.5%	16	0.1%	350	1.9%	631	3.5%
REFUELING	247	1.4%	16	0.1%	370	2.1%	633	3.5%
TOTAL	5,750	32.0%	759	4.2%	11,483	63.8%	17,991	100.0%
PRESSURIZED WATER REACTORS								
REACTOR OPS & SURV	1,215	5.1%	93	0.4%	887	3.7%	2,195	9.2%
ROUTINE MAINTENANCE	2,547	10.7%	806	3.4%	5,015	21.1%	8,367	35.2%
IN-SERVICE INSPECTION	234	1.0%	206	0.9%	1,473	6.2%	1,913	8.1%
SPECIAL MAINTENANCE	1,371	5.8%	631	2.7%	5,335	22.5%	7,337	30.9%
WASTE PROCESSING	381	1.6%	16	0.1%	486	2.0%	883	3.7%
REFUELING	760	3.2%	139	0.6%	2,160	9.1%	3,060	12.9%
TOTAL	6,508	27.4%	1,892	8.0%	15,356	64.6%	23,755	100.0%
ALL LIGHT WATER REACTORS								
REACTOR OPS & SURV	2,725	6.5%	181	0.4%	1,698	4.1%	4,604	11.0%
ROUTINE MAINTENANCE	5,359	12.8%	1,161	2.8%	9,217	22.1%	15,738	37.7%
IN-SERVICE INSPECTION	377	0.9%	249	0.6%	2,991	7.2%	3,617	8.7%
SPECIAL MAINTENANCE	2,144	5.1%	872	2.1%	9,566	22.9%	12,581	30.1%
WASTE PROCESSING	646	1.5%	32	0.1%	837	2.0%	1,514	3.6%
REFUELING	1,007	2.4%	155	0.4%	2,530	6.1%	3,692	8.8%
TOTAL	12,258	29.4%	2,650	6.3%	26,838	64.3%	41,746	100.0%

TABLE 4.9

PERCENTAGES OF ANNUAL COLLECTIVE
DOSE AT LWRs BY WORK FUNCTION
1979 - 1988

WORK FUNCTION	PERCENTAGE OF COLLECTIVE DOSE EACH YEAR									
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
REACTOR OPERATIONS AND SURVEILLANCE	12.2%	9.5%	8.9%	9.4%	10.1%	11.4%	12.8%	12.8%	11.9%	11.0%
ROUTINE MAINTENANCE	29.2%	35.5%	36.1%	27.9%	29.7%	26.9%	34.6%	33.2%	35.0%	37.7%
INSERVICE INSPECTION	9.0%	5.5%	5.3%	6.5%	7.6%	6.3%	8.6%	8.3%	8.0%	8.7%
SPECIAL MAINTENANCE	39.4%	40.6%	40.5%	46.8%	43.9%	45.4%	32.5%	35.5%	33.2%	30.1%
WASTE PROCESSING	3.6%	3.0%	4.2%	5.0%	4.6%	3.6%	5.1%	4.0%	3.9%	3.6%
REFUELING	6.6%	6.1%	5.0%	4.4%	4.1%	6.4%	6.5%	6.2%	8.1%	8.8%

TABLE 4.10
ANNUAL COLLECTIVE DOSE
BY OCCUPATION AND PERSONNEL TYPE
1988

OCCUPATION	STATION EMPLOYEES PERSON-REM	% OF TOTAL	UTILITY EMPLOYEES PERSON-REM	% OF TOTAL	CONTRACT WORKERS PERSON-REM	% OF TOTAL	TOTAL PER WORK FUNCTION PERSON-REM	% OF TOTAL
BOILING WATER REACTORS								
MAINTENANCE	3,228	17.9%	582	3.2%	9,353	52.0%	13,162	73.2%
OPERATIONS	1,024	5.7%	43	0.2%	341	1.9%	1,408	7.8%
HEALTH PHYSICS	890	4.9%	31	0.2%	988	5.5%	1,909	10.6%
SUPERVISORY	287	1.6%	23	0.1%	90	0.5%	400	2.2%
ENGINEERING	321	1.8%	81	0.4%	710	3.9%	1,112	6.2%
TOTAL	5,750	32.0%	759	4.2%	11,483	63.8%	17,991	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	3,310	13.9%	1,650	6.9%	9,841	41.4%	14,800	62.3%
OPERATIONS	1,256	5.3%	35	0.1%	617	2.6%	1,908	8.0%
HEALTH PHYSICS	1,157	4.9%	31	0.1%	2,799	11.8%	3,986	16.8%
SUPERVISORY	295	1.2%	25	0.1%	336	1.4%	657	2.8%
ENGINEERING	491	2.1%	151	0.6%	1,763	7.4%	2,405	10.1%
TOTAL	6,508	27.4%	1,892	8.0%	15,356	64.6%	23,755	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	6,537	15.7%	2,231	5.3%	19,193	46.0%	27,962	67.0%
OPERATIONS	2,280	5.5%	78	0.2%	959	2.3%	3,316	7.9%
HEALTH PHYSICS	2,047	4.9%	62	0.1%	3,786	9.1%	5,895	14.1%
SUPERVISORY	582	1.4%	48	0.1%	426	1.0%	1,056	2.5%
ENGINEERING	812	1.9%	231	0.6%	2,474	5.9%	3,517	8.4%
TOTAL	12,258	29.4%	2,650	6.3%	26,838	64.3%	41,746	100.0%

refueling activities (particularly in 1987 and 1988 when it increased to over 8%) is due to the fact that some sites include doses other than those directly associated with fuel movement in this category.

Figure 4.5 graphically shows the trends in the collective dose by work function and type of personnel for the years 1984 through 1988 for BWRs and PWRs separately. Contractor personnel still incur most of the collective dose during special maintenance and in-service inspection, but, at least in recent years, the collective dose is more equally divided between contractor and plant and utility personnel during routine maintenance, reactor operations, waste processing, and refueling activities. The general decrease in collective dose is also apparent among most of these activities.

Table 4.10 presents the distribution of the collective dose for 1988 at all LWRs among five occupations. As expected, maintenance personnel incurred the majority (67%) of the collective dose with contractor maintenance personnel receiving about twice as much as the station and utility maintenance employees combined. This is about the same as that reported for 1986 and 1987. Supervisory personnel received 2.5% of the dose, compared to 2.75% in 1987, while workers in the remaining three occupations--operations, health physics, and engineering--received 7.9%, 14.1%, and 8.4% respectively, of the collective dose. None of these values changed very much from those found for 1986 and 1987. The collective doses shown in Tables 4.8 and 4.10 do not equal those shown in other tables in the report because they are the sum of the doses taken from the type of annual reports shown in Appendix D rather than the collective dose that was obtained or calculated from the annual reports required to be submitted pursuant to 10 CFR Part 20.407.

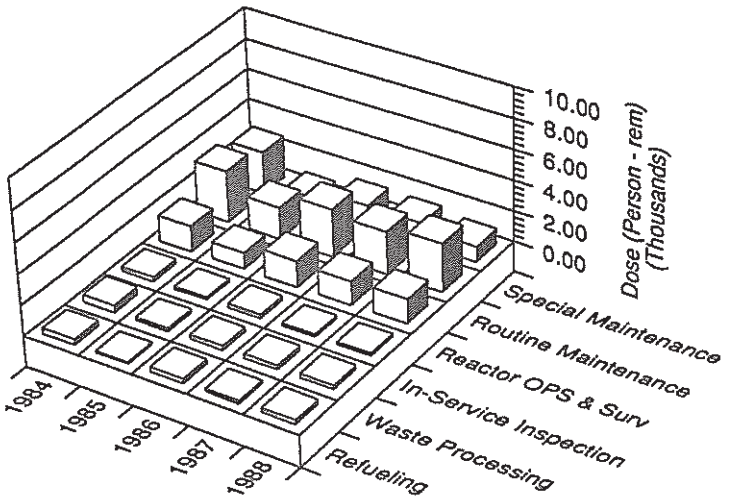
Another use made of the reports given in Appendix D is in proportioning the collective dose obtained from the § 20.407 annual reports into the work functions and personnel types shown in Appendix C. This was done in the following way:

(1) The collective dose incurred by workers in the work function "Reactor Operations and Surveillance" on each plant's annual report submitted pursuant to their technical specifications (the first number in the last column in Appendix D) was determined.

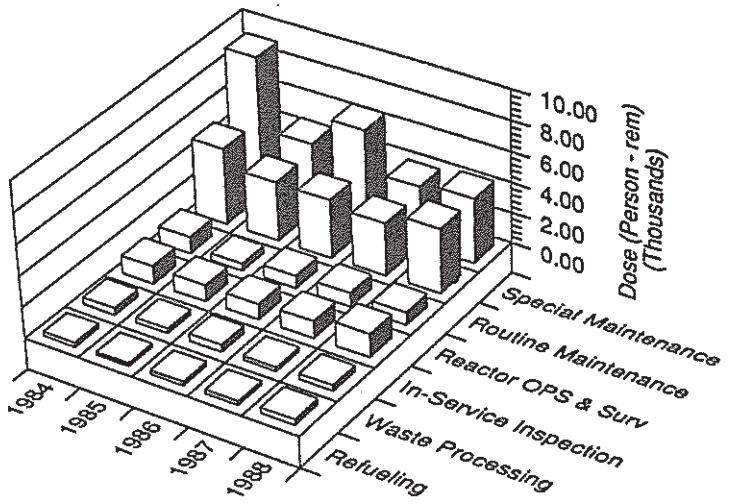
(2) The ratio of this dose to the total collective dose (the last number in the last column in Appendix D) was calculated and multiplied by the total collective dose that had been calculated or obtained from the § 20.407 annual report. This product is the collective dose shown in the column headed "Operations" in Appendix C.

Figure 4.5
Collective Dose by Work Function and Personnel Type
1984 – 1988

Boiling Water Reactors

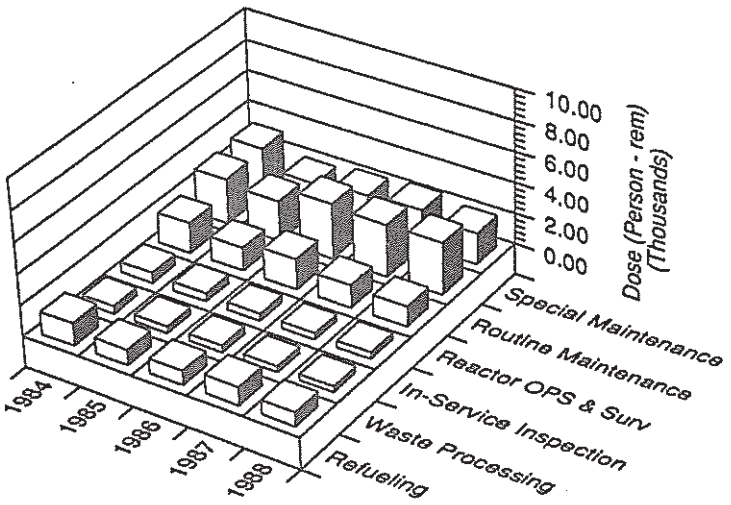


Plant

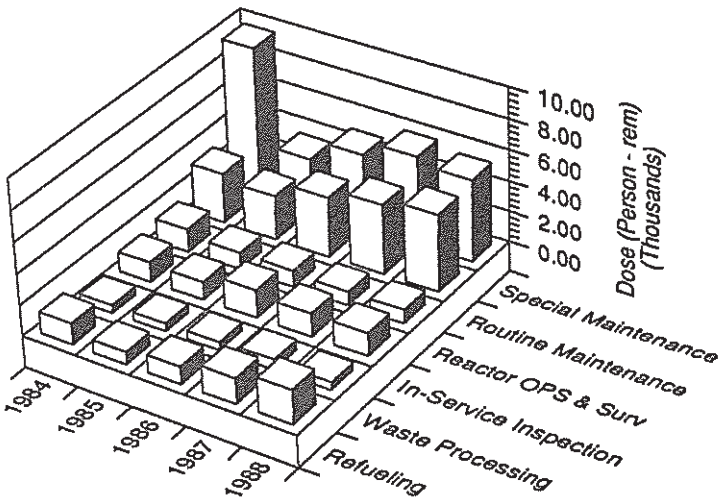


Contract

Pressurized Water Reactors



Plant



Contract

(3) The collective dose shown in the column headed "Maintenance and Others" in Appendix C was determined by first summing the collective doses incurred by workers in the five remaining functions given in Appendix D and then calculating the fraction that this dose is of the total collective dose. This fraction was multiplied by the total collective dose calculated from the § 20.407 annual reports to yield the collective dose shown in this column of Appendix C.

(4) A similar procedure was followed in determining the collective dose for the columns headed "Contractor" and "Station & Utility" in Appendix C.

4.7 Number of Personnel by Work Function and Employee Type

Half of the information presented in the statistical annual reports shown in Appendix D concerns the number of various types of personnel that performed certain work functions. Tables 4.11 and 4.12 sum this information to show the percentage of personnel by work function and occupation. The major problem in interpreting the figures shown in these tables is the fact that the same person may perform several work functions during the year so that the total number of personnel obtained by summing those shown in the various work functions would be inflated. However, Table 4.11 is still useful in showing the percentage of personnel associated with each of the six work functions shown. About 57% of the personnel performed routine or special maintenance functions, about 17% were involved with reactor operations and surveillance, and the remaining 26% were about equally divided among the other three work functions.

Table 4.12 shows the percentage of personnel in each of five "occupations" at BWRs, PWRs, and LWRs. The workers were similarly distributed at BWRs and PWRs, the largest difference occurred in the maintenance and health physics categories with 63% and 11% at BWRs and 55% and 16% at PWRs, respectively. A large part of these two categories were contractor personnel whereas station and utility personnel formed the majority of the "operations" category. Overall, 56.2% of the personnel were contractors, 36.3% were station employees, and 7.5% were utility employees in 1988.

Table 4.13 presents the average annual dose incurred by workers in the five "occupations" in 1988. These averages were calculated by dividing the collective dose reported for these groups (see Table 4.10) by the number of individuals shown in Table 4.12. It shows that in nearly every instance, the maintenance and health physics personnel incur the highest average doses and that supervisory and engineering personnel usually have the lowest. When examining the values of the averages that are given in Table 4.13, one should

TABLE 4.11
NUMBER OF PERSONNEL*
BY WORK FUNCTION AND PERSONNEL TYPE
1988

WORK AND JOB FUNCTION	STATION EMPLOYEES NUMBER	STATION EMPLOYEES % OF TOTAL	UTILITY EMPLOYEES NUMBER	UTILITY EMPLOYEES % OF TOTAL	CONTRACT WORKERS NUMBER	CONTRACT WORKERS % OF TOTAL	TOTAL PER WORK FUNCTION NUMBER	TOTAL PER WORK FUNCTION % OF TOTAL
BOILING WATER REACTORS								
REACTOR OPS & SURV	7,130	9.1%	527	0.7%	4,151	5.3%	11,808	15.1%
ROUTINE MAINTENANCE	15,062	19.3%	1,690	2.2%	15,721	20.1%	32,473	41.5%
IN-SERVICE INSPECTION	1,467	1.9%	333	0.4%	12,037	15.4%	13,837	17.7%
SPECIAL MAINTENANCE	3,555	4.5%	939	1.2%	8,545	10.9%	13,039	16.7%
WASTE PROCESSING	2,220	2.8%	202	0.3%	1,345	1.7%	3,767	4.8%
REFUELING	1,805	2.3%	109	0.1%	1,320	1.7%	3,234	4.1%
TOTAL	31,239	40.0%	3,800	4.9%	43,119	55.2%	78,158	100.0%
PRESSURIZED WATER REACTORS**								
REACTOR OPS & SURV	6,611	8.9%	2,123	2.8%	5,344	7.2%	14,078	18.9%
ROUTINE MAINTENANCE	8,649	11.6%	2,796	3.7%	12,242	16.4%	23,687	31.8%
IN-SERVICE INSPECTION	1,683	2.3%	858	1.2%	3,813	5.1%	6,354	8.5%
SPECIAL MAINTENANCE	5,065	6.8%	2,226	3.0%	10,673	14.3%	17,964	24.1%
WASTE PROCESSING	2,055	2.8%	243	0.3%	1,803	2.4%	4,101	5.5%
REFUELING	2,601	3.5%	616	0.8%	5,168	6.9%	8,385	11.2%
TOTAL	26,664	35.8%	8,862	11.9%	39,043	52.4%	74,569	100.0%
ALL LIGHT WATER REACTORS**								
REACTOR OPS & SURV	13,741	9.0%	2,650	1.7%	9,495	6.2%	25,886	16.9%
ROUTINE MAINTENANCE	23,711	15.5%	4,486	2.9%	27,963	18.3%	56,160	36.8%
IN-SERVICE INSPECTION	3,150	2.1%	1,191	0.8%	15,850	10.4%	20,191	13.2%
SPECIAL MAINTENANCE	8,620	5.6%	3,165	2.1%	19,218	12.6%	31,003	20.3%
WASTE PROCESSING	4,275	2.8%	445	0.3%	3,148	2.1%	7,868	5.2%
REFUELING	4,406	2.9%	725	0.5%	6,488	4.2%	11,619	7.6%
TOTAL	57,903	37.9%	12,662	8.3%	82,162	53.8%	152,727	100.0%

* Workers may be counted in more than one category. The number of personnel in Table 4.12 should be considered to be more accurate than Table 4.11, because the actual total number of individuals in each profession was provided by some plants in an attempt to correct for the multiple counting of individuals.

** Table 4.11 does not include the number of personnel from the PWRs at Point Beach 1,2 (180 people), because the data were not submitted in the suggested format.

TABLE 4.12
NUMBER OF PERSONNEL*
BY OCCUPATION AND PERSONNEL TYPE
1988

OCCUPATION	STATION EMPLOYEES NUMBER	% OF TOTAL	UTILITY EMPLOYEES NUMBER	% OF TOTAL	CONTRACT WORKERS NUMBER	% OF TOTAL	TOTAL PER WORK FUNCTION NUMBER	% OF TOTAL
BOILING WATER REACTORS								
MAINTENANCE	7,417	19.4%	1,631	4.3%	14,918	39.0%	23,966	62.6%
OPERATIONS	2,983	7.8%	262	0.7%	1,256	3.3%	4,501	11.8%
HEALTH PHYSICS	1,951	5.1%	71	0.2%	2,156	5.6%	4,178	10.9%
SUPERVISORY	1,060	2.8%	109	0.3%	457	1.2%	1,626	4.2%
ENGINEERING	1,491	3.9%	526	1.4%	1,987	5.2%	4,004	10.5%
TOTAL	14,902	38.9%	2,599	6.8%	20,774	54.3%	38,275	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	7,157	14.4%	2,913	5.9%	17,302	34.8%	27,372	55.0%
OPERATIONS	4,023	8.1%	140	0.3%	1,287	2.6%	5,450	11.0%
HEALTH PHYSICS	2,683	5.4%	72	0.1%	5,259	10.6%	8,014	16.1%
SUPERVISORY	1,471	3.0%	224	0.5%	702	1.4%	2,397	4.8%
ENGINEERING	1,697	3.4%	639	1.3%	4,189	8.4%	6,525	13.1%
TOTAL	17,031	34.2%	3,988	8.0%	28,739	57.8%	49,758	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	14,574	16.6%	4,544	5.2%	32,220	36.6%	51,338	58.3%
OPERATIONS	7,006	8.0%	402	0.5%	2,543	2.9%	9,951	11.3%
HEALTH PHYSICS	4,634	5.3%	143	0.2%	7,415	8.4%	12,192	13.8%
SUPERVISORY	2,531	2.9%	333	0.4%	1,159	1.3%	4,023	4.6%
ENGINEERING	3,188	3.6%	1,165	1.3%	6,176	7.0%	10,529	12.0%
TOTAL	31,933	36.3%	6,587	7.5%	49,513	56.2%	88,033	100.0%

* Workers may be counted in more than one category. The number of personnel in this table is considered to be more accurate than Table 4.11 because the actual total number of individuals in each category was provided by some plants in an attempt to correct for the multiple counting of individuals. This table does include the number of personnel from Point Beach 1,2.

TABLE 4.13
AVERAGE DOSES BY OCCUPATION AND PERSONNEL TYPE*
1988

OCCUPATION	STATION			UTILITY			CONTRACT			TOTAL		
	COLL. DOSE	NUMBER OF EMPLOYEES	AVERAGE DOSE	COLL. DOSE	NUMBER OF EMPLOYEES	AVERAGE DOSE	COLL. DOSE	NUMBER OF EMPLOYEES	AVERAGE DOSE	COLL. DOSE	NUMBER OF EMPLOYEES	AVERAGE DOSE
BOILING WATER REACTORS												
MAINTENANCE	3,228	7,417	0.44	582	1,631	0.36	9,353	14,918	0.63	13,162	23,966	0.55
OPERATIONS	1,024	2,983	0.34	43	262	0.16	341	1,256	0.27	1,408	4,501	0.31
HEALTH PHYSICS	890	1,951	0.46	31	71	0.43	988	2,156	0.46	1,909	4,178	0.46
SUPERVISORY	287	1,060	0.27	23	109	0.21	90	457	0.20	400	1,626	0.25
ENGINEERING	321	1,491	0.22	81	526	0.15	710	1,987	0.36	1,112	4,004	0.28
TOTAL	5,750	14,902	0.39	759	2,599	0.29	11,483	20,774	0.55	17,991	38,275	0.47
PRESSURIZED WATER REACTORS												
MAINTENANCE	3,310	7,157	0.46	1,650	2,913	0.57	9,841	17,302	0.57	14,800	27,372	0.54
OPERATIONS	1,256	4,023	0.31	35	140	0.25	617	1,287	0.48	1,908	5,450	0.35
HEALTH PHYSICS	1,157	2,683	0.43	31	72	0.43	2,799	5,259	0.53	3,986	8,014	0.50
SUPERVISORY	295	1,471	0.20	25	224	0.11	336	702	0.48	657	2,397	0.27
ENGINEERING	491	1,697	0.29	151	639	0.24	1,763	4,189	0.42	2,405	6,525	0.37
TOTAL	6,508	17,031	0.38	1,892	3,988	0.47	15,356	28,739	0.53	23,755	49,758	0.48
ALL LIGHT WATER REACTORS												
MAINTENANCE	6,537	14,574	0.45	2,231	4,544	0.49	19,193	32,220	0.60	27,962	51,338	0.54
OPERATIONS	2,280	7,006	0.44	78	402	0.19	959	2,543	0.38	3,316	9,951	0.33
HEALTH PHYSICS	2,047	4,634	0.23	62	143	0.43	3,786	7,415	0.51	5,895	12,192	0.48
SUPERVISORY	582	2,531	0.25	48	333	0.15	426	1,159	0.37	1,056	4,023	0.26
ENGINEERING	812	3,188	0.38	231	1,165	0.20	2,474	6,176	0.40	3,517	10,529	0.33
TOTAL	12,258	31,933	0.38	2,650	6,587	0.40	26,838	49,513	0.54	41,746	88,033	0.47

* Workers may be counted in more than one category, but the actual total number of individuals in each category was used when it was provided by the plant.

bear in mind the several sources of error to which they are subject: (1) the number of individuals may be inflated because the same plant contractor employee may work at several plants so that the employee would be counted more than once in a summary such as Table 4.13; (2) the occupations are not clearly defined so that workers performing certain tasks in one plant may be classified as being in one occupation and be included in a different one at another plant; (3) some plants count only those workers whose doses exceed 0.10 rem (cSv) while other plants count all workers regardless of the dose received. It is because of these reasons that the usefulness of the numbers of individuals obtained from the reports provided in Appendix D is rather limited, and they are not used to develop any other statistics in this document.

4.8 Graphical Representation of Dose Trends in Appendix E

Appendix E is a recent addition to this report. Each page of Appendix E presents two types of graphs for one site. One graph plots certain dose-performance indicators from 1973 through 1988, and the other indicates the collective dose by job function for 1978 through 1988. The dose and performance indicators shown in the top graph illustrate the history of the collective dose for the site, the rolling three-year average dose per reactor, and the gross electricity generated at the site. These data are plotted, beginning with the plant's first full year of commercial operation, and continuing through 1988. However, any data reported prior to 1973 are not included. The three-year average dose per reactor data is included because it appears to provide a better overall indication of the plant's general trend in collective dose. This average is determined by summing the collective dose for the current year and the previous two years and then dividing this sum by the number of reactors in operation during those years. This reduces the sporadic effects of refueling operations and occasional high-dose maintenance activities, and gives a better idea of collective dose trends over the life of the plant. (One may note that for sites with more than one reactor, the plot of the three-year rolling average will lie below that of the plot of the annual collective dose for the site because it is calculated on a per-reactor basis.)

The second type of graph at the bottom of each page in Appendix E displays the breakdown of collective dose by job function and employee type for the years 1978 through 1988. The horizontal axis lists the six job functions of reactor operations, routine maintenance, in-service inspection, special maintenance, waste management and refueling operations and the vertical axis indicates collective dose at each site. This representation quickly shows the job functions where most of the dose was accumulated as well as the division of

the collective dose among plant and contract workers. The data are taken from the submittals presented in Appendix D and therefore represent at least 80% of the collective dose at each site. Only those reactors that have completed at least one full year of commercial operation are presented in Appendix E.

4.9 Health Implications of Average Annual Doses

Of interest to individuals exposed to radiation in the workplace, are the potential health risks associated with occupational exposure. If any damage to health is caused by exposure to radiation in the workplace, it would likely manifest itself as certain types of cancer in the exposed worker or, less likely, as inherited genetic damage in the first few generations of the workers' offspring. A vast amount of scientific information is available from which estimates of these risks can be made. Much of this information, however, has been obtained from epidemiologic studies of human populations at considerably higher doses and dose rates than those normally experienced in the workplace. Complementary to this, information obtained from many animal and cell biology studies has greatly enhanced our knowledge and understanding of the biological effects of ionizing radiation. Although using this information to estimate risks in the workplace introduces uncertainties, these uncertainties can be dealt with in such a manner that the risk is not likely to be underestimated. Thus, the discussion below is likely to overstate the health implications rather than understate them.

Cancer induction as a result of radiation exposure has been examined by many organizations having scientific and medical expertise in the subject. One of these, the National Academy of Sciences (NAS), published a comprehensive review of the biological effects of ionizing radiation in 1990 [Ref. 16]. Based on this report, which is still under review by NRC and others, the 107,019 workers receiving the average dose of 0.41 rem (cSv) or the maximum accidental dose of 6.1 rems (cSv) to the whole body during 1988 (see page 6-4) might expect an increased cancer death risk of about two chances in a thousand for the average dose and about four chances in a thousand for the maximum dose[10]. Should a worker receive 0.41 rem (cSv) per year continuously during an entire working career (working from age 18 until age 65) the lifetime risk of dying from cancer is estimated to increase by less than 3% over the normal risk of dying of cancer. Since the American Cancer

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10 These estimates were calculated from Table 4-2 of Ref. 16. The average dose risk estimate assumes continuous lifetime exposure (ages 18-65), while the accute dose risk estimate assumes a one-time instantaneous exposure. Note that these estimates are based on observations of individuals exposed to high doses of radiation over short periods of time. The BEIR committee, in its report, cautions that dose rate reduction factors (DREFs) will need to be applied to low-dose and low- dose-rate exposures. (see Ref. 16, pp. 171 and 174)

Society estimates that an individual's risk of dying of cancer is about 20% (one in five) the risk to an individual receiving 0.41 rem (cSv) would be approximately 20.6% instead of 20%.

The potential genetic effects from a worker population receiving about 43,906 person-rems (person-cSv) is small compared to genetic damages that normally occur spontaneously in a population of this size. Approximately 100,000 serious genetic defects occur normally in one million live births, i.e., an average of about one serious defect in every ten live births. Theoretically, the total genetic damage in the first generation children of the 107,019 exposed workers would, according to the report NUREG/CR-4214 [Ref. 17], be an increase of about two or less cases (less than 0.02%) compared to the expected 10,000 cases that occur normally[11]. No significant increase in the number of genetic defects has been observed in the children of individuals exposed to much higher levels of ionizing radiation at Hiroshima and Nagasaki, Japan.

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11 Assuming that, on the average, each exposed person will have one live born child in the future, i.e., 107,019 children born to this worker population.

5 TERMINATION DATA SUBMITTED PURSUANT TO 10 CFR § 20.408

5.1 Termination Reports, 1969-1988

In 1969, the Atomic Energy Commission (predecessor of the NRC) began requiring certain categories of licensees[12] to submit personal identification and exposure information upon the termination of each monitored person's employment or work assignment at their facilities. The appropriate information on each report has been manually coded and entered into the Commission's computerized Radiation Exposure Information Reporting System (REIRS) for permanent retention. The data are retrievable by several criteria - social security number, name, facility, etc. - which allows statistical analysis of the data as well as the tracing of individual dose histories. During the years that this information has been collected, more than 1.3 million reports have been received for approximately 618,000 individuals who have been reported as having terminated their employment at facilities in one or more of the categories of covered licensees. The figures given for the number of reports and the number of individuals are different because thousands of individuals have worked at more than one facility over the years and a termination report was submitted to the NRC each time they left a facility. Table 5.1 provides a breakdown of this information for individuals terminating during each of these 20 years and, since the majority of termination reports are submitted by nuclear power facilities, the number of individuals terminating from power reactors is displayed separately. Primarily because of the need for workers at an increasing number of nuclear power plants, the number of individuals terminating employment or work assignment has increased nearly every year, and in 1988, about 75,431 individuals terminated employment or work assignments at nuclear power plants.

5.2 Limitations of Termination Data

When examining or using the statistics that are based on the termination data, one should keep in mind that these data have various limitations: (1) some licensees submit a termination report for each monitoring period rather than waiting until the individual actually completes a work assignment at the facility; (2) the reports contain no indication of the tasks the workers may have performed nor of the type of employees (contractor, plant part-time, etc.) they were while monitored by the licensee; (3) the period(s) of exposure

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12 Commercial nuclear power reactors; industrial radiographers; fuel processors, fabricators, and reprocessors; and manufacturers and distributors of specified quantities of by-product material. Three other types of NRC licensees are now required to submit reports pursuant to 10 CFR § 20.407 and § 20.408: geologic repositories for high-level radioactive waste; receivers of radioactive waste from other persons for land disposal; and independent installations for the storage of spent fuel.

that are reported for terminating individuals may indicate the monitoring period during which they may have been exposed to radiation rather than the actual dates of exposure; (4) some licensees report cumulative periods of exposure and doses rather than the actual periods and dose incurred during each period; and (5) licensees having more than one licensed facility sometimes include in the termination report, submitted when individuals leave the second facility, the dose that they incurred at the first facility, which may already have been reported. Although attempts have been made to correct for some of these problems, they are still a small additional source of error in any statistics developed from the termination data.

TABLE 5.1
TERMINATION REPORTS SUBMITTED TO THE NRC

1969 - 1988

YEAR	All Covered Categories*			Power Reactor Licensees		
	Number of Termination Records	Number of Reports Submitted+	Number of Terminating Individuals	Number of Termination Records	Number of Reports Submitted+	Number of Terminating Individuals
1969	5,009		3,992	790		727
1970	8,606		6,069	2,126		1,908
1971	12,955		8,874	2,246		2,197
1972	15,685		10,353	4,997		3,888
1973	19,985		15,588	11,525		9,071
1974	30,389		21,499	16,946		11,603
1975	44,676		27,415	38,376		22,627
1976	70,230		40,079	63,593		35,294
1977	88,295		42,183	81,074		36,864
1978	96,010		44,541	85,308		37,359
1979	133,470		58,913	118,218		48,305
1980	175,408		73,662	162,515		65,092
1981	205,103		73,004	196,104		67,908
1982	200,191		67,589	192,314		63,848
1983	243,229		76,202	234,803		72,869
1984	305,302	124,963	80,608	294,386	121,215	77,380
1985	235,300	116,462	80,809	231,200	112,140	77,065
1986		111,957	81,985		107,857	78,379
1987		125,915	91,059		119,366	85,743
1988		113,072	80,211		106,273	75,431

* Commercial nuclear power reactors; industrial radiographers; fuel processors, fabricators, and reprocessors; manufacturers and distributors of specified quantities of byproduct materials; low-level waste disposal facilities; and independent spent fuel storage installations.

\+ Because of a recent change in the computer system (both hardware and software), a count of "Termination Records" will no longer be provided. The "Number of Reports Submitted" will be shown instead.

5.3 Transient Workers per Calendar Quarter

One use of the information contained in the termination reports is the examination of the doses being received by short-term workers. Since a large number of the termination reports indicated periods of exposure that were less than 90 days, it is possible that several thousand individuals could have been employed by two or more licensees during the same calendar quarter. Thus, in this report, a "quarterly transient" worker is defined to be an individual who began and terminated employment at two or more different licensed facilities within one calendar quarter. This allows one to examine the doses of those workers that move rapidly between facilities.

Table 5.2 displays some of the information gathered from these termination reports that were submitted by all covered licensees and by licensed nuclear power facilities, separately. One can quickly see that the vast majority of these individuals are monitored by nuclear power facilities. The number of these individuals has about doubled during the past ten years from some 1,809 in 1979 to 3,665 in 1988. The average individual dose (which is approximately equal to a quarterly dose for these workers) has decreased over these years to a value of 0.27 rem (cSv).

The bottom half of the table separates the information shown for power reactor licensees into that for reactor workers employed by two, three, and four or more different reactor licensees. The table shows that most of these transients were reported by two different licensees during a quarter and that their average quarterly dose has remained at about 0.30 rem (cSv) for the past several years, as has the average dose of individuals employed by three facilities. The average dose incurred by persons terminated by three or more plants has remained at about 0.16 rem (cSv) for the past several years. All of these average doses are considerably less than those incurred 10 years ago. This is believed to be a reflection of the industry's continuing efforts to reduce the exposure of all individuals working at their facilities and their efforts to limit the workers' annual doses to less than five rems regardless of the number of facilities at which they work during the year.

Examination of these records also revealed that some individuals have worked for as many as six different NRC licensees during one calendar quarter, and examination of their doses revealed no instances during the last seven years in which a worker exceeded the quarterly limit of three rems (cSv) as a result of working at two or more different licensed facilities within one calendar quarter. In most of the cases that were found in previous years, the doses that the workers had received while employed by the first utility were re-evaluated and revised upward later in the year. These late revisions

TABLE 5.2
TRANSIENT WORKERS PER CALENDAR QUARTER
1979 - 1988

All Covered Licensees				Power Reactor Facilities			
Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-rems person-cSv)	Average Individual Dose (rem or cSv)	Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-rems person-cSv)	Average Individual Dose (rem or cSv)
1979	1,809	836	0.46	1979	1,754	802	0.46
1980	2,355	1,063	0.45	1980	2,218	1,033	0.47
1981	2,344	955	0.41	1981	2,335	952	0.41
1982	2,428	935	0.39	1982	2,396	914	0.38
1983	2,774	913	0.33	1983	2,728	886	0.32
1984	3,414	1,123	0.33	1984	3,356	1,083	0.32
1985	2,791	700	0.25	1985	2,746	674	0.25
1986	3,069	921	0.30	1986	3,033	910	0.30
1987	3,543	1,022	0.29	1987	3,517	1,011	0.29
1988	3,665	1,001	0.27	1988	3,622	991	0.27

Power Reactor Facilities

Year	No. of Persons Terminated by Two Licensees	Collective Dose	Average Dose	No. of Persons Terminated by Three Licensees	Collective Dose	Average Dose	No. of Persons Terminated by >Three Licensees	Collective Dose	Average Dose
1979	1,527	647	0.43	178	130	0.73	49	25	0.51
1980	1,896	856	0.45	259	140	0.54	63	36	0.57
1981	1,967	780	0.40	308	145	0.47	60	27	0.45
1982	2,047	789	0.39	288	113	0.39	61	12	0.20
1983	2,276	767	0.34	362	101	0.28	90	18	0.20
1984	2,782	901	0.32	431	147	0.34	143	35	0.24
1985	2,340	597	0.26	335	67	0.20	71	10	0.14
1986	2,612	785	0.30	362	115	0.32	59	10	0.17
1987	2,992	875	0.29	425	121	0.28	100	16	0.16
1988	2,947	808	0.27	541	161	0.30	134	22	0.16

resulted in a few workers receiving quarterly doses that slightly exceeded three rems (cSv). However, because some facilities do not report the workers' doses in quarterly increments in the termination reports that are submitted to the NRC, it is not always possible to determine, from the data in REIRS, the portion of the dose received during each quarter. This inability could have allowed any of these doses that exceeded three rems to go undetected by the analyses presented in this document. Regulations require that each licensee take measures to ensure that such exposures do not occur, and if they do occur, they are reported to the Commission separately (see Section 6).

5.4 Transient Workers per Calendar Year at Nuclear Power Facilities

Since the number of transient workers per calendar quarter comprises only a small percentage of the total number of individuals terminating each year, it was decided to examine the data reported for workers who began and terminated two or more periods of employment with two or more different reactor facilities within one calendar year. An examination of these data would allow one to determine the number and average dose for these "annual transients." Since more than 95% of these transients are reported by nuclear power facilities, only the termination records of these individuals were examined in detail.

Table 5.3 summarizes the number and doses of the transients found among the individuals terminating during the ten years from 1979 through 1988. The number of these individuals increased from about 3,900 in 1979 to about 8,700 in 1988. The average dose remained at about 1 rem (cSv) until 1985 when the average dose decreased by about 30% to 0.77 rem (cSv). The average dose has continued to decrease to a value of 0.64 rem (cSv) in 1988.

The lower portion of Table 5.3 shows the number and doses of workers who were terminated by two, three, and four or more different licensees during each calendar year. The average dose of workers terminating from two plants has decreased to about 0.5 rem (cSv) and the average dose of workers terminating at three plants decreased to about 0.8, while the average dose of individuals terminating from three or more facilities remains at about 1 rem (cSv). However, the average doses calculated for all these workers are now significantly lower than those reported for prior years.

Another way in which the distribution of the doses received by transient workers can be useful is in the determination of the impact that the inclusion of these individuals in each of two or more licensees' annual reports had on the annual summary (Table 4.4) for all nuclear power facilities (one of the

TABLE 5.3

TRANSIENT WORKERS PER CALENDAR YEAR AT NUCLEAR POWER FACILITIES

1979 - 1988

Year	No. of Commercial Reactors	No. of Persons Terminated by Two or More Licensees	Collective Dose (person-rems person-cSv)	Average Dose (rems or cSv)
1979	68	3,938	3,891	0.99
1980	69	5,463	6,028	1.10
1981	71	5,425	5,381	0.99
1982	75	5,303	5,610	1.06
1983	76	6,340	6,675	1.05
1984	79	7,760	8,045	1.04
1985	83	6,871	5,319	0.77
1986	90	7,816	5,954	0.76
1987	97	9,469	6,712	0.71
1988	103	8,760	5,586	0.64

Year	No. of Persons Terminated by Two Licensees	Collective Dose	Average Dose	No. of Persons Terminated by Three Licensees	Collective Dose	Average Dose	No. of Persons Terminated by >Three Licensees	Collective Dose	Average Dose
1979	2,761	2,097	0.76	688	805	1.17	489	989	2.02
1980	3,772	3,444	0.91	959	1,245	1.30	732	1,339	1.83
1981	3,745	3,033	0.81	924	1,172	1.27	756	1,176	1.56
1982	3,645	3,349	0.92	913	1,131	1.24	745	1,130	1.52
1983	4,203	3,624	0.86	1,256	1,694	1.39	881	1,357	1.53
1984	5,118	4,224	0.83	1,461	1,945	1.33	1,181	1,875	1.59
1985	4,584	3,000	0.65	1,357	1,400	1.03	930	920	0.99
1986	5,079	2,907	0.57	1,490	1,508	1.01	1,247	1,539	1.23
1987	6,107	3,339	0.55	1,852	1,693	0.91	1,510	1,680	1.11
1988	5,584	2,784	0.50	1,772	1,429	0.81	1,404	1,373	0.98

problems mentioned in Section 2). Table 5.4a shows the correct distribution of transient worker doses as determined from the above-mentioned termination reports and compares it with the distribution of the doses of these workers as they would have appeared in a summation of the annual statistical reports submitted by each of the nuclear power facilities. During each of the years shown, each of the transient workers was counted an average of 2.66 times so that in 1988, the 8,759 transients would have been counted as 23,306 individuals. This was not surprising because some individuals were reported by as many as nine different facilities.

Table 5.4b illustrates the impact that the multiple reporting of these transient individuals had on the staff's summation of the annual statistical reports for the years 1982 through 1988. Since each nuclear power facility reports the distribution of the doses received by workers while monitored by the particular facility during the year, one would expect that a summation of these reports would result in individuals being counted several times in dose ranges lower than the range in which their total accumulated dose (the sum of the personnel monitoring results incurred at each facility during the year) would actually place them. Thus, while the total collective dose would remain the same, the number of workers, their dose distribution, and average dose would be affected by this multiple reporting. This was found to be true because too few workers were reported in the higher dose ranges. For example, in 1988, Table 5.4b shows that the summation of annual reports indicated that 103,251 workers received a measurable dose, 2,310 of whom received doses greater than two rems (cSv). After accounting for those individuals that were reported more than once, the corrected distribution indicated that there were really only 95,841 workers that received a measurable dose and that 2,951 of them received doses greater than two rems (cSv). Thus, some 3.1% of the workers with measurable dose received an annual dose greater than two rems rather than 2.2% that would have been computed from the "Reported Statistical Distribution" shown in the first row of Table 5.4b.

Since the number of transient workers receiving measurable doses and the collective dose they receive are only about 5% and 14% of the total number of workers and of the total collective dose, respectively, each year, their impact on <u>most</u> of the statistics derived from compilations of the annual summary reports is not very great. However, when examining the number of annual doses in the higher dose ranges (Table 5.4b), one finds that the correct statistical distribution indicates that the number of workers who received doses greater than four rems (cSv) is usually about twice the number found in the reported statistical distribution. But there is still a clear trend for the number of higher doses to decrease; in 1988, there were only 529 annual doses that exceeded three rems, which is less than the number

TABLE 5.4a
REPORTED AND CORRECT DOSE OF TRANSIENT WORKERS FOR CALENDAR YEAR AT POWER REACTORS*

Type of Distribution and Year	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																Total Individuals	**Collective Dose (Person-rem or -cSv)	Avg. Dose (rem or cSv)	Avg. Meas. Dose (rem or cSv)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Correct Distribution of Transients - 1982	623	1,226	452	397	332	286	867	536	339	184	42	18	1	0	0	1	5,304	5,610	1.06	1.20
Reported Distribution of Transients - 1982	3,803	3,480	1,432	1,308	842	661	1,502	506	87	20	1						13,642	5,610	0.41	0.57
Correct Distribution of Transients - 1983	881	1,480	513	445	367	320	975	663	420	185	61	24	4	2			6,340	6,675	1.05	1.22
Reported Distribution of Transients - 1983	4,904	4,273	1,529	1,397	986	752	1,801	642	101	13	5	2					16,405	6,675	0.41	0.58
Correct Distribution of Transients - 1984	1,108	1,852	557	540	425	387	1,193	878	544	202	52	22					7,760	8,045	1.04	1.21
Reported Distribution of Transients - 1984	6,054	5,440	1,894	1,757	1,255	979	2,370	639	97	10							20,495	8,045	0.39	0.56
Correct Distribution of Transients - 1985	1,201	1,854	518	521	455	314	967	629	336	74	1						6,870	5,319	0.77	0.94
Reported Distribution of Transients - 1985	6,037	5,014	1,625	1,459	1,042	664	1,484	371	51	1							17,748	5,319	0.30	0.45
Correct Distribution of Transients - 1986	1,319	2,006	648	656	472	369	1,248	691	325	72							7,806	5,954	0.76	0.92
Reported Distribution of Transients - 1986	6,866	5,372	2,071	1,935	1,236	856	1,685	299	50	1							20,371	5,954	0.29	0.44
Correct Distribution of Transients - 1987	1,992	1,717	773	922	767	632	1,681	670	266	48							9,468	6,712	0.70	0.88
Reported Distribution of Transients - 1987	9,369	5,276	2,762	2,650	1,780	1,125	1,835	189	30	1							25,017	6,712	0.26	0.42
Correct Distribution of Transients - 1988	2,001	1,609	813	858	669	577	1,444	606	169	13							8,759	5,586	0.64	0.83
Reported Distribution of Transients - 1988	9,138	4,949	2,564	2,496	1,577	1,020	1,415	142	5								23,306	5,586	0.24	0.39

*Includes data from Fort St. Vrain.
**Collective dose found by summing the actual doses reported for those workers in their termination reports.

TABLE 5.4b
EFFECTS OF TRANSIENT WORKERS ON ANNUAL STATISTICAL COMPILATIONS*

Type of Distribution and Year	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																Total Individuals	**Collective Dose (Person-rem or -cSv)	Avg. Dose (rem or cSv)	Avg. Meas. Dose (rem or cSv)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Reported Statistical Distribution - 1982	45,871	31,502	12,693	10,814	6,739	4,795	10,855	4,686	1,814	432	56	13	4	0	1		130,275	52,190	0.40	0.62
**Correct Statistical Distribution - 1982	42,691	29,247	11,713	9,903	6,229	4,420	10,220	4,716	2,066	596	97	31	5	0	1	1	121,936	52,190	0.43	0.66
Reported Statistical Distribution - 1983	52,036	31,948	12,211	10,296	6,470	4,708	12,171	5,311	1,950	544	65	16	4				137,730	56,473	0.41	0.66
**Correct Statistical Distribution - 1983	48,013	29,155	11,195	9,344	5,851	4,276	11,345	5,332	2,269	716	121	38	8	2			127,665	56,473	0.44	0.71
Reported Statistical Distribution - 1984	61,232	39,946	14,772	11,492	7,166	5,396	12,453	4,967	1,675	295							159,394	55,238	0.35	0.56
**Correct Statistical Distribution - 1984	56,286	36,358	13,435	10,275	6,336	4,804	11,283	5,206	2,122	487	52	22					146,666	55,238	0.38	0.61
Reported Statistical Distribution - 1985	66,399	40,361	14,155	12,012	7,214	4,897	10,557	3,317	716	84							159,712	43,077	0.27	0.46
**Correct Statistical Distribution - 1985	61,563	37,201	13,048	11,074	6,627	4,547	10,040	3,575	1001	157	1						148,834	43,077	0.29	0.49
Reported Statistical Distribution - 1986	73,818	44,895	16,000	13,112	7,780	5,179	10,678	2,670	593	75							174,800	42,655	0.24	0.42
**Correct Statistical Distribution - 1986	68,271	41,529	14,577	11,833	7,016	4,692	10,241	3,062	868	146							162,235	42,655	0.26	0.45
Reported Statistical Distribution - 1987	93,491	44,833	17,824	14,566	8,599	5,824	10,765	1,710	241	22							197,875	40,591	0.21	0.39
**Correct Statistical Distribution - 1987	86,114	41,274	15,835	12,838	7,586	5,331	10,611	2,191	477	69							182,326	40,591	0.22	0.42
Reported Statistical Distribution - 1988	96,996	43,246	17,750	14,869	8,874	5,938	10,264	1,958	342	9		1					200,247	40,841	0.20	0.40
**Correct Statistical Distribution - 1988	88,859	39,906	15,999	13,231	7,966	5,495	10,293	2,422	506	22		1					184,700	40,841	0.22	0.43

*Includes data from Fort St. Vrain.
**Distribution found by subtracting the correct from the reported distribution shown in Table 5.4a and then subtracting this difference from the reported statistical distribution shown in Table 5.4b.

for 1987 (546) and is about half of the number (1,014) found in 1986. Table 5.5 also shows that only one dose greater than five rems was recorded in 1988. This reflects the industry's continuing concerted efforts to keep the total annual doses of all workers under five rems and shows that such reductions can be accomplished without increasing the collective dose.

TABLE 5.5

ANNUAL WHOLE BODY DOSES EXCEEDING FIVE REMS (cSv)
AT NUCLEAR POWER FACILITIES

Year	Reported Number >5 Rems (cSv)	Corrected Number >5 Rems (cSv)	Difference
1977	270	351	81
1978	103	158	55
1979	130	180	50
1980	311	391	80
1981	189	235	46
1982	74	135	61
1983	85	169	84
1984	0	74	74
1985	0	1	1
1986	0	0	0
1987	0	0	0
1988	1	1	0

5.5 Temporary Workers per Calendar Year at Nuclear Power Facilities

To complete the examination of the doses received by the short-term workers employed at nuclear power facilities, Table 5.6 summarizes the data compiled on "temporary workers." For purposes of this report, temporary workers were defined to be those individuals who began and ended a period of employment or work assignment at only one nuclear power facility during the calendar year. Table 5.6 shows that the number of these temporary individuals increased by about 55% between 1978 and 1988 while the number of reactors increased by 60% during this time. The number of temporary workers receiving a measurable dose, however, increased by only 20%. The collective dose reached a high of nearly 17,000 person-rems (person-cSv) in the early eighties, but declined to about 7,600 person-rems (person-cSv) in 1988. The average measurable dose remained at about 0.6 rem during the early eighties, but in 1985, all of the

TABLE 5.6

TEMPORARY WORKERS PER CALENDAR YEAR
AT NUCLEAR POWER FACILITIES
(Individuals Terminated by Only One Employer)

Year	No. of Reactors	Number of Temps. Monitored	Number with Measurable Doses	Collective Dose (person-rems person-cSv)	Average Dose (rem or cSv)	Average Measurable Dose (rem or cSv)
1978	64	28,864	17,110	9,821	0.34	0.57
1979	68	38,347	21,491	9,488	0.25	0.44
1980	69	48,383	28,305	16,168	0.33	0.57
1981	71	48,265	28,675	16,755	0.35	0.58
1982	75	44,503	25,646	14,266	0.32	0.56
1983	76	50,903	26,682	16,007	0.31	0.60
1984	79	53,438	29,988	15,856	0.30	0.52
1985	83	48,678	24,991	10,418	0.21	0.42
1986	90	47,108	22,911	8,014	0.17	0.35
1987	97	51,365	22,433	8,303	0.16	0.37
1988	103	44,812	20,575	7,618	0.17	0.37

parameters listed in Table 5.6, except for the number of reactors, decreased significantly and have remained at about the same level since then. This resulted in the average measurable dose of these workers falling to 0.37 rem (cSv) where it has remained for 1988.

One apparent discrepancy in the above analysis of termination data is that not all of the individuals that terminated during each of the calendar year are included. When one compares the total number of persons terminating during a year (Table 5.1) to the sum of workers terminating from one facility (temporary workers, Table 5.6) and the number of individuals terminating from two or more facilities (transient workers, Table 5.3), one finds a considerable difference in these figures. This is because of the criteria that is used to determine which individuals should be included in the "temporary" and "transient" worker groups. To be included in either of these groups in this analysis, the individuals' periods of employment must <u>begin and end</u> during the same calendar year. Any individual whose beginning or ending dates of employment overlap the beginning and ending dates of the calendar year are not included in these analyses. In 1988, for example, one finds that

the number of individuals not included in these analyses is roughly 25,000. However, there is no indication that the exclusion of these individuals significantly impacts the statistics presented here.

6 PERSONNEL OVEREXPOSURES - 10 CFR § 20.403 and 10 CFR § 20.405

6.1 Control Levels

One requirement of the above-referenced sections of Part 20, Title 10, Chapter I, Code of Federal Regulations, as it existed during 1988, is that all persons licensed by the NRC must submit reports of all occurrences involving personnel radiation exposures that exceed certain control levels, thus providing for investigations and corrective actions as necessary. The term "overexposure" means an exposure above regulatory limits and is not necessarily intended to indicate that a worker has been subjected to an unacceptable biological risk. Based on the magnitude of the exposure, the occurrence may be placed into one of three categories:

(1) Category A

10 CFR § 20.403(a)(1) - Exposure of the whole body of any individual to 25 rems (cSv) or more; exposure to the skin of the whole body of any individual to 150 rems (cSv) or more; or exposure of the extremities (feet, ankles, hands or forearms) of any individual to 375 rems (cSv) or more. The Commission must be notified immediately of these events.

(2) Category B

10 CFR § 20.403(b)(1) - Exposure of the whole body of any individual to 5 rems (cSv) or more; exposure of the skin of the whole body of any individual to 30 rems (cSv) or more; or exposure of the extremities to 75 rems (cSv) or more. The Commission must be notified within 24 hours of these events.

(3) Category C

10 CFR § 20.405 - Exposure of any individual to radiation or concentrations of radioactive material that exceeds any applicable quarterly limit in Part 20 [§ 20.101 or § 20.104(b)] or in the licensee's license but is less than the values given above. This includes reports of whole body exposures that exceed 1.25 rems (cSv), or that exceed 3 rems (cSv), as discussed in Section 3.2. Reports of skin exposures that exceed 7.5 rems (cSv) and extremity exposures that exceed 18.75 rems (cSv) are included, and reports of exposures of individuals to concentrations in excess of the levels given in 10 CFR § 20.103 and Appendix B usually fall into

this category as well. These reports must be submitted to the Commission within 30 days of the occurrence.

6.2 Summary of Overexposures

Table 6.1 summarizes all the occupational overexposures to external sources of radiation as reported by Commission licensees pursuant to § 20.403 and § 20.405 during the years 1980 through 1988. For 1985, 1986, 1987 and 1988, it shows the number of individuals that exceeded various limits while employed by one of several types of licensees. For the years 1980 through 1984, only the overexposures reported by licensed industrial radiography firms are shown separately. Most of the occurrences included in the "Others" category come from research facilities, universities and measuring and well-logging activities. In 1980, the total number of individuals reported as being overexposed was 96, a considerable increase over the numbers reported for other years. This increase was due to the overexposure of some 67 individuals at one nuclear power facility during steam generator repair work. They received doses between 3 and 5 rems. In 1988, four individuals received external doses that exceeded applicable quarterly limits. The highest external whole body dose was 6.1 rems (cSv). In each of the years from 1985 through 1988, the highest external whole body dose was 27.0, 4.2, 7.5, and 6.1 rems (cSv), respectively.

In 1988 there were four incidents in which external exposures of the magnitude described as Category A or B were received by four individuals. One was both a whole body and an extremity overexposure, one was both an extremity and a skin overexposure, and two were skin overexposures. In addition, one internal exposure above regulatory limits occurred. Summaries of the five incidents are presented below.

On January 14, 1988, a researcher received a dose of 127 rems to the hand and a dose of 14 rems to the skin of the neck from phosphorus-32 skin contamination. The researcher probably contaminated his hand while removing protective gloves, and he subsequently transferred the contamination to his neck.

On August 10, 1988, a radiographer using a 27-curie iridium-192 source retracted the source after the last exposure. He failed, however, to secure the source in the shielded position and he attempted to perform the required survey with an inoperable survey meter. The radiographer was thus unaware that he had inadvertently pushed the source out of the shielded position as he

TABLE 6.1
PERSONNEL OVEREXPOSURES TO EXTERNAL RADIATION
1980-1988

YEAR	LICENSE CATEGORY	PERSONS AND DOSES (REM)	TYPES OF OVEREXPOSURES AND DOSES								
			WHOLE BODY (REM)			SKIN (REMS)			EXTREMITY (REMS)		
			(<5)	(>5<25)	(>25)	(>7.5<30)	(>30<150)	(>150)	(>18.75<75)	(>75<375)	(>375)
1988	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	2	1						1	
		SUM OF DOSES	5.8	6.1						118	
	POWER REACTORS	NO. OF PERSONS	6			3	1	1			
		SUM OF DOSES	15.7			52.8	61	278			
	MEDICAL FACILITIES	NO. OF PERSONS				1				1	
		SUM OF DOSES				14.0				127	
	MARKETING & MANUFACT.	NO. OF PERSONS	1						1		
		SUM OF DOSES	3.64						58		
	OTHER	NO. OF PERSONS									
		SUM OF DOSES									
1987	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	1							1	
		SUM OF DOSES	3.1							180	
	POWER REACTORS	NO. OF PERSONS	1			2			1		
		SUM OF DOSES	1.3			34.8			30.3		
	MEDICAL FACILITIES	NO. OF PERSONS		1							
		SUM OF DOSES		7.5							
	MARKETING & MANUFACT.	NO. OF PERSONS							2		1
		SUM OF DOSES							41.7		650
	OTHER	NO. OF PERSONS	1			3					
		SUM OF DOSES	1.5			93.6					
1986	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	2								
		SUM OF DOSES	4.4								
	POWER REACTORS	NO. OF PERSONS	1								2
		SUM OF DOSES	3.3								930
	MEDICAL FACILITIES	NO. OF PERSONS	1								
		SUM OF DOSES	4.2								
	MARKETING & MANUFACT.	NO. OF PERSONS									
		SUM OF DOSES									
	OTHER	NO. OF PERSONS							1	1	
		SUM OF DOSES							41.2	115	
1985	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	6	3	1					1	
		SUM OF DOSES	16.7	32.6	27.0					288	
	POWER REACTORS	NO. OF PERSONS	3			1					
		SUM OF DOSES	3.3			10.8					
	MEDICAL FACILITIES	NO. OF PERSONS	3								
		SUM OF DOSES	6.7								
	MARKETING & MANUFACT.	NO. OF PERSONS							2	1	
		SUM OF DOSES							38.7	93	
	OTHER	NO. OF PERSONS	1				1		1		
		SUM OF DOSES	1.8				38.0		21.5		
1984	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	1					3		
		SUM OF DOSES	12.5	8.2					127.9		
	ALL OTHER	NO. OF PERSONS	6	1					5		
		SUM OF DOSES	15.0	5.2					110.7		
1983	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	1								1
		SUM OF DOSES	4.7								650
	ALL OTHER	NO. OF PERSONS	11	1[a]					27	2	
		SUM OF DOSES	20.1	25					887	228	
1982	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	6	3							
		SUM OF DOSES	16.1	20.7							
	ALL OTHER	NO. OF PERSONS	5[b]	1					15	2	
		SUM OF DOSES	12.5	9.4					569	206	
1981	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	7	1							
		SUM OF DOSES	12.2	7.1							
	ALL OTHER	NO. OF PERSONS	10	2[c]		1			4		
		SUM OF DOSES	24.1	30.9		8.1			102.9		
1980	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	4	1					1		
		SUM OF DOSES	23.6	7.7					56		
	ALL OTHER	NO. OF PERSONS	86						3		3
		SUM OF DOSES	291.8						73.5		33,000

[a]This person simultaneously received an extremity overexposure of 61 rems (cSv) that is not shown.
[b]One of these persons simultaneously received skin overexposure of 15.2 rems (cSv) that is not shown.
[c]One of these persons simultaneously received an extremity overexposure of 21 rems (cSv) that is not shown.

approached the exposure device. While working in the vicinity of the camera with the source partially exposed, the radiographer received a whole- body dose of 6.1 rems and an extremity dose of 118 rems.

On November 23, 1988, an employee at a nuclear power plant, working outside the radiologically controlled area, detected a "hot particle" containing 38 microcuries of cobalt-60 on his skin. The particle appeared to have migrated to the area from an adjacent area where a spill of contaminated water had occurred. The employee received a dose of 61 rems to the skin.

On February 4, 1988, a welder performing maintenance activities at a nuclear power plant received a skin dose from a "hot particle" containing 23.8 microcuries of cobalt-60 lodged in his street clothing behind his knee. The particle was detected at the controlled-zone exit frisk point. The welder had not surveyed himself properly at two other survey points within the controlled area. The calculated dose to the welder's skin was 278 rems.
On May 2, 1988, a chemist working for a radiochemical processor and distributor accidentally injected herself with 9.7 millicuries of tritium (3H). The cause of the incident was a procedure which brought the needle, containing high-specific-activity tritium, into close proximity with the chemist's fingers. Section 20.103 of 10 CFR Part 20 limits a worker's intake of radioactive material (by any route) to that which would result from inhalation of the concentration in Part 20, Appendix B, Table 1, (the maximum permissible concentration, or MPC) for thirteen 40-hour weeks (520 MPC-hours). The employee's intake exceeded this amount by approximately 60%. Because of more rapid than normal excretion of the tritium, the actual whole-body dose to the employee was 0.49 rem from the incident and 0.53 rem for the calendar quarter.

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APPENDIX A

Alphabetical Listing of Annual Exposure Data Compiled for Certain NRC Licensees

1988

APPENDIX A*

INDUSTRIAL RADIOGRAPHERS Single Location - 1988

Licensee Name	Program Code - 03310	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
ABEX CORP. RESEARCH CENTER		29-01208-02	9	9	2	0.20
ABEX CORP. WAUKESHA FOUNDRY DIV.		48-13776-01	6	0	0	0.00
AIR PRODUCTS AND CHEMICALS, INCORPORATED		37-05105-05	20	3	0	0.05
ALONSO & CARUS IRON WORKS, INC.		52-21350-01	7	4	0	0.08
AMERICAN FOUNDRY, NUCLEAR DIVISION		35-26893-01	6	5	2	0.32
ARMY, DEPT. OF THE,		13-18235-01	16	3	0	0.05
ARMY, DEPT. OF THE,		35-19189-02	29	0	0	0.00
ARMY, DEPT. OF THE,		29-00047-06	186	39	2	0.05
ARROW TANK & ENGINEERING COMPANY		22-13253-01	5	2	0	0.05
ATLANTIC RESEARCH CORPORATION		45-02808-04	21	21	3	0.14
BABCOCK & WILCOX COMPANY		34-02160-03	50	23	3	0.12
BRIGHTON CORP.		34-21480-01	6	6	4	0.73
BUCKEYE STEEL CASTINGS		34-06627-01	2	1	0	0.05
CONNEX PIPE SYSTEMS		34-00850-02	6	3	1	0.27
COPES-VULCAN		37-19530-01	1	1	0	0.38
DAY & ZIMMERMAN, INC., LONE STAR DIV.		42-15051-02	4	0	0	0.00
DRESSER IND.,WORTHINGTON PUMP DIV		29-02210-02	4	0	0	0.00
DURALOY COMPANY (THE)		37-02279-02	7	6	1	0.22
EMPIRE STEEL CASTINGS, INC.		37-02448-01	4	3	0	0.05
FMC CORPORATION, NAVAL SYSTEMS DIV.		22-25944-01	0	0	0	0.00
GENERAL ELECTRIC COMPANY		34-00499-10	3	1	0	0.05
GENERAL MOTORS CORPORATION		21-08678-05	1	0	0	0.00
GENERAL MOTORS CORPORATION		21-02392-01	3	0	0	0.00
GENERAL MOTORS CORPORATION		34-15315-02	37	1	0	0.05
GTE LABS, INC.		20-15610-02	4	1	0	0.05
HARRISON STEEL CASTINGS COMPANY		13-02141-01	7	2	0	0.21
HESS OIL VIRGIN ISLANDS CORPORATION		55-15533-02	0	0	0	0.00
HIGH STEEL STRUCTURES, INC.		37-17534-01	18	8	1	0.07
INDUSTRIAL NDT CO., INC.		39-24888-01	19	17	15	0.85
INGERSOLL-RAND COMPANY		29-02015-02	2	2	0	0.11
INTERIOR, DEPARTMENT OF THE		24-02619-02	6	2	0	0.05
KOMOKO TUBE CO.		13-21248-01	0	0	0	0.00
LUCIUS PITKIN INC.		29-27816-01	14	8	1	0.17
LYNCHBURG FOUNDRY COMPANY		45-17464-01	10	2	0	0.05
MANOIR - ELECTRO ALLOYS, INC.		34-24346-01	14	11	2	0.17
MASON & HANGER-SILAS CO., INC.		14-24479-01	117	14	1	0.05
MAYNARD ELECTRIC STEEL CASTING COMPANY		48-07080-01	5	5	1	0.23
MCCLELLAN AIR FORCE BASE		04-10117-2AFP	4	3	1	0.24
MINNESOTA VALLEY ENGINEERING		22-24393-01	4	3	1	0.31
MISSOURI STEEL CASTINGS CO.		25-15152-01	5	1	0	0.05
MORTON THIOKOL		17-16380-01	43	9	0	0.05

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Single Location - 1988

Licensee Name	Program Code - 03310	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
MORTON THIOKOL, INC.		01-00856-02	18	3	0	0.05
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		45-08886-02	0	0	0	0.00
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION		34-00507-04	48	23	1	0.05
NATIONAL CASTING		34-01115-03	0	0	0	0.00
NATIONAL FEEDSCREW & MACHINING, INC.		34-24500-01	0	0	0	0.00
NAVY, DEPT. OF THE		28-00102-A1NP	39	36	4	0.10
NAVY, DEPT. OF THE		04-60258-A1NP	19	17	1	0.06
NAVY, DEPT. OF THE		19-0464A-A1NP	4	3	0	0.13
NAVY, DEPT. OF THE		56-62586-A1NP	0	0	0	0.00
NAVY, DEPT. OF THE		46-00253-A1NP	4	3	0	0.05
NAVY, DEPT. OF THE		37-00151-A1NP	78	11	1	0.05
NAVY, DEPT. OF THE		39-52903-A1NP	12	4	0	0.05
NAVY, DEPT. OF THE		45-60921-A1NP	0	0	0	0.00
NAVY, DEPT. OF THE		59-45249-A1NP	8	8	1	0.07
NAVY, DEPT. OF THE		59-45255-A1NP	9	8	1	0.07
NILES STEEL TANK COMPANY		21-04741-01	4	1	0	0.05
NORTHWEST AIRLINES INC.		22-12080-01	53	4	0	0.05
O'CONNELL LIMITED PARTNERSHIP		35-13735-01	3	3	1	0.39
P. X. ENGINEERING COMPANY INC.		20-15102-01	4	1	0	0.05
PELTON CASTEEL INC		48-02669-02	5	5	0	0.08
PENNSYLVANIA SHIPBUILDING CO.		37-21067-01	5	4	1	0.19
PRYOR FOUNDRY, INC.		35-18099-01	3	0	0	0.00
QUAKER ALLOY		37-03671-01	20	11	4	0.35
REFINERY PRODUCTS CORPORATION		48-03665-02	5	3	0	0.05
SAWYER RESEARCH PRODUCTS, INC.		34-02044-01	6	0	0	0.00
SHAFER VALVE CO.		34-21198-01	3	1	0	0.05
SOUTHWESTERN ENGINEERING CO.		24-19500-01	4	4	2	0.42
STRUTHERS WELLS CORPORATION		37-11152-01	16	2	0	0.05
TAYLOR AND FENN COMPANY		06-02024-01	3	3	0	0.05
TRANS WORLD AIRLINES, INC.		24-05151-05	74	13	1	0.05
UNITED STATES PIPE AND FOUNDRY COMPANY		29-07262-01	2	0	0	0.00
VOLLRATH COMPANY, FOUNDRY DIV.		48-05395-01	4	0	0	0.00
WESTINGHOUSE ELECTRIC CORPORATION		37-05809-02	10	0	0	0.00
WILLIAM POWELL COMPANY (THE)		34-02963-01	9	1	0	0.05
WISCONSIN CENTRIFUGAL, INCORPORATED		48-11641-01	5	4	0	0.11
WORD INDUSTRIES PIPE FABRICATING INC.		35-15458-01	0	0	0	0.00

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1988

Licensee Name	Program Code - 03320	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
ABC TESTING		20-19778-01	19	17	4	0.22
ADVANCED RADIATION SERVICE, INC.		29-14171-01	6	2	2	1.19
ADVEX CORPORATION		45-16452-01	19	15	14	0.91
AKRON INDUSTRIAL SERVICE, INC.		34-24673-01	2	2	2	0.78
ALLEGHENY LABS.		37-20734-01	10	10	11	1.09
AMERICAN AIRLINES, INC.		35-13964-01	101	20	2	0.08
AMERICAN INSPECTION CO. INC.		12-24801-01	42	38	24	0.62
AMERICAN OIL COMPANY (THE) (AMOCO)		13-00155-10	30	22	2	0.11
AMERICON, INC.		34-02160-04	65	17	2	0.11
AMOCO OIL COMPANY, YORKTOWN REFINERY		45-01378-02	13	1	0	0.05
ANCHOR/DARLING VALVE COMPANY		37-15476-01	6	5	1	0.21
ANR PIPELINE CO, LABORATORY SERVICES		21-24502-01	6	1	0	0.38
ANVIL CORP		46-23236-01	5	5	0	0.08
ARMY, DEPT. OF THE		30-02405-05	6	2	0	0.05
ARNOLD GREENE TESTING LABORATORIES		20-01074-02	33	18	3	0.16
ARROW NDE CO, INC.		35-23198-01	3	3	2	0.53
ASTROTECH, INC.		37-09928-01	15	6	1	0.13
ATEC ASSOC. OF VA., INC.		45-16546-03	8	5	1	0.12
BOOTHE-TWINING,INC		04-19522-01	50	43	27	0.63
BAKER TESTING SERVICES INC.		20-19067-01	11	7	1	0.13
BATH IRON WORKS CORPORATION		18-00828-04	20	7	1	0.09
BENJAMIN F. SHAW CO.		01-24890-01	4	2	1	0.28
BILL MILLER, INC.		35-19048-01	32	28	13	0.47
BMY, DIV. OF HARSCO CORP.		37-20684-02	6	1	0	0.18
BOOTHE-TWINING, INC.		04-19522-01	50	43	27	0.63
BRAN-SHON INC.		34-25850-01	9	7	0	0.07
BRANCH RADIOGRAPHIC LABORATORIES, INC.		29-03405-02	24	24	8	0.34
BRAUN ENGINEERING TESTING, INC.		22-16537-02	15	13	5	0.36
BRIGGS ASSOCIATES INC.		20-16401-01	45	22	2	0.07
BRIGGS ASSOCIATES INC.		20-16401-02	0	0	0	0.00
C & R LABORATORIES		53-19179-01	6	4	7	1.66
CALUMET TESTING SERVICES INC.		13-16347-01	41	30	21	0.71
CAPITAL X-RAY SERVICE, INC.		35-11114-01	19	19	31	1.64
CARROLL ENGINEERS, INC.		20-13042-02	4	2	0	0.11
CBI INDUSTRIES, INC.		42-13553-02	150	89	36	0.40
CENTURY INSPECTION, INC.		42-08456-02	87	80	76	0.95
CERTIFIED TESTING LABORATORIES, INC.		29-14150-01	60	60	12	0.20
CHERNE CONTRACTING CORPORATION		22-18342-01	0	0	0	0.00
CLEVELAND X-RAY INSPECTION, INC.		35-15205-01	89	89	70	0.79
COLUMBIA GAS TRANSMISSION CORPORATION		47-16060-01	6	3	0	0.13
COMBUSTION ENGINEERING, NDE SERVICE DEPT.		06-04154-01	39	32	11	0.35
CONAM INSP., INC.		42-16559-01	55	46	18	0.39

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1988

Licensee Name	Program Code - 03320	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
CONSOLIDATED NDE, INC.		29-21452-01	73	73	73	1.00
CONSTRUCTION ENGINEERING CONSULTANT		37-18456-01	46	31	7	0.24
CONSUMERS POWER COMPANY		21-08606-03	19	14	1	0.10
COTTON HOUSTON, INC.		42-26823-01	0	0	0	0.00
CRAMER & LINDELL ENGINEERS, INC.		06-20794-01	25	13	2	0.17
CRANE MIDWEST FITTINGS		24-00563-02	8	6	2	0.37
CTI, INC.		50-19202-01	53	48	23	0.48
CTL ENGINEERING, INC.		34-08331-01	2	2	1	0.50
D & S TESTING, INC.		34-21458-01	19	16	15	0.93
DANIEL INTERNATIONAL CORPORATION		39-01261-02	0	0	0	0.00
DAYTON X-RAY COMPANY		34-06943-01	15	13	7	0.53
EAGLE INSPECTION AND TESTING, INC.		17-26831-01	0	0	0	0.00
EASTERN TESTING AND INSPECTION, INC.		29-09814-01	27	27	16	0.60
EBASCO SERVICES, INC.		29-07056-03	38	19	7	0.39
EDWARDS PIPELINE TESTING, INC.		35-23193-01	73	70	62	0.89
EG & G FLORIDA, INC., BOC-005		09-21233-01	44	17	1	0.06
ELPASO NATURAL GAS COMPANY, SOUTHERN DIVISION		42-03201-02	5	5	2	0.41
EQUITABLE GAS COMPANY		37-17491-01	7	1	0	0.05
FACTORY MUTUAL RESEARCH CORPORATION		20-04007-02	7	0	0	0.00
FOSTER WHEELER ENERGY CORP.		31-01776-05	20	7	0	0.07
FROEHLING & ROBERTSON INC.		45-08890-01	11	8	4	0.50
GENERAL DYNAMICS CORPORATION		06-01781-08	81	81	12	0.14
GLOBE X-RAY SERVICES, INC.		35-15194-01	21	21	21	1.02
H&G INSPECTION CO., INC.		42-26838-01	15	15	20	1.35
H&H X-RAY SERVICES INC.		17-19236-01	8	8	10	1.23
H. R. INSPECTION SERVICE INC.		15-06209-01	5	4	5	1.13
HERRON TESTING LABORATORY INC.		34-00681-03	13	10	1	0.05
HIGH MOUNTAIN INSPECTION SERV., INC.		49-26808-01	61	55	54	0.98
HOUSTON INSPECTION SERVICE, INC.		42-23150-01	2	2	0	0.05
HOUSTON INSPECTION, INC.		42-26962-01	2	2	0	0.05
HUNTINGTON TESTING LAB, INC.		47-23076-01	21	21	12	0.59
HUTCHINSON AREA VO-TECH INSTITUTE		22-15554-01	281	35	2	0.06
INDEPENDENT INSPECTION CORP. INC.		35-26824-01	5	5	9	1.80
INDEPENDENT INSPECTION CORP. INC.		35-26824-02	5	5	15	2.98
INDUSTRIAL LABORATORIES, INC.		41-04226-02	11	11	7	0.61
INDUSTRIAL NDT SERVICES DIVISION		13-06147-04	17	13	3	0.23
INDUSTRIAL TESTING LABORATORY SERVICES CORP.		37-16406-01	11	1	0	0.05
INSPECTION SERVICE CORP		37-11636-01	5	5	3	0.60
INSPECTION SERVICES & TESTING		50-23257-01	18	14	2	0.17
INSPECTION SERVICES, INC.		41-21154-01	23	20	10	0.52
INTERMOUNTAIN TESTING COMPANY		05-07872-01	21	21	21	1.01
INTERNATIONAL TESTING LAB.		29-14027-01	6	1	0	0.05
JACKSONVILLE SHIPYARDS INC.		09-15611-01	7	3	0	0.09

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1988

Licensee Name	Program Code - 03320	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
LABARGE PIPE & STEEL CO.		35-26836-01	2	2	0	0.21
LAW ENGINEERING TESTING COMPANY		10-00346-03	13	9	3	0.38
LEHIGH TESTING LABORATORIES, INC.		07-01173-03	10	9	2	0.21
M.W. KELLOGG CO.		42-16573-01	0	0	0	0.00
MAGNA CHEK, INC.		21-19111-02	30	25	2	0.10
MASSACHUSETTS MATERIALS RESEARCH INC.		20-19130-01	7	3	0	0.05
MATERIALS TESTING LABORATORIES, INC.		45-17151-01	13	13	1	0.09
MATTINGLY TESTING SERVICES, INC.		25-21479-01	5	4	1	0.23
MCELROY DIVERSIFIED SERVICES		49-26947-01	0	0	0	0.00
MET-CHEM TESTING LABS OF UTAH, INC.		43-26821-01	34	29	14	0.49
METALOGIC, A DIV. OF WTL, INC.		02-19728-01	10	8	4	0.55
MIDWEST INSPECTION SERVICE LTD		48-16296-01	14	10	4	0.36
MK-FERGUSON CO		34-24757-01	19	17	10	0.57
MONTANA X-RAY INC.		25-21134-01	1	1	2	1.50
MQS INSPECTION		12-00622-07	573	406	274	0.67
N.V. ENTERPRISES		49-26888-01	3	3	1	0.20
NATIONAL INSPECTION & CONSULTANTS, INC.		09-21289-01	0	0	0	0.00
NAVY, DEPT. OF THE		46-00251-A1NP	74	60	5	0.09
NAVY, DEPT. OF THE		59-04697-A1NP	20	9	0	0.05
NAVY, DEPT. OF THE		59-04720-A1NP	15	15	3	0.21
NAVY, DEPT. OF THE		39-00191-A1NP	65	55	5	0.09
NAVY, DEPT. OF THE		38-68829-A1NP	13	0	0	0.00
NAVY, DEPT. OF THE		04-00221-A1NP	48	42	4	0.08
NAVY, DEPT. OF THE		53-00314-A1NP	17	0	0	0.00
NAVY, DEPT. OF THE		06-68316-A1NP	23	17	1	0.07
NAVY, DEPT. OF THE		04-60036-A1NP	0	0	0	0.00
NAVY, DEPT. OF THE		04-68828-A1NP	6	4	1	0.13
NAVY, DEPT. OF THE		45-00181-A1NP	61	54	5	0.09
NAVY, DEPT. OF THE		53-00311-A1NP	26	25	1	0.06
NAVY, DEPT. OF THE		04-0581A-A1NP	82	2	0	0.05
NAVY, DEPT. OF THE		53-68251-A1NP	9	5	0	0.05
NAVY, DEPT. OF THE		04-65918-A1NP	23	1	0	0.05
NAVY, DEPT. OF THE		45-32770-A1NP	19	0	0	0.00
NAVY, DEPT. OF THE		46-68438-A1NP	25	25	1	0.05
NAVY, DEPT. OF THE		59-21047-A1NP	18	18	1	0.05
NAVY, DEPT. OF THE		59-21063-A1NP	25	0	0	0.00
NAVY, DEPT. OF THE		59-20132-A1NP	15	15	1	0.08
NAVY, DEPT. OF THE		59-20635-A1NP	12	12	1	0.05
NAVY, DEPT. OF THE		59-45247-A1NP	13	0	0	0.00
NAVY, DEPT. OF THE		59-04696-A1NP	21	20	2	0.09
NAVY, DEPT. OF THE		59-08810-A1NP	29	0	0	0.00
NAVY, DEPT. OF THE		59-05851-A1NP	10	1	0	0.05

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1988

Licensee Name	Program Code - 03320	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
NAVY, DEPT. OF THE		59-68780-A1NP	13	13	1	0.06
NAVY, DEPT. OF THE		59-04628-A1NP	6	6	0	0.05
NAVY, DEPT. OF THE		59-04620-A1NP	17	1	0	0.05
NAVY, DEPT. OF THE		59-04629-A1NP	19	16	1	0.05
NAVY, DEPT. OF THE		59-05837-A1NP	19	0	0	0.00
NAVY, DEPT. OF THE		59-04648-A1NP	18	5	0	0.05
NAVY, DEPT. OF THE		59-21098-A1NP	13	0	0	0.00
NAVY, DEPT. OF THE		59-08808-A1NP	13	3	0	0.05
NAVY, DEPT. OF THE		59-21046-A1NP	20	0	0	0.00
NAVY, DEPT. OF THE		59-04639-A1NP	9	0	0	0.00
NDE SERVICES, INC.		05-19821-01	15	15	6	0.39
NDT SPECIALISTS, INC.		48-25917-01	1	1	0	0.38
NEW YORK TESTING LABORATORIES, INCORPORATED		31-02933-01	5	3	1	0.35
NEWPORT NEWS SHIPBUILDING AND DRY DOCK		45-09428-02	105	103	15	0.15
NONDESTRUCTIVE INSPECTION SERVICE		47-11883-01	5	5	4	0.75
NONDESTRUCTIVE TESTING CORP		29-19742-01	19	15	4	0.27
NOOTER CORPORATION		24-03783-01	19	6	0	0.07
NORFOLK SHIPBUILDING AND DRYDOCK CORPORATION		45-12042-01	24	15	1	0.10
NORTH AMERICAN INSPECTION, INC.		37-23370-01	41	41	41	1.01
NOVA DATA TESTING LABS, INC.		45-24872-01	8	8	7	0.83
OKLAHOMA TESTING LABORATORIES		35-10577-01	14	14	1	0.09
OLD DOMINION FABRICATORS		45-15581-01	4	4	2	0.38
PANHANDLE EASTERN PIPELINE CO.		42-23731-01	5	4	1	0.16
PARKER INDUSTRIAL X-RAY LABORATORY CORP.		06-01337-03	16	9	2	0.22
PENN INSPECTION CO.		35-21144-01	16	15	17	1.12
PITT-DES MOINES, INC.		37-27878-01	7	3	0	0.05
PITTSBURGH-DES MOINES CORPORATION		37-02607-02	11	7	2	0.23
PLANT INSPECTION CO		04-21032-01	0	0	0	0.00
POWER INSPECTION, INC.		37-21428-01	3	1	0	0.05
POWER PIPING COMPANY		37-09945-01	12	7	1	0.10
PRECISION COMPONENTS CORPORATION		37-16280-01	83	34	3	0.10
PROFESSIONAL SERVICES INDUSTRIES, INC.		37-00276-25	98	87	86	0.99
PROFESSIONAL WELDING ASSOC., INC.		48-25806-01	4	2	1	0.63
PROGRESS SERVICES,INC.		34-19592-01	17	14	2	0.16
PUBLIC SERVICE OF INDIANA		13-15544-06	5	3	1	0.27
PULLMAN POWER PRODUCTS CORPORATION		37-08042-01	16	5	1	0.12
Q.C. LABORATORIES, INC.		09-11579-03	30	29	18	0.62
QC SERVICES		04-14875-02	23	18	10	0.54
QUALITY ASSURANCE LABORATORIES, INC.		18-19078-01	8	5	3	0.54
QUALITY ENGINEERING SERV.& TESTS.		35-26815-01	13	10	7	0.74
QUALITY SYSTEMS NDE, LTD.		37-28085-01	15	14	11	0.82
RADIOGRAPHY INSPECTION, INC.		35-26812-01	9	8	5	0.67

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1988

Licensee Name	Program Code - 03320	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
RELIANCE TESTING LABORATORIES INC.		19-17176-01	19	15	6	0.41
S&ME, INC./AIRPORT STA.		41-24965-01	19	8	2	0.23
SAMSON INSPECTION TECHNICAL SERVICES, INC.		34-25898-01	13	9	1	0.16
SCIENTIFIC INSPECTION TECH., INC.		41-25027-01	24	20	9	0.47
SCIENTIFIC TECHNICAL, INC.		45-24882-01	5	5	1	0.10
SIERRA TESTING, INC.		35-26950-01	31	29	17	0.60
SMITH-EMERY COMPANY		04-19467-01	3	3	0	0.05
SOUTHWEST X-RAY CORP.		03-21354-01	11	11	13	1.21
SPACE SCIENCE SERVICES, INC.		09-07550-01	67	50	27	0.55
SPEC CONSULTANTS, INC.		37-27891-01	10	10	4	0.36
SPECTRUM LABORATORIES, INC.		29-07266-01	4	2	0	0.05
ST. LOUIS TESTING LABORATORIES INC.		24-00188-02	11	10	10	1.02
STANDARD TESTING & ENGINEERING CO.		35-17054-02	6	5	1	0.23
STANDARD TESTING & ENGINEERING CO.		37-17054-01	18	9	1	0.12
STONE & WEBSTER ENGINEERING CORPORATION		20-05600-02	11	2	1	0.28
TEI ANALYTICAL SERVICES, INC.		37-28004-01	77	71	41	0.58
TENNESSEE GAS PIPELINE CO.		42-09073-02	23	17	2	0.10
TESTING INSTITUTE OF ALASKA, INC.		50-17446-01	10	10	10	0.95
TESTING TECHNOLOGIES, INC.		45-25007-01	7	6	1	0.19
TESTMASTER INSPECTION CO., INC.		34-24872-01	21	21	11	0.54
TRI STATE ASSOCIATES, INC.		45-24967-01	3	3	8	2.50
TRI-STATE INSPECTION & CONSULTANTS		37-19640-01	3	3	3	1.14
TRUTOM LTD.		06-20755-01	37	22	6	0.28
TULSA GAMMA RAY, INC.		35-17178-01	27	27	28	1.02
TUMBLEWEED X-RAY CO.		03-23185-01	39	27	25	0.92
TWIN CITY TESTING AND ENGINEERING LABORATORY		22-01376-02	30	21	11	0.52
TWIN PORTS TESTING, INC.		48-23476-01	39	22	22	0.99
ULTRA TECHNOLOGY, INC.		50-23363-01	44	33	15	0.44
ULTRASONIC SPECIALISTS, INC.		47-24878-01	11	9	4	0.41
UNITED STATES TESTING CO.		04-23240-01	284	133	48	0.36
UNIVERSAL TECHNICAL TESTING, INC.		37-00453-03	21	16	9	0.58
UNIVERSAL TESTING LABORATORIES, INC.		29-16397-01	19	9	1	0.09
VENEGAS INDUSTRIAL TESTING		28-14847-02	3	3	0	0.13
VOITH HYDRO, INC.		37-16280-03	18	13	1	0.05
WALASHEK ENTERPRISES, INC.		53-23225-01	14	8	2	0.29
WESTERN STRESS, INC.		42-26900-01	81	49	33	0.68
WESTERN X-RAY COMPANY		35-19993-01	10	10	10	1.02
WISCONSIN INDUSTRIAL TESTING INC.		48-17480-01	56	54	49	0.90
WOS TESTING CO.		12-24959-01	2	1	0	0.05
X-RAY, INC.		46-03414-03	22	21	12	0.56

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

MANUFACTURERS AND DISTRIBUTORS - 1988

Licensee Name	Program Type	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
AMERSHAM CORP	BROAD	03211	20-12836-01	68	53	15	0.28
COMBUSTION ENGINEERING	BROAD	03211	34-00255-03	424	251	15	0.06
E. I. DUPONT DE NEMOURS & CO., INC.	BROAD	03211	20-00320-21	0	0	0	0.00
E. R. SQUIBB AND SONS, INC.	BROAD	03211	29-00139-02	530	120	42	0.35
HALLIBURTON COMPANY	BROAD	03211	35-00502-03	0	0	0	0.00
MALLINCKRODT, INC.	BROAD	03211	24-04206-01	310	234	242	1.03
NUCLEAR RESEARCH CORPORATION	BROAD	03211	29-04236-01	37	11	1	0.05
PANAMETRICS INCORPORATED	BROAD	03211	20-07181-01	0	0	0	0.00
TEXAS NUCLEAR CORPORATION	BROAD	03211	42-01485-04	95	85	19	0.23
UPJOHN COMPANY	BROAD	03211	21-00182-03	655	83	5	0.06
ADVANCED MAGNETICS	LIMITED	03214	20-20526-01	23	4	0	0.05
AIRCO INCORPORATED	LIMITED	03214	29-02085-01	12	2	0	0.05
FRONTIER TECHNOLOGY CORP	LIMITED	03212	SNM-1957	11	5	1	0.19
PHARMATOPES INC.	LIMITED	02500	34-19007-01MD	13	13	1	0.09
RTS TECHNOLOGY, INC.	LIMITED	03214	20-27966-01	3	1	0	0.05
SYNCOR CORP.	LIMITED	02500	24-19360-01MD	19	10	1	0.12
SAFETY LIGHT CORPORATION	LIMITED	03212	37-00030-02	0	0	0	0.00

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

FUEL FABRICATORS AND PROCESSORS - 1988

Licensee Name	Program Code - 21210	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
ADVANCED NUCLEAR FUELS CORP.		SNM-1227	380	315	28	0.09
BABCOCK AND WILCOX CO.		SNM-0042	2752	720	54	0.07
BABCOCK AND WILCOX FUEL CO.		SNM-1168	157	95	6	0.07
COMBUSTION ENGINEERING INC.		SNM-1067	598	598	37	0.06
COMBUSTION ENGINEERING, INC.		SNM-0033	98	77	12	0.16
GENERAL ATOMICS		SNM-0696	452	43	8	0.19
GENERAL ELECTRIC CO.		SNM-1097	1000	631	73	0.12
NUCLEAR FUEL SERVICES INC,		SNM-0124	5516	627	32	0.05
UNITED NUCLEAR CORPORATION, INC.		SNM-0368	219	30	2	0.05
WESTINGHOUSE ELECTRIC CORP		SNM-1107	822	733	202	0.28

INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 1988

Licensee Name	Program Code - 23200	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
CAROLINA POWER AND LIGHT CO.		SNM-2502	127	23	1	0.06
GENERAL ELECTRIC COMPANY		SNM-2500	90	34	24	0.70
VIRGINIA ELECTRIC POWER*		SNM-2501	0	0	0	0.00

*Reported with Surry 1,2 DPR-32,37

LOW LEVEL WASTE DISPOSAL FACILITIES - 1988

Licensee Name	Program Code - 03231	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose* (person-rem)	Average Meas'ble Dose (rems or cSv)
U.S. ECOLOGY, INC.		16-19204-01	202	45	7	0.16
CHEM-NUCLEAR SYSTEMS		12-13536-01	662	126	20	0.16

* The collective dose shown in this Appendix has been rounded to the nearest rem, whereas the average measurable dose has been calculated using the non-rounded dose reported by the licensee.

APPENDIX B

Annual Whole Body Doses at Licensed Nuclear Power Facilities

1988

APPENDIX B
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
1988

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONITORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (Person-rem,cSv)
		No Measurable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.00-6.00	6.00-7.00	7.00-12.00	>12.0			
ARKANSAS 1,2	PWR	1,345	723	423	349	263	171	362	96	33			1			3,766	2,421	1,387 **
BEAVER VALLEY 1,2*	PWR	1,787	793	320	282	159	87	113	10							3,551	1,764	530 **
BIG ROCK POINT	BWR	132	131	32	28	26	25	45	14	2						435	303	170
BROWNS FERRY 1,2,3	BWR	5,222	1,212	750	597	304	168	245	47	1						8,546	3,324	1,155 **
BRUNSWICK 1,2	BWR	2,343	737	413	389	257	183	470	158	41						4,991	2,648	1,747 **
BYRON 1,2*	PWR	1,720	351	278	238	146	116	87	6							2,942	1,222	459 **
CALLAWAY 1	PWR	987	271	69	9	4										1,340	353	27 **
CALVERT CLIFFS 1,2	PWR	823	721	190	173	103	54	55								2,119	1,296	291 **
CATAWBA 1,2	PWR	1,324	813	430	386	179	95	104	2							3,333	2,009	556 **
CLINTON *	BWR	1,743	441	160	94	39	13	21	1							2,512	769	130 **
COOK 1,2	PWR	1,289	862	436	411	182	114	215	38	6	2					3,555	2,266	935
COOPER STATION	BWR	1,842	467	173	113	84	47	58								2,784	942	251 **
CRYSTAL RIVER 3	PWR	1,057	379	114	55	19	2									1,626	569	64 **
DAVIS-BESSE	PWR	1,336	539	268	191	99	33	51	2							2,519	1,183	307 **
DIABLO CANYON 1,2	PWR	1,468	526	352	323	191	145	247	39	3						3,294	1,826	877 **
DRESDEN 2,3	BWR	1,313	632	382	363	242	226	500	57	12						3,727	2,414	1,409 **
DUANE ARNOLD	BWR	1,901	244	187	211	176	99	210	9							3,037	1,136	614 **
FARLEY 1,2	PWR	371	816	418	248	156	57	130	15							2,211	1,840	552 **
FITZPATRICK	BWR	712	582	227	207	127	108	239	55	8						2,265	1,553	786 **
FORT CALHOUN	PWR	102	1,060	185	136	119	54	39	1							1,696	1,594	272 **
GINNA	PWR	606	404	169	126	81	49	66	2							1,503	897	295
GRAND GULF	BWR	1,767	398	145	80	29	11	22	2	3	2					2,459	692	147 **
HADDAM NECK	PWR	711	358	130	80	48	43	71	5							1,446	735	237 **
HARRIS *	PWR	1,263	325	178	103	66	31	18								1,984	721	169 **
HATCH 1,2	BWR	1,481	676	446	415	272	188	414	83	15						3,990	2,509	1,401 **
HOPE CREEK 1	BWR	970	1,032	301	245	83	44	29								2,704	1,734	287 **
INDIAN POINT 2	PWR	610	451	151	128	64	38	58								1,500	890	235 **
INDIAN POINT 3	PWR	656	247	84	51	42	15	12								1,107	451	93 **
KEWAUNEE	PWR	237	305	129	134	64	30	41	2							942	705	210 **
LASALLE 1,2	BWR	1,220	562	304	314	243	245	747	245	75	2					3,957	2,737	2,471 **
LIMERICK 1	BWR	6,499	804	99	44	3										7,449	950	52 **
MAINE YANKEE	PWR	383	258	128	113	126	111	295	27							1,441	1,058	725 **
MCGUIRE 1,2	PWR	1,392	1,035	487	481	291	192	284	36	2						4,200	2,808	1,104 **
MILLSTONE POINT 1	BWR	245	124	53	49	33	21	39	6	2						572	327	144 **
MILLSTONE POINT 2,3	PWR	1,363	688	298	272	184	120	219	36	10						3,190	1,827	804 **

* Indicates plants counted for the first time in 1988 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX B (Continued)
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
1988

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (Person-rem,cSv)
		No Mea-surable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.00-6.00	6.00-7.00	7.00-12.00	>12.0			
MONTICELLO	BWR	1,309	173	75	65	16	18	23	5							1,684	375	110 **
NINE MILE POINT 1	BWR	1,095	1,530	360	271	110	69	182	90	14						3,721	2,626	854 **
NORTH ANNA 1,2	PWR	1,242	720	115	95	35	19	8								2,234	992	112 **
OCONEE 1,2,3	PWR	1,064	983	520	501	338	164	156	10							3,736	2,672	871 **
OYSTER CREEK	BWR	340	1,294	284	292	212	181	464	135	13						3,215	2,875	1,504 **
PALISADES	PWR	503	571	214	186	127	102	212	51	9						1,975	1,472	730 **
PALO VERDE 1,2	PWR	1,657	1,137	365	279	122	107	120	38	5						3,830	2,173	688
PEACH BOTTOM 2,3	BWR	6,118	1,309	762	598	378	295	661	176	25						10,322	4,204	2,330 **
PERRY *	BWR	1,485	511	172	67	23	6	3								2,267	782	105
PILGRIM	BWR	2,814	1,267	347	211	111	69	61	7							4,887	2,073	392 **
POINT BEACH 1,2	PWR	364	203	136	106	70	70	141	8							1,098	734	410
PRAIRIE ISLAND 1,2	PWR	496	295	187	130	57	23	39	1							1,228	732	199 **
QUAD CITIES 1,2	BWR	1,130	404	190	234	166	176	294	19	3						2,616	1,486	827 **
RANCHO SECO	PWR	1,578	462	150	59	15	4	3								2,271	693	78 **
RIVER BEND 1	BWR	1,537	280	103	72	38	13	5	2							2,050	513	107
ROBINSON 2	PWR	1,631	472	231	218	144	131	140	14	1						2,982	1,351	564 **
SALEM 1,2	PWR	1,099	1,339	129	73	38	16	14								2,708	1,609	503 **
SAN ONOFRE 1,2,3	PWR	1,517	960	443	350	201	133	213	23	1						3,841	2,324	781 **
SEQUOYAH 1,2	PWR	2,770	988	568	414	229	118	119	3							5,209	2,439	678 **
ST. LUCIE 1,2	PWR	1,207	509	253	227	183	127	142	7							2,655	1,448	611
SUMMER 1	PWR	701	337	180	201	138	117	145	9							1,828	1,127	511 **
SURRY 1,2	PWR	1,262	1,510	347	303	223	195	442	140	22	2					4,446	3,184	1,542 **
SUSQUEHANNA 1,2	BWR	2,048	668	459	428	206	105	38								3,952	1,904	516 **
THREE MILE ISLAND 1	PWR	267	557	192	137	71	27	27	1							1,279	1,012	210 **
THREE MILE ISLAND 2	PWR	231	483	91	118	83	79	236	125	32						1,478	1,247	917 **
TROJAN	PWR	1,117	567	291	268	140	69	73								2,525	1,408	401 **
TURKEY POINT 3,4	PWR	1,826	674	290	321	232	156	168								3,667	1,841	738
VERMONT YANKEE	BWR	912	127	86	80	41	28	14	3							1,291	379	124 **
VOGTLE 1*	PWR	3,232	678	255	143	27	4	1								4,340	1,108	138 **
WASHINGTON NUCLEAR 2	BWR	1,501	439	226	142	92	59	75	15	1	1					2,551	1,050	353 **
WATERFORD 3	PWR	1,053	574	313	222	80	39	17	1							2,299	1,246	259 **
WOLF CREEK 1	PWR	1,666	458	182	163	96	43	67	2							2,677	1,011	297 **
YANKEE-ROWE	PWR	402	361	94	113	74	40	54	2							1,140	738	227 **
ZION 1,2	PWR	1,364	415	231	344	254	201	401	77	3						3,290	1,926	1,260 **

* Indicates plants counted for the first time in 1988 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX B (Continued)
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
1988

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONI- TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (Person-rem,cSv)
		No Measurable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5 00	5.00-6.00	6.00-7.00	7.00-12.00	>12.0			
TOTALS: 68 PWRs		49,079	27,178	11,014	9,260	5,563	3,541	5,405	829	127	4		1			112,001	62,922	22,854
TOTALS: 34 BWRs		47,679	16,044	6,736	5,609	3,311	2,397	4,859	1,129	215	5					87,984	40,305	17,986
TOTALS: 102 LWRs		95,758	43,222	17,750	14,869	8,874	5,938	10,264	1,958	342	9		1			198,985	103,227	40,840
FORT ST. VRAIN	HTGR	238	24													262	24	1

* Indicates plants counted for the first time in 1988 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX B (Continued)
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
FACILITIES NOT IN OPERATION OR IN OPERATION LESS THAN ONE YEAR
1988

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (Person-rem,cSv)
		No Mea-surable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.00-6.00	6.00-7.00	7.00-12.00	>12.0			
BELLEFONTE	PWR	33	3													36	3	0
BRAIDWOOD 1,2	PWR	2,877	517	176	50	12	4									3,636	759	75 **
COMANCHE PEAK	PWR	138	11													149	11	1
FERMI 2	BWR	2,002	648	214	77	22	3	1								2,967	965	117
HUMBOLDT BAY *	BWR	129	9	1												139	10	1
LACROSSE *	BWR	481	12	6	6	8	8	7	2							530	49	31
SEABROOK	PWR	947	1													948	1	0
SHOREHAM	BWR	1,786	4													1,790	4	0
SOUTH TEXAS 1	PWR	1,949	187	15	6											2,157	208	10 **
WATTS BAR	PWR	124	4													128	4	0
TOTALS: 11		10,466	1,396	412	139	42	15	8	2							12,480	2,014	235

* Indicates plants that are no longer in commercial operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX C*

Personnel, Dose and Power Generation Summary

1969-1988

* A discussion of the methods used to collect and calculate the information contained in this Appendix is given in Section 2.1.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ARKANSAS 1,2	1975	588.0	76.5	147	21					0.14	0.0
Docket 50-313; DPR-51; NPF-6	1976	464.6	56.6	476	289	27	262	100	189	0.61	0.6
1st commercial operation 12/74	1977	610.3	76.8	601	256	28	228	111	145	0.43	0.4
Type - PWRs	1978	627.2	77.5	722	189	32	157	109	80	0.26	0.3
Capacity - 836, 858 MWe	1979	397.0	55.3	1,321	369	54	315	252	117	0.28	0.9
	1980	452.8	63.7	1,233	342	81	261	213	129	0.28	0.8
	1981	1,104.7	68.3	2,225	1,102	130	972	843	259	0.50	1.0
	1982	905.4	58.6	1,608	803	97	706	505	298	0.50	0.9
	1983	915.0	54.7	2,109	1,397	97	1,300	1,145	252	0.66	1.5
	1984	1,289.1	77.4	1,742	806	89	717	533	273	0.46	0.6
	1985	1,192.3	73.6	1,262	286	61	225	148	138	0.23	0.2
	1986	1,070.3	66.9	2,135	1,141	194	947	881	260	0.53	1.1
	1987	1,366.1	87.9	1,123	382	92	290	205	177	0.34	0.3
	1988	1,070.3	67.5	2,421	1,387	138	1,249	1,094	293	0.57	1.3
BEAVER VALLEY 1	1977	355.6	57.0	331	87	8	79	58	29	0.26	0.2
Docket 50-334; DPR-66	1978	304.2	40.8	646	190	11	179	152	38	0.29	0.6
1st commercial operation 10/76	1979	221.0	40.0	704	132	22	110	67	65	0.19	0.6
Type - PWR	1980	39.8	6.8	1,817	553	76	477	477	76	0.30	13.9
Capacity - 810 MWe	1981	573.4	73.6	1,237	229	38	191	142	87	0.19	0.4
	1982	326.7	41.6	1,755	599	126	473	481	118	0.34	1.8
	1983	561.2	68.2	1,485	772	158	614	615	157	0.52	1.4
	1984	576.7	71.8	1,393	504	125	379	302	202	0.36	0.9
	1985	717.7	91.9	619	60	17	43	12	48	0.10	0.1
	1986	581.3	70.7	1,575	627	82	545	456	171	0.40	1.1
	1987	684.1	83.6	1,282	210	43	167	137	73	0.16	0.3
	1988	1,386.1	86.7	1,764	530	90	440	438	92	0.30	0.4
BIG ROCK POINT	1969	48.1		165	136					0.82	2.8
Docket 50-155; DPR-6	1970	43.5		290	194					0.67	4.5
1st commercial operation 3/63	1971	44.4		260	184					0.71	4.1
Type - BWR	1972	43.5		195	181					0.93	4.2
Capacity - 69 MWe	1973	50.9		241	285			119	166	1.18	5.6
	1974	40.7	70.3	281	276	54	222	42	234	0.98	6.8
	1975	35.1	59.8	300	180	58	122	20	160	0.60	5.1
	1976	29.5	50.1	488	289	82	207	105	184	0.59	9.8

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
BIG ROCK POINT (Continued)	1977	43.6	73.4	465	334	94	240	60	274	0.72	7.7
	1978	48.5	77.9	285	160	93	82	9	166	0.56	3.6
	1979	13.0	23.5	623	455	89	366	102	353	0.73	35.0
	1980	48.9	79.0	599	354	16	338	91	263	0.59	7.2
	1981	56.9	90.6	479	160	58	102	38	122	0.33	2.8
	1982	43.6	70.8	521	328	129	199	68	260	0.63	7.5
	1983	42.3	71.0	493	263	32	231	55	208	0.53	6.2
	1984	50.3	78.6	297	155	37	118	20	135	0.52	3.1
	1985	43.8	73.5	435	291	54	237	60	231	0.67	6.6
	1986	61.0	95.5	202	84	34	50	17	67	0.42	1.4
	1987	45.3	70.0	251	222	45	177	35	187	0.88	4.9
	1988	46.1	71.4	303	170	34	136	25	145	0.56	3.7
BROWNS FERRY 1,2,3	1975	161.7	17.8	2,380	325					0.14	2.0
Docket 50-259, 50-260, 50-296	1976	337.6	26.9	2,207	234					0.11	0.7
DPR - 33, - 52, - 68	1977	1,327.5	73.7	1,858	863	60	803	249	614	0.46	0.7
1st commercial operation 8/74, 3/75, 3/77	1978	1,992.1	73.5	2,376	1,792	4	1,788	259	1,533	0.75	0.9
	1979	2,393.0	79.1	2,689	1,667	0	1,667	289	1,378	0.62	0.7
Type - BWRs	1980	2,182.1	73.6	2,712	1,826	4	1,821	49	1,776	0.67	0.8
Capacity - 1065,1065,1065 MWe	1981	2,132.9	69.5	3,379	2,380	100	2,280	404	1,976	0.70	1.1
	1982	2,025.4	67.6	3,277	2,220	181	2,039	317	1,903	0.68	1.1
	1983	1,641.0	54.3	3,302	3,363	276	3,087	908	2,454	1.02	2.0
	1984	1,431.9	54.2	2,962	1,940	229	1,711	541	1,399	0.65	1.4
	1985	368.2	11.9	2,755	1,159	201	958	306	853	0.42	3.1
	1986	0.0	0.0	3,003	1,050	13	1,037	343	707	0.35	---
	1987	0.0	0.0	3,115	1,181	187	994	222	959	0.38	---
	1988	0.0	0.0	3,324	1,155	234	921	109	1,046	0.35	---
BRUNSWICK 1,2	1976	297.2	56.0	1,265	326	15	311	222	104	0.26	1.1
Docket 50-324, 50-325; DPR-62, -71	1977	291.1	55.7	1,512	1,120	48	1,071	782	337	0.74	3.8
1st commercial operation 3/77, 11/75	1978	1,173.1	83.7	1,458	1,004	99	905	695	309	0.69	0.9
Type - BWRs	1979	810.0	60.1	2,891	2,602	97	2,505	2,074	528	0.90	3.2
Capacity - 790, 790 MWe	1980	687.2	52.2	3,788	3,870	111	3,759	3,098	772	1.02	5.6
	1981	925.2	56.9	3,854	2,638	159	2,479	1,890	748	0.68	2.9
	1982	540.3	50.3	4,957	3,792	162	3,630	2,841	951	0.76	7.0
	1983	636.7	44.3	5,602	3,475	152	3,323	2,428	1,047	0.62	5.5

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
BRUNSWICK 1,2 (Continued)	1984	761.3	51.5	5,046	3,260	143	3,117	2,363	897	0.65	4.3
	1985	822.2	58.4	4,057	2,804	121	2,683	2,078	726	0.69	3.4
	1986	1,051.3	69.1	3,370	1,909	232	1,677	761	1,148	0.57	1.8
	1987	1,152.4	79.1	3,052	1,419	144	1,275	861	558	0.46	1.2
	1988	990.8	67.7	2,648	1,747	219	1,528	1,051	696	0.66	1.8
BYRON 1	1986	894.5	88.6	1,081	104	16	88	65	39	0.10	0.1
Docket 50-454; NPF-37	1987	650.9	68.6	1,826	769	11	758	667	102	0.42	1.2
1st commercial operation 9/85	1988	1,534.7	84.3	1,222	459	0	459	333	126	0.38	0.3
Type - PWR											
Capacity - 1129 MWe											
CALLAWAY 1	1985	967.4	90.0	964	36	16	20	7	29	0.04	0.0
Docket 50-483; NPF-30	1986	865.2	81.3	1,052	225	53	172	129	96	0.21	0.3
1st commercial operation 12/84	1987	759.0	70.1	1,082	393	89	304	249	144	0.36	0.5
Type - PWR	1988	1,069.2	92.5	353	27	12	15	2	25	0.08	0.0
Capacity - 1120											
CALVERT CLIFFS 1,2	1976	753.4	95.2	507	74	28	46	8	66	0.15	0.1
Docket 50-317, 50-318; DPR-53, -69	1977	583.0	72.1	2,265	547	36	511	224	323	0.24	0.9
1st commercial operation 5/75, 4/77	1978	1,188.5	75.8	1,391	500	13	487	143	357	0.36	0.4
Type - PWRs	1979	1,161.0	74.0	1,428	805	33	772	423	382	0.56	0.7
Capacity - 825, 825 MWe	1980	1,309.9	84.1	1,496	677	15	662	402	275	0.45	0.5
	1981	1,379.7	83.1	1,555	607	29	578	378	229	0.39	0.4
	1982	1,238.3	73.7	1,805	1,057	84	973	402	655	0.59	0.9
	1983	1,397.2	81.6	1,915	668	5	663	143	525	0.35	0.5
	1984	1,389.4	79.3	1,369	479	61	418	78	401	0.35	0.3
	1985	1,189.8	68.4	1,598	694	69	625	144	550	0.43	0.6
	1986	1,530.0	87.2	1,296	347	2	345	101	246	0.27	0.2
	1987	1,207.3	69.1	1,384	412	29	383	110	302	0.30	0.3
	1988	1,397.7	80.2	1,296	291	30	261	90	201	0.22	0.2

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
CATAWBA 1,2	1986	638.9	49.9	1,724	286	27	259	68	218	0.17	0.4
Docket 50-413, 50-414; NPF-35, NPF-52	1987	1,651.2	73.9	1,865	449	32	417	161	288	0.24	0.3
1st commercial operation 6/85, 8/86	1988	1,675.2	75.8	2,009	556	71	485	200	356	0.28	0.3
Type - PWR											
Capacity - 1129, 1129 MWe											
CLINTON	1988	701.3	82.5	769	130	48	82	64	66	0.17	0.2
Docket 50-461; NPF-62											
1st commercial operation 11/87											
Type - BWR											
Capacity - 930 MWe											
COOK 1,2	1976	807.4	83.1	395	116	13	103	71	45	0.29	0.1
Docket 5-315; DPR-58, -74	1977	573.0	76.1	802	300	21	278	138	161	0.37	0.5
1st commercial operation 8/75, 7/78	1978	744.8	73.6	778	336	49	287	139	197	0.43	0.5
Type - PWRs	1979	1,373.0	65.3	1,445	718	45	673	454	264	0.50	0.5
Capacity - 1020, 1060 MWe	1980	1,552.4	74.1	1,345	493	46	447	323	170	0.37	0.3
	1981	1,557.3	73.4	1,341	656	48	607	442	213	0.49	0.4
	1982	1,461.6	69.8	1,527	699	67	632	472	227	0.46	0.5
	1983	1,456.5	71.2	1,418	658	50	608	467	191	0.46	0.5
	1984	1,526.0	75.3	1,559	762	42	720	597	165	0.49	0.5
	1985	925.4	47.6	1,984	945	93	852	758	187	0.48	1.0
	1986	1,307.1	73.4	1,774	745	22	723	585	160	0.42	0.6
	1987	1,199.5	69.5	1,696	666	79	587	525	141	0.39	0.6
	1988	1,160.4	63.2	2,266	935	56	879	822	113	0.41	0.8
COOPER STATION	1975	456.4	83.6	579	117	30	87	19	98	0.20	0.3
Docket 50-298; DPR-46	1976	433.3	75.5	763	350	39	311	210	140	0.46	0.8
1st commercial operation 7/74	1977	538.2	86.2	315	198	50	147	66	131	0.63	0.4
Type - BWR	1978	576.0	91.0	297	158	40	118	58	100	0.53	0.3
Capacity - 764 MWe	1979	591.0	87.6	426	221	50	171	89	132	0.52	0.4
	1980	448.3	71.2	785	859	70	789	644	215	1.09	1.9
	1981	457.1	71.2	935	579	63	516	382	197	0.62	1.3
	1982	622.3	84.6	743	542	66	476	361	181	0.73	0.9
	1983	396.6	63.3	1,383	1,293	57	1,236	1,081	212	0.93	3.3

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
COOPER STATION (Continued)	1984	411.9	67.2	1,598	799	46	753	635	164	0.50	1.9
	1985	127.3	21.5	1,980	1,333	49	1,284	1,104	229	0.67	10.5
	1986	480.0	74.7	895	320	49	271	115	205	0.36	0.7
	1987	652.3	94.7	549	103	26	77	11	92	0.19	0.2
	1988	493.4	67.1	942	251	40	211	118	133	0.27	0.5
CRYSTAL RIVER 3	1978	311.5	41.4	643	321	8	313	244	77	0.50	1.0
Docket 50-302; DPR-72	1979	453.0	58.9	1,150	495	29	466	346	149	0.43	1.1
1st commercial operation 3/77	1980	404.1	53.2	1,053	625	24	601	382	243	0.59	1.5
Type - PWR	1981	490.4	62.2	1,120	408	18	340	236	172	0.36	0.8
Capacity - 821 MWe	1982	589.8	76.0	780	177	9	168	116	61	0.23	0.3
	1983	452.1	58.8	1,720	552	71	481	353	199	0.32	1.2
	1984	774.2	94.5	549	49	10	39	22	27	0.09	0.1
	1985	344.2	47.6	1,976	689	43	646	424	265	0.35	2.0
	1986	319.5	41.8	1,057	472	25	447	298	174	0.45	1.5
	1987	436.0	60.1	1,384	488	49	439	302	186	0.35	1.1
	1988	690.2	84.0	569	64	2	62	17	47	0.11	0.1
DAVIS-BESSE 1	1978	326.4	48.7	421	48	13	35	14	34	0.11	0.1
Docket 50-346; NPF-3	1979	381.0	67.0	304	30	8	22	5	25	0.10	0.1
1st commercial operation 11/77	1980	256.4	36.2	1,283	154	4	150	121	33	0.12	0.6
Type - PWR	1981	531.4	67.4	578	58	1	57	32	26	0.10	0.1
Capacity - 860 MWe	1982	390.8	51.5	1,350	164	12	152	139	25	0.12	0.4
	1983	592.1	73.0	718	80	6	74	46	34	0.11	0.1
	1984	518.5	62.5	1,088	177	10	167	122	55	0.16	0.3
	1985	238.3	31.2	718	71	3	68	46	25	0.10	0.3
	1986	3.3	1.3	981	124	22	102	103	21	0.13	37.6
	1987	618.0	83.5	625	47	11	36	27	20	0.08	0.1
	1988	144.1	21.5	1,183	307	36	271	255	52	0.26	2.1
DIABLO CANYON 1,2	1986	641.5	80.6	1,260	304	4	300	206	98	0.24	0.5
Docket 50-275, 50-323; DPR-80, DPR-82	1987	1,688.6	80.5	1,170	336	5	331	226	110	0.29	0.2
1st commercial operation 5/85, 3/86	1988	1,386.1	66.3	1,826	877	4	873	593	284	0.48	0.6
Type - PWRs											
Capacity - 1073, 1087 MWe											

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
DRESDEN 1*,2,3	1969	99.7			286						2.9
Docket 50-010, 50-237, 50-249;	1970	163.1			143						0.9
DPR-2, -19, -25	1971	394.5			715						1.8
1st commercial operation 7/60, 7/70,	1972	1,243.7			728						0.6
11/71	1973	1,112.2		1,341	939	143	796	344	595	0.70	0.8
Type - BWRs	1974	842.5	54.9	1,594	1,662			57	1,605	1.04	2.0
Capacity - 197, 772, 773 MWe	1975	708.1	54.6	2,310	3,423	271	3,152	2,252	1,171	1.48	4.8
	1976	1,127.2	80.8	1,746	1,680	228	1,452	749	931	0.96	1.5
	1977	1,132.9	77.0	1,862	1,694	316	1,377	693	1,000	0.91	1.5
	1978	1,242.2	79.5	1,946	1,529	204	1,325	619	910	0.79	1.2
	1979	1,013.0	74.7	2,407	1,800	191	1,609	641	1,159	0.75	1.8
	1980	1,074.4	55.0	2,717	2,105	236	1,869	1,093	1,012	0.77	2.0
	1981	1,035.7	51.5	2,331	2,802	120	2,682	1,850	952	1.03	2.7
	1982	1,085.3	77.9	2,572	2,923	136	2,787	1,731	1,192	1.14	2.7
	1983	913.6	65.6	2,854	3,582	176	3,406	2,127	1,455	1.26	3.9
	1984	789.8	55.3	2,261	1,774	153	1,621	814	960	0.78	2.2
	1985	903.0	64.5	2,817	1,686	473	1,212	878	807	0.60	1.9
	1986	740.5	52.6	3,111	2,796	272	2,524	2,113	683	0.90	3.8
	1987	933.9	68.2	2,052	1,245	262	983	645	600	0.61	1.3
	1988	1,014.7	75.2	2,414	1,409	215	1,194	808	601	0.58	1.4
DUANE ARNOLD	1976	305.2	78.0	350	105	14	91	62	43	0.30	0.3
Docket 50-331; DPR-49	1977	353.6	78.9	538	299	36	263	220	79	0.56	0.8
1st commercial operation 2/75	1978	149.2	33.2	1,112	974	59	915	932	42	0.88	6.5
Type - BWR	1979	352.0	78.0	757	275	35	240	219	56	0.36	0.8
Capacity - 515 MWe	1980	339.1	73.3	1,108	671	32	639	570	101	0.61	2.0
	1981	277.7	69.8	1,286	790	56	734	598	192	0.61	2.8
	1982	278.5	74.7	524	229	18	211	175	54	0.44	0.8
	1983	283.0	62.9	1,468	1,135	42	1,093	1,016	119	0.77	4.0
	1984	329.4	72.9	611	189	27	162	117	72	0.31	0.6
	1985	236.2	53.8	1,414	1,112	49	1,063	954	158	0.79	4.7
	1986	365.5	82.0	476	187	49	138	94	93	0.39	0.5
	1987	308.4	63.0	1,094	667	241	426	478	189	0.61	2.2
	1988	386.5	72.7	1,136	614	71	543	416	198	0.54	1.6

*Dresden 1 has been shut down since 1978, and in 1985 it was decided that it would not be put in commercial operation again. Therefore, it is no longer included in the count of commercial reactors.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
FARLEY 1,2	1978	713.8	86.5	527	108	39	69	34	74	0.20	0.2
Docket 50-348, 50-364; NPF-2, -8	1979	211.0	28.6	1,227	643	108	535	460	183	0.52	3.0
1st commercial operation 12/77, 7/81	1980	557.3	69.3	1,330	435	106	329	185	250	0.33	0.8
Type - PWR	1981	310.2	41.4	1,331	512	96	415	270	241	0.38	1.6
Capacity - 816, 807 MWe	1982	1,271.5	79.2	1,453	484	155	329	196	288	0.33	0.4
	1983	1,356.5	83.0	1,938	1,021	241	780	479	542	0.53	0.8
	1984	1,447.0	86.6	2,046	902	177	725	504	398	0.44	0.6
	1985	1,368.2	81.1	2,551	799	157	642	443	356	0.31	0.6
	1986	1,409.3	83.8	2,314	858	148	710	464	394	0.37	0.6
	1987	1,369.7	83.3	1,871	598	105	493	347	251	0.32	0.4
	1988	1,567.7	91.9	1,840	552	74	478	340	212	0.30	0.4
FITZPATRICK	1976	489.0	71.6	600	202					0.34	0.4
Docket 50-333; DPR-59	1977	460.5	68.4	1,380	1,080	14	1,066	937	143	0.78	2.3
1st commercial operation 7/75	1978	497.0	72.1	904	909	166	743	597	312	1.01	1.8
Type - BWR	1979	349.0	50.8	850	859	169	690	538	321	1.01	2.5
Capacity - 810 MWe	1980	509.5	70.3	2,056	2,040	118	1,922	1,808	232	0.99	4.0
	1981	562.9	74.7	2,490	1,425	187	1,238	1,072	353	0.57	2.5
	1982	583.6	75.0	2,322	1,190	136	1,054	862	328	0.51	2.0
	1983	546.2	70.6	1,715	1,090	158	932	667	423	0.64	2.0
	1984	576.2	76.8	1,610	971	82	889	467	504	0.60	1.7
	1985	492.3	63.7	1,845	1,051	110	941	718	333	0.57	2.1
	1986	711.2	90.6	1,185	411	81	330	168	243	0.35	0.6
	1987	496.2	67.3	1,578	940	164	776	616	324	0.60	1.9
	1988	514.0	66.6	1,553	786	162	624	506	280	0.51	1.5
FORT CALHOUN	1975	252.3	67.4	469	294			92	202	0.63	1.2
Docket 50-285; DPR-40	1976	265.9	69.5	516	313	28	285	38	275	0.61	1.2
1st commercial operation 9/73	1977	351.8	79.4	535	297	33	264	72	225	0.56	0.8
Type - PWR	1978	342.3	75.1	596	410	59	351	151	259	0.69	1.2
Capacity - 478 MWe	1979	440.0	95.7	451	126	19	107	47	79	0.28	0.3
	1980	242.3	60.4	891	668	38	630	426	242	0.75	2.8
	1981	260.9	72.3	822	458	61	397	254	204	0.56	1.8
	1982	418.0	89.7	604	217	44	173	99	118	0.36	0.5

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
FORT CALHOUN (Continued)	1983	330.4	73.1	860	433	66	367	205	228	0.50	1.3
	1984	279.2	59.9	913	563	91	472	313	250	0.62	2.0
	1985	367.0	73.7	982	373	54	319	231	142	0.38	1.0
	1986	431.8	94.3	756	74	26	48	30	44	0.10	0.2
	1987	366.0	74.6	1,247	388	79	310	227	162	0.31	1.1
	1988	315.5	74.0	1,594	272	74	198	173	99	0.17	0.9
GINNA	1971	327.8		340	430	69	361	108	322	1.26	1.3
Docket 50-244; DPR-18	1972	293.6		677	1,032	71	961	278	754	1.52	3.5
1st commercial operation 7/70	1973	409.5		319	224	55	169	84	140	0.70	0.5
Type - PWR	1974	253.7	62.4	884	1,225					1.39	4.8
Capacity - 470 MWe	1975	365.2	76.7	685	538					0.79	1.5
	1976	248.8	58.2	758	636	29	607	210	426	0.84	2.6
	1977	365.6	85.5	530	401	15	386	120	281	0.76	1.1
	1978	386.5	80.6	657	450	20	430	98	352	0.68	1.2
	1979	355.0	72.8	878	592	68	524	207	385	0.67	1.7
	1980	370.5	76.0	1,073	708	64	644	302	406	0.66	1.9
	1981	399.0	82.1	925	655	49	606	251	404	0.71	1.6
	1982	289.0	58.8	1,117	1,140	80	1,060	546	594	1.02	3.9
	1983	365.0	74.6	969	855	42	813	378	477	0.88	2.3
	1984	378.1	77.2	713	395	57	337	195	199	0.55	1.0
	1985	436.7	87.9	845	426	91	335	178	248	0.50	1.0
	1986	433.3	87.4	901	357	45	312	107	250	0.40	0.8
	1987	459.0	91.3	773	344	35	309	151	193	0.45	0.7
	1988	423.1	86.4	897	295	37	258	114	181	0.33	0.7
GRAND GULF	1986	494.7	60.9	1,486	436	68	368	329	107	0.29	0.9
Docket 50-416; NPF-29	1987	920.7	81.1	1,358	420	106	314	303	117	0.31	0.5
1st commercial operation 7/85	1988	1,136.6	93.9	692	147	57	90	52	95	0.21	0.1
Type - BWR											
Capacity - 1108 MWe											

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
HADDAM NECK	1969	438.5		138	106			27	79	0.77	0.2
Docket 50-213; DPR-61	1970	424.7		734	689			463	226	0.94	1.6
1st commercial operation 1/68	1971	502.2		289	342			166	176	1.18	0.7
Type -PWR	1971	515.6		355	325			181	144	0.91	0.6
Capacity - 569 MWe	1973	293.1		951	697			544	153	0.73	2.4
	1974	521.4	91.2	550	201					0.37	0.4
	1975	494.3	89.9	795	703	20	683			0.88	1.4
	1976	482.9	82.5	644	449	5	444	253	196	0.70	0.9
	1977	480.7	83.9	894	641	59	582	440	201	0.72	1.3
	1978	563.4	98.6	216	117	25	92	18	99	0.54	0.2
	1979	493.0	87.5	1,226	1,162	73	1,088	783	378	0.95	2.4
	1980	426.8	75.0	1,860	1,353	175	1,178	1,076	277	0.73	3.2
	1981	487.5	84.3	1,554	1,036	174	862	809	227	0.67	2.1
	1982	543.9	93.4	559	126	46	80	22	104	0.23	0.2
	1983	453.7	77.8	1,645	1,384	106	1,278	1,017	367	0.84	3.1
	1984	404.0	71.7	1,430	1,216	154	1,062	803	413	0.85	3.0
	1985	556.1	98.4	384	101	21	80	22	79	0.26	0.2
	1986	294.8	53.6	1,945	1,567	179	1,388	1,274	293	0.81	5.3
	1987	304.6	53.7	1,763	750	106	314	303	117	0.43	0.5
	1988	397.4	68.8	735	237	43	194	107	130	0.32	0.6
HARRIS 1	1988	652.9	73.5	721	169	29	140	118	51	0.23	0.3
Docket 50-400; NPF-63											
1st commercial operation 5/87											
Type - PWR											
Capacity - 860 MWe											
HATCH 1,2	1976	496.3	83.8	630	134	79	55	4	130	0.21	0.3
Docket 50-321, 50-366; DPR-57;	1977	446.8	66.3	1,303	465	96	369	220	245	0.36	1.0
NPF-05	1978	513.0	72.8	1,304	248	88	160	52	196	0.19	0.5
1st commercial operation 12/75, 9/79	1979	401.0	54.6	2,131	582	85	497	382	200	0.27	1.5
Type - BWRs	1980	1,008.7	70.9	1,930	449	143	306	163	286	0.23	0.4
Capacity - 752, 748 MWe	1981	870.9	64.3	2,899	1,337	200	1,137	792	545	0.46	1.5
	1982	768.0	56.6	3,418	1,460	218	1,242	1,064	396	0.43	1.9

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
HATCH 1,2 (Continued)	1983	934.7	68.6	3,428	1,299	253	1,046	851	448	0.38	1.4
	1984	658.6	47.3	4,110	2,218	311	1,907	1,861	357	0.54	3.4
	1985	1,211.0	79.6	2,841	818	182	636	507	311	0.29	0.7
	1986	872.1	64.8	3,486	1,497	347	1,150	862	635	0.43	1.7
	1987	1,295.4	88.1	2,202	816	207	609	435	381	0.37	0.6
	1988	1,001.4	66.8	2,509	1,401	275	1,126	927	474	0.56	1.4
HOPE CREEK 1	1987	869.2	85.1	589	117	21	96	40	77	0.20	0.1
Docket 50-354; NPF-57	1988	832.7	78.4	1,734	287	38	249	163	124	0.17	0.3
1st commercial operation 12/86											
Type - BWR											
Capacity - 1031 MWe											
HUMBOLDT BAY*	1969	44.6		125	164	69	95	12	152	1.31	3.7
Docket 50-133; DPR-7	1970	49.3		115	209	130	79	37	172	1.82	4.2
1st commercial operation 8/63	1971	39.6		140	292	114	178	65	227	2.09	7.4
Type - BWR	1972	43.1		127	253	81	172	57	196	1.99	5.9
Capacity - 63 MWe	1973	50.1		210	266	60	206			1.27	5.3
	1974	43.4	83.8	296	318	103	215			1.07	7.3
	1975	45.3	83.9	265	339	131	208	112	227	1.28	7.5
	1976	23.5	46.4	523	683	37	646	50	633	1.31	29.1
	1977	0.0	0.0	1,063	1,905	24	1,880	973	931	1.79	---
	1978	0.0	0.0	320	335	13	322	145	190	1.05	---
	1979	0.0	0.0	135	31	11	20	2	29	0.23	---
	1980	0.0	0.0	142	22	10	12	3	19	0.15	---
	1981	0.0	0.0	75	9					0.12	---
	1982	0.0	0.0	71	19	5	14	0	19	0.27	---
	1983	0.0	0.0	84	17	4	13	0	17	0.20	---

* Humboldt Bay has been shutdown since 1976 and in 1984, it was decided that it would not be placed in operation again. Therefore, it it no longer included in the count of commercial reactors.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
INDIAN POINT 1**,2,3***	1969	206.2			298						1.4
Docket 50-3, 50-247, 50-286;	1970	43.3			1,639						37.8
DPR-5, -26, -64	1971	154.0			768						5.0
1st commercial operation 10/62, 8/73,	1972	142.3			967						6.8
8/76	1973	0.0		2,998	5,262	709	4,553	2,847	2,415	1.75	---
Type - PWR	1974	556.1	59.4	1,019	910					0.89	1.6
Capacity - 0, 864, 965	1975	584.4	74.8	891	705	166	539	47	658	0.79	1.2
	1976	273.9	34.8	1,590	1,950	154	1,796	172	1,778	1.23	7.1
	1977	1,278.3	75.3	1,391	1,070	189	881	383	687	0.77	0.8
	1978	1,172.3	67.8	1,909	2,006	260	1,746	759	1,247	1.05	1.7
INDIAN POINT 1**,2	1979	574.0	71.4	1,349	1,279	209	1,070	612	667	0.95	2.2
	1980	510.8	64.8	1,577	971	181	790	398	573	0.62	1.9
	1981	367.5	46.0	2,595	2,731	237	2,494	1,595	1,137	1.05	7.4
	1982	532.4	65.4	2,144	1,635	343	1,292	883	752	0.76	3.1
	1983	702.6	84.0	1,057	486	200	286	217	269	0.46	0.7
INDIAN POINT 2	1984	416.7	51.9	2,919	2,644	650	1,994	1,863	781	0.91	6.3
Docket 50-247; DPR-26	1985	791.4	95.7	708	192	123	69	95	97	0.27	0.2
1st commercial operation 8/73	1986	457.5	56.2	1,926	1,250	350	900	349	901	0.65	2.7
Type - PWR	1987	611.4	72.3	1,980	1,217	128	1,089	805	412	0.61	2.0
Capacity - 864 MWe	1988	719.3	82.5	890	235	51	184	117	118	0.26	0.3

** Indian Point 1 was defueled in 1975 and in 1984 it was decided that it would not be placed in operation again. Therefore, it is no longer included in the count of commercial reactors.

***Indian Point 3 was purchased by a different utility and now reports separately.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
INDIAN POINT 3***	1979	574.0	66.5	808	636	63	573	482	154	0.79	1.1
Docket 50-286; DPR-64	1980	367.3	53.2	977	308	47	261	210	98	0.32	0.8
1st commercial operation 8/76	1981	367.5	59.8	677	364	46	318	255	109	0.54	1.0
Type - PWR	1982	171.5	22.5	1,477	1,226	42	1,184	1,094	132	0.83	7.1
Capacity - 965 MWe	1983	7.8	2.6	941	607	38	569	494	113	0.65	77.8
	1984	714.4	76.3	658	230	48	182	127	103	0.35	0.3
	1985	566.5	66.0	1,093	570	35	535	455	115	0.52	1.0
	1986	655.3	73.4	588	202	34	168	123	79	0.34	0.3
	1987	574.6	61.6	1,308	500	84	416	365	135	0.38	0.9
	1988	792.5	82.2	451	93	41	52	39	54	0.21	0.1
KEWAUNEE	1975	401.9	88.2	104	28	1	27	12	16	0.27	0.1
Docket 50-305; DPR-43	1976	405.9	78.9	381	270	16	254	193	77	0.71	0.7
1st commercial operation 6/74	1977	425.0	79.9	312	140	8	131	76	63	0.45	0.3
Type - PWR	1978	466.6	89.5	335	154	11	143	89	65	0.46	0.3
Capacity - 503 MWe	1979	412.0	79.0	343	127	6	121	79	48	0.37	0.3
	1980	433.8	82.1	401	165	7	158	103	62	0.41	0.4
	1981	451.8	86.7	383	141	7	134	94	47	0.37	0.3
	1982	458.4	87.6	353	101	5	96	51	50	0.29	0.2
	1983	444.1	83.7	445	165	10	155	119	46	0.37	0.4
	1984	455.3	85.7	482	139	7	132	90	19	0.29	0.3
	1985	443.1	82.4	519	176	4	172	118	58	0.34	0.4
	1986	461.7	85.8	502	169	8	161	111	58	0.34	0.4
	1987	480.0	89.2	755	226	8	218	173	53	0.30	0.5
	1988	467.5	87.5	705	210	6	204	165	45	0.30	0.4
LACROSSE*	1970	15.3			111			40	71		7.2
Docket 50-409; DPR-45	1971	323.1		218	158					0.72	4.8
1st commercial operation 11/69	1972	29.2		151	172					1.14	5.9
Type - BWR	1973	24.4		157	221					1.41	9.1
Capacity - 48 MWe	1974	37.9	81.0	115	139	89	50	6	133	1.21	3.7
	1975	32.0	69.6	165	234					1.42	7.3

* Lacrosse ended commercial operation in 1987 and will not be put in commercial operation again. Therefore it is no longer included in the count of commercial reactors.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
LACROSSE (Continued)	1976	21.2	47.6	118	110	40	71	6	105	0.93	5.2
	1977	11.3	33.7	141	225	60	164	8	216	1.60	19.8
	1978	21.6	62.0	182	164	69	95	6	158	0.90	7.6
	1979	24.0	71.8	153	186	65	121	21	165	1.22	7.8
	1980	26.4	68.5	124	218	63	155	11	207	1.76	8.3
	1981	29.6	76.0	187	123	62	61	3	120	0.66	4.2
	1982	17.2	44.6	148	205	65	140	16	189	1.39	11.9
	1983	24.8	59.7	160	313	103	210	31	282	1.96	12.6
	1984	38.5	80.5	288	252	141	111	5	247	0.88	6.5
	1985	39.2	86.7	373	173	76	97	22	151	0.46	4.4
	1986	19.6	46.1	260	290					1.12	14.8
	1987	0.0	0.0	127	68	42	26	2	66	0.54	---
LASALLE 1,2	1984	677.8	77.8	1,245	252	30	222	86	166	0.20	0.4
Docket 50-373, -374; NPF-11, -18	1985	987.9	53.0	1,635	685	88	597	420	265	0.42	0.7
1st commercial operation 1/84, 10/84	1986	929.5	50.6	1,614	949	151	798	557	392	0.59	1.0
Type - BWR	1987	1,030.0	58.0	1,744	1,394	216	1,178	988	406	0.80	1.4
Capacity - 1036, 1036 MWe	1988	1,317.6	70.7	2,737	2,471	253	2,218	1,978	493	0.90	1.9
LIMERICK 1	1987	636.1	67.7	2,156	174	7	168	114	61	0.08	0.3
Docket 50-352; NPF-39	1988	794.9	96.4	950	52	21	32	23	30	0.05	0.1
1st commercial operation 2/86											
Type - BWR											
Capacity - 1055 MWe											
MAINE YANKEE	1973	408.7		782	117			59	58	0.15	0.3
Docket 50-309; DPR-36	1974	432.6	68.7	619	420	64	356	188	232	0.68	1.0
1st commercial operation 12/72	1975	542.9	79.9	440	319	15	304	181	138	0.72	0.6
Type - PWR	1976	712.2	95.0	244	85	27	58	26	59	0.35	0.1
Capacity - 810 MWe	1977	617.6	82.2	508	245	46	199	112	133	0.48	0.4
	1978	642.7	84.1	638	420	54	366	262	158	0.66	0.7
	1979	537.0	68.4	393	154	70	84	26	128	0.39	0.3
	1980	527.0	72.2	735	462	117	345	277	185	0.63	0.9

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
MAINE YANKEE (Continued)	1981	624.2	78.2	868	424	11	413	308	116	0.49	0.7
	1982	542.5	69.1	1,295	619	33	586	462	157	0.48	1.1
	1983	677.1	83.6	592	164	40	124	72	92	0.28	0.2
	1984	605.7	74.4	1,262	884	9	875	702	182	0.70	1.5
	1985	635.4	79.2	1,009	700	54	646	529	171	0.69	1.1
	1986	737.6	87.8	495	100	21	79	14	86	0.20	0.1
	1987	478.1	61.8	1,100	722	39	683	531	191	0.66	1.5
	1988	591.9	77.3	1,058	725	52	673	576	149	0.69	1.2
MCGUIRE 1,2	1982	524.9	80.4	1,560	169	26	143	29	140	0.11	0.3
Docket 50-369, -370; NPF-9, -17	1983	558.3	55.4	1,751	521	35	486	123	398	0.30	0.9
1st commercial operation 12/81, 3/84	1984	764.1	68.5	1,663	507	40	467	110	397	0.30	0.7
Type - PWR	1985	808.4	77.0	2,217	771	92	679	277	494	0.35	0.5
Capacity - 1180, 1180 MWe	1986	1,360.0	60.1	2,326	1,015	46	969	399	616	0.44	0.7
	1987	1,774.7	78.1	2,865	1,043	38	1,005	510	533	0.36	0.6
	1988	1,830.7	79.7	2,808	1,104	65	1,039	592	512	0.39	0.6
MILLSTONE POINT 1	1972	377.6		612	596	50	546	340	256	0.97	1.6
Docket 50-245; DPR-21	1973	225.1		1,184	663	125	538	422	241	0.56	2.9
1st commercial operation 3/71	1974	430.3	79.1	2,477	1,430					0.58	3.3
Type - BWR	1975	465.4	75.6	2,587	2,022					0.78	4.3
Capacity - 654 MWe	1976	449.8	76.1	1,387	1,194	54	1,140	955	239	0.86	2.7
	1977	575.7	89.6	1,075	394	118	274	159	233	0.37	0.7
	1978	556.6	87.6	1,391	1,416	140	1,099	907	332	1.02	2.2
	1979	505.0	77.3	2,001	1,795	198	1,595	1,326	467	0.90	3.6
	1980	405.8	69.0	3,024	2,157	100	2,058	1,864	294	0.71	5.3
	1981	304.3	51.6	2,506	1,496	96	1,400	1,201	295	0.60	4.9
	1982	490.2	79.9	1,370	929	78	851	587	342	0.68	1.9
	1983	640.1	95.6	309	244	63	181	74	170	0.79	0.4
	1984	516.1	78.8	1,992	836	80	756	532	304	0.42	1.6
	1985	548.5	83.6	732	608	65	543	369	239	0.83	1.1
	1986	626.8	95.4	389	150	46	104	52	98	0.39	0.2
	1987	523.4	77.9	1,588	684	56	628	523	161	0.43	1.3
	1988	658.8	98.0	327	144	31	113	60	84	0.44	0.2

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
MILLSTONE POINT 2,3	1976	545.7	78.7	620	168	26	142	73	95	0.27	0.3
Docket 50-336, 50-423; DPR-65, NPF-49	1977	518.7	65.7	667	242	38	204	153	89	0.36	0.5
1st commercial operation 12/75, 4/86	1978	536.6	67.3	1,420	1,444	72	1,549	1,534	87	1.02	3.0
Type - PWR	1979	520.0	62.8	525	471	81	391	305	167	0.90	0.9
Capacity - 857, 1197 MWe	1980	579.3	69.2	893	637	76	560	514	122	0.71	1.1
	1981	722.4	82.6	890	531	44	487	393	138	0.60	0.7
	1982	595.9	70.6	2,083	1,413	27	1,386	1,219	194	0.68	2.4
	1983	294.0	34.2	2,383	1,881	170	1,711	1,548	333	0.79	6.4
	1984	782.7	93.5	285	120	11	109	63	57	0.42	0.2
	1985	417.8	49.4	1,905	1,581	60	1,521	1,255	326	0.83	3.8
	1986	816.7	93.4	2,393	993	125	793	737	181	0.41	1.5
	1987	1,624.5	82.3	1,441	505	19	486	370	135	0.35	0.3
	1988	1,594.8	78.4	1,827	804	31	773	523	281	0.44	0.5
MONTICELLO	1972	424.4		99	61	40	21	1	60	0.62	0.1
Docket 50-263; DPR-22	1973	389.5		401	176	48	128	67	109	0.44	0.5
1st commercial operation 6/71	1974	349.3	74.9	842	349			91	258	0.41	1.0
Type - BWR	1975	344.8	72.2	1,353	1,353					1.00	3.9
Capacity - 536 MWe	1976	476.4	91.5	325	263	59	204	51	212	0.81	0.6
	1977	425.6	79.9	860	1,000	135	865	661	339	1.16	2.3
	1978	459.4	87.2	679	375	62	313	165	210	0.55	0.8
	1979	522.0	97.6	372	157	62	95	51	106	0.42	0.3
	1980	411.8	78.2	1,114	531	82	449	248	283	0.48	1.3
	1981	389.3	72.6	1,446	1,004	101	903	756	248	0.69	2.6
	1982	291.1	63.3	1,307	993	130	863	760	233	0.76	3.4
	1983	494.6	96.3	416	121	57	64	23	98	0.29	0.2
	1984	33.7	9.2	1,872	2,462	208	2,254	927	1,535	1.32	73.1
	1985	509.8	91.7	586	327	87	240	47	280	0.56	0.6
	1986	402.7	79.1	895	596	94	502	115	481	0.67	1.5
	1987	422.5	80.5	941	568	102	466	115	453	0.60	1.3
	1988	542.5	99.7	375	110	40	70	10	100	0.29	0.2

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
NINE MILE POINT 1	1970	227.0		821	44	12	32	17	27	0.05	0.2
Docket 50-220; DPR-63	1971	346.5		1,006	195	43	152	63	132	0.19	0.6
1st commercial operation 12/69	1972	381.8		735	285	59	226	28	257	0.39	0.7
Type - BWR	1973	411.0		550	567	139	428	118	449	1.03	1.4
Capacity - 610 MWe	1974	385.9	70.5	740	824	42	782	279	545	1.11	2.1
	1975	359.0	72.1	649	681	68	613	203	478	1.05	1.9
	1976	484.6	88.2	392	428	52	376	229	199	1.09	0.9
	1977	347.4	59.2	1,093	1,383	41	1,342	883	500	1.27	4.0
	1978	527.7	95.1	561	314	59	255	26	288	0.56	0.6
	1979	354.0	66.1	1,326	1,497	106	1,391	940	557	1.13	4.2
	1980	533.9	92.3	1,174	591	75	516	251	340	0.50	1.1
	1981	385.2	66.0	2,029	1,592	144	1,448	1,064	528	0.78	4.1
	1982	133.5	21.4	1,352	1,264	63	1,201	944	320	0.93	9.5
	1983	329.8	56.2	1,405	860	50	810	576	284	0.61	2.6
	1984	426.8	71.9	1,530	890	163	727	372	518	0.58	2.1
	1985	580.9	96.4	1,007	265	60	205	43	222	0.26	0.5
	1986	371.0	65.3	1,878	1,275	36	1,184	698	522	0.68	3.3
	1987	542.6	92.8	1,190	141	35	106	39	102	0.12	0.3
	1988	0.0	0.0	2,626	854	33	821	509	345	0.33	---
NORTH ANNA 1,2	1979	507.0	61.7	2,025	449	78	371	190	259	0.22	0.9
Docket 50-338; NPF-04, -09	1980	681.8	86.5	2,086	218	128	90	85	133	0.10	0.3
1st commercial operation 6/78, 12/80	1981	1,241.9	71.5	2,416	680	188	492	343	337	0.28	0.5
Type - PWRs	1982	777.7	45.8	2,872	1,915	78	1,837	1,207	708	0.67	2.5
Capacity - 893, 893 MWe	1983	1,338.4	76.1	2,228	665	129	536	296	369	0.30	0.5
	1984	1,021.3	58.8	3,062	1,945	154	1,791	1,416	529	0.64	1.9
	1985	1,516.9	86.1	2,436	838	141	698	502	337	0.34	0.6
	1986	1,484.5	83.0	2,831	722	111	611	343	379	0.26	0.5
	1987	1,112.6	64.6	2,624	1,521	60	1,461	1,075	446	0.58	1.4
	1988	1,772.7	93.8	992	112	28	84	19	93	0.11	0.1

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
OCONEE 1,2,3	1974	650.6	60.1	844	517	18	499	144	373	0.61	0.8
Docket 50-269, 50-270, 50-287;	1975	1,838.3	75.5	829	497	72	425	90	407	0.60	0.3
DPR-38, -47, -55	1976	1,561.4	63.0	1,215	1,026	65	961	219	807	0.84	0.7
1st commercial operation 7/73, 9/74,	1977	1,566.4	65.9	1,595	1,328	244	1,084	294	1,034	0.83	0.8
12/74	1978	1,909.0	75.8	1,636	1,393	179	1,214	340	1,053	0.85	0.7
Type - PWRs	1979	1,708.0	67.7	2,100	1,001	123	878	181	820	0.48	0.6
Capacity - 860, 860, 860 MWe	1980	1,703.7	70.1	2,124	1,055	117	938	162	893	0.50	0.6
	1981	1,661.5	66.8	2,445	1,211	113	1,098	275	936	0.50	0.7
	1982	1,293.1	52.5	2,445	1,792	97	1,695	364	1,428	0.73	1.4
	1983	2,141.5	82.2	1,902	1,207	88	1,119	316	891	0.63	0.6
	1984	2,242.9	85.7	2,085	1,106	63	1,043	260	846	0.53	0.5
	1985	2,036.3	80.5	2,729	1,304	143	1,161	378	926	0.48	0.6
	1986	1,995.6	79.0	2,499	949	37	912	261	688	0.38	0.5
	1987	1,962.6	81.2	2,672	1,142	51	1,091	376	766	0.43	0.6
	1988	2,228.9	86.6	2,672	871	51	820	317	554	0.33	0.4
OYSTER CREEK	1970	413.6		95	63	21	42	11	52	0.66	0.1
Docket 50-219; DPR-16	1971	448.9		249	240	50	190	92	148	0.96	0.5
1st commercial operation 12/69	1972	515.0		339	582	150	432	167	415	1.72	1.1
Type - BWR	1973	424.6		782	1,236	195	1,041	683	553	1.58	2.9
Capacity - 620 MWe	1974	434.5	70.4	935	984	166	818	162	822	1.05	2.3
	1975	373.6	73.3	1,210	1,140	169	971	271	869	0.94	3.1
	1976	456.5	79.3	1,582	1,078	70	1,008	587	491	0.68	2.4
	1977	385.7	70.1	1,673	1,614	76	1,538	1,048	566	0.96	4.2
	1978	431.8	74.3	1,411	1,279	134	1,145	696	583	0.91	3.0
	1979	541.0	85.9	842	467	95	372	135	332	0.55	0.9
	1980	232.9	41.4	1,966	1,733	97	1,636	1,182	551	0.88	7.4
	1981	314.8	59.8	1,689	917	48	869	479	438	0.54	2.9
	1982	242.7	62.5	1,270	865	33	832	491	374	0.68	3.6
	1983	27.9	11.5	2,303	2,257	65	2,192	1,863	394	0.98	80.9
	1984	37.1	9.6	2,369	2,054	134	1,920	1,538	516	0.87	55.4
	1985	446.1	89.4	2,342	748	116	632	318	430	0.32	1.7
	1986	157.3	31.5	3,740	2,436	288	2,148	1,924	512	0.65	15.5
	1987	371.0	61.9	1,932	522	112	410	211	311	0.27	1.4
	1988	419.6	65.5	2,875	1,504	135	1,369	1,232	272	0.52	3.6

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
PALISADES	1972	216.8			78						0.4
Docket 50-255; DPR-20	1973	286.8		975	1,133	16	1,117	661	472	1.16	4.0
1st commercial operation 12/71	1974	10.7	5.5	774	627					0.81	58.6
Type - PWR	1975	302.0	64.5	495	306					0.62	1.0
Capacity - 730 MWe	1976	346.9	55.2	742	696	23	673	109	587	0.94	2.0
	1977	616.6	91.4	332	100	13	87	23	77	0.30	0.2
	1978	320.2	49.7	849	764	52	712	173	591	0.90	2.4
	1979	415.0	59.9	1,599	854	99	755	360	494	0.53	2.1
	1980	288.3	42.9	1,307	424	191	233	312	112	0.32	1.5
	1981	418.2	57.2	2,151	902	167	735	737	165	0.42	2.2
	1982	404.3	54.7	1,554	330	73	257	203	127	0.21	0.8
	1983	454.4	60.3	2,167	977	145	832	494	483	0.45	2.2
	1984	98.7	15.2	1,344	573	79	494	339	334	0.43	5.8
	1985	639.2	83.8	1,355	507	105	402	239	268	0.37	0.8
	1986	102.3	15.1	1,438	672	148	524	204	468	0.47	6.6
	1987	319.2	45.5	1,122	456	85	371	216	240	0.41	1.4
	1988	413.4	55.3	1,472	730	138	592	466	264	0.50	1.8
PALO VERDE 1,2	1987	1,638.1	64.9	1,792	669	101	568	437	232	0.37	0.4
Docket 50-528, 50-529; NPF-41, NPF-51	1988	1,700.9	74.1	2,173	688	77	611	472	216	0.32	0.4
1st commercial operation 1/86, 9/86											
Type - PWRs											
Capacity - 1221, 1221 MWe											
PEACH BOTTOM 2,3	1975	1,234.3	80.9	971	228					0.23	0.2
Docket 50-277, 50-278; DPR-44, -56	1976	1,379.2	73.0	2,136	840	180	660	434	406	0.39	0.6
1st commercial operation 7/74, 12/74	1977	1,052.4	58.7	2,827	2,036	223	1,813	1,374	662	0.72	1.9
Type - BWR	1978	1,636.3	84.0	2,244	1,317	162	1,155	709	608	0.59	0.8
Capacity - 1051, 1035 MWe	1979	1,740.0	84.5	2,276	1,388	245	1,143	717	671	0.61	0.8
	1980	1,374.2	66.3	2,774	2,302	311	1,991	1,596	706	0.83	1.7
	1981	1,161.8	58.0	2,857	2,506	273	2,233	1,880	626	0.88	2.2
	1982	1,583.3	76.9	2,734	1,977	313	1,664	1,347	630	0.72	1.2
	1983	824.7	40.5	3,107	2,963	331	2,632	2,422	541	0.95	3.6
	1984	1,165.8	57.4	3,313	2,450	225	2,225	2,045	405	0.74	2.1

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
PEACH BOTTOM 2,3 (Continued)	1985	682.7	37.5	4,209	3,354	396	2,958	2,727	627	0.80	4.9
	1986	1,395.0	71.7	2,454	1,080	294	786	671	409	0.44	0.8
	1987	365.7	19.3	4,363	2,195	178	2,017	1,712	483	0.50	6.0
	1988	0.0	0.0	4,204	2,330	114	2,216	2,028	302	0.55	---
PERRY Docket 50-440; NPF-58 1st commercial operation 11/87 Type - BWR Capacity - 1205 MWe	1988	869.3	75.9	782	105	34	71	36	69	0.13	0.1
PILGRIM 1	1973	484.0		230	126	49	77			0.55	0.3
Docket 50-293; DPR-35	1974	234.1	39.2	454	415					0.91	1.8
1st commercial operation 12/72	1975	308.1	71.3	473	798	142	656	412	386	1.69	2.6
Type - BWR	1976	287.8	60.7	1,317	2,648	66	2,582	2,270	378	2.01	9.2
Capacity - 670 MWe	1977	316.6	61.4	1,875	3,142	146	2,996	2,176	966	1.68	9.9
	1978	519.5	83.1	1,667	1,327	157	1,170	895	432	0.80	2.6
	1979	574.0	89.4	2,458	1,015	131	884	516	499	0.41	1.8
	1980	360.3	56.2	3,549	3,626	207	3,419	3,076	550	1.02	10.1
	1981	408.9	65.9	2,803	1,836	70	1,766	1,418	418	0.66	4.5
	1982	389.9	63.9	2,854	1,539	314	1,225	1,094	445	0.54	3.9
	1983	559.5	87.2	2,326	1,162	296	886	776	386	0.50	2.1
	1984	1.4	0.4	4,542	4,082	647	3,435	3,767	315	0.90	---
	1985	587.3	91.5	2,209	893	13	880	718	175	0.40	1.5
	1986	121.9	18.8	2,635	874	16	764	718	156	0.33	7.2
	1987	0.0	0.0	4,710	1,579	99	1,480	1,485	94	0.34	---
	1988	0.0	0.0	2,073	392	58	334	218	174	0.19	---
POINT BEACH 1,2	1971	393.4			164						0.4
Docket 50-266, 50-301; DPR-24, -27	1972	378.3			580						1.5
1st commercial operation 12/70	1973	693.7		501	588	72	516			1.17	0.8
Type - PWRs	1974	760.2	81.3	400	295	70	225	81	214	0.74	0.4
Capacity - 485, 485 MWe	1975	801.2	82.9	339	459					1.35	0.6

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
POINT BEACH 1,2 (Continued)	1976	857.3	86.7	313	370	58	312	107	263	1.18	0.4
	1977	873.9	87.3	417	430	63	366	212	217	1.03	0.5
	1978	914.4	90.9	336	320	71	249	111	209	0.95	0.3
	1979	808.0	80.8	610	644	65	579	449	195	1.06	0.8
	1980	727.2	82.5	561	598	60	538	420	178	1.07	0.8
	1981	760.4	83.6	773	596	83	513	364	232	0.77	0.8
	1982	757.2	84.3	767	609	72	537	375	234	0.79	0.8
	1983	648.2	72.7	1,702	1,403	81	1,322	1,179	224	0.82	2.2
	1984	788.9	78.6	1,372	789	121	668	457	332	0.58	1.0
	1985	831.3	82.5	671	482	71	411	242	240	0.72	0.6
	1986	858.9	85.7	664	402	50	352	219	183	0.61	0.5
	1987	857.5	85.0	720	554	55	499	369	185	0.77	0.6
	1988	899.3	87.8	734	410	64	346	235	175	0.56	0.5
PRAIRIE ISLAND 1,2	1974	181.9	43.9	150	18			5	13	0.12	0.1
Docket 50-282, 50-306; DPR-42, -60	1975	836.0	83.3	477	123					0.26	0.1
1st commercial operation 12/73	1976	725.2	76.6	818	447	68	379	235	212	0.55	0.6
Type - PWRs	1977	922.9	87.2	718	300	73	227	60	240	0.42	0.3
Capacity - 503, 500 MWe	1978	941.1	92.2	546	221	43	178	48	173	0.40	0.2
	1979	865.0	86.0	594	180	29	151	49	131	0.30	0.2
	1980	800.7	79.9	983	353	40	313	141	212	0.36	0.4
	1981	844.9	80.5	836	329	153	176	128	201	0.39	0.4
	1982	944.9	90.4	645	229	30	199	68	161	0.36	0.2
	1983	921.1	86.8	654	233	14	219	73	160	0.36	0.3
	1984	972.4	91.7	546	147	18	129	52	95	0.27	0.2
	1985	882.6	84.0	1,082	416	31	385	136	280	0.38	0.5
	1986	930.6	90.3	818	255	11	244	80	175	0.31	0.3
	1987	969.6	91.3	593	135	9	126	51	84	0.23	0.1
	1988	932.0	88.7	732	199	17	182	62	137	0.27	0.2

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
QUAD CITIES 1,2	1974	958.1	72.3	678	482			36	446	0.71	0.5
Docket 50-254, 50-265; DPR-29, -30	1975	833.6	68.4	1,083	1,618	114	1,504	692	926	1.49	1.9
1st commercial operation 2/73, 3/73	1976	951.2	73.1	1,225	1,651	269	1,382	648	1,003	1.35	1.7
Type - BWRs	1977	970.1	84.0	907	1,031	108	923	373	658	1.14	1.1
Capacity - 769, 769 MWe	1978	1,124.5	88.6	1,207	1,618	156	1,462	722	896	1.34	1.4
	1979	1,075.0	84.6	1,688	2,158	215	1,943	1,250	908	1.28	2.0
	1980	866.9	64.4	3,089	4,823	291	4,547	3,657	1,181	1.56	5.6
	1981	1,156.9	81.1	2,246	3,146	100	3,046	2,623	523	1.40	2.7
	1982	1,018.7	76.0	2,314	3,757	177	3,580	2,653	1,104	1.62	3.7
	1983	1,088.5	79.2	1,802	2,491	166	2,325	1,937	554	1.38	2.3
	1984	994.6	65.7	1,678	1,579	122	1,457	1,078	501	0.94	1.6
	1985	1,268.0	82.7	1,184	990	172	818	27	963	0.84	0.8
	1986	1,093.2	71.0	1,451	992	134	858	593	399	0.68	0.9
	1987	1,126.6	74.1	1,429	775	85	690	468	307	0.54	0.7
	1988	1,173.7	82.0	1,486	827	136	691	545	282	0.56	0.7
RANCHO SECO	1976	268.1	30.4	297	58	6	52	17	41	0.20	0.2
Docket 50-312; DPR-54	1977	706.4	77.1	515	391	61	329	248	142	0.76	0.6
1st commercial operation 4/75	1978	607.7	80.5	508	323	76	247	176	147	0.64	0.5
Type - PWR	1979	687.0	91.1	287	126	27	99	64	62	0.44	0.2
Capacity - 873 MWe	1980	530.9	60.4	890	412	110	302	281	131	0.46	0.8
	1981	321.2	40.2	772	402	83	319	266	137	0.52	1.3
	1982	409.5	53.3	766	337	49	288	217	120	0.44	0.8
	1983	347.9	46.8	1,338	787	158	629	604	183	0.59	2.3
	1984	460.0	58.3	802	222	73	149	115	107	0.28	0.5
	1985	238.7	30.8	1,764	756	183	573	583	173	0.43	3.2
	1986	0.0	0.0	1,513	402	17	385	125	277	0.27	---
	1987	0.0	0.0	1,533	300	52	248	216	84	0.20	---
	1988	355.8	59.5	693	78	13	65	33	45	0.11	0.2

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (~cSv) per Work Function		Person-rems (~cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (~cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
RIVER BEND 1	1987	605.2	66.6	1,268	378	70	308	249	129	0.30	0.6
Docket 50-458; NPF-47	1988	880.7	92.8	513	107	30	77	34	73	0.21	0.1
1st commercial operation 6/86											
Type - BWR											
Capacity - 936 MWe											
ROBINSON 2	1972	580.0		245	215	42	173	137	78	0.88	0.4
Docket 50-261; DPR-23	1973	455.1		831	695					0.84	1.5
1st commercial operation 3/71	1974	578.1	83.3	853	672	185	487			0.79	1.2
Type - PWR	1975	501.8	72.7	849	1,142					1.35	2.3
Capacity - 665 MWe	1976	585.5	84.7	597	715	30	685	457	758	1.20	1.2
	1977	511.5	85.2	634	455	52	403	223	232	0.72	0.9
	1978	480.5	72.0	943	963	63	900	529	434	1.02	2.0
	1979	482.0	70.8	1,454	1,188	60	1,128	794	394	0.82	2.5
	1980	387.3	62.2	2,009	1,852	79	1,773	1,379	473	0.92	4.8
	1981	426.6	73.0	1,462	733	45	688	513	220	0.50	1.7
	1982	277.5	48.9	2,011	1,426	128	1,298	945	481	0.71	5.1
	1983	409.8	75.5	2,244	923	96	827	628	295	0.41	2.3
	1984	28.0	7.0	4,127	2,880	196	2,684	2,549	331	0.70	102.9
	1985	629.5	87.9	1,378	311	52	259	165	146	0.23	0.5
	1986	577.1	80.3	1,571	539	46	493	340	199	0.34	0.9
	1987	510.1	71.1	1,379	499	54	445	313	186	0.36	1.0
	1988	385.0	65.1	1,351	564	44	520	370	194	0.42	1.5
SALEM 1,2	1978	546.4	55.6	574	122	28	94	32	90	0.21	0.2
Docket 50-272, -311; DPR-70, -75	1979	250.0	25.5	1,488	584	100	484	359	225	0.39	2.3
1st commercial operation 6/77	1980	680.6	69.2	1,704	449	55	394	281	168	0.26	0.7
Type - PWRs	1981	743.0	78.1	1,652	254	4	250	152	102	0.15	0.3
Capacity - 1079, 1106 MWe	1982	1,440.4	72.6	3,228	1,203	66	1,137	846	357	0.37	0.8
	1983	742.0	30.5	2,383	581	10	571	463	118	0.24	0.8
	1984	650.1	31.8	1,395	681	10	671	469	212	0.49	1.0
	1985	1,657.7	75.8	1,112	204	26	178	91	113	0.18	0.1

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
SALEM 1,2 (Continued)	1986	1,484.3	70.4	3,554	599	10	589	459	140	0.17	0.4
	1987	1,478.2	72.5	2,543	600	8	592	433	167	0.24	0.4
	1988	1,591.6	72.2	1,609	503	1	502	329	174	0.31	0.3
SAN ONOFRE 1,2,3	1969	314.1		123	42	10	32	5	37	0.34	0.1
Docket 50-206, -361, -362;	1970	365.9		251	155	13	142	59	96	0.62	0.4
DPR-13, NPF-10, NPF-15	1971	362.1		121	50	12	38	3	47	0.41	0.1
1st commercial operation 1/68, 8/83, 4/84	1972	338.5		326	256	29	227	117	139	0.79	0.8
Type - PWR	1973	273.7		570	353	40	313	168	185	0.62	1.3
Capacity - 436, 1070, 1080 MWe	1974	377.8	86.1	219	71					0.32	0.2
	1975	389.0	87.4	424	292					0.69	0.8
	1976	297.9	70.2	1,330	880	147	733	629	251	0.66	3.0
	1977	281.2	63.7	985	847	77	770	451	396	0.86	3.0
	1978	323.2	80.2	764	401	25	376	234	167	0.52	1.2
	1979	401.0	90.2	521	139	23	116	65	74	0.27	0.3
	1980	97.3	22.3	3,063	2,386	219	2,168	2,018	369	0.78	24.5
	1981	95.9	26.7	2,902	3,223	100	3,123	3,104	119	1.11	33.6
	1982	61.6	15.7	3,055	832	81	751	729	102	0.27	13.5
	1983	0.0	0.0	1,701	155	31	124	113	42	0.09	---
	1984	670.4	34.2	7,514	986	105	879	830	154	0.13	1.5
	1985	1,381.8	66.5	5,742	722	58	664	581	141	0.13	0.5
	1986	1,698.2	61.1	3,594	824	86	738	574	250	0.23	0.5
	1987	1,983.0	77.8	2,138	696	113	583	408	288	0.33	0.4
	1988	1,982.3	67.4	2,324	781	99	682	518	263	0.34	0.4
SEQUOYAH 1,2	1982	583.5	52.8	1,965	570	67	503	57	513	0.29	1.0
Docket 50-327, -328; DPR-77, -79	1983	1,663.7	75.1	1,772	491	74	417	46	445	0.28	0.3
1st commercial operation 7/81, 6/82	1984	1,481.9	69.0	2,373	1,117	153	964	111	1,006	0.47	0.8
Type - PWR	1985	1,151.3	51.3	1,854	1,071	118	953	243	828	0.58	0.9
Capacity - 1148, 1148 MWe	1986	0.0	0.0	1,735	526	101	425	70	456	0.30	---
	1987	0.0	0.0	2,080	420	55	365	101	319	0.20	---
	1988	490.8	30.6	2,439	678	73	605	115	563	0.28	1.4

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ST. LUCIE 1,2	1977	649.1	84.7	445	152	26	126	92	60	0.34	0.2
Docket 50-335, -387; DPR-67; NPF-16	1978	606.4	76.5	797	337	15	322	140	197	0.42	0.6
1st commercial operation 12/76, 3/83	1979	592.0	74.0	907	438	25	413	209	229	0.48	0.7
Type - PWRs	1980	627.9	77.5	1,074	532	82	450	195	337	0.50	0.8
Capacity - 827, 837 MWe	1981	599.1	72.7	1,473	929	20	909	556	373	0.63	1.6
	1982	816.8	94.0	1,045	272	17	255	105	167	0.26	0.3
	1983	290.3	15.4	2,211	1,204	5	1,199	924	280	0.54	4.1
	1984	1,183.0	69.6	2,090	1,263	41	1,222	808	455	0.60	1.1
	1985	1,445.8	82.5	1,971	1,344	293	1,046	809	535	0.68	0.9
	1986	1,588.6	89.1	1,279	491	81	410	322	169	0.38	0.3
	1987	1,407.9	80.5	2,012	951	1	950	560	391	0.47	0.7
	1988	1,639.7	92.2	1,448	611	54	557	371	240	0.42	0.4
SUMMER 1	1984	504.6	61.1	1,120	295	29	266	202	93	0.26	0.6
Docket 50-395; NPF-12	1985	627.7	71.6	1,201	379	74	305	241	138	0.32	0.6
1st commercial operation 1/84	1986	853.7	95.3	392	23	5	18	12	11	0.06	0.03
Type - PWR	1987	618.7	70.1	1,075	560	34	526	454	106	0.52	0.9
Capacity - 885 MWe	1988	605.3	67.8	1,127	511	35	476	403	108	0.45	0.8
SURRY 1,2	1973	420.6		936	152					0.16	0.4
Docket 50-280, 50-281; DPR-32, -37	1974	717.4	49.8	1,715	884	72	812			0.52	1.2
1st commercial operation 12/72, 5/73	1975	1,079.0	70.8	1,948	1,649	27	1,622	1,065	584	0.85	1.5
Type - PWRs	1976	930.7	60.4	2,753	3,165	444	2,721	1,873	1,292	1.15	3.4
Capacity - 781, 775 MWe	1977	1,139.0	72.2	1,860	2,307	348	1,959	1,380	927	1.24	2.0
	1978	1,210.6	77.2	2,203	1,792	726	1,111	1,029	808	0.81	1.5
	1979	343.0	42.3	5,065	3,584	173	3,411	2,975	609	0.71	10.4
	1980	568.2	40.3	5,317	3,821	353	3,483	3,117	719	0.72	6.8
	1981	907.6	59.3	3,753	4,244	428	3,816	3,040	1,204	1.13	4.7
	1982	1,323.3	88.5	1,878	1,460	399	1,091	506	984	0.79	1.1
	1983	916.2	61.3	2,754	3,220	571	2,649	1,786	1,434	1.17	3.5
	1984	1,026.7	71.0	3,198	2,247	536	1,711	1,575	672	0.70	2.2
	1985	1,166.4	78.2	3,206	1,815	508	1,307	1,232	583	0.57	1.6

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
SURRY 1,2 (Continued)	1986	1,080.5	69.0	3,763	2,356	430	1,926	1,677	679	0.63	2.2
	1987	1,132.7	71.8	2,675	712	192	520	325	387	0.27	0.6
	1988	750.4	49.1	3,184	1,542	68	1,474	1,117	425	0.48	2.1
SUSQUEHANNA 1,2	1984	719.9	72.6	2,827	308	71	237	128	180	0.11	0.4
Docket 50-387, 50-388; NPF-14; NPF-22	1985	1,452.2	76.4	3,669	1,106	77	1,029	790	316	0.30	1.8
1st commercial operation 6/83, 2/85	1986	1,344.8	67.0	2,996	828	80	748	402	426	0.28	0.6
Type - BWR	1987	1,749.5	84.3	2,548	621	36	585	341	280	0.24	0.4
Capacity - 1032, 1032 MWe	1988	1,691.0	80.8	1,904	516	52	464	281	235	0.27	0.3
THREE MILE ISLAND 1,2	1975	675.9	82.2	131	73			18	55	0.56	0.1
Docket 50-289, -320; DPR-50, -73	1976	530.0	65.4	819	286	23	263	69	217	0.35	0.5
1st commercial operation 9/74, 12/78	1977	664.5	80.9	1,122	360	15	344	128	231	0.32	0.5
Type - PWRs	1978	690.0	85.1	1,929	504	23	481	235	269	0.26	0.7
Capacity - 776, 880 MWe	1979	266.0	21.9	3,975	1,392	197	1,195	907	485	0.35	5.2
	1980	0.0	0.0	2,328	394	29	365	234	160	0.17	---
	1981	0.0	0.0	2,103	376	50	326	190	186	0.18	---
	1982	0.0	0.0	2,123	1,004	62	942	433	571	0.47	---
	1983	0.0	0.0	1,592	1,159	79	1,080	637	522	0.73	---
	1984	0.0	0.0	1,079	688	49	639	330	358	0.64	---
	1985	103.6	10.6	1,890	857	7	70	16	61	0.45	0.7
THREE MILE ISLAND 1*	1986	585.2	70.9	1,360	213	36	177	89	124	0.16	0.4
Docket 50-289; DPR-50	1987	610.7	72.5	1,259	149	40	109	50	99	0.12	0.2
1st commercial operation 9/74	1988	661.0	76.1	1,012	210	40	170	88	122	0.21	0.3
Type - PWR											
Capacity - 776 MWe											

* Three Mile Island 1 resumed commercial power generation 10/85 after being under regulatory restraint since 1979.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
THREE MILE ISLAND 2**	1986	0.0	0.0	1,497	915	152	763	613	302	0.61	---
Docket 50-320; DPR-73	1987	0.0	0.0	1,378	977	90	887	687	290	0.71	---
1st commercial operation 12/78	1988	0.0	0.0	1,247	917	31	886	691	226	0.74	---
Type - PWR											
Capacity - 880 MWE											
TROJAN	1977	792.0	92.6	591	174	30	144	105	69	0.29	0.2
Docket 50-344; NPF-1	1978	205.5	20.6	711	319	81	238	124	195	0.45	1.6
1st commercial operation 5/76	1979	631.0	58.1	736	258	74	183	113	144	0.35	0.4
Type - PWR	1980	727.5	72.5	1,159	421	77	344	305	116	0.36	0.6
Capacity - 1080 MWe	1981	775.6	74.1	1,311	609	113	496	363	246	0.46	0.8
	1982	579.5	60.8	977	419	76	343	168	251	0.43	0.7
	1983	494.2	62.4	969	307	35	272	129	178	0.32	0.6
	1984	567.0	54.4	1,042	433	40	393	230	203	0.42	0.8
	1985	829.1	76.7	852	363	31	332	210	153	0.43	0.4
	1986	852.4	79.7	1,321	381	46	335	274	107	0.29	0.4
	1987	525.5	52.9	1,209	363	66	297	266	97	0.30	0.7
	1988	758.6	66.7	1,408	401	108	293	311	90	0.28	0.5
TURKEY POINT 3,4	1973	401.9		444	78					0.18	0.2
Docket 50-250, 50-251; DPR-31, -41	1974	953.6		794	454	88	366	202	252	0.57	0.5
1st commercial operation 12/72, 9/73	1975	1,003.7	74.9	1,176	876	270	606	559	317	0.74	0.9
Type - PWRs	1976	974.2	71.2	1,647	1,184	89	1,095	868	316	0.72	1.2
Capacity - 666, 666 MWe	1977	979.5	72.1	1,319	1,036	94	942	522	514	0.79	1.1
	1978	1,000.2	78.8	1,336	1,032	90	942	546	486	0.77	1.0
	1979	811.0	62.4	2,002	1,680	299	1,381	997	683	0.84	2.1
	1980	990.6	73.6	1,803	1,651	232	1,419	1,218	433	0.92	1.7
	1981	654.0	46.8	2,932	2,251	274	1,977	1,854	397	0.77	3.4
	1982	915.7	65.2	2,956	2,119	197	1,922	1,656	463	0.72	2.3
	1983	878.4	62.8	2,930	2,681	272	2,409	2,119	562	0.92	3.1
	1984	946.7	68.5	2,010	1,255	217	1,038	876	379	0.62	1.3

**Three Mile Island 2 has been shut down since the 1979 accident, but is still included in the count of reactors while dose is being accumulated to defuel and decommission the unit.

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
TURKEY POINT 3,4 (Continued)	1985	1,034.9	74.7	1,905	1,253	91	1,162	817	436	0.66	1.2
	1986	754.1	54.9	1,808	946	71	875	716	230	0.52	1.3
	1987	431.3	33.6	1,980	1,371	79	1,292	987	384	0.69	3.2
	1988	809.8	58.7	1,841	738	18	720	523	215	0.40	0.9
VERMONT YANKEE	1973	222.1		244	85					0.35	0.4
Docket 50-271; DPR-28	1974	303.5		357	216	24	192	103	113	0.61	0.7
1st commercial operation 11/72	1975	429.0	87.8	282	153	70	83	63	90	0.54	0.4
Type - BWR	1976	389.6	77.1	815	411	36	375	246	165	0.50	1.1
Capacity - 504 MWe	1977	423.5	85.1	641	258	83	175	90	168	0.40	0.6
	1978	387.5	75.9	934	339	78	261	158	181	0.36	0.9
	1979	414.0	82.1	1,220	1,170	546	624	642	528	0.96	2.8
	1980	357.8	71.5	1,443	1,338	141	1,197	926	412	0.93	3.7
	1981	429.1	84.6	1,264	731	121	610	408	323	0.58	1.7
	1982	501.0	96.0	481	205	60	145	80	125	0.43	0.4
	1983	346.1	69.3	1,316	1,527	215	1,312	787	740	1.16	4.4
	1984	398.1	79.0	954	626	80	523	307	296	0.66	1.5
	1985	361.4	71.8	1,392	1,051	164	887	898	153	0.76	2.9
	1986	248.1	48.9	1,389	1,188	44	1,144	1,092	96	0.86	4.8
	1987	423.6	83.2	827	303	37	266	226	77	0.37	0.7
	1988	492.1	94.9	379	124	27	97	67	57	0.33	0.3
VOGTLE 1	1988	820.4	74.8	1,108	138	13	125	107	31	0.12	0.2
Docket 50-424; NPF-68											
1st commercial operation 6/87											
Type - PWR											
Capacity - 1079 MWe											
WASHINGTON NUCLEAR 2	1985	616.0	87.6	755	119	42	77	42	77	0.16	0.2
Docket 50-397; NPF-21	1986	616.0	74.0	1,013	222	56	166	70	152	0.22	0.4
1st commercial operation 12/84	1987	639.0	68.3	1,201	406	95	311	143	263	0.34	0.6
Type - BWR	1988	707.7	68.6	1,050	353	81	272	93	260	0.34	0.5
Capacity - 1095 MWe											

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
WATERFORD 3	1986	875.7	79.1	1,244	223	62	161	178	45	0.18	0.3
Docket 50-382; NPF-38	1987	891.8	80.9	959	156	33	123	106	50	0.16	0.2
1st commercial operation 9/85	1988	784.3	73.7	1,246	259	79	180	207	52	0.21	0.3
Type - PWR											
Capacity - 1075 MWe											
WOLF CREEK 1	1986	832.8	73.3	681	142	27	115	77	65	0.21	0.2
Docket 50-482; NPF-42	1987	778.8	68.6	671	134	25	109	80	54	0.20	0.2
1st commercial operation 9/85	1988	794.7	67.9	1,011	297	62	235	177	120	0.29	0.4
Type - PWR											
Capacity - 1128 MWe											
YANKEE ROWE	1969	138.3		193	215	83	132	78	133	1.11	1.6
Docket 50-29; DPR-3	1970	146.1		355	255	90	165	158	97	0.72	1.7
1st commercial operation 7/61	1971	173.5		155	90	46	44	19	71	0.58	0.5
Type - PWR	1972	78.7		282	255	63	192	146	109	0.90	3.2
Capacity - 167 MWe	1973	127.1		133	99			47	52	0.74	0.8
	1974	111.3		243	205			99	106	0.84	1.8
	1975	145.1	82.4	249	116	52	64	66	50	0.47	0.8
	1976	152.2	89.9	152	59	17	42	4	55	0.39	0.4
	1977	124.6	73.9	725	356	28	328	174	182	0.49	2.9
	1978	145.0	81.0	565	282	26	256	95	187	0.50	1.9
	1979	149.0	81.6	441	127	16	111	52	75	0.29	0.9
	1980	35.6	22.0	502	213	6	207	90	123	0.42	6.0
	1981	109.0	74.4	515	302	8	294	136	166	0.59	2.8
	1982	108.6	73.4	814	474	6	468	215	259	0.58	4.4
	1983	163.5	91.4	395	68	19	49	4	64	0.17	0.4
	1984	124.8	71.4	654	348	15	33	141	207	0.53	2.8
	1985	144.3	85.3	653	211	17	194	81	130	0.32	1.5
	1986	169.7	95.0	384	45	20	25	2	43	0.12	0.3
	1987	138.7	81.1	593	217	38	180	127	91	0.37	1.6
	1988	136.4	84.5	738	227	35	192	148	79	0.31	1.7

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY (Continued)

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ZION 1,2	1974	425.3	71.1	306	56			13	43	0.18	0.1
Docket 50-295, 50-304; DPR-39, -48	1975	1,181.5	74.9	436	127	17	110	49	78	0.29	0.1
1st commercial operation 12/73, 9/74	1976	1,134.9	61.9	774	571	64	507	257	314	0.74	0.5
Type - PWRs	1977	1,358.6	75.0	784	1,003	43	960	561	442	1.28	0.7
Capacity - 1040, 1040 MWe	1978	1,613.5	80.2	1,104	1,017	150	867	418	599	0.92	0.6
	1979	1,238.0	67.6	1,472	1,274	168	1,106	747	527	0.87	1.0
	1980	1,411.2	74.1	1,363	920	97	823	560	360	0.67	0.7
	1981	1,366.9	72.3	1,754	1,720	50	1,670	1,155	564	0.98	1.3
	1982	1,186.4	64.3	1,575	2,103	42	2,061	1,688	415	1.34	1.8
	1983	1,222.3	69.4	1,285	1,311	118	1,193	905	406	1.02	1.1
	1984	1,389.9	69.6	1,110	786	23	763	556	230	0.71	0.6
	1985	1,187.9	62.9	1,498	1,166	41	1,125	784	382	0.78	1.0
	1986	1,462.0	73.2	967	498	22	476	346	152	0.51	0.8
	1987	1,337.0	67.8	1,046	693	40	653	458	235	0.66	0.5
	1988	1,549.1	76.6	1,926	1,260	38	1,222	1,045	215	0.65	0.8

APPENDIX D

Number of Personnel and Person-Rem by Work and Job Function

1988

APPENDIX D

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *ARKANSAS 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	1	36	43	1.130	0.240	7.224	8.594
OPERATIONS PERSONNEL	66	0	0	66	34.564	0.000	0.000	34.564
HEALTH PHYSICS PERSONNEL	49	0	165	214	13.726	0.000	64.639	78.365
SUPERVISORY PERSONNEL	4	0	0	4	0.553	0.000	0.000	0.553
ENGINEERING PERSONNEL	3	2	13	18	1.060	0.275	3.760	5.095
TOTAL	128	3	214	345	51.033	0.515	75.623	127.171
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	78	10	239	327	28.169	2.887	103.565	134.621
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	10	0	82	92	1.665	0.000	16.363	18.028
SUPERVISORY PERSONNEL	3	0	2	5	0.652	0.000	0.700	1.352
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.455	0.455
TOTAL	91	10	325	426	30.486	2.887	121.083	154.456
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	24	1	150	175	6.560	0.190	42.869	49.619
OPERATIONS PERSONNEL	2	0	0	2	0.935	0.000	0.000	0.935
HEALTH PHYSICS PERSONNEL	2	0	41	43	1.270	0.000	7.447	8.717
SUPERVISORY PERSONNEL	2	0	1	3	0.325	0.000	0.275	0.600
ENGINEERING PERSONNEL	2	22	22	46	0.295	0.290	8.211	8.796
TOTAL	32	23	214	269	9.385	0.480	58.802	68.667
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	105	14	576	695	66.819	5.474	324.884	397.177
OPERATIONS PERSONNEL	2	0	1	3	0.675	0.000	0.405	1.080
HEALTH PHYSICS PERSONNEL	23	0	135	158	6.345	0.000	56.300	62.645
SUPERVISORY PERSONNEL	7	0	5	12	2.220	0.000	3.345	5.565
ENGINEERING PERSONNEL	4	1	53	58	1.040	0.155	31.637	32.832
TOTAL	141	15	770	926	77.099	5.629	416.571	499.299
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	16	16	0.000	0.000	3.110	3.110
OPERATIONS PERSONNEL	4	0	0	4	0.670	0.000	0.000	0.670
HEALTH PHYSICS PERSONNEL	18	0	54	72	9.746	0.000	18.342	28.088
SUPERVISORY PERSONNEL	4	0	0	4	1.130	0.000	0.000	1.130
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	26	0	70	96	11.546	0.000	21.452	32.998
REFUELING								
MAINTENANCE PERSONNEL	87	10	343	440	61.210	4.950	198.761	264.921
OPERATIONS PERSONNEL	20	0	0	20	3.335	0.000	0.000	3.335
HEALTH PHYSICS PERSONNEL	18	0	183	201	5.725	0.000	84.306	90.031
SUPERVISORY PERSONNEL	6	0	3	9	4.186	0.000	0.730	4.916
ENGINEERING PERSONNEL	7	1	70	78	2.095	0.245	33.202	35.542
TOTAL	138	11	599	748	76.551	5.195	316.999	398.745
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	300 (145)	36 (20)	1360 (782)	1696 (947)	163.888	13.741	680.413	858.042
OPERATIONS PERSONNEL	94 (75)	0 (0)	1 (1)	95 (76)	40.179	0.000	0.405	40.584
HEALTH PHYSICS PERSONNEL	120 (57)	0 (0)	660 (278)	780 (335)	38.477	0.000	247.397	285.874
SUPERVISORY PERSONNEL	26 (16)	0 (0)	11 (6)	37 (22)	9.066	0.000	5.050	14.116
ENGINEERING PERSONNEL	16 (12)	26 (6)	160 (122)	202 (140)	4.490	0.965	77.265	82.720
GRAND TOTALS	556 (305)	62 (26)	2192 (1189)	2810(1520)	256.100	14.706	1010.530	1281.336

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BEAVER VALLEY 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	0	29	35	1.260	0.000	11.160	12.420
OPERATIONS PERSONNEL	42	0	0	42	9.260	0.000	0.000	9.260
HEALTH PHYSICS PERSONNEL	25	0	73	98	8.850	0.000	29.900	38.750
SUPERVISORY PERSONNEL	15	0	35	50	5.635	0.000	9.720	15.355
ENGINEERING PERSONNEL	5	0	0	5	0.721	0.000	0.010	0.731
TOTAL	93	0	137	230	25.726	0.000	50.790	76.516
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	86	0	152	238	29.036	0.000	65.150	94.186
OPERATIONS PERSONNEL	1	0	0	1	0.320	0.000	0.010	0.330
HEALTH PHYSICS PERSONNEL	4	0	4	8	1.355	0.000	2.085	3.440
SUPERVISORY PERSONNEL	7	0	12	19	1.742	0.000	4.615	6.357
ENGINEERING PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
TOTAL	98	0	168	266	32.458	0.000	71.860	104.318
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	140	141	0.435	0.000	103.610	104.045
OPERATIONS PERSONNEL	1	0	0	1	0.080	0.000	0.175	0.255
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.105	0.000	0.455	0.560
SUPERVISORY PERSONNEL	6	0	35	41	4.305	0.000	29.015	33.320
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	8	0	176	184	4.925	0.000	133.255	138.180
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	136	138	0.715	0.000	63.250	63.965
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.605	0.605
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.005	0.005
SUPERVISORY PERSONNEL	1	0	7	8	0.350	0.000	3.915	4.265
ENGINEERING PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
TOTAL	3	0	144	147	1.070	0.000	67.775	68.845
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	12	14	0.415	0.000	3.810	4.225
OPERATIONS PERSONNEL	3	0	0	3	1.065	0.000	0.000	1.065
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.125	0.000	0.920	1.045
SUPERVISORY PERSONNEL	3	0	0	3	0.835	0.000	0.005	0.840
ENGINEERING PERSONNEL	0	0	0	0	0.835	0.000	0.000	0.835
TOTAL	9	0	15	24	3.275	0.000	4.735	8.010
REFUELING								
MAINTENANCE PERSONNEL	15	0	54	69	7.420	0.000	31.610	39.030
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.020	0.020
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	0.150	0.150
SUPERVISORY PERSONNEL	5	0	23	28	3.260	0.000	11.150	14.410
ENGINEERING PERSONNEL	1	0	1	2	0.335	0.000	1.065	1.400
TOTAL	21	0	79	100	11.015	0.000	43.995	55.010
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	112	0	523	635	39.281	0.000	278.590	317.871
OPERATIONS PERSONNEL	47	0	1	48	10.725	0.000	0.810	11.535
HEALTH PHYSICS PERSONNEL	30	0	82	112	10.435	0.000	33.515	43.950
SUPERVISORY PERSONNEL	37	0	112	149	16.127	0.000	58.420	74.547
ENGINEERING PERSONNEL	6	0	1	7	1.901	0.000	1.075	2.976
GRAND TOTALS	232	0	719	951	78.469	0.000	372.410	450.879

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BIG ROCK POINT

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	0	1	0.649	0.045	0.000	0.694
OPERATIONS PERSONNEL	28	1	0	29	21.750	0.159	0.000	21.909
HEALTH PHYSICS PERSONNEL	12	0	4	16	5.807	0.012	0.589	6.408
SUPERVISORY PERSONNEL	2	0	1	3	0.624	0.025	0.104	0.753
ENGINEERING PERSONNEL	2	0	0	2	0.466	0.000	0.000	0.466
TOTAL	45	1	5	51	29.296	0.241	0.693	30.230
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	29	23	7	59	13.394	9.257	3.216	25.867
OPERATIONS PERSONNEL	0	4	0	4	0.101	0.568	0.000	0.669
HEALTH PHYSICS PERSONNEL	7	0	7	14	2.038	0.000	1.990	4.028
SUPERVISORY PERSONNEL	2	2	1	5	0.291	0.255	0.228	0.774
ENGINEERING PERSONNEL	1	0	0	1	0.522	0.022	0.000	0.544
TOTAL	39	29	15	83	16.346	10.102	5.434	31.882
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	16	6	23	0.189	7.461	6.837	14.487
OPERATIONS PERSONNEL	0	0	0	0	0.008	0.053	0.000	0.061
HEALTH PHYSICS PERSONNEL	3	1	6	10	0.892	0.146	2.114	3.152
SUPERVISORY PERSONNEL	0	1	1	2	0.000	0.649	0.843	1.492
ENGINEERING PERSONNEL	1	0	0	1	0.590	0.000	0.000	0.590
TOTAL	5	18	13	36	1.679	8.309	9.794	19.782
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	21	34	6	61	18.937	18.520	1.380	38.837
OPERATIONS PERSONNEL	9	3	0	12	2.113	1.701	0.000	3.814
HEALTH PHYSICS PERSONNEL	11	0	7	18	7.849	0.000	3.864	11.713
SUPERVISORY PERSONNEL	6	4	2	12	1.884	0.875	0.523	3.282
ENGINEERING PERSONNEL	4	0	0	4	1.534	0.000	0.000	1.534
TOTAL	51	41	15	107	32.317	21.096	5.767	59.180
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	0	1	13	2.483	0.013	0.968	3.464
OPERATIONS PERSONNEL	0	0	0	0	0.302	0.135	0.000	0.437
HEALTH PHYSICS PERSONNEL	5	0	0	5	2.037	0.000	0.000	2.037
SUPERVISORY PERSONNEL	0	0	0	0	0.012	0.000	0.000	0.012
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	17	0	1	18	4.834	0.148	0.968	5.950
REFUELING								
MAINTENANCE PERSONNEL	7	1	0	8	1.869	0.162	0.000	2.031
OPERATIONS PERSONNEL	15	0	0	15	2.656	0.036	0.000	2.692
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.293	0.000	0.028	0.321
SUPERVISORY PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
ENGINEERING PERSONNEL	1	2	0	3	0.137	0.372	0.000	0.509
TOTAL	23	3	0	26	4.960	0.570	0.028	5.558
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	71	74	20	165	37.521	35.458	12.401	85.380
OPERATIONS PERSONNEL	52	8	0	60	26.930	2.652	0.000	29.582
HEALTH PHYSICS PERSONNEL	38	1	24	63	18.916	0.158	8.585	27.659
SUPERVISORY PERSONNEL	10	7	5	22	2.816	1.804	1.698	6.318
ENGINEERING PERSONNEL	9	2	0	11	3.249	0.394	0.000	3.643
GRAND TOTALS	180	92	49	321	89.432	40.466	22.684	152.582

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BROWNS FERRY 1,2,3 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1041	32	12	1085	53.797	0.927	0.251	54.975
OPERATIONS PERSONNEL	134	0	8	142	15.188	0.000	0.909	16.097
HEALTH PHYSICS PERSONNEL	117	1	10	128	53.707	0.000	3.992	57.699
SUPERVISORY PERSONNEL	83	0	0	83	10.058	0.000	0.000	10.058
ENGINEERING PERSONNEL	140	28	129	297	9.687	1.768	51.605	63.060
TOTAL	1515	61	159	1735	142.437	2.695	56.757	201.889
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	1185	41	23	1249	531.026	9.318	7.855	548.199
OPERATIONS PERSONNEL	166	2	6	174	14.325	0.109	0.099	14.533
HEALTH PHYSICS PERSONNEL	117	1	10	128	28.374	0.029	1.760	30.163
SUPERVISORY PERSONNEL	84	0	0	84	9.812	0.700	0.000	10.512
ENGINEERING PERSONNEL	151	26	84	261	30.321	4.170	2.676	37.167
TOTAL	1703	70	123	1896	613.858	14.326	12.390	640.574
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	149	4	5	158	7.362	0.163	0.161	7.686
OPERATIONS PERSONNEL	40	0	0	40	0.237	0.000	0.000	0.237
HEALTH PHYSICS PERSONNEL	66	0	4	70	0.830	0.000	0.075	0.905
SUPERVISORY PERSONNEL	4	0	0	4	0.020	0.000	0.000	0.020
ENGINEERING PERSONNEL	31	6	8	45	1.688	0.532	0.533	2.753
TOTAL	290	10	17	317	10.137	0.695	0.769	11.601
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	763	10	5	778	90.246	0.977	0.285	91.508
OPERATIONS PERSONNEL	16	0	0	16	0.079	0.000	0.000	0.079
HEALTH PHYSICS PERSONNEL	72	0	4	76	3.227	0.000	0.195	3.422
SUPERVISORY PERSONNEL	35	0	0	35	0.608	0.000	0.000	0.608
ENGINEERING PERSONNEL	98	17	29	144	7.758	1.255	4.459	13.472
TOTAL	984	27	38	1049	101.918	2.232	4.939	109.089
WASTE PROCESSING								
MAINTENANCE PERSONNEL	70	3	0	73	3.229	0.002	0.000	3.231
OPERATIONS PERSONNEL	38	0	2	40	0.713	0.000	0.621	1.334
HEALTH PHYSICS PERSONNEL	34	0	2	36	2.013	0.000	0.010	2.023
SUPERVISORY PERSONNEL	1	0	0	1	0.062	0.000	0.000	0.062
ENGINEERING PERSONNEL	14	0	3	17	0.526	0.000	0.040	0.566
TOTAL	157	3	7	167	6.543	0.002	0.671	7.216
REFUELING								
MAINTENANCE PERSONNEL	63	0	0	63	0.992	0.000	0.000	0.992
OPERATIONS PERSONNEL	64	0	0	64	3.425	0.000	0.000	3.425
HEALTH PHYSICS PERSONNEL	54	1	1	56	3.291	0.005	0.260	3.556
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	12	0	37	49	0.047	0.000	18.608	18.655
TOTAL	194	1	38	233	7.755	0.005	18.868	26.628
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	3271	90	45	3406	686.652	11.387	8.552	706.591
OPERATIONS PERSONNEL	458	2	16	476	33.967	0.109	1.629	35.705
HEALTH PHYSICS PERSONNEL	460	3	31	494	91.442	0.034	6.292	97.768
SUPERVISORY PERSONNEL	208	0	0	208	20.560	0.700	0.000	21.260
ENGINEERING PERSONNEL	446	77	290	813	50.027	7.725	77.921	135.673
GRAND TOTALS	4843	172	382	5397	882.648	19.955	94.394	996.997

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BRUNSWICK 1,2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	65	4	78	147	17.208	3.566	25.956	46.730
OPERATIONS PERSONNEL	99	0	35	134	60.475	0.000	11.089	71.564
HEALTH PHYSICS PERSONNEL	73	0	50	123	71.784	0.000	47.656	119.440
SUPERVISORY PERSONNEL	0	0	0	0	0.162	0.000	0.072	0.234
ENGINEERING PERSONNEL	14	0	4	18	5.797	0.203	2.266	8.266
TOTAL	251	4	167	422	155.426	3.769	87.039	246.234
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	321	102	545	968	317.683	65.447	365.895	749.025
OPERATIONS PERSONNEL	1	0	39	40	0.919	0.000	15.914	16.833
HEALTH PHYSICS PERSONNEL	19	0	25	44	5.379	0.000	8.335	13.714
SUPERVISORY PERSONNEL	0	0	3	3	0.289	0.049	0.899	1.237
ENGINEERING PERSONNEL	72	10	151	233	35.029	3.111	86.762	124.902
TOTAL	413	112	763	1288	359.299	68.607	477.805	905.711
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	33	24	192	249	11.072	19.513	136.514	167.099
OPERATIONS PERSONNEL	0	0	4	4	0.165	0.000	0.700	0.865
HEALTH PHYSICS PERSONNEL	14	0	20	34	6.505	0.000	7.833	14.338
SUPERVISORY PERSONNEL	0	0	0	0	0.100	0.000	0.130	0.230
ENGINEERING PERSONNEL	24	4	90	118	10.379	1.992	61.180	73.551
TOTAL	71	28	306	405	28.221	21.505	206.357	256.083
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	92	0	370	462	58.459	0.365	263.365	322.189
OPERATIONS PERSONNEL	0	0	1	1	0.040	0.000	0.731	0.771
HEALTH PHYSICS PERSONNEL	11	0	11	22	3.773	0.000	6.003	9.776
SUPERVISORY PERSONNEL	0	0	0	0	0.035	0.000	0.270	0.305
ENGINEERING PERSONNEL	25	6	83	114	10.505	2.053	47.677	60.235
TOTAL	128	6	465	599	72.812	2.418	318.046	393.276
WASTE PROCESSING								
MAINTENANCE PERSONNEL	46	0	43	89	29.387	0.100	19.915	49.402
OPERATIONS PERSONNEL	0	0	0	0	0.025	0.000	0.282	0.307
HEALTH PHYSICS PERSONNEL	10	0	9	19	7.814	0.000	7.241	15.055
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	0	10	10	0.665	0.062	6.454	7.181
TOTAL	56	0	62	118	37.901	0.162	33.892	71.955
REFUELING								
MAINTENANCE PERSONNEL	28	20	82	130	19.683	9.307	37.330	66.320
OPERATIONS PERSONNEL	2	0	0	2	0.691	0.000	0.085	0.776
HEALTH PHYSICS PERSONNEL	5	0	3	8	1.511	0.000	0.877	2.388
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.005	0.005
ENGINEERING PERSONNEL	3	0	44	47	1.404	0.055	20.202	21.661
TOTAL	38	20	129	187	23.289	9.362	58.499	91.150
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	585	150	1310	2045	453.492	98.298	848.975	1400.765
OPERATIONS PERSONNEL	102	0	79	181	62.315	0.000	28.801	91.116
HEALTH PHYSICS PERSONNEL	132	0	118	250	96.766	0.000	77.945	174.711
SUPERVISORY PERSONNEL	0	0	3	3	0.596	0.049	1.376	2.021
ENGINEERING PERSONNEL	138	20	382	540	63.779	7.476	224.541	295.796
GRAND TOTALS	957	170	1892	3019	676.948	105.823	1181.638	1964.409

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BYRON 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	1	2	0.006	0.000	0.010	0.016
OPERATIONS PERSONNEL	1	0	0	1	0.047	0.000	0.000	0.047
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	0.009	0.009
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.046	0.000	0.000	0.046
TOTAL	3	0	2	5	0.099	0.000	0.019	0.118
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	26	1	12	39	8.515	0.035	4.774	13.324
OPERATIONS PERSONNEL	42	0	2	44	10.223	0.000	1.654	11.877
HEALTH PHYSICS PERSONNEL	14	0	1	15	8.006	0.000	0.423	8.429
SUPERVISORY PERSONNEL	4	0	0	4	1.360	0.000	0.000	1.360
ENGINEERING PERSONNEL	9	7	42	58	1.825	0.077	14.709	16.611
TOTAL	95	8	57	160	29.929	0.112	21.560	51.601
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	1	2	0.039	0.000	0.080	0.119
OPERATIONS PERSONNEL	1	0	0	1	0.075	0.000	0.000	0.075
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.526	0.000	0.056	0.582
SUPERVISORY PERSONNEL	1	0	0	1	0.263	0.000	0.000	0.263
ENGINEERING PERSONNEL	1	2	2	5	0.266	0.017	0.684	0.967
TOTAL	5	2	4	11	1.169	0.017	0.820	2.006
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	16	0	43	59	5.236	0.000	17.238	22.474
OPERATIONS PERSONNEL	23	0	0	23	5.602	0.000	0.000	5.602
HEALTH PHYSICS PERSONNEL	13	0	4	17	7.474	0.000	1.094	8.568
SUPERVISORY PERSONNEL	5	0	0	5	1.705	0.000	0.000	1.705
ENGINEERING PERSONNEL	6	1	49	56	1.387	0.013	17.039	18.439
TOTAL	63	1	96	160	21.404	0.013	35.371	56.788
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	1	2	0.015	0.000	0.072	0.087
OPERATIONS PERSONNEL	8	0	2	10	1.373	0.000	1.506	2.879
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.370	0.000	0.009	0.379
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.333	0.333
TOTAL	10	0	6	16	1.758	0.000	1.920	3.678
REFUELING								
MAINTENANCE PERSONNEL	98	7	309	414	32.702	0.408	122.767	155.877
OPERATIONS PERSONNEL	49	0	1	50	12.296	0.000	0.065	12.361
HEALTH PHYSICS PERSONNEL	20	0	71	91	10.977	0.000	22.981	33.958
SUPERVISORY PERSONNEL	22	0	0	22	7.431	0.000	0.000	7.431
ENGINEERING PERSONNEL	20	17	341	378	4.355	0.180	118.485	123.020
TOTAL	209	24	722	955	67.761	0.588	264.298	332.647
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	143	8	367	518	46.513	0.443	144.941	191.897
OPERATIONS PERSONNEL	124	0	5	129	29.616	0.000	3.225	32.841
HEALTH PHYSICS PERSONNEL	49	0	79	128	27.353	0.000	24.572	51.925
SUPERVISORY PERSONNEL	32	0	0	32	10.759	0.000	0.000	10.759
ENGINEERING PERSONNEL	37	27	436	500	7.879	0.287	151.250	159.416
GRAND TOTALS	385	35	887	1307	122.120	0.730	323.988	446.838

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *CALLAWAY 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.239	0.000	0.000	0.239
OPERATIONS PERSONNEL	18	0	0	18	5.810	0.000	0.148	5.958
HEALTH PHYSICS PERSONNEL	19	0	0	19	5.653	0.000	0.000	5.653
SUPERVISORY PERSONNEL	0	0	0	0	0.384	0.000	0.000	0.384
ENGINEERING PERSONNEL	0	0	0	0	0.163	0.000	0.048	0.211
TOTAL	37	0	0	37	12.249	0.000	0.196	12.445
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	20	0	2	22	7.179	0.000	1.198	8.377
OPERATIONS PERSONNEL	4	0	1	5	1.988	0.000	0.198	2.186
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.929	0.000	0.000	0.929
SUPERVISORY PERSONNEL	0	0	0	0	0.147	0.000	0.000	0.147
ENGINEERING PERSONNEL	1	0	0	1	0.348	0.000	0.030	0.378
TOTAL	27	0	3	30	10.591	0.000	1.426	12.017
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.015	0.000	0.003	0.018
OPERATIONS PERSONNEL	1	0	0	1	0.172	0.000	0.000	0.172
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.008	0.000	0.000	0.008
SUPERVISORY PERSONNEL	0	0	0	0	0.023	0.000	0.000	0.023
ENGINEERING PERSONNEL	1	0	0	1	0.546	0.000	0.027	0.573
TOTAL	2	0	0	2	0.764	0.000	0.030	0.794
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.046	0.000	0.082	0.128
OPERATIONS PERSONNEL	0	0	0	0	0.006	0.000	0.000	0.006
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.102	0.000	0.000	0.102
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.017	0.000	0.000	0.017
TOTAL	0	0	0	0	0.171	0.000	0.082	0.253
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	1	0	1	2	0.930	0.000	0.688	1.618
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.193	0.000	0.000	0.193
SUPERVISORY PERSONNEL	0	0	0	0	0.055	0.000	0.000	0.055
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	1	0	1	2	1.178	0.000	0.688	1.866
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	20	0	2	22	7.479	0.000	1.283	8.762
OPERATIONS PERSONNEL	24	0	2	26	8.906	0.000	1.034	9.940
HEALTH PHYSICS PERSONNEL	21	0	0	21	6.885	0.000	0.000	6.885
SUPERVISORY PERSONNEL	0	0	0	0	0.609	0.000	0.000	0.609
ENGINEERING PERSONNEL	2	0	0	2	1.074	0.000	0.105	1.179
GRAND TOTALS	67	0	4	71	24.953	0.000	2.422	27.375

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *CALVERT CLIFFS 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	4	1	1	6	0.680	0.110	0.258	1.048
OPERATIONS PERSONNEL	47	0	0	47	17.686	0.000	0.000	17.686
HEALTH PHYSICS PERSONNEL	17	0	3	20	4.030	0.000	0.835	4.865
SUPERVISORY PERSONNEL	6	0	0	6	0.802	0.000	0.000	0.802
ENGINEERING PERSONNEL	6	0	0	6	0.781	0.000	0.000	0.781
TOTAL	80	1	4	85	23.979	0.110	1.093	25.182
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	22	0	29	51	4.938	0.000	6.255	11.193
OPERATIONS PERSONNEL	1	0	0	1	0.142	0.000	0.000	0.142
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.106	0.000	0.000	0.106
TOTAL	24	0	29	53	5.186	0.000	6.255	11.441
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	24	39	66	0.453	9.104	12.126	21.683
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	4	0	1	5	0.587	0.000	0.152	0.739
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	6	0	0	6	2.982	0.000	0.000	2.982
TOTAL	13	24	40	77	4.022	9.104	12.278	25.404
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	140	45	79	264	46.152	16.167	25.011	87.330
OPERATIONS PERSONNEL	14	0	1	15	3.245	0.000	0.199	3.444
HEALTH PHYSICS PERSONNEL	25	1	18	44	9.668	0.257	2.698	12.623
SUPERVISORY PERSONNEL	5	1	3	9	0.698	0.151	0.901	1.750
ENGINEERING PERSONNEL	12	0	3	15	3.255	0.000	0.975	4.230
TOTAL	196	47	104	347	63.018	16.575	29.784	109.377
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	18	20	0.224	0.000	6.396	6.620
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	24	1	14	39	9.125	1.316	5.470	15.911
SUPERVISORY PERSONNEL	2	0	0	2	0.509	0.000	0.000	0.509
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	28	1	32	61	9.858	1.316	11.866	23.040
REFUELING								
MAINTENANCE PERSONNEL	34	27	11	72	15.076	11.256	1.960	28.292
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	17	1	39	57	4.389	0.128	11.000	15.517
SUPERVISORY PERSONNEL	3	0	0	3	2.119	0.000	0.000	2.119
ENGINEERING PERSONNEL	1	0	0	1	0.225	0.000	0.000	0.225
TOTAL	55	28	50	133	21.809	11.384	12.960	46.153
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	205 (157)	97 (80)	177 (143)	479 (380)	67.523	36.637	52.006	156.166
OPERATIONS PERSONNEL	62 (70)	0 (0)	1 (3)	63 (73)	21.073	0.000	0.199	21.272
HEALTH PHYSICS PERSONNEL	87 (44)	3 (1)	75 (58)	165 (103)	27.799	1.701	20.155	49.655
SUPERVISORY PERSONNEL	16 (16)	1 (1)	3 (4)	20 (21)	4.128	0.151	0.901	5.180
ENGINEERING PERSONNEL	26 (28)	0 (0)	3 (4)	29 (32)	7.349	0.000	0.975	8.324
GRAND TOTALS	396 (315)	101 (82)	259 (212)	756 (609)	127.872	38.489	74.236	240.597

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *CATAWBA 1,2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	135	482	242	859	6.632	22.620	6.530	35.782
OPERATIONS PERSONNEL	64	0	54	118	19.733	0.025	1.245	21.003
HEALTH PHYSICS PERSONNEL	50	0	139	189	12.035	0.000	10.424	22.459
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	83	21	15	119	6.690	0.335	0.480	7.505
TOTAL	332	503	450	1285	45.090	22.980	18.679	86.749
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	130	465	142	737	21.819	68.253	12.470	102.542
OPERATIONS PERSONNEL	44	2	53	99	0.805	0.665	23.374	24.844
HEALTH PHYSICS PERSONNEL	50	0	128	178	6.201	0.000	14.445	20.646
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	68	18	13	99	9.180	2.395	4.465	16.040
TOTAL	292	485	336	1113	38.005	71.313	54.754	164.072
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	69	219	119	407	1.990	58.465	32.990	93.445
OPERATIONS PERSONNEL	3	0	16	19	0.035	0.070	0.150	0.255
HEALTH PHYSICS PERSONNEL	28	0	78	106	2.320	0.000	13.940	16.260
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	54	11	20	85	9.065	8.930	5.310	23.305
TOTAL	154	230	233	617	13.410	67.465	52.390	133.265
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	108	457	180	745	9.954	140.084	87.325	237.363
OPERATIONS PERSONNEL	19	1	26	46	0.745	0.000	1.590	2.335
HEALTH PHYSICS PERSONNEL	36	0	117	153	4.395	0.000	21.885	26.280
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	57	16	3	76	8.225	1.750	1.045	11.020
TOTAL	220	474	326	1020	23.319	141.834	111.845	276.998
WASTE PROCESSING								
MAINTENANCE PERSONNEL	15	31	5	51	0.175	0.140	0.000	0.315
OPERATIONS PERSONNEL	8	0	39	47	0.115	0.065	0.935	1.115
HEALTH PHYSICS PERSONNEL	30	0	21	51	5.110	0.000	3.620	8.730
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	15	2	1	18	0.475	0.000	0.520	0.995
TOTAL	68	33	66	167	5.875	0.205	5.075	11.155
REFUELING								
MAINTENANCE PERSONNEL	19	74	7	100	0.485	1.800	0.200	2.485
OPERATIONS PERSONNEL	6	0	2	8	0.140	0.000	0.000	0.140
HEALTH PHYSICS PERSONNEL	14	0	30	44	0.080	0.000	0.050	0.130
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	14	2	1	17	0.080	0.035	0.070	0.185
TOTAL	53	76	40	169	0.785	1.835	0.320	2.940
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	476 (135)	1728 (489)	695 (236)	2899 (860)	41.055	291.362	139.515	471.932
OPERATIONS PERSONNEL	144 (65)	3 (1)	190 (53)	337 (119)	21.573	0.825	27.294	49.692
HEALTH PHYSICS PERSONNEL	208 (50)	0 (0)	513 (139)	721 (189)	30.141	0.000	64.364	94.505
SUPERVISORY PERSONNEL	0 (0)	0 (0)	0 (0)	0 (0)	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	291 (81)	70 (21)	53 (25)	414 (127)	33.715	13.445	11.890	59.050
GRAND TOTALS	1119 (331)	1801 (511)	1451 (453)	4371(1295)	126.484	305.632	243.063	675.179

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *CLINTON

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.079	0.233	0.312
OPERATIONS PERSONNEL	33	0	1	34	0.000	10.344	1.692	12.036
HEALTH PHYSICS PERSONNEL	36	0	24	60	0.046	23.228	12.404	35.678
SUPERVISORY PERSONNEL	7	0	0	7	0.007	1.934	0.268	2.209
ENGINEERING PERSONNEL	3	0	1	4	0.000	1.046	0.374	1.420
TOTAL	79	0	26	105	0.053	36.631	14.971	51.655
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	58	0	122	180	0.000	24.057	40.544	64.601
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.017	0.017
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.004	0.490	0.494
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.012	0.000	0.012
ENGINEERING PERSONNEL	3	0	1	4	0.000	0.938	0.253	1.191
TOTAL	61	0	124	185	0.000	25.011	41.304	66.315
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.003	0.038	0.041
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.029	0.029
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.004	0.007	0.011
SUPERVISORY PERSONNEL	0	0	0	0	0.007	0.002	0.021	0.030
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.012	0.000	0.012
TOTAL	0	0	0	0	0.007	0.021	0.095	0.123
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.097	0.097
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.004	0.007	0.011
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.002	0.000	0.002
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.006	0.114	0.120
WASTE PROCESSING								
MAINTENANCE PERSONNEL	24	0	11	35	0.000	9.294	12.643	21.937
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.097	0.007	0.104
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.002	0.000	0.002
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	24	0	11	35	0.000	9.393	12.660	22.053
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.011	0.011
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.004	0.007	0.011
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.002	0.049	0.051
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.006	0.077	0.083
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	82 (97)	0 (0)	133 (149)	215 (246)	0.000	33.433	53.566	86.999
OPERATIONS PERSONNEL	33 (38)	0 (0)	1 (5)	34 (43)	0.000	10.344	1.768	12.112
HEALTH PHYSICS PERSONNEL	36 (38)	0 (1)	25 (26)	61 (65)	0.046	23.341	12.922	36.309
SUPERVISORY PERSONNEL	7 (7)	0 (0)	0 (0)	7 (7)	0.014	1.954	0.338	2.306
ENGINEERING PERSONNEL	6 (9)	0 (0)	2 (2)	8 (11)	0.000	1.996	0.627	2.623
GRAND TOTALS	164 (189)	0 (1)	161 (182)	325 (372)	0.060	71.068	69.221	140.349

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *COOK 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	10	17	0.971	0.000	3.062	4.033
OPERATIONS PERSONNEL	56	1	33	90	15.451	0.155	13.699	29.305
HEALTH PHYSICS PERSONNEL	18	0	61	79	7.353	0.000	22.952	30.305
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.130	0.130
ENGINEERING PERSONNEL	10	0	4	14	1.822	0.000	0.674	2.496
TOTAL	91	1	109	201	25.597	0.155	40.517	66.269
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	101	2	241	344	44.339	0.267	155.889	200.495
OPERATIONS PERSONNEL	19	1	22	42	5.910	0.338	6.246	12.494
HEALTH PHYSICS PERSONNEL	6	0	13	19	1.205	0.000	5.106	6.311
SUPERVISORY PERSONNEL	2	0	1	3	0.285	0.000	0.244	0.529
ENGINEERING PERSONNEL	3	3	0	6	0.357	0.536	0.000	0.893
TOTAL	131	6	277	414	52.096	1.141	167.485	220.722
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	18	23	0.954	0.000	3.448	4.402
OPERATIONS PERSONNEL	3	1	14	18	0.630	0.650	8.586	9.866
HEALTH PHYSICS PERSONNEL	3	0	3	6	0.494	0.000	0.929	1.423
SUPERVISORY PERSONNEL	1	0	0	1	0.170	0.000	0.000	0.170
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.170	0.170
TOTAL	12	1	36	49	2.248	0.650	13.133	16.031
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	11	31	680	722	1.722	28.997	541.633	572.352
OPERATIONS PERSONNEL	20	10	11	41	4.961	4.987	10.332	20.280
HEALTH PHYSICS PERSONNEL	0	0	79	79	0.000	0.000	103.184	103.184
SUPERVISORY PERSONNEL	10	10	12	32	1.102	0.432	4.257	5.791
ENGINEERING PERSONNEL	10	10	20	40	0.145	3.130	22.918	26.193
TOTAL	51	61	802	914	7.930	37.546	682.324	727.800
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	54	55	0.620	0.000	19.097	19.717
OPERATIONS PERSONNEL	0	0	4	4	0.000	0.000	2.429	2.429
HEALTH PHYSICS PERSONNEL	0	0	17	17	0.000	0.000	4.597	4.597
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	1	2	0.170	0.000	0.175	0.345
TOTAL	2	0	76	78	0.790	0.000	26.298	27.088
REFUELING								
MAINTENANCE PERSONNEL	4	0	18	22	0.528	0.000	8.664	9.192
OPERATIONS PERSONNEL	10	1	66	77	4.750	0.106	33.386	38.242
HEALTH PHYSICS PERSONNEL	2	0	14	16	0.205	0.000	5.743	5.948
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	1	0	2	0.121	0.151	0.000	0.272
TOTAL	17	2	98	117	5.604	0.257	47.793	53.654
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	129 (102)	33 (2)	1021 (324)	1183 (428)	49.134	29.264	731.793	810.191
OPERATIONS PERSONNEL	108 (73)	14 (2)	150 (106)	272 (181)	31.702	6.236	74.678	112.616
HEALTH PHYSICS PERSONNEL	29 (18)	0 (0)	187 (79)	216 (97)	9.257	0.000	142.511	151.768
SUPERVISORY PERSONNEL	13 (3)	10 (0)	14 (1)	37 (4)	1.557	0.432	4.631	6.620
ENGINEERING PERSONNEL	25 (11)	14 (4)	26 (5)	65 (20)	2.615	3.817	23.937	30.369
GRAND TOTALS	304 (207)	71 (8)	1398 (515)	1773 (730)	94.265	39.749	977.550	1111.564

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *COOPER STATION

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	9	0	8	17	0.579	0.000	0.664	1.243
OPERATIONS PERSONNEL	50	0	0	50	17.666	0.000	0.000	17.666
HEALTH PHYSICS PERSONNEL	26	0	11	37	5.941	0.000	1.219	7.160
SUPERVISORY PERSONNEL	4	2	1	7	0.659	0.419	0.112	1.190
ENGINEERING PERSONNEL	17	17	19	53	4.599	2.642	3.629	10.870
TOTAL	106	19	39	164	29.444	3.061	5.624	38.129
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	72	3	221	296	61.557	1.901	93.652	157.110
OPERATIONS PERSONNEL	1	0	0	1	0.001	0.000	0.000	0.001
HEALTH PHYSICS PERSONNEL	22	0	13	35	15.493	0.000	5.648	21.141
SUPERVISORY PERSONNEL	1	2	0	3	0.098	0.120	0.000	0.218
ENGINEERING PERSONNEL	4	23	11	38	0.069	8.231	1.319	9.619
TOTAL	100	28	245	373	77.218	10.252	100.619	188.089
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	14	14	0.000	0.000	4.549	4.549
OPERATIONS PERSONNEL	4	0	0	4	0.079	0.000	0.000	0.079
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.035	0.035
TOTAL	4	0	15	19	0.079	0.000	4.584	4.663
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	0	1	4	0.181	0.000	0.013	0.194
OPERATIONS PERSONNEL	1	0	0	1	0.059	0.000	0.000	0.059
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.086	0.000	0.015	0.101
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	2	8	0.326	0.000	0.028	0.354
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0	1	0.001	0.000	0.000	0.001
OPERATIONS PERSONNEL	7	0	0	7	2.947	0.000	0.000	2.947
HEALTH PHYSICS PERSONNEL	8	0	0	8	0.421	0.000	0.000	0.421
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	16	0	0	16	3.369	0.000	0.000	3.369
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	34	0	0	34	1.490	0.000	0.000	1.490
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.042	0.000	0.046	0.088
SUPERVISORY PERSONNEL	2	0	0	2	0.103	0.000	0.000	0.103
ENGINEERING PERSONNEL	4	0	0	4	0.272	0.000	0.000	0.272
TOTAL	41	0	1	42	1.907	0.000	0.046	1.953
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	85 (72)	3 (3)	244 (236)	332 (311)	62.318	1.901	98.878	163.097
OPERATIONS PERSONNEL	97 (52)	0 (0)	0 (0)	97 (52)	22.242	0.000	0.000	22.242
HEALTH PHYSICS PERSONNEL	59 (27)	0 (0)	26 (13)	85 (40)	21.983	0.000	6.928	28.911
SUPERVISORY PERSONNEL	7 (4)	4 (2)	1 (1)	12 (7)	0.860	0.539	0.112	1.511
ENGINEERING PERSONNEL	25 (17)	40 (26)	31 (20)	96 (63)	4.940	10.873	4.983	20.796
GRAND TOTALS	273 (172)	47 (31)	302 (270)	622 (473)	112.343	13.313	110.901	236.557

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *CRYSTAL RIVER 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	1	1	0.462	0.070	0.285	0.817
OPERATIONS PERSONNEL	7	0	0	7	0.055	0.000	0.000	0.055
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.523	0.000	0.139	0.662
SUPERVISORY PERSONNEL	0	0	0	0	0.082	0.065	0.054	0.201
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.079	0.000	0.079
TOTAL	7	0	1	8	1.122	0.214	0.478	1.814
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	60	37	19	116	16.119	12.096	6.218	34.433
OPERATIONS PERSONNEL	0	0	0	0	3.194	0.000	0.012	3.206
HEALTH PHYSICS PERSONNEL	23	0	24	47	8.323	0.000	8.384	16.707
SUPERVISORY PERSONNEL	1	0	3	4	0.804	0.159	0.825	1.788
ENGINEERING PERSONNEL	1	2	2	5	0.354	0.420	0.932	1.706
TOTAL	85	39	48	172	28.794	12.675	16.371	57.840
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.026	0.008	0.000	0.034
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.007	0.007
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.011	0.000	0.011
TOTAL	0	0	0	0	0.026	0.019	0.007	0.052
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	0	2	1.389	0.070	0.059	1.518
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	7	0	0	7	2.374	0.000	0.035	2.409
SUPERVISORY PERSONNEL	1	0	0	1	0.169	0.051	0.000	0.220
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	10	0	0	10	3.932	0.121	0.094	4.147
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	62	37	20	119	17.996	12.244	6.562	36.802
OPERATIONS PERSONNEL	7	0	0	7	3.249	0.000	0.012	3.261
HEALTH PHYSICS PERSONNEL	30	0	24	54	11.220	0.000	8.558	19.778
SUPERVISORY PERSONNEL	2	0	3	5	1.055	0.275	0.886	2.216
ENGINEERING PERSONNEL	1	2	2	5	0.354	0.510	0.932	1.796
GRAND TOTALS	102	39	49	190	33.874	13.029	16.950	63.853

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *DAVIS-BESSE

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	20	0	94	114	0.133	0.000	1.824	1.957
OPERATIONS PERSONNEL	40	0	13	53	8.913	0.000	0.126	9.039
HEALTH PHYSICS PERSONNEL	36	0	69	105	9.945	0.000	19.471	29.416
SUPERVISORY PERSONNEL	4	0	1	5	0.271	0.000	0.000	0.271
ENGINEERING PERSONNEL	17	0	36	53	1.208	0.000	1.786	2.994
TOTAL	117	0	213	330	20.470	0.000	23.207	43.677
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	62	0	426	488	6.271	0.000	55.353	61.624
OPERATIONS PERSONNEL	19	0	0	19	0.011	0.000	0.000	0.011
HEALTH PHYSICS PERSONNEL	26	0	75	101	2.721	0.000	5.104	7.825
SUPERVISORY PERSONNEL	1	0	0	1	0.038	0.000	0.000	0.038
ENGINEERING PERSONNEL	8	0	39	47	0.117	0.000	0.972	1.089
TOTAL	116	0	540	656	9.158	0.000	61.429	70.587
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	17	0	138	155	1.201	0.000	12.065	13.266
OPERATIONS PERSONNEL	14	0	0	14	0.079	0.000	0.000	0.079
HEALTH PHYSICS PERSONNEL	22	0	42	64	1.024	0.000	1.337	2.361
SUPERVISORY PERSONNEL	1	0	0	1	0.062	0.000	0.000	0.062
ENGINEERING PERSONNEL	13	0	41	54	0.792	0.000	14.690	15.482
TOTAL	67	0	221	288	3.158	0.000	28.092	31.250
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	61	0	417	478	7.262	0.000	110.264	117.526
OPERATIONS PERSONNEL	14	0	1	15	0.108	0.000	0.000	0.108
HEALTH PHYSICS PERSONNEL	36	0	93	129	7.425	0.000	12.683	20.108
SUPERVISORY PERSONNEL	4	0	0	4	0.784	0.000	0.000	0.784
ENGINEERING PERSONNEL	12	0	52	64	0.349	0.000	15.701	16.050
TOTAL	127	0	563	690	15.928	0.000	138.648	154.576
WASTE PROCESSING								
MAINTENANCE PERSONNEL	11	0	10	21	0.025	0.000	1.049	1.074
OPERATIONS PERSONNEL	19	0	12	31	0.102	0.000	3.600	3.702
HEALTH PHYSICS PERSONNEL	28	0	48	76	3.296	0.000	2.259	5.555
SUPERVISORY PERSONNEL	1	0	1	2	0.000	0.000	0.300	0.300
ENGINEERING PERSONNEL	0	0	15	15	0.000	0.000	7.964	7.964
TOTAL	59	0	86	145	3.423	0.000	15.172	18.595
REFUELING								
MAINTENANCE PERSONNEL	45	0	147	192	6.010	0.000	32.822	38.832
OPERATIONS PERSONNEL	29	0	0	29	0.417	0.000	0.000	0.417
HEALTH PHYSICS PERSONNEL	28	0	45	73	3.257	0.000	4.240	7.497
SUPERVISORY PERSONNEL	2	0	0	2	0.013	0.000	0.000	0.013
ENGINEERING PERSONNEL	10	0	19	29	0.885	0.000	5.591	6.476
TOTAL	114	0	211	325	10.582	0.000	42.653	53.235
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	216	0	1232	1448	20.902	0.000	213.377	234.279
OPERATIONS PERSONNEL	135	0	26	161	9.630	0.000	3.726	13.356
HEALTH PHYSICS PERSONNEL	176	0	372	548	27.668	0.000	45.094	72.762
SUPERVISORY PERSONNEL	13	0	2	15	1.168	0.000	0.300	1.468
ENGINEERING PERSONNEL	60	0	202	262	3.351	0.000	46.704	50.055
GRAND TOTALS	600	0	1834	2434	62.719	0.000	309.201	371.920

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *DIABLO CANYON 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	20	1	0	21	2.000	0.000	0.000	2.000
HEALTH PHYSICS PERSONNEL	15	0	0	15	2.000	0.000	0.000	2.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	35	1	0	36	4.000	0.000	0.000	4.000
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	57	14	92	163	11.000	2.000	23.000	36.000
OPERATIONS PERSONNEL	11	0	2	13	3.000	0.000	0.000	3.000
HEALTH PHYSICS PERSONNEL	23	1	54	78	4.000	0.000	10.000	14.000
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	2	2	6	0.000	1.000	1.000	2.000
TOTAL	94	17	150	261	18.000	3.000	34.000	55.000
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	31	13	47	2.000	11.000	3.000	16.000
OPERATIONS PERSONNEL	5	0	1	6	5.000	0.000	0.000	5.000
HEALTH PHYSICS PERSONNEL	0	1	0	1	0.000	1.000	0.000	1.000
SUPERVISORY PERSONNEL	1	0	0	1	1.000	0.000	0.000	1.000
ENGINEERING PERSONNEL	2	2	0	4	2.000	1.000	0.000	3.000
TOTAL	11	34	14	59	10.000	13.000	3.000	26.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	135	67	574	776	64.000	31.000	334.000	429.000
OPERATIONS PERSONNEL	71	6	9	86	16.000	2.000	3.000	21.000
HEALTH PHYSICS PERSONNEL	46	2	161	209	39.000	1.000	122.000	162.000
SUPERVISORY PERSONNEL	2	1	1	4	2.000	0.000	1.000	3.000
ENGINEERING PERSONNEL	20	14	24	58	7.000	4.000	8.000	19.000
TOTAL	274	90	769	1133	128.000	38.000	468.000	634.000
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	1	0	2	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	1	0	1	2	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	4	0	13	17	1.000	0.000	3.000	4.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	1	14	21	1.000	0.000	3.000	4.000
REFUELING								
MAINTENANCE PERSONNEL	68	7	58	133	29.000	3.000	19.000	51.000
OPERATIONS PERSONNEL	23	1	1	25	5.000	0.000	0.000	5.000
HEALTH PHYSICS PERSONNEL	14	3	49	66	5.000	1.000	15.000	21.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	1	2	5	1.000	0.000	0.000	1.000
TOTAL	107	12	110	229	40.000	4.000	34.000	78.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	264 (158)	120 (84)	737 (680)	1121 (922)	106.000	47.000	379.000	532.000
OPERATIONS PERSONNEL	131 (120)	8 (8)	14 (15)	153 (143)	31.000	2.000	3.000	36.000
HEALTH PHYSICS PERSONNEL	102 (78)	7 (4)	277 (204)	386 (286)	51.000	3.000	150.000	204.000
SUPERVISORY PERSONNEL	4 (2)	1 (1)	1 (1)	6 (4)	3.000	0.000	1.000	4.000
ENGINEERING PERSONNEL	26 (25)	19 (18)	28 (30)	73 (73)	10.000	6.000	9.000	25.000
GRAND TOTALS	527 (383)	155 (115)	1057 (930)	1739(1428)	201.000	58.000	542.000	801.000

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *DRESDEN 2,3

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	29	11	121	161	17.032	3.211	57.865	78.108
OPERATIONS PERSONNEL	78	0	19	97	68.026	0.000	7.700	75.726
HEALTH PHYSICS PERSONNEL	21	0	1	22	23.531	0.000	0.219	23.750
SUPERVISORY PERSONNEL	32	0	0	32	21.898	0.000	0.000	21.898
ENGINEERING PERSONNEL	22	12	6	40	10.591	2.004	3.305	15.900
TOTAL	182	23	147	352	141.078	5.215	69.089	215.382
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	419	10	710	1139	245.016	2.964	338.721	586.701
OPERATIONS PERSONNEL	46	0	13	59	41.032	0.000	5.080	46.112
HEALTH PHYSICS PERSONNEL	30	0	47	77	34.814	0.000	29.378	64.192
SUPERVISORY PERSONNEL	71	0	0	71	48.068	0.000	0.000	48.068
ENGINEERING PERSONNEL	27	8	18	53	12.953	1.253	10.085	24.291
TOTAL	593	18	788	1399	381.883	4.217	383.264	769.364
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	1	115	120	2.485	0.020	55.042	57.547
OPERATIONS PERSONNEL	1	0	3	4	0.025	0.000	1.052	1.077
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.344	0.000	0.000	0.344
SUPERVISORY PERSONNEL	1	0	0	1	0.534	0.000	0.000	0.534
ENGINEERING PERSONNEL	2	4	60	66	0.934	0.647	34.838	36.419
TOTAL	9	5	178	192	4.322	0.667	90.932	95.921
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	5	68	443	516	2.681	19.014	211.700	233.395
OPERATIONS PERSONNEL	1	0	1	2	0.168	0.000	0.125	0.293
HEALTH PHYSICS PERSONNEL	2	0	4	6	2.752	0.000	2.479	5.231
SUPERVISORY PERSONNEL	1	0	0	1	0.839	0.000	0.000	0.839
ENGINEERING PERSONNEL	2	5	6	13	1.298	0.843	3.511	5.652
TOTAL	11	73	454	538	7.738	19.857	217.815	245.410
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	1	88	90	0.419	0.076	42.340	42.835
OPERATIONS PERSONNEL	7	0	9	16	6.383	0.000	3.868	10.251
HEALTH PHYSICS PERSONNEL	6	0	1	7	6.536	0.000	0.158	6.694
SUPERVISORY PERSONNEL	5	0	0	5	3.052	0.000	0.000	3.052
ENGINEERING PERSONNEL	1	1	0	2	0.130	0.091	0.000	0.221
TOTAL	20	2	98	120	16.520	0.167	46.366	63.053
REFUELING								
MAINTENANCE PERSONNEL	19	0	0	19	11.588	0.000	0.000	11.588
OPERATIONS PERSONNEL	5	0	0	5	4.343	0.000	0.000	4.343
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.826	0.000	0.000	0.826
SUPERVISORY PERSONNEL	3	0	0	3	1.907	0.000	0.000	1.907
ENGINEERING PERSONNEL	1	1	1	3	0.052	0.032	0.895	0.979
TOTAL	29	1	1	31	18.716	0.032	0.895	19.643
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	477	91	1477	2045	279.221	25.285	705.668	1010.174
OPERATIONS PERSONNEL	138	0	45	183	119.977	0.000	17.825	137.802
HEALTH PHYSICS PERSONNEL	61	0	53	114	68.803	0.000	32.234	101.037
SUPERVISORY PERSONNEL	113	0	0	113	76.298	0.000	0.000	76.298
ENGINEERING PERSONNEL	55	31	91	177	25.958	4.870	52.634	83.462
GRAND TOTALS	844	122	1666	2632	570.257	30.155	808.361	1408.773

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *DUANE ARNOLD TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	10	1	20	31	5.770	0.412	13.439	19.621
OPERATIONS PERSONNEL	40	0	2	42	30.783	0.000	0.977	31.760
HEALTH PHYSICS PERSONNEL	6	0	15	21	5.387	0.000	9.258	14.645
SUPERVISORY PERSONNEL	3	0	1	4	0.462	0.000	0.143	0.605
ENGINEERING PERSONNEL	8	0	5	13	2.670	0.000	1.943	4.613
TOTAL	67	1	43	111	45.072	0.412	25.760	71.244
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	99	9	212	320	81.378	6.131	193.796	281.305
OPERATIONS PERSONNEL	4	0	1	5	2.083	0.000	0.167	2.250
HEALTH PHYSICS PERSONNEL	13	0	12	25	10.713	0.000	6.179	16.892
SUPERVISORY PERSONNEL	4	0	7	11	1.454	0.000	2.602	4.056
ENGINEERING PERSONNEL	19	1	10	30	10.619	0.322	3.882	14.823
TOTAL	139	10	242	391	106.247	6.453	206.626	319.326
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	12	2	68	82	10.256	0.203	74.814	85.273
OPERATIONS PERSONNEL	1	0	1	2	0.313	0.000	1.068	1.381
HEALTH PHYSICS PERSONNEL	1	0	6	7	1.289	0.000	3.395	4.684
SUPERVISORY PERSONNEL	1	0	4	5	0.474	0.000	2.936	3.410
ENGINEERING PERSONNEL	2	0	5	7	2.289	0.000	7.507	9.796
TOTAL	17	2	84	103	14.621	0.203	89.720	104.544
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	8	1	89	98	6.350	0.393	61.071	67.814
OPERATIONS PERSONNEL	1	0	0	1	0.306	0.000	0.000	0.306
HEALTH PHYSICS PERSONNEL	2	0	4	6	1.780	0.000	1.722	3.502
SUPERVISORY PERSONNEL	1	0	4	5	0.312	0.000	1.100	1.412
ENGINEERING PERSONNEL	6	0	11	17	2.455	0.000	5.946	8.401
TOTAL	18	1	108	127	11.203	0.393	69.839	81.435
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	0	1	6	2.024	0.001	0.590	2.615
OPERATIONS PERSONNEL	3	0	2	5	1.272	0.000	1.390	2.662
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.501	0.000	0.673	1.174
SUPERVISORY PERSONNEL	0	0	0	0	0.080	0.000	0.000	0.080
ENGINEERING PERSONNEL	0	0	0	0	0.110	0.000	0.018	0.128
TOTAL	9	0	4	13	3.987	0.001	2.671	6.659
REFUELING								
MAINTENANCE PERSONNEL	7	0	22	29	4.980	0.000	15.863	20.843
OPERATIONS PERSONNEL	6	0	0	6	2.894	0.000	0.000	2.894
HEALTH PHYSICS PERSONNEL	1	0	5	6	0.879	0.000	2.511	3.390
SUPERVISORY PERSONNEL	1	0	1	2	0.115	0.000	0.437	0.552
ENGINEERING PERSONNEL	3	0	2	5	1.074	0.000	2.384	3.458
TOTAL	18	0	30	48	9.942	0.000	21.195	31.137
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	141	13	412	566	110.758	7.140	359.573	477.471
OPERATIONS PERSONNEL	55	0	6	61	37.651	0.000	3.602	41.253
HEALTH PHYSICS PERSONNEL	24	0	43	67	20.549	0.000	23.738	44.287
SUPERVISORY PERSONNEL	10	0	17	27	2.897	0.000	7.218	10.115
ENGINEERING PERSONNEL	38	1	33	72	19.217	0.322	21.680	41.219
GRAND TOTALS	268	14	511	793	191.072	7.462	415.811	614.345

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *FARLEY 1,2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	67	0	64	131	1.530	0.000	4.240	5.770
OPERATIONS PERSONNEL	208	0	7	215	24.800	0.000	0.120	24.920
HEALTH PHYSICS PERSONNEL	81	0	111	192	16.610	0.000	19.850	36.460
SUPERVISORY PERSONNEL	33	19	24	76	1.200	0.290	0.370	1.860
ENGINEERING PERSONNEL	38	12	94	144	1.480	0.250	3.370	5.100
TOTAL	427	31	300	758	45.620	0.540	27.950	74.110
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	185	8	90	283	17.440	0.440	9.370	27.250
OPERATIONS PERSONNEL	90	0	9	99	16.210	0.000	0.850	17.060
HEALTH PHYSICS PERSONNEL	32	0	39	71	3.370	0.000	1.590	4.960
SUPERVISORY PERSONNEL	7	3	2	12	0.190	0.030	0.020	0.240
ENGINEERING PERSONNEL	18	9	197	224	0.200	0.120	11.950	12.270
TOTAL	332	20	337	689	37.410	0.590	23.780	61.780
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	15	0	90	105	3.110	0.000	50.390	53.500
OPERATIONS PERSONNEL	4	0	1	5	0.590	0.000	0.010	0.600
HEALTH PHYSICS PERSONNEL	12	0	20	32	1.910	0.000	2.540	4.450
SUPERVISORY PERSONNEL	2	2	3	7	0.080	0.020	0.630	0.730
ENGINEERING PERSONNEL	15	2	135	152	0.960	0.050	41.790	42.800
TOTAL	48	4	249	301	6.650	0.070	95.360	102.080
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	191	8	218	417	47.940	0.550	38.250	86.740
OPERATIONS PERSONNEL	79	0	4	83	5.500	0.000	1.040	6.540
HEALTH PHYSICS PERSONNEL	38	0	57	95	9.210	0.000	10.750	19.960
SUPERVISORY PERSONNEL	16	7	4	27	0.720	0.740	1.490	2.950
ENGINEERING PERSONNEL	27	11	564	602	1.800	2.410	127.160	131.370
TOTAL	351	26	847	1224	65.170	3.700	178.690	247.560
WASTE PROCESSING								
MAINTENANCE PERSONNEL	11	0	4	15	1.230	0.000	0.190	1.420
OPERATIONS PERSONNEL	55	0	0	55	13.880	0.000	0.000	13.880
HEALTH PHYSICS PERSONNEL	35	0	18	53	10.600	0.000	2.260	12.860
SUPERVISORY PERSONNEL	4	0	0	4	1.810	0.000	0.000	1.810
ENGINEERING PERSONNEL	1	0	27	28	0.020	0.000	1.510	1.530
TOTAL	106	0	49	155	27.540	0.000	3.960	31.500
REFUELING								
MAINTENANCE PERSONNEL	57	0	34	91	16.810	0.000	2.950	19.760
OPERATIONS PERSONNEL	35	0	0	35	3.390	0.000	0.000	3.390
HEALTH PHYSICS PERSONNEL	23	0	29	52	4.420	0.000	2.100	6.520
SUPERVISORY PERSONNEL	5	3	1	9	0.130	0.070	0.390	0.590
ENGINEERING PERSONNEL	5	0	42	47	0.320	0.000	4.530	4.850
TOTAL	125	3	106	234	25.070	0.070	9.970	35.110
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	526	16	500	1042	88.060	0.990	105.390	194.440
OPERATIONS PERSONNEL	471	0	21	492	64.370	0.000	2.020	66.390
HEALTH PHYSICS PERSONNEL	221	0	274	495	46.120	0.000	39.090	85.210
SUPERVISORY PERSONNEL	67	34	34	135	4.130	1.150	2.900	8.180
ENGINEERING PERSONNEL	104	34	1059	1197	4.780	2.830	190.310	197.920
GRAND TOTALS	1389	84	1888	3361	207.460	4.970	339.710	552.140

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *FITZPATRICK

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	120	40	178	338	16.881	0.180	6.106	23.167
OPERATIONS PERSONNEL	111	29	12	152	38.878	0.000	0.380	39.258
HEALTH PHYSICS PERSONNEL	42	8	133	183	25.779	0.000	54.666	80.445
SUPERVISORY PERSONNEL	33	16	55	104	1.897	0.690	2.675	5.262
ENGINEERING PERSONNEL	25	16	47	88	2.758	0.540	4.348	7.646
TOTAL	331	109	425	865	86.193	1.410	68.175	155.778
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	144	86	490	720	82.119	0.059	174.545	256.723
OPERATIONS PERSONNEL	81	22	23	126	8.692	0.007	0.741	9.440
HEALTH PHYSICS PERSONNEL	28	7	105	140	3.296	0.000	11.116	14.412
SUPERVISORY PERSONNEL	31	16	69	116	2.587	0.325	10.204	13.116
ENGINEERING PERSONNEL	21	16	49	86	1.155	0.249	5.080	6.484
TOTAL	305	147	736	1188	97.849	0.640	201.686	300.175
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	64	13	295	372	6.909	0.241	96.296	103.446
OPERATIONS PERSONNEL	26	4	5	35	1.674	0.000	4.319	5.993
HEALTH PHYSICS PERSONNEL	9	1	63	73	0.338	0.000	2.610	2.948
SUPERVISORY PERSONNEL	11	6	44	61	1.309	0.166	9.448	10.923
ENGINEERING PERSONNEL	7	3	25	35	0.235	0.356	1.589	2.180
TOTAL	117	27	432	576	10.465	0.763	114.262	125.490
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	36	3	257	296	1.126	0.130	41.151	42.407
OPERATIONS PERSONNEL	5	1	10	16	0.190	0.000	1.140	1.330
HEALTH PHYSICS PERSONNEL	9	2	38	49	0.861	0.000	1.239	2.100
SUPERVISORY PERSONNEL	4	3	30	37	0.145	0.002	1.687	1.834
ENGINEERING PERSONNEL	6	3	20	29	0.182	0.172	0.417	0.771
TOTAL	60	12	355	427	2.504	0.304	45.634	48.442
WASTE PROCESSING								
MAINTENANCE PERSONNEL	107	94	223	424	40.352	0.017	22.928	63.297
OPERATIONS PERSONNEL	96	37	21	154	11.493	0.000	11.343	22.836
HEALTH PHYSICS PERSONNEL	28	11	87	126	2.674	0.760	9.298	12.732
SUPERVISORY PERSONNEL	15	7	34	56	0.526	0.135	0.925	1.586
ENGINEERING PERSONNEL	9	4	18	31	0.110	0.038	1.658	1.806
TOTAL	255	153	383	791	55.155	0.950	46.152	102.257
REFUELING								
MAINTENANCE PERSONNEL	71	18	59	148	8.613	0.033	3.555	12.201
OPERATIONS PERSONNEL	53	17	24	94	3.438	0.093	3.710	7.241
HEALTH PHYSICS PERSONNEL	8	6	26	40	0.720	0.000	1.994	2.714
SUPERVISORY PERSONNEL	10	4	17	31	0.167	0.052	0.487	0.706
ENGINEERING PERSONNEL	5	5	7	17	0.016	0.125	0.229	0.370
TOTAL	147	50	133	330	12.954	0.303	9.975	23.232
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	542	254	1502	2298	156.000	0.660	344.581	501.241
OPERATIONS PERSONNEL	372	110	95	577	64.365	0.100	21.633	86.098
HEALTH PHYSICS PERSONNEL	124	35	452	611	33.668	0.760	80.923	115.351
SUPERVISORY PERSONNEL	104	52	249	405	6.631	1.370	25.426	33.427
ENGINEERING PERSONNEL	73	47	166	286	4.456	1.480	13.321	19.257
GRAND TOTALS	1215	498	2464	4177	265.120	4.370	485.884	755.374

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *FORT CALHOUN

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	23	24	0.883	0.669	9.991	11.543
OPERATIONS PERSONNEL	20	1	0	21	10.582	1.019	0.139	11.740
HEALTH PHYSICS PERSONNEL	20	0	56	76	9.399	0.085	35.842	45.326
SUPERVISORY PERSONNEL	1	0	0	1	1.140	0.096	0.012	1.248
ENGINEERING PERSONNEL	15	4	24	43	5.774	1.767	12.019	19.560
TOTAL	57	5	103	165	27.778	3.636	58.003	89.417
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	54	38	61	153	25.131	14.902	24.532	64.565
OPERATIONS PERSONNEL	0	0	0	0	0.244	0.017	0.015	0.276
HEALTH PHYSICS PERSONNEL	0	0	41	41	0.147	0.000	20.771	20.918
SUPERVISORY PERSONNEL	0	0	0	0	0.071	0.000	0.000	0.071
ENGINEERING PERSONNEL	3	0	11	14	0.804	0.258	4.211	5.273
TOTAL	57	38	113	208	26.397	15.177	49.529	91.103
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	5	38	43	0.135	1.610	23.821	25.566
OPERATIONS PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.010	0.000	0.775	0.785
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.005	0.000	0.005
ENGINEERING PERSONNEL	0	2	7	9	0.080	0.545	3.042	3.667
TOTAL	0	7	48	55	0.245	2.160	27.638	30.043
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	30	24	88	142	11.418	8.706	42.453	62.577
OPERATIONS PERSONNEL	1	0	0	1	0.560	0.003	0.010	0.573
HEALTH PHYSICS PERSONNEL	0	0	5	5	0.386	0.005	1.269	1.660
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	2	2	20	24	0.671	0.651	7.711	9.033
TOTAL	33	26	113	172	13.045	9.365	51.443	73.853
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	1	3	7	1.157	0.665	1.107	2.929
OPERATIONS PERSONNEL	0	0	0	0	0.015	0.000	0.000	0.015
HEALTH PHYSICS PERSONNEL	3	0	32	35	1.960	0.000	9.570	11.530
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.038	0.020	0.034	0.092
TOTAL	6	1	35	42	3.170	0.685	10.711	14.566
REFUELING								
MAINTENANCE PERSONNEL	18	23	34	75	6.406	8.390	8.987	23.783
OPERATIONS PERSONNEL	2	0	0	2	2.535	0.015	0.020	2.570
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.000	0.000	1.010	1.010
SUPERVISORY PERSONNEL	0	1	0	1	0.225	0.104	0.000	0.329
ENGINEERING PERSONNEL	3	0	5	8	0.638	0.170	1.581	2.389
TOTAL	23	24	42	89	9.804	8.679	11.598	30.081
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	106	91	247	444	45.130	34.942	110.891	190.963
OPERATIONS PERSONNEL	23	1	0	24	13.956	1.054	0.184	15.194
HEALTH PHYSICS PERSONNEL	23	0	140	163	11.902	0.090	69.237	81.229
SUPERVISORY PERSONNEL	1	1	0	2	1.446	0.205	0.012	1.663
ENGINEERING PERSONNEL	23	8	67	98	8.005	3.411	28.598	40.014
GRAND TOTALS	176	101	454	731	80.439	39.702	208.922	329.063

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *FORT ST. VRAIN

TYPE: HTGR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
GRAND TOTALS	0	0	0	0	0.000	0.000	0.000	0.000

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *GINNA

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	85	50	84	219	0.548	4.738	3.603	8.889
OPERATIONS PERSONNEL	0	29	0	29	0.000	9.143	0.000	9.143
HEALTH PHYSICS PERSONNEL	25	11	1	37	7.445	4.597	0.003	12.045
SUPERVISORY PERSONNEL	23	16	12	51	1.868	2.659	0.260	4.787
ENGINEERING PERSONNEL	8	0	4	12	0.519	0.000	0.386	0.905
TOTAL	141	106	101	348	10.380	21.137	4.252	35.769
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	147	49	140	336	25.642	21.842	21.152	68.636
OPERATIONS PERSONNEL	0	21	0	21	0.000	0.446	0.000	0.446
HEALTH PHYSICS PERSONNEL	24	11	4	39	3.010	2.926	0.875	6.811
SUPERVISORY PERSONNEL	25	16	13	54	7.043	2.434	2.357	11.834
ENGINEERING PERSONNEL	23	0	2	25	10.120	0.000	0.234	10.354
TOTAL	219	97	159	475	45.815	27.648	24.618	98.081
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	39	5	20	64	2.959	0.010	0.445	3.414
OPERATIONS PERSONNEL	0	1	0	1	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	9	1	0	10	0.080	0.000	0.000	0.080
SUPERVISORY PERSONNEL	7	5	6	18	0.217	0.075	0.176	0.468
ENGINEERING PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
TOTAL	56	12	26	94	3.256	0.085	0.621	3.962
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	122	47	136	305	33.588	4.284	46.865	84.737
OPERATIONS PERSONNEL	0	12	0	12	0.000	0.148	0.000	0.148
HEALTH PHYSICS PERSONNEL	19	9	4	32	0.485	0.508	0.030	1.023
SUPERVISORY PERSONNEL	21	11	11	43	2.956	0.504	1.058	4.518
ENGINEERING PERSONNEL	11	0	2	13	0.746	0.000	0.098	0.844
TOTAL	173	79	153	405	37.775	5.444	48.051	91.270
WASTE PROCESSING								
MAINTENANCE PERSONNEL	24	11	14	49	1.120	0.412	0.095	1.627
OPERATIONS PERSONNEL	0	8	0	8	0.000	0.080	0.000	0.080
HEALTH PHYSICS PERSONNEL	8	8	4	20	0.925	0.116	0.685	1.726
SUPERVISORY PERSONNEL	1	1	0	2	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	0	0	3	0.000	0.000	0.000	0.000
TOTAL	36	28	18	82	2.045	0.608	0.780	3.433
REFUELING								
MAINTENANCE PERSONNEL	62	20	134	216	8.590	2.313	31.721	42.624
OPERATIONS PERSONNEL	0	6	0	6	0.000	0.020	0.000	0.020
HEALTH PHYSICS PERSONNEL	14	8	2	24	0.880	2.719	0.045	3.644
SUPERVISORY PERSONNEL	7	5	7	19	0.690	0.115	0.080	0.885
ENGINEERING PERSONNEL	17	0	0	17	5.844	0.000	0.000	5.844
TOTAL	100	39	143	282	16.004	5.167	31.846	53.017
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	479 (159)	182 (50)	528 (151)	1189 (360)	72.447	33.599	103.881	209.927
OPERATIONS PERSONNEL	0 (0)	77 (29)	0 (0)	77 (29)	0.000	9.837	0.000	9.837
HEALTH PHYSICS PERSONNEL	99 (25)	48 (11)	15 (6)	162 (42)	12.825	10.866	1.638	25.329
SUPERVISORY PERSONNEL	84 (25)	54 (16)	49 (14)	187 (55)	12.774	5.787	3.931	22.492
ENGINEERING PERSONNEL	63 (25)	0 (0)	8 (4)	71 (29)	17.229	0.000	0.718	17.947
GRAND TOTALS	725 (234)	361 (106)	600 (175)	1686 (515)	115.275	60.089	110.168	285.532

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *GRAND GULF

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	3	10	1.170	0.000	0.510	1.680
OPERATIONS PERSONNEL	58	0	1	59	15.350	0.000	0.350	15.700
HEALTH PHYSICS PERSONNEL	38	0	9	47	32.060	0.000	2.110	34.170
SUPERVISORY PERSONNEL	2	0	0	2	0.260	0.000	0.000	0.260
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	105	0	13	118	48.840	0.000	2.970	51.810
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	74	0	16	90	29.610	0.000	24.160	53.770
OPERATIONS PERSONNEL	10	0	0	10	1.760	0.000	0.000	1.760
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.260	0.000	0.130	0.390
SUPERVISORY PERSONNEL	2	0	0	2	0.390	0.000	0.000	0.390
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	88	0	17	105	32.020	0.000	24.290	56.310
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	2	2	0.000	0.000	0.270	0.270
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.120	0.120
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	3	3	0.000	0.000	0.390	0.390
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	29	29	0.000	0.000	7.360	7.360
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	0.780	0.780
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	32	32	0.000	0.000	8.140	8.140
WASTE PROCESSING								
MAINTENANCE PERSONNEL	17	0	10	27	4.860	0.000	8.020	12.880
OPERATIONS PERSONNEL	1	0	2	3	0.110	0.000	2.290	2.400
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.430	0.000	0.840	1.270
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	20	0	13	33	5.400	0.000	11.150	16.550
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98	0	60	158	35.640	0.000	40.320	75.960
OPERATIONS PERSONNEL	69	0	3	72	17.220	0.000	2.640	19.860
HEALTH PHYSICS PERSONNEL	42	0	11	53	32.750	0.000	3.080	35.830
SUPERVISORY PERSONNEL	4	0	4	8	0.650	0.000	0.900	1.550
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
GRAND TOTALS	213	0	78	291	86.260	0.000	46.940	133.200

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *HADDAM NECK

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	5	1	0	6	2.090	0.480	0.670	3.240
OPERATIONS PERSONNEL	37	1	0	38	22.650	0.240	0.400	23.290
HEALTH PHYSICS PERSONNEL	12	1	9	22	7.320	0.390	3.980	11.690
SUPERVISORY PERSONNEL	0	0	0	0	0.070	0.000	0.000	0.070
ENGINEERING PERSONNEL	3	0	0	3	0.900	0.380	0.280	1.560
TOTAL	57	3	9	69	33.030	1.490	5.330	39.850
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	49	5	50	104	38.160	2.190	18.090	58.440
OPERATIONS PERSONNEL	2	0	2	4	1.080	0.080	0.640	1.800
HEALTH PHYSICS PERSONNEL	18	1	9	28	6.090	0.550	3.960	10.600
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
ENGINEERING PERSONNEL	3	8	6	17	0.890	2.470	2.150	5.510
TOTAL	72	14	67	153	46.240	5.290	24.840	76.370
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	8	0	25	33	2.660	0.090	8.190	10.940
OPERATIONS PERSONNEL	1	0	0	1	0.120	0.000	0.040	0.160
HEALTH PHYSICS PERSONNEL	4	1	6	11	1.540	0.150	1.360	3.050
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	2	33	37	1.310	0.560	10.910	12.780
TOTAL	15	3	64	82	5.630	0.800	20.500	26.930
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	13	18	31	0.030	3.900	4.370	8.300
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.210	0.000	0.000	0.210
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.080	0.080
ENGINEERING PERSONNEL	0	1	2	3	0.000	0.340	0.330	0.670
TOTAL	0	14	20	34	0.240	4.240	4.790	9.270
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.020	0.050	0.090	0.160
OPERATIONS PERSONNEL	1	0	0	1	0.290	0.000	0.070	0.360
HEALTH PHYSICS PERSONNEL	13	0	6	19	8.530	0.090	1.720	10.340
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.150	0.000	0.150
TOTAL	14	0	6	20	8.850	0.290	1.880	11.020
REFUELING								
MAINTENANCE PERSONNEL	21	2	45	68	8.910	0.780	31.940	41.630
OPERATIONS PERSONNEL	1	0	4	5	0.590	0.000	2.680	3.270
HEALTH PHYSICS PERSONNEL	6	1	7	14	1.130	0.140	1.520	2.790
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	4	7	11	0.050	1.430	5.160	6.640
TOTAL	28	7	63	98	10.680	2.350	41.300	54.330
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	83	21	138	242	51.870	7.490	63.350	122.710
OPERATIONS PERSONNEL	42	1	6	49	24.730	0.320	3.840	28.890
HEALTH PHYSICS PERSONNEL	53	4	37	94	24.820	1.320	12.540	38.680
SUPERVISORY PERSONNEL	0	0	0	0	0.100	0.000	0.080	0.180
ENGINEERING PERSONNEL	8	15	48	71	3.150	5.330	18.830	27.310
GRAND TOTALS	186	41	229	456	104.670	14.460	98.640	217.770

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *HARRIS

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	4	0	5	9	1.201	0.040	4.614	5.855
OPERATIONS PERSONNEL	33	1	11	45	10.420	0.128	5.598	16.146
HEALTH PHYSICS PERSONNEL	19	0	40	59	7.134	0.060	13.003	20.197
SUPERVISORY PERSONNEL	0	0	0	0	0.087	0.025	0.020	0.132
ENGINEERING PERSONNEL	0	0	1	1	0.452	0.120	0.360	0.932
TOTAL	56	1	57	114	19.294	0.373	23.595	43.262
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	27	9	48	84	7.976	2.297	15.288	25.561
OPERATIONS PERSONNEL	0	0	1	1	0.027	0.000	0.495	0.522
HEALTH PHYSICS PERSONNEL	0	0	6	6	0.362	0.011	2.356	2.729
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	4	1	2	7	1.331	0.297	1.846	3.474
TOTAL	31	10	57	98	9.696	2.605	19.985	32.286
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	10	1	10	21	3.740	0.389	4.403	8.532
OPERATIONS PERSONNEL	0	0	0	0	0.109	0.000	0.095	0.204
HEALTH PHYSICS PERSONNEL	22	0	23	45	5.657	0.080	7.232	12.969
SUPERVISORY PERSONNEL	0	1	0	1	0.060	0.125	0.000	0.185
ENGINEERING PERSONNEL	19	1	26	46	6.883	0.647	16.482	24.012
TOTAL	51	3	59	113	16.449	1.241	28.212	45.902
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	27	11	101	139	10.256	3.332	49.636	63.224
OPERATIONS PERSONNEL	0	0	2	2	0.243	0.000	0.805	1.048
HEALTH PHYSICS PERSONNEL	9	0	26	35	3.533	0.061	7.097	10.691
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.090	0.090
ENGINEERING PERSONNEL	13	4	84	101	4.626	1.061	42.386	48.073
TOTAL	49	15	213	277	18.658	4.454	100.014	123.126
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.315	0.315
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	2	0	0	2	1.345	0.000	0.110	1.455
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.032	0.032
TOTAL	2	0	0	2	1.345	0.000	0.457	1.802
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.210	0.065	0.070	0.345
OPERATIONS PERSONNEL	0	0	0	0	0.172	0.005	0.000	0.177
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.100	0.000	0.175	0.275
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.160	0.058	0.815	1.033
TOTAL	0	0	0	0	0.642	0.128	1.060	1.830
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	68	21	164	253	23.383	6.123	74.326	103.832
OPERATIONS PERSONNEL	33	1	14	48	10.971	0.133	6.993	18.097
HEALTH PHYSICS PERSONNEL	52	0	95	147	18.131	0.212	29.973	48.316
SUPERVISORY PERSONNEL	0	1	0	1	0.147	0.150	0.110	0.407
ENGINEERING PERSONNEL	36	6	113	155	13.452	2.183	61.921	77.556
GRAND TOTALS	189	29	386	604	66.084	8.801	173.323	248.208

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *HATCH 1,2

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	96	3	201	300	61.634	1.493	77.301	140.428
OPERATIONS PERSONNEL	81	0	0	81	38.191	0.016	0.107	38.314
HEALTH PHYSICS PERSONNEL	44	0	60	104	31.071	0.000	29.765	60.836
SUPERVISORY PERSONNEL	33	6	8	47	14.793	1.410	2.468	18.671
ENGINEERING PERSONNEL	17	3	24	44	7.116	0.944	8.577	16.637
TOTAL	271	12	293	576	152.805	3.863	118.218	274.886
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	155	9	395	559	65.219	2.665	166.880	234.764
OPERATIONS PERSONNEL	52	0	1	53	28.425	0.000	0.195	28.620
HEALTH PHYSICS PERSONNEL	41	1	41	83	31.355	0.278	20.560	52.193
SUPERVISORY PERSONNEL	15	6	11	32	4.915	1.682	4.488	11.085
ENGINEERING PERSONNEL	13	4	29	46	5.805	1.692	9.953	17.450
TOTAL	276	20	477	773	135.719	6.317	202.076	344.112
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	30	0	174	204	15.517	0.064	65.507	81.088
OPERATIONS PERSONNEL	6	0	0	6	1.978	0.000	0.008	1.986
HEALTH PHYSICS PERSONNEL	5	1	11	17	5.842	0.139	3.276	9.257
SUPERVISORY PERSONNEL	6	1	5	12	3.432	0.292	2.852	6.576
ENGINEERING PERSONNEL	6	1	8	15	3.257	0.449	3.665	7.371
TOTAL	53	3	198	254	30.026	0.944	75.308	106.278
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	102	8	498	608	50.732	4.430	332.024	387.186
OPERATIONS PERSONNEL	33	0	0	33	10.272	0.098	0.008	10.378
HEALTH PHYSICS PERSONNEL	37	1	60	98	23.545	0.132	32.550	56.227
SUPERVISORY PERSONNEL	16	7	10	33	5.685	2.193	5.653	13.531
ENGINEERING PERSONNEL	15	2	38	55	5.617	0.810	16.798	23.225
TOTAL	203	18	606	827	95.851	7.663	387.033	490.547
WASTE PROCESSING								
MAINTENANCE PERSONNEL	23	0	106	129	8.113	0.064	36.620	44.797
OPERATIONS PERSONNEL	5	0	0	5	1.093	0.000	0.008	1.101
HEALTH PHYSICS PERSONNEL	4	0	16	20	3.029	0.000	4.974	8.003
SUPERVISORY PERSONNEL	2	1	4	7	0.764	0.292	1.472	2.528
ENGINEERING PERSONNEL	0	0	1	1	0.053	0.017	0.743	0.813
TOTAL	34	1	127	162	13.052	0.373	43.817	57.242
REFUELING								
MAINTENANCE PERSONNEL	38	0	177	215	14.757	0.064	88.315	103.136
OPERATIONS PERSONNEL	17	0	0	17	5.198	0.000	0.096	5.294
HEALTH PHYSICS PERSONNEL	3	0	17	20	1.401	0.000	6.687	8.088
SUPERVISORY PERSONNEL	2	1	4	7	1.039	0.292	1.408	2.739
ENGINEERING PERSONNEL	7	0	12	19	4.275	0.096	4.478	8.849
TOTAL	67	1	210	278	26.670	0.452	100.984	128.106
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	444 (44)	20 (20)	1551 (1551)	2015(1615)	215.972	8.780	766.647	991.399
OPERATIONS PERSONNEL	194 (194)	0 (0)	1 (1)	195 (195)	85.157	0.114	0.422	85.693
HEALTH PHYSICS PERSONNEL	134 (134)	3 (3)	205 (205)	342 (342)	96.243	0.549	97.812	194.604
SUPERVISORY PERSONNEL	74 (74)	22 (22)	42 (42)	138 (138)	30.628	6.161	18.341	55.130
ENGINEERING PERSONNEL	58 (58)	10 (10)	112 (112)	180 (180)	26.123	4.008	44.214	74.345
GRAND TOTALS	904 (504)	55 (55)	1911 (1911)	2870(2470)	454.123	19.612	927.436	1401.171

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *HOPE CREEK 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	16	0	7	23	7.697	0.231	5.208	13.136
OPERATIONS PERSONNEL	41	0	0	41	12.755	0.000	0.194	12.949
HEALTH PHYSICS PERSONNEL	12	0	5	17	3.766	0.000	2.753	6.519
SUPERVISORY PERSONNEL	0	1	0	1	0.302	0.229	0.032	0.563
ENGINEERING PERSONNEL	1	0	1	2	0.960	0.194	0.215	1.369
TOTAL	70	1	13	84	25.480	0.654	8.402	34.536
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	8	0	1	9	3.437	0.022	1.105	4.564
OPERATIONS PERSONNEL	0	0	0	0	0.475	0.000	0.626	1.101
HEALTH PHYSICS PERSONNEL	1	0	5	6	1.406	0.000	1.520	2.926
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.001	0.001
ENGINEERING PERSONNEL	0	0	0	0	0.234	0.007	0.006	0.247
TOTAL	9	0	6	15	5.552	0.029	3.258	8.839
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.196	0.000	0.287	0.483
OPERATIONS PERSONNEL	0	0	0	0	0.078	0.000	0.009	0.087
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.131	0.000	0.000	0.131
SUPERVISORY PERSONNEL	0	0	0	0	0.120	0.000	0.015	0.135
ENGINEERING PERSONNEL	0	0	0	0	0.172	0.011	0.003	0.186
TOTAL	0	0	0	0	0.697	0.011	0.314	1.022
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	50	0	20	70	17.897	0.034	10.304	28.235
OPERATIONS PERSONNEL	4	0	0	4	2.271	0.000	0.006	2.277
HEALTH PHYSICS PERSONNEL	27	0	12	39	7.264	0.000	2.848	10.112
SUPERVISORY PERSONNEL	0	1	0	1	0.235	0.129	0.004	0.368
ENGINEERING PERSONNEL	2	1	0	3	1.031	0.252	0.140	1.423
TOTAL	83	2	32	117	28.698	0.415	13.302	42.415
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.151	0.000	0.101	0.252
OPERATIONS PERSONNEL	1	0	0	1	0.954	0.000	0.000	0.954
HEALTH PHYSICS PERSONNEL	4	0	3	7	1.029	0.000	1.693	2.722
SUPERVISORY PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
ENGINEERING PERSONNEL	0	0	0	0	0.154	0.000	0.000	0.154
TOTAL	5	0	3	8	2.291	0.000	1.794	4.085
REFUELING								
MAINTENANCE PERSONNEL	101	9	277	387	29.078	2.200	118.210	149.488
OPERATIONS PERSONNEL	19	0	4	23	5.383	0.000	1.587	6.970
HEALTH PHYSICS PERSONNEL	24	0	67	91	7.656	0.000	0.615	8.271
SUPERVISORY PERSONNEL	3	0	2	5	0.924	0.145	0.477	1.546
ENGINEERING PERSONNEL	5	4	2	11	1.691	2.269	0.980	4.940
TOTAL	152	13	352	517	44.732	4.614	121.869	171.215
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	175	9	305	489	58.456	2.487	135.215	196.158
OPERATIONS PERSONNEL	65	0	4	69	21.916	0.000	2.422	24.338
HEALTH PHYSICS PERSONNEL	68	0	92	160	21.252	0.000	9.429	30.681
SUPERVISORY PERSONNEL	3	2	2	7	1.584	0.503	0.529	2.616
ENGINEERING PERSONNEL	8	5	3	16	4.242	2.733	1.344	8.319
GRAND TOTALS	319	16	406	741	107.450	5.723	148.939	262.112

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *INDIAN POINT 2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	71	40	47	158	7.312	2.332	6.681	16.325
OPERATIONS PERSONNEL	51	0	0	51	30.230	0.000	0.000	30.230
HEALTH PHYSICS PERSONNEL	22	0	9	31	2.107	0.000	0.978	3.085
SUPERVISORY PERSONNEL	8	2	0	10	0.863	0.197	0.000	1.060
ENGINEERING PERSONNEL	11	1	1	13	1.665	0.125	0.105	1.895
TOTAL	163	43	57	263	42.177	2.654	7.764	52.595
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	60	31	18	109	4.353	1.221	0.797	6.371
OPERATIONS PERSONNEL	2	0	0	2	0.055	0.000	0.000	0.055
HEALTH PHYSICS PERSONNEL	2	0	2	4	0.030	0.000	0.050	0.080
SUPERVISORY PERSONNEL	2	0	1	3	0.080	0.000	0.001	0.081
ENGINEERING PERSONNEL	4	0	1	5	0.190	0.000	0.140	0.330
TOTAL	70	31	22	123	4.708	1.221	0.988	6.917
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	3	13	21	0.074	1.130	2.202	3.406
OPERATIONS PERSONNEL	3	0	0	3	0.220	0.000	0.000	0.220
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.000	0.000	0.065	0.065
SUPERVISORY PERSONNEL	0	2	1	3	0.000	0.182	0.034	0.216
ENGINEERING PERSONNEL	3	0	0	3	0.060	0.000	0.000	0.060
TOTAL	11	5	16	32	0.354	1.312	2.301	3.967
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	83	51	114	248	27.122	10.153	50.590	87.865
OPERATIONS PERSONNEL	17	0	0	17	0.630	0.000	0.000	0.630
HEALTH PHYSICS PERSONNEL	18	0	12	30	2.966	0.000	3.530	6.496
SUPERVISORY PERSONNEL	11	4	1	16	2.025	0.790	1.107	3.922
ENGINEERING PERSONNEL	12	1	1	14	1.793	0.040	0.635	2.468
TOTAL	141	56	128	325	34.536	10.983	55.862	101.381
WASTE PROCESSING								
MAINTENANCE PERSONNEL	47	9	79	135	5.108	0.331	35.862	41.301
OPERATIONS PERSONNEL	5	0	0	5	0.319	0.000	0.000	0.319
HEALTH PHYSICS PERSONNEL	20	0	19	39	6.771	0.000	11.339	18.110
SUPERVISORY PERSONNEL	11	4	1	16	1.348	0.177	0.119	1.644
ENGINEERING PERSONNEL	10	0	1	11	1.100	0.000	1.915	3.015
TOTAL	93	13	100	206	14.646	0.508	49.235	64.389
REFUELING								
MAINTENANCE PERSONNEL	12	2	20	34	2.103	0.020	1.174	3.297
OPERATIONS PERSONNEL	19	0	0	19	2.953	0.000	0.000	2.953
HEALTH PHYSICS PERSONNEL	17	0	13	30	1.174	0.000	2.444	3.618
SUPERVISORY PERSONNEL	2	1	0	3	0.480	0.010	0.000	0.490
ENGINEERING PERSONNEL	5	0	0	5	0.732	0.000	0.000	0.732
TOTAL	55	3	33	91	7.442	0.030	3.618	11.090
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	278 (98)	136 (54)	291 (147)	705 (299)	46.072	15.187	97.306	158.565
OPERATIONS PERSONNEL	97 (56)	0 (0)	0 (0)	97 (56)	34.407	0.000	0.000	34.407
HEALTH PHYSICS PERSONNEL	79 (23)	0 (0)	57 (20)	136 (43)	13.048	0.000	18.406	31.454
SUPERVISORY PERSONNEL	34 (15)	13 (4)	4 (2)	51 (21)	4.796	1.356	1.261	7.413
ENGINEERING PERSONNEL	45 (17)	2 (1)	4 (2)	51 (20)	5.540	0.165	2.795	8.500
GRAND TOTALS	533 (209)	151 (59)	356 (171)	1040 (439)	103.863	16.708	119.768	240.339

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *INDIAN POINT 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	1	1	0.000	0.000	0.090	0.090
OPERATIONS PERSONNEL	41	0	0	41	6.070	0.000	0.000	6.070
HEALTH PHYSICS PERSONNEL	19	0	10	29	6.920	0.000	1.960	8.880
SUPERVISORY PERSONNEL	10	0	0	10	2.040	0.000	0.000	2.040
ENGINEERING PERSONNEL	2	0	0	2	0.480	0.000	0.000	0.480
TOTAL	72	0	11	83	15.510	0.000	2.050	17.560
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	10	10	0.000	0.000	1.860	1.860
OPERATIONS PERSONNEL	0	1	1	2	0.000	0.060	0.060	0.120
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.060	0.060
TOTAL	0	1	12	13	0.000	0.060	1.980	2.040
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.080	0.080
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	1	1	0.000	0.000	0.080	0.080
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	23	0	54	77	2.620	0.000	11.160	13.780
OPERATIONS PERSONNEL	5	1	5	11	0.620	0.110	0.550	1.280
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	3	0	1	4	0.490	0.000	0.090	0.580
ENGINEERING PERSONNEL	1	0	1	2	0.380	0.000	0.070	0.450
TOTAL	32	1	61	94	4.110	0.110	11.870	16.090
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	0	5	17	2.850	0.000	0.630	3.480
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	1	0	0	1	0.180	0.000	0.000	0.180
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	13	0	5	18	3.030	0.000	0.630	3.660
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	35	0	70	105	5.470	0.000	13.740	19.210
OPERATIONS PERSONNEL	46	2	7	55	6.690	0.170	0.690	7.550
HEALTH PHYSICS PERSONNEL	19	0	10	29	6.920	0.000	1.960	8.880
SUPERVISORY PERSONNEL	14	0	1	15	2.710	0.000	0.090	2.800
ENGINEERING PERSONNEL	3	0	2	5	0.860	0.000	0.130	0.990
GRAND TOTALS	117	2	90	209	22.650	0.170	16.610	39.430

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *KEWAUNEE

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	4	0	12	16	0.106	0.000	0.289	0.395
OPERATIONS PERSONNEL	19	0	0	19	4.076	0.000	0.000	4.076
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	4	2	0	6	0.343	0.210	0.000	0.553
ENGINEERING PERSONNEL	8	8	1	17	0.444	0.122	0.000	0.566
TOTAL	35	10	13	58	4.969	0.332	0.289	5.590
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	40	13	64	117	6.649	2.612	16.006	25.267
OPERATIONS PERSONNEL	12	1	8	21	1.035	0.000	1.636	2.671
HEALTH PHYSICS PERSONNEL	19	0	37	56	7.713	0.000	12.151	19.864
SUPERVISORY PERSONNEL	2	1	0	3	0.003	0.000	0.000	0.003
ENGINEERING PERSONNEL	3	3	2	8	0.096	0.025	0.142	0.263
TOTAL	76	18	111	205	15.496	2.637	29.935	48.068
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	1	32	39	0.271	0.140	3.043	3.454
OPERATIONS PERSONNEL	0	1	8	9	0.000	0.000	2.321	2.321
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	1	0	0	1	0.011	0.000	0.000	0.011
ENGINEERING PERSONNEL	2	1	1	4	0.120	0.228	0.010	0.358
TOTAL	9	3	41	53	0.402	0.368	5.374	6.144
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	40	11	172	223	5.392	0.680	103.791	109.863
OPERATIONS PERSONNEL	8	1	10	19	0.190	0.402	2.108	2.700
HEALTH PHYSICS PERSONNEL	4	0	2	6	0.151	0.000	0.404	0.555
SUPERVISORY PERSONNEL	2	1	2	5	0.308	0.000	0.599	0.907
ENGINEERING PERSONNEL	8	9	10	27	2.061	2.133	1.798	5.992
TOTAL	62	22	196	280	8.102	3.215	108.700	120.017
WASTE PROCESSING								
MAINTENANCE PERSONNEL	17	9	6	32	0.299	0.056	0.557	0.912
OPERATIONS PERSONNEL	4	0	0	4	1.890	0.000	0.000	1.890
HEALTH PHYSICS PERSONNEL	4	0	4	8	1.419	0.000	0.069	1.488
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	25	9	10	44	3.608	0.056	0.626	4.290
REFUELING								
MAINTENANCE PERSONNEL	9	4	18	31	1.299	1.309	10.423	13.031
OPERATIONS PERSONNEL	1	0	0	1	0.029	0.000	0.000	0.029
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	1	0	0	1	0.085	0.000	0.000	0.085
ENGINEERING PERSONNEL	1	1	0	2	0.043	0.133	0.000	0.176
TOTAL	12	5	18	35	1.456	1.442	10.423	13.321
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	116	38	304	458	14.016	4.797	134.109	152.922
OPERATIONS PERSONNEL	44	3	26	73	7.220	0.402	6.065	13.687
HEALTH PHYSICS PERSONNEL	27	0	43	70	9.283	0.000	12.624	21.907
SUPERVISORY PERSONNEL	10	4	2	16	0.750	0.210	0.599	1.559
ENGINEERING PERSONNEL	22	22	14	58	2.764	2.641	1.950	7.355
GRAND TOTALS	219	67	389	675	34.033	8.050	155.347	197.430

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *LASALLE 1,2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	26	8	76	110	34.020	0.920	87.960	122.900
OPERATIONS PERSONNEL	69	0	102	171	53.110	0.000	13.520	66.630
HEALTH PHYSICS PERSONNEL	24	0	6	30	31.970	0.000	3.870	35.840
SUPERVISORY PERSONNEL	36	0	0	36	14.200	0.000	0.000	14.200
ENGINEERING PERSONNEL	27	9	13	49	9.050	0.530	4.300	13.880
TOTAL	182	17	197	396	142.350	1.450	109.650	253.450
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	115	14	1053	1182	156.520	1.530	1212.430	1370.480
OPERATIONS PERSONNEL	35	0	1	36	27.180	0.000	0.460	27.640
HEALTH PHYSICS PERSONNEL	10	0	84	94	14.240	0.000	55.180	69.420
SUPERVISORY PERSONNEL	89	0	0	89	34.720	0.000	0.000	34.720
ENGINEERING PERSONNEL	49	84	71	204	16.280	4.790	23.210	44.280
TOTAL	298	98	1209	1605	248.940	6.320	1291.280	1546.540
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	8	9	0.170	0.000	9.650	9.820
OPERATIONS PERSONNEL	1	0	0	1	0.020	0.000	0.000	0.020
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.020	0.000	0.060	0.080
SUPERVISORY PERSONNEL	1	0	0	1	0.040	0.000	0.000	0.040
ENGINEERING PERSONNEL	4	9	53	66	1.570	0.520	17.600	19.690
TOTAL	8	9	62	79	1.820	0.520	27.310	29.650
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	9	408	419	1.600	0.960	470.220	472.780
OPERATIONS PERSONNEL	3	0	0	3	2.050	0.000	0.000	2.050
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.510	0.000	2.090	2.600
SUPERVISORY PERSONNEL	3	0	0	3	1.070	0.000	0.000	1.070
ENGINEERING PERSONNEL	9	6	53	68	3.020	0.370	17.580	20.970
TOTAL	18	15	464	497	8.250	1.330	489.890	499.470
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	35	37	0.660	0.000	40.930	41.590
OPERATIONS PERSONNEL	39	0	6	45	30.230	0.000	10.090	40.320
HEALTH PHYSICS PERSONNEL	6	0	3	9	8.610	0.000	2.160	10.770
SUPERVISORY PERSONNEL	5	0	0	5	2.210	0.000	0.000	2.210
ENGINEERING PERSONNEL	3	3	2	8	0.750	0.160	0.030	0.940
TOTAL	55	3	46	104	42.460	0.160	53.210	95.830
REFUELING								
MAINTENANCE PERSONNEL	21	1	6	28	28.350	0.010	4.610	32.970
OPERATIONS PERSONNEL	8	0	0	8	6.480	0.000	0.000	6.480
HEALTH PHYSICS PERSONNEL	2	0	1	3	1.690	0.000	0.030	1.720
SUPERVISORY PERSONNEL	8	0	0	8	3.130	0.000	0.000	3.130
ENGINEERING PERSONNEL	2	2	5	9	0.190	0.060	1.680	1.930
TOTAL	41	3	12	56	39.840	0.070	6.320	46.230
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	167	32	1586	1785	221.320	3.420	1825.800	2050.540
OPERATIONS PERSONNEL	155	0	109	264	119.070	0.000	24.070	143.140
HEALTH PHYSICS PERSONNEL	44	0	98	142	57.040	0.000	63.390	120.430
SUPERVISORY PERSONNEL	142	0	0	142	55.370	0.000	0.000	55.370
ENGINEERING PERSONNEL	94	113	197	404	30.860	6.430	64.400	101.690
GRAND TOTALS	602	145	1990	2737	483.660	9.850	1977.660	2471.170

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *LIMERICK 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	51	4	37	92	3.473	0.058	1.560	5.091
OPERATIONS PERSONNEL	66	1	27	94	5.046	0.050	1.486	6.582
HEALTH PHYSICS PERSONNEL	39	1	17	57	4.842	0.010	2.314	7.166
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	19	3	5	27	1.829	0.196	0.185	2.210
TOTAL	175	9	86	270	15.190	0.314	5.545	21.049
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	80	33	203	316	6.803	0.606	4.675	12.084
OPERATIONS PERSONNEL	49	24	177	250	1.041	0.447	4.424	5.912
HEALTH PHYSICS PERSONNEL	32	2	17	51	1.459	0.048	0.598	2.105
SUPERVISORY PERSONNEL	1	2	2	5	0.023	0.027	0.033	0.083
ENGINEERING PERSONNEL	18	11	53	82	0.365	0.247	1.197	1.809
TOTAL	180	72	452	704	9.691	1.375	10.927	21.993
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	7	0	0	7	0.095	0.000	0.000	0.095
OPERATIONS PERSONNEL	2	0	0	2	0.043	0.000	0.000	0.043
HEALTH PHYSICS PERSONNEL	4	0	0	4	0.110	0.000	0.000	0.110
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.019	0.019
TOTAL	13	0	1	14	0.248	0.000	0.019	0.267
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	41	0	18	59	1.308	0.000	0.782	2.090
OPERATIONS PERSONNEL	7	0	17	24	0.221	0.000	0.682	0.903
HEALTH PHYSICS PERSONNEL	13	1	2	16	0.509	0.010	0.037	0.556
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	17	17	0.000	0.000	0.566	0.566
TOTAL	61	1	54	116	2.038	0.010	2.067	4.115
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	1	29	38	0.128	0.008	1.494	1.630
OPERATIONS PERSONNEL	17	0	30	47	0.597	0.000	2.451	3.048
HEALTH PHYSICS PERSONNEL	19	0	12	31	0.623	0.000	0.619	1.242
SUPERVISORY PERSONNEL	1	0	0	1	0.029	0.000	0.000	0.029
ENGINEERING PERSONNEL	1	0	2	3	0.010	0.000	0.258	0.268
TOTAL	46	1	73	120	1.387	0.008	4.822	6.217
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	187 (11)	38 (36)	287 (239)	512 (286)	11.807	0.672	8.511	20.990
OPERATIONS PERSONNEL	141 (112)	25 (25)	251 (203)	417 (340)	6.948	0.497	9.043	16.488
HEALTH PHYSICS PERSONNEL	107 (56)	4 (3)	48 (33)	159 (92)	7.543	0.068	3.568	11.179
SUPERVISORY PERSONNEL	2 (2)	2 (2)	2 (2)	6 (6)	0.052	0.027	0.033	0.112
ENGINEERING PERSONNEL	38 (35)	14 (14)	78 (77)	130 (126)	2.204	0.443	2.225	4.872
GRAND TOTALS	475 (216)	83 (80)	666 (554)	1224 (850)	28.554	1.707	23.380	53.641

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *MAINE YANKEE TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	8	10	1.208	0.000	3.214	4.422
OPERATIONS PERSONNEL	43	0	1	44	22.168	0.000	0.250	22.418
HEALTH PHYSICS PERSONNEL	16	0	22	38	4.230	0.000	6.255	10.485
SUPERVISORY PERSONNEL	7	0	13	20	3.340	0.000	3.313	6.653
ENGINEERING PERSONNEL	10	0	9	19	3.185	0.000	3.355	6.540
TOTAL	78	0	53	131	34.131	0.000	16.387	50.518
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	33	0	93	126	19.290	0.000	35.902	55.192
OPERATIONS PERSONNEL	9	0	0	9	2.763	0.000	0.030	2.793
HEALTH PHYSICS PERSONNEL	9	0	9	18	2.347	0.000	3.230	5.577
SUPERVISORY PERSONNEL	6	0	7	13	2.290	0.000	2.443	4.733
ENGINEERING PERSONNEL	2	0	18	20	1.130	0.000	5.953	7.083
TOTAL	59	0	127	186	27.820	0.000	47.558	75.378
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	38	39	1.055	0.000	32.065	33.120
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.010	0.000	1.180	1.190
SUPERVISORY PERSONNEL	2	0	5	7	0.390	0.000	5.845	6.235
ENGINEERING PERSONNEL	3	0	41	44	0.952	0.000	35.510	36.462
TOTAL	6	0	88	94	2.407	0.000	74.600	77.007
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	5	0	56	61	1.250	0.000	36.086	37.336
OPERATIONS PERSONNEL	0	0	0	0	0.035	0.000	0.000	0.035
HEALTH PHYSICS PERSONNEL	0	0	15	15	0.030	0.000	5.535	5.565
SUPERVISORY PERSONNEL	0	0	4	4	0.035	0.000	1.015	1.050
ENGINEERING PERSONNEL	2	0	78	80	0.470	0.000	55.630	56.100
TOTAL	7	0	153	160	1.820	0.000	98.266	100.086
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	14	15	0.295	0.000	6.940	7.235
OPERATIONS PERSONNEL	3	0	1	4	1.013	0.000	0.240	1.253
HEALTH PHYSICS PERSONNEL	8	0	9	17	2.820	0.000	7.535	10.355
SUPERVISORY PERSONNEL	8	0	4	12	2.947	0.000	1.651	4.598
ENGINEERING PERSONNEL	0	0	3	3	0.055	0.000	2.670	2.725
TOTAL	20	0	31	51	7.130	0.000	19.036	26.166
REFUELING								
MAINTENANCE PERSONNEL	37	0	261	298	30.650	0.000	201.221	231.871
OPERATIONS PERSONNEL	37	0	1	38	16.247	0.000	0.265	16.512
HEALTH PHYSICS PERSONNEL	17	0	82	99	7.052	0.000	60.146	67.198
SUPERVISORY PERSONNEL	28	0	32	60	11.922	0.000	22.449	34.371
ENGINEERING PERSONNEL	18	0	63	81	6.975	0.000	24.757	31.732
TOTAL	137	0	439	576	72.846	0.000	308.838	381.684
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	79	0	470	549	53.748	0.000	315.428	369.176
OPERATIONS PERSONNEL	92	0	3	95	42.226	0.000	0.785	43.011
HEALTH PHYSICS PERSONNEL	50	0	141	191	16.489	0.000	83.881	100.370
SUPERVISORY PERSONNEL	51	0	65	116	20.924	0.000	36.716	57.640
ENGINEERING PERSONNEL	35	0	212	247	12.767	0.000	127.875	140.642
GRAND TOTALS	307	0	891	1198	146.154	0.000	564.685	710.839

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *MCGUIRE 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	136	493	440	1069	1.315	6.140	4.095	11.550
OPERATIONS PERSONNEL	85	6	82	173	29.000	1.950	9.465	40.415
HEALTH PHYSICS PERSONNEL	70	1	206	277	9.601	0.000	6.325	15.926
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	123	27	11	161	11.513	0.140	0.055	11.708
TOTAL	415	527	739	1681	51.429	8.230	19.940	79.599
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	143	522	523	1188	62.616	250.714	218.639	531.969
OPERATIONS PERSONNEL	80	6	95	181	4.420	1.010	43.790	49.220
HEALTH PHYSICS PERSONNEL	70	1	207	278	29.235	0.000	113.976	143.211
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	115	22	17	154	29.485	9.285	3.935	42.705
TOTAL	409	551	842	1802	125.756	261.009	380.340	767.105
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	41	135	79	255	5.045	6.580	12.845	24.470
OPERATIONS PERSONNEL	3	1	14	18	0.025	0.000	0.080	0.105
HEALTH PHYSICS PERSONNEL	32	0	65	97	1.835	0.000	2.625	4.460
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	39	3	3	45	3.285	0.000	0.350	3.635
TOTAL	115	139	161	415	10.190	6.580	15.900	32.670
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	125	369	366	860	7.650	118.310	217.745	343.705
OPERATIONS PERSONNEL	13	0	54	67	0.140	0.000	2.625	2.765
HEALTH PHYSICS PERSONNEL	64	1	146	211	8.200	0.135	60.300	68.635
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	63	16	5	84	7.595	4.215	3.470	15.280
TOTAL	266	386	571	1223	23.585	122.660	284.140	430.385
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	41	7	62	0.005	0.345	0.000	0.350
OPERATIONS PERSONNEL	16	4	41	61	0.450	0.280	3.835	4.565
HEALTH PHYSICS PERSONNEL	45	0	31	76	7.090	0.000	0.580	7.670
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	32	1	1	34	1.295	0.000	1.520	2.815
TOTAL	107	46	80	233	8.840	0.625	5.935	15.400
REFUELING								
MAINTENANCE PERSONNEL	19	144	129	292	0.315	7.190	12.985	20.490
OPERATIONS PERSONNEL	17	2	36	55	0.350	0.140	3.050	3.540
HEALTH PHYSICS PERSONNEL	33	0	84	117	2.270	0.000	3.560	5.830
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	18	5	9	32	0.160	0.095	0.970	1.225
TOTAL	87	151	258	496	3.095	7.425	20.565	31.085
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	478 (166)	1704 (501)	1544 (593)	3726 (1260)	76.946	389.279	466.309	932.534
OPERATIONS PERSONNEL	214 (87)	19 (7)	322 (96)	555 (190)	34.385	3.380	62.845	100.610
HEALTH PHYSICS PERSONNEL	314 (70)	3 (1)	739 (206)	1056 (277)	58.231	0.135	187.366	245.732
SUPERVISORY PERSONNEL	3 (0)	0 (0)	0 (0)	3 (0)	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	390 (119)	74 (26)	46 (18)	510 (163)	53.333	13.735	10.300	77.368
GRAND TOTALS	1399 (442)	1800 (535)	2651 (913)	5850 (1890)	222.895	406.529	726.820	1356.244

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *MILLSTONE POINT 1

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	16	1	2	19	4.310	1.180	0.590	6.080
OPERATIONS PERSONNEL	34	0	1	35	17.010	0.080	0.320	17.410
HEALTH PHYSICS PERSONNEL	16	0	6	22	4.400	0.000	2.620	7.020
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
ENGINEERING PERSONNEL	3	2	3	8	0.523	0.480	2.680	3.683
TOTAL	69	3	12	84	26.243	1.740	6.220	34.203
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	8	0	2	10	3.090	0.120	0.960	4.170
OPERATIONS PERSONNEL	5	0	0	5	1.430	0.000	0.140	1.570
HEALTH PHYSICS PERSONNEL	2	0	4	6	0.840	0.000	1.080	1.920
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.110	0.070	0.110	0.290
TOTAL	15	0	6	21	5.470	0.190	2.290	7.950
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.030	0.030
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	1	0	0	1	0.210	0.110	0.000	0.320
TOTAL	1	0	0	1	0.220	0.110	0.030	0.360
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	48	2	35	85	28.560	0.580	16.310	45.450
OPERATIONS PERSONNEL	13	1	18	32	4.710	0.300	12.740	17.750
HEALTH PHYSICS PERSONNEL	14	0	7	21	5.090	0.000	3.920	9.010
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.070	0.070
ENGINEERING PERSONNEL	1	7	6	14	0.680	2.370	1.930	4.980
TOTAL	76	10	66	152	39.040	3.250	34.970	77.260
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	5	8	1.210	0.020	6.640	7.870
OPERATIONS PERSONNEL	15	0	1	16	6.810	0.000	2.210	9.020
HEALTH PHYSICS PERSONNEL	21	0	17	38	8.030	0.000	10.010	18.040
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	3	3	6	0.010	0.860	3.290	4.160
TOTAL	39	3	26	68	16.070	0.880	22.150	39.100
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	75	3	44	122	37.170	1.900	24.500	63.570
OPERATIONS PERSONNEL	67	1	20	88	29.960	0.380	15.440	45.780
HEALTH PHYSICS PERSONNEL	53	0	34	87	18.360	0.000	17.630	35.990
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.080	0.100
ENGINEERING PERSONNEL	5	12	12	29	1.533	3.890	8.010	13.433
GRAND TOTALS	200	16	110	326	87.043	6.170	65.660	158.873

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *MILLSTONE POINT 2,3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	0	1	0.320	0.010	0.260	0.590
OPERATIONS PERSONNEL	51	0	0	51	23.460	0.140	0.080	23.680
HEALTH PHYSICS PERSONNEL	17	0	18	35	4.100	0.000	4.870	8.970
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.060	0.080
ENGINEERING PERSONNEL	0	0	0	0	0.110	0.090	0.070	0.270
TOTAL	69	0	18	87	28.010	0.240	5.340	33.590
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	103	4	416	523	132.150	2.640	288.070	422.860
OPERATIONS PERSONNEL	58	1	21	80	29.980	0.240	11.460	41.680
HEALTH PHYSICS PERSONNEL	28	1	101	130	16.160	0.240	42.110	58.510
SUPERVISORY PERSONNEL	0	0	0	0	0.040	0.000	0.110	0.150
ENGINEERING PERSONNEL	13	28	84	125	7.810	12.360	58.000	78.170
TOTAL	202	34	622	858	186.140	15.480	399.750	601.370
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	113	114	0.520	0.000	43.890	44.410
OPERATIONS PERSONNEL	0	0	2	2	0.150	0.010	1.680	1.840
HEALTH PHYSICS PERSONNEL	1	0	15	16	0.460	0.000	5.430	5.890
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
ENGINEERING PERSONNEL	3	3	45	51	1.110	1.470	36.030	38.610
TOTAL	5	3	175	183	2.240	1.480	87.040	90.760
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	32	1	60	93	12.040	0.210	20.270	32.520
OPERATIONS PERSONNEL	2	0	0	2	1.290	0.000	0.440	1.730
HEALTH PHYSICS PERSONNEL	9	0	6	15	3.620	0.010	2.140	5.770
SUPERVISORY PERSONNEL	0	0	0	0	0.040	0.000	0.000	0.040
ENGINEERING PERSONNEL	3	9	12	24	0.510	2.020	4.850	7.380
TOTAL	46	10	78	134	17.500	2.240	27.700	47.440
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	20	21	0.590	0.000	6.000	6.590
OPERATIONS PERSONNEL	10	0	1	11	3.630	0.000	0.550	4.180
HEALTH PHYSICS PERSONNEL	27	0	31	58	13.780	0.000	15.520	29.300
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	1	5	6	0.010	0.460	1.140	1.610
TOTAL	38	1	57	96	18.010	0.460	23.210	41.680
REFUELING								
MAINTENANCE PERSONNEL	41	2	29	72	27.960	0.290	14.830	43.080
OPERATIONS PERSONNEL	16	0	1	17	4.960	0.000	0.380	5.340
HEALTH PHYSICS PERSONNEL	5	0	44	49	1.160	0.000	12.320	13.480
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	6	3	11	20	1.180	1.130	4.980	7.290
TOTAL	68	5	85	158	35.260	1.420	32.510	69.190
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	179	7	638	824	173.580	3.150	373.320	550.050
OPERATIONS PERSONNEL	137	1	25	163	63.470	0.390	14.590	78.450
HEALTH PHYSICS PERSONNEL	87	1	215	303	39.280	0.250	82.390	121.920
SUPERVISORY PERSONNEL	0	0	0	0	0.100	0.000	0.180	0.280
ENGINEERING PERSONNEL	25	44	157	226	10.730	17.530	105.070	133.330
GRAND TOTALS	428	53	1035	1516	287.160	21.320	575.550	884.030

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *MONTICELLO

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	27	3	0	30	6.882	1.981	0.069	8.932
OPERATIONS PERSONNEL	39	0	0	39	14.026	0.071	0.000	14.097
HEALTH PHYSICS PERSONNEL	21	0	1	22	8.113	0.025	0.576	8.714
SUPERVISORY PERSONNEL	10	1	4	15	3.818	0.827	1.671	6.316
ENGINEERING PERSONNEL	7	0	0	7	1.782	0.000	0.000	1.782
TOTAL	104	4	5	113	34.621	2.904	2.316	39.841
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	33	31	11	75	12.197	15.357	2.535	30.089
OPERATIONS PERSONNEL	3	0	0	3	1.052	0.000	0.000	1.052
HEALTH PHYSICS PERSONNEL	10	0	0	10	2.396	0.000	0.284	2.680
SUPERVISORY PERSONNEL	0	0	1	1	0.416	0.285	0.371	1.072
ENGINEERING PERSONNEL	0	0	0	0	0.161	0.000	0.000	0.161
TOTAL	46	31	12	89	16.222	15.642	3.190	35.054
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	0	1	0.000	0.404	0.000	0.404
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.123	0.042	0.051	0.216
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	1	0	1	0.123	0.446	0.051	0.620
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	30	3	35	0.950	25.397	2.383	28.730
OPERATIONS PERSONNEL	0	0	0	0	0.077	0.000	0.000	0.077
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.324	0.000	0.000	0.324
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	30	3	36	1.351	25.397	2.383	29.131
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4	0	0	4	1.521	0.091	0.000	1.612
OPERATIONS PERSONNEL	0	0	0	0	0.697	0.000	0.000	0.697
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.605	0.000	0.163	0.768
SUPERVISORY PERSONNEL	0	0	2	2	0.018	0.000	1.506	1.524
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	3	9	2.841	0.091	1.669	4.601
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	66	65	14	145	21.550	43.230	4.987	69.767
OPERATIONS PERSONNEL	42	0	0	42	15.852	0.071	0.000	15.923
HEALTH PHYSICS PERSONNEL	33	0	2	35	11.438	0.025	1.023	12.486
SUPERVISORY PERSONNEL	11	1	7	19	4.375	1.154	3.599	9.128
ENGINEERING PERSONNEL	7	0	0	7	1.943	0.000	0.000	1.943
GRAND TOTALS	159	66	23	248	55.158	44.480	9.609	109.247

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *NINE MILE POINT 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1079	2	11	1092	11.164	0.010	0.175	11.349
OPERATIONS PERSONNEL	379	20	599	998	9.184	0.029	2.324	11.537
HEALTH PHYSICS PERSONNEL	640	0	343	983	3.684	0.000	3.546	7.230
SUPERVISORY PERSONNEL	34	0	2	36	0.388	0.000	0.008	0.396
ENGINEERING PERSONNEL	31	0	6	37	0.229	0.000	0.033	0.262
TOTAL	2163	22	961	3146	24.649	0.039	6.086	30.774
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	4853	258	2399	7510	151.191	2.609	70.331	224.131
OPERATIONS PERSONNEL	470	1	337	808	6.481	0.001	6.534	13.016
HEALTH PHYSICS PERSONNEL	2442	2	2723	5167	25.515	0.010	50.977	76.502
SUPERVISORY PERSONNEL	263	2	28	293	6.736	0.050	0.358	7.144
ENGINEERING PERSONNEL	539	43	479	1061	8.358	0.479	10.737	19.574
TOTAL	8567	306	5966	14839	198.281	3.149	138.937	340.367
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	382	8	6919	7309	16.961	0.514	226.797	244.272
OPERATIONS PERSONNEL	52	1	13	66	0.477	0.005	0.126	0.608
HEALTH PHYSICS PERSONNEL	40	14	232	286	0.388	0.260	3.930	4.578
SUPERVISORY PERSONNEL	45	0	278	323	0.771	0.000	6.110	6.881
ENGINEERING PERSONNEL	239	125	2220	2584	4.450	1.825	66.683	72.958
TOTAL	758	148	9662	10568	23.047	2.604	303.646	329.297
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	449	3	570	1022	43.139	0.022	11.154	54.315
OPERATIONS PERSONNEL	19	0	6	25	0.107	0.000	0.025	0.132
HEALTH PHYSICS PERSONNEL	33	10	142	185	0.216	0.150	1.755	2.121
SUPERVISORY PERSONNEL	40	0	5	45	2.820	0.000	0.170	2.990
ENGINEERING PERSONNEL	217	101	633	951	3.975	2.957	14.979	21.911
TOTAL	758	114	1356	2228	50.257	3.129	28.083	81.469
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	0	9	21	0.097	0.000	0.128	0.225
OPERATIONS PERSONNEL	1060	0	35	1095	8.308	0.000	1.367	9.675
HEALTH PHYSICS PERSONNEL	64	0	37	101	0.734	0.000	0.541	1.275
SUPERVISORY PERSONNEL	14	4	0	18	0.298	0.000	0.000	0.298
ENGINEERING PERSONNEL	13	0	1	14	0.086	0.023	0.005	0.114
TOTAL	1163	4	82	1249	9.523	0.023	2.041	11.587
REFUELING								
MAINTENANCE PERSONNEL	150	6	16	172	4.195	0.245	0.315	4.755
OPERATIONS PERSONNEL	403	0	8	411	3.973	0.000	0.052	4.025
HEALTH PHYSICS PERSONNEL	13	0	20	33	0.100	0.000	0.125	0.225
SUPERVISORY PERSONNEL	119	0	0	119	0.932	0.000	0.000	0.932
ENGINEERING PERSONNEL	93	2	14	109	0.523	0.006	0.133	0.662
TOTAL	778	8	58	844	9.723	0.251	0.625	10.599
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	6925 (222)	277 (17)	9924 (312)	17126 (551)	226.747	3.400	308.900	539.047
OPERATIONS PERSONNEL	2383 (59)	22 (1)	998 (26)	3403 (86)	28.530	0.035	10.428	38.993
HEALTH PHYSICS PERSONNEL	3232 (95)	26 (4)	3497 (83)	6755 (182)	30.637	0.420	60.874	91.931
SUPERVISORY PERSONNEL	515 (63)	6 (2)	313 (15)	834 (80)	11.945	0.050	6.646	18.641
ENGINEERING PERSONNEL	1132 (127)	271 (64)	3353 (247)	4756 (438)	17.621	5.290	92.570	115.481
GRAND TOTALS	14187 (566)	602 (88)	18085 (683)	32874 (1337)	315.480	9.195	479.418	804.093

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *NORTH ANNA 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	102	5	24	131	2.000	0.031	1.061	3.092
OPERATIONS PERSONNEL	217	3	3	223	13.740	0.019	0.008	13.767
HEALTH PHYSICS PERSONNEL	61	2	15	78	10.081	0.005	1.037	11.123
SUPERVISORY PERSONNEL	57	1	4	62	1.085	0.002	0.020	1.107
ENGINEERING PERSONNEL	40	7	5	52	0.328	0.036	0.023	0.387
TOTAL	477	18	51	546	27.234	0.093	2.149	29.476
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	146	34	136	316	29.533	7.109	9.568	46.210
OPERATIONS PERSONNEL	85	3	3	91	9.030	0.008	0.242	9.280
HEALTH PHYSICS PERSONNEL	62	0	14	76	14.977	0.000	6.233	21.210
SUPERVISORY PERSONNEL	42	1	3	46	4.150	0.016	0.032	4.198
ENGINEERING PERSONNEL	25	3	5	33	0.471	0.035	0.179	0.685
TOTAL	360	41	161	562	58.161	7.168	16.254	81.583
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	7	9	0.019	0.040	0.369	0.428
OPERATIONS PERSONNEL	5	0	0	5	0.055	0.000	0.000	0.055
HEALTH PHYSICS PERSONNEL	3	0	1	4	0.089	0.000	0.002	0.091
SUPERVISORY PERSONNEL	2	0	0	2	0.040	0.000	0.000	0.040
ENGINEERING PERSONNEL	7	1	3	11	0.249	0.000	0.013	0.262
TOTAL	19	1	11	31	0.452	0.040	0.384	0.876
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	30	40	0.094	0.000	0.132	0.226
OPERATIONS PERSONNEL	14	0	0	14	0.158	0.000	0.000	0.158
HEALTH PHYSICS PERSONNEL	4	0	2	6	0.054	0.000	0.015	0.069
SUPERVISORY PERSONNEL	1	0	0	1	0.002	0.000	0.000	0.002
ENGINEERING PERSONNEL	3	0	0	3	0.005	0.000	0.000	0.005
TOTAL	32	0	32	64	0.313	0.000	0.147	0.460
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	1	15	28	0.085	0.010	0.117	0.212
OPERATIONS PERSONNEL	24	0	2	26	2.371	0.000	0.768	3.139
HEALTH PHYSICS PERSONNEL	18	0	6	24	1.637	0.000	0.069	1.706
SUPERVISORY PERSONNEL	4	0	0	4	0.265	0.000	0.000	0.265
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	58	1	23	82	4.358	0.010	0.954	5.322
REFUELING								
MAINTENANCE PERSONNEL	0	0	4	4	0.000	0.037	0.013	0.050
OPERATIONS PERSONNEL	15	0	0	15	0.347	0.000	0.000	0.347
HEALTH PHYSICS PERSONNEL	2	0	1	3	1.637	0.000	0.001	1.638
SUPERVISORY PERSONNEL	2	1	0	3	0.051	0.011	0.000	0.062
ENGINEERING PERSONNEL	0	2	1	3	0.067	0.026	0.008	0.101
TOTAL	19	3	6	28	2.102	0.074	0.022	2.198
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	272	40	216	528	31.731	7.227	11.260	50.218
OPERATIONS PERSONNEL	360	6	8	374	25.701	0.027	1.018	26.746
HEALTH PHYSICS PERSONNEL	150	2	39	191	28.475	0.005	7.357	35.837
SUPERVISORY PERSONNEL	108	3	7	118	5.593	0.029	0.052	5.674
ENGINEERING PERSONNEL	75	13	14	102	1.120	0.097	0.223	1.440
GRAND TOTALS	965	64	284	1313	92.620	7.385	19.910	119.915

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *OCONEE 1,2,3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	167	583	348	1098	2.425	1.495	0.375	4.295
OPERATIONS PERSONNEL	100	1	24	125	31.135	0.000	0.505	31.640
HEALTH PHYSICS PERSONNEL	60	0	148	208	4.950	0.000	11.025	15.975
SUPERVISORY PERSONNEL	1	0	0	1	0.200	0.000	0.000	0.200
ENGINEERING PERSONNEL	91	28	15	134	7.570	0.300	0.195	8.065
TOTAL	419	612	535	1566	46.280	1.795	12.100	60.175
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	186	631	379	1196	89.765	221.496	107.206	418.467
OPERATIONS PERSONNEL	86	1	61	148	17.195	0.120	51.920	69.235
HEALTH PHYSICS PERSONNEL	61	0	148	209	14.120	0.000	53.075	67.195
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	87	28	13	128	22.285	4.610	1.695	28.590
TOTAL	420	660	601	1681	143.365	226.226	213.896	583.487
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	20	108	56	184	0.465	8.840	5.665	14.970
OPERATIONS PERSONNEL	5	0	0	5	0.140	0.000	0.000	0.140
HEALTH PHYSICS PERSONNEL	15	0	75	90	0.533	0.000	4.252	4.785
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	40	8	7	55	7.110	1.075	1.925	10.110
TOTAL	80	116	138	334	8.248	9.915	11.842	30.005
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	143	519	262	924	7.230	141.040	99.280	247.550
OPERATIONS PERSONNEL	58	0	35	93	3.815	0.000	1.530	5.345
HEALTH PHYSICS PERSONNEL	38	0	116	154	6.735	0.000	19.365	26.100
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	61	27	9	97	7.520	5.055	2.605	15.180
TOTAL	300	546	422	1268	25.300	146.095	122.780	294.175
WASTE PROCESSING								
MAINTENANCE PERSONNEL	29	53	4	86	0.505	3.645	0.320	4.470
OPERATIONS PERSONNEL	21	0	55	76	1.325	0.000	4.205	5.530
HEALTH PHYSICS PERSONNEL	47	0	18	65	2.835	0.000	0.835	3.670
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	31	2	9	42	5.545	0.000	2.265	7.810
TOTAL	128	55	86	269	10.210	3.645	7.625	21.480
REFUELING								
MAINTENANCE PERSONNEL	22	72	28	122	2.025	26.420	3.530	31.975
OPERATIONS PERSONNEL	74	0	11	85	5.475	0.000	0.415	5.890
HEALTH PHYSICS PERSONNEL	26	0	71	97	0.475	0.000	3.700	4.175
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	28	6	1	35	0.705	0.250	0.175	1.130
TOTAL	150	78	111	339	8.680	26.670	7.820	43.170
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	567 (185)	1966 (659)	1077 (414)	3610(1258)	102.415	402.936	216.376	721.727
OPERATIONS PERSONNEL	344 (100)	2 (1)	186 (62)	532 (163)	59.085	0.120	58.575	117.780
HEALTH PHYSICS PERSONNEL	247 (61)	0 (0)	576 (148)	823 (209)	29.648	0.000	92.252	121.900
SUPERVISORY PERSONNEL	1 (1)	0 (0)	0 (0)	1 (1)	0.200	0.000	0.000	0.200
ENGINEERING PERSONNEL	338 (117)	99 (31)	54 (24)	491 (172)	50.735	11.290	8.860	70.885
GRAND TOTALS	1497 (464)	2067 (691)	1893 (648)	5457(1803)	242.083	414.346	376.063	1032.492

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *OYSTER CREEK

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	162	0	240	402	13.446	0.000	9.745	23.191
OPERATIONS PERSONNEL	169	0	12	181	44.732	0.000	0.203	44.935
HEALTH PHYSICS PERSONNEL	69	0	120	189	22.481	0.000	53.435	75.916
SUPERVISORY PERSONNEL	40	0	6	46	1.277	0.000	0.140	1.417
ENGINEERING PERSONNEL	34	0	16	50	0.727	0.000	0.110	0.837
TOTAL	474	0	394	868	82.663	0.000	63.633	146.296
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	351	5	1318	1674	73.322	0.027	262.063	335.412
OPERATIONS PERSONNEL	307	1	67	375	21.193	0.000	1.743	22.936
HEALTH PHYSICS PERSONNEL	72	0	88	160	4.730	0.000	9.390	14.120
SUPERVISORY PERSONNEL	141	0	72	213	6.450	0.000	6.036	12.486
ENGINEERING PERSONNEL	183	0	136	319	4.837	0.000	5.708	10.545
TOTAL	1054	6	1681	2741	110.532	0.027	284.940	395.499
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	40	0	546	586	1.366	0.000	343.698	345.064
OPERATIONS PERSONNEL	27	0	4	31	3.827	0.000	1.868	5.695
HEALTH PHYSICS PERSONNEL	13	0	4	17	0.125	0.000	0.230	0.355
SUPERVISORY PERSONNEL	3	0	5	8	0.000	0.000	0.602	0.602
ENGINEERING PERSONNEL	9	0	35	44	1.361	0.000	29.865	31.226
TOTAL	92	0	594	686	6.679	0.000	376.263	382.942
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	187	1	1104	1292	47.055	0.174	542.488	589.717
OPERATIONS PERSONNEL	124	0	16	140	9.191	0.000	3.557	12.748
HEALTH PHYSICS PERSONNEL	40	0	58	98	3.615	0.000	6.448	10.063
SUPERVISORY PERSONNEL	43	0	30	73	5.866	0.000	8.034	13.900
ENGINEERING PERSONNEL	69	0	69	138	6.690	0.000	10.697	17.387
TOTAL	463	1	1277	1741	72.417	0.174	571.224	643.815
WASTE PROCESSING								
MAINTENANCE PERSONNEL	79	0	98	177	0.522	0.000	8.689	9.211
OPERATIONS PERSONNEL	39	0	3	42	0.436	0.000	3.434	3.870
HEALTH PHYSICS PERSONNEL	21	0	27	48	0.542	0.000	2.250	2.792
SUPERVISORY PERSONNEL	10	0	4	14	0.016	0.000	0.000	0.016
ENGINEERING PERSONNEL	7	0	3	10	0.727	0.000	0.518	1.245
TOTAL	156	0	135	291	2.243	0.000	14.891	17.134
REFUELING								
MAINTENANCE PERSONNEL	108	0	255	363	9.341	0.000	23.464	32.805
OPERATIONS PERSONNEL	62	0	5	67	8.434	0.000	0.150	8.584
HEALTH PHYSICS PERSONNEL	25	0	16	41	1.176	0.000	0.553	1.729
SUPERVISORY PERSONNEL	8	0	5	13	0.269	0.000	0.832	1.101
ENGINEERING PERSONNEL	15	0	15	30	0.689	0.000	1.012	1.701
TOTAL	218	0	296	514	19.909	0.000	26.011	45.920
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	927 (357)	6	(5) 3561 (1447)	4494(1809)	145.052	0.201	1190.147	1335.400
OPERATIONS PERSONNEL	728 (325)	1	(1) 107 (69)	836 (395)	87.813	0.000	10.955	98.768
HEALTH PHYSICS PERSONNEL	240 (91)	0	(0) 313 (139)	553 (230)	32.669	0.000	72.306	104.975
SUPERVISORY PERSONNEL	245 (146)	0	(0) 122 (74)	367 (220)	13.878	0.000	15.644	29.522
ENGINEERING PERSONNEL	317 (189)	0	(0) 274 (150)	591 (339)	15.031	0.000	47.910	62.941
GRAND TOTALS	2457 (1108)	7	(6) 4377 (1879)	6841(2993)	294.443	0.201	1336.962	1631.606

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PALISADES

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	23	1	62	86	5.064	0.321	27.543	32.928
OPERATIONS PERSONNEL	58	0	10	68	28.968	0.040	3.224	32.232
HEALTH PHYSICS PERSONNEL	25	0	72	97	13.525	0.000	40.122	53.647
SUPERVISORY PERSONNEL	33	1	3	37	9.222	0.357	0.795	10.374
ENGINEERING PERSONNEL	16	2	9	27	4.289	0.725	4.048	9.062
TOTAL	155	4	156	315	61.068	1.443	75.732	138.243
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	77	46	239	362	59.514	23.692	116.344	199.550
OPERATIONS PERSONNEL	12	0	2	14	3.184	0.005	0.437	3.626
HEALTH PHYSICS PERSONNEL	17	0	39	56	5.741	0.000	11.934	17.675
SUPERVISORY PERSONNEL	14	2	8	24	4.267	1.061	4.503	9.831
ENGINEERING PERSONNEL	6	11	43	60	2.596	4.569	18.788	25.953
TOTAL	126	59	331	516	75.302	29.327	152.006	256.635
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	48	49	100	0.552	43.301	22.271	66.124
OPERATIONS PERSONNEL	4	1	2	7	0.961	0.209	0.959	2.129
HEALTH PHYSICS PERSONNEL	4	0	31	35	1.552	0.000	12.991	14.543
SUPERVISORY PERSONNEL	3	2	1	6	1.040	0.973	0.392	2.405
ENGINEERING PERSONNEL	2	11	86	99	0.724	6.065	66.313	73.102
TOTAL	16	62	169	247	4.829	50.548	102.926	158.303
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	61	63	0.544	0.098	24.864	25.506
OPERATIONS PERSONNEL	5	0	0	5	0.861	0.000	0.086	0.947
HEALTH PHYSICS PERSONNEL	9	0	13	22	3.940	0.000	5.249	9.189
SUPERVISORY PERSONNEL	2	0	2	4	0.443	0.015	0.770	1.228
ENGINEERING PERSONNEL	4	3	31	38	1.100	0.876	18.171	20.147
TOTAL	22	3	107	132	6.888	0.989	49.140	57.017
WASTE PROCESSING								
MAINTENANCE PERSONNEL	10	0	1	11	3.238	0.056	0.423	3.717
OPERATIONS PERSONNEL	1	0	0	1	0.265	0.000	0.025	0.290
HEALTH PHYSICS PERSONNEL	11	0	2	13	11.324	0.000	0.358	11.682
SUPERVISORY PERSONNEL	2	0	0	2	0.997	0.000	0.039	1.036
ENGINEERING PERSONNEL	0	0	1	1	0.011	0.000	0.273	0.284
TOTAL	24	0	4	28	15.835	0.056	1.118	17.009
REFUELING								
MAINTENANCE PERSONNEL	33	2	29	64	9.565	0.733	26.528	36.826
OPERATIONS PERSONNEL	5	0	0	5	1.632	0.000	0.029	1.661
HEALTH PHYSICS PERSONNEL	2	0	13	15	0.634	0.000	6.129	6.763
SUPERVISORY PERSONNEL	8	0	2	10	1.780	0.000	3.168	4.948
ENGINEERING PERSONNEL	11	1	50	62	3.280	0.212	49.573	53.065
TOTAL	59	3	94	156	16.891	0.945	85.427	103.263
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	148	97	441	686	78.477	68.201	217.973	364.651
OPERATIONS PERSONNEL	85	1	14	100	35.871	0.254	4.760	40.885
HEALTH PHYSICS PERSONNEL	68	0	170	238	36.716	0.000	76.783	113.499
SUPERVISORY PERSONNEL	62	5	16	83	17.749	2.406	9.667	29.822
ENGINEERING PERSONNEL	39	28	220	287	12.000	12.447	157.166	181.613
GRAND TOTALS	402	131	861	1394	180.813	83.308	466.349	730.470

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PALO VERDE 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	15	0	40	55	5.935	0.000	12.366	18.301
OPERATIONS PERSONNEL	83	0	7	90	24.411	0.000	3.510	27.921
HEALTH PHYSICS PERSONNEL	50	0	111	161	18.224	0.000	0.227	18.451
SUPERVISORY PERSONNEL	4	0	2	6	1.150	0.000	1.885	3.035
ENGINEERING PERSONNEL	1	0	4	5	1.258	0.000	3.530	4.788
TOTAL	153	0	164	317	50.978	0.000	21.518	72.496
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	156	0	307	463	73.294	0.000	227.012	300.306
OPERATIONS PERSONNEL	36	0	55	91	20.896	0.000	32.130	53.026
HEALTH PHYSICS PERSONNEL	16	0	97	113	5.512	0.000	39.536	45.048
SUPERVISORY PERSONNEL	1	0	6	7	0.330	0.000	2.500	2.830
ENGINEERING PERSONNEL	11	0	23	34	8.712	0.000	14.347	23.059
TOTAL	220	0	488	708	108.744	0.000	315.525	424.269
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	12	12	0.170	0.000	5.965	6.135
OPERATIONS PERSONNEL	0	0	3	3	0.015	0.000	1.815	1.830
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.045	0.000	0.055	0.100
SUPERVISORY PERSONNEL	0	0	0	0	0.045	0.000	0.000	0.045
ENGINEERING PERSONNEL	4	0	1	5	1.035	0.000	0.720	1.755
TOTAL	4	0	16	20	1.310	0.000	8.555	9.865
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	7	0	12	19	2.928	0.000	4.390	7.318
OPERATIONS PERSONNEL	3	0	1	4	0.895	0.000	0.305	1.200
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.158	0.000	1.260	1.418
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	0	0	0	0.060	0.000	0.115	0.175
TOTAL	10	0	16	26	4.051	0.000	6.070	10.121
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	0	46	54	3.189	0.000	14.061	17.250
OPERATIONS PERSONNEL	20	0	55	75	16.411	0.000	30.306	46.717
HEALTH PHYSICS PERSONNEL	3	0	46	49	2.172	0.000	24.760	26.932
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.850	0.850
ENGINEERING PERSONNEL	0	0	1	1	0.010	0.000	0.175	0.185
TOTAL	31	0	149	180	21.782	0.000	70.152	91.934
REFUELING								
MAINTENANCE PERSONNEL	23	0	22	45	11.130	0.000	14.455	25.585
OPERATIONS PERSONNEL	10	0	11	21	2.470	0.000	3.028	5.498
HEALTH PHYSICS PERSONNEL	3	0	6	9	1.130	0.000	2.085	3.215
SUPERVISORY PERSONNEL	2	0	1	3	0.375	0.000	0.180	0.555
ENGINEERING PERSONNEL	1	0	5	6	1.115	0.000	2.625	3.740
TOTAL	39	0	45	84	16.220	0.000	22.373	38.593
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	209	0	439	648	96.646	0.000	278.249	374.895
OPERATIONS PERSONNEL	152	0	132	284	65.098	0.000	71.094	136.192
HEALTH PHYSICS PERSONNEL	72	0	263	335	27.241	0.000	67.923	95.164
SUPERVISORY PERSONNEL	7	0	10	17	1.910	0.000	5.415	7.325
ENGINEERING PERSONNEL	17	0	34	51	12.190	0.000	21.512	33.702
GRAND TOTALS	457	0	878	1335	203.085	0.000	444.193	647.278

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PEACH BOTTOM 2,3

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	65	158	623	846	3.543	5.617	32.640	41.800
OPERATIONS PERSONNEL	129	21	195	345	20.121	0.765	12.203	33.089
HEALTH PHYSICS PERSONNEL	83	4	128	215	13.385	0.062	19.837	33.284
SUPERVISORY PERSONNEL	3	0	15	18	0.204	0.000	1.038	1.242
ENGINEERING PERSONNEL	43	10	19	72	2.727	0.525	1.347	4.599
TOTAL	323	193	980	1496	39.980	6.969	67.065	114.014
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	115	405	1175	1695	11.250	34.469	141.928	187.647
OPERATIONS PERSONNEL	136	34	252	422	16.560	2.286	22.225	41.071
HEALTH PHYSICS PERSONNEL	101	4	176	281	15.031	0.177	40.676	55.884
SUPERVISORY PERSONNEL	5	3	9	17	0.107	0.186	0.326	0.619
ENGINEERING PERSONNEL	46	11	27	84	4.468	0.583	1.456	6.507
TOTAL	403	457	1639	2499	47.416	37.701	206.611	291.728
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	62	87	151	0.024	2.685	3.997	6.706
OPERATIONS PERSONNEL	1	3	5	9	0.008	0.157	0.106	0.271
HEALTH PHYSICS PERSONNEL	3	0	8	11	0.052	0.000	0.131	0.183
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.197	0.000	0.304	0.501
TOTAL	6	65	100	171	0.281	2.842	4.538	7.661
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	114	417	2008	2539	38.842	95.882	1469.678	1604.402
OPERATIONS PERSONNEL	59	33	287	379	3.814	5.599	116.300	125.713
HEALTH PHYSICS PERSONNEL	71	2	225	298	12.491	0.301	132.936	145.728
SUPERVISORY PERSONNEL	2	2	5	9	0.029	0.098	1.412	1.539
ENGINEERING PERSONNEL	33	8	21	62	4.246	1.739	5.407	11.392
TOTAL	279	462	2546	3287	59.422	103.619	1725.733	1888.774
WASTE PROCESSING								
MAINTENANCE PERSONNEL	16	21	157	194	0.686	0.644	14.885	16.215
OPERATIONS PERSONNEL	9	4	24	37	0.223	0.034	1.869	2.126
HEALTH PHYSICS PERSONNEL	26	1	38	65	1.309	0.032	2.854	4.195
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.010	0.010
TOTAL	51	26	220	297	2.218	0.710	19.618	22.546
REFUELING								
MAINTENANCE PERSONNEL	10	8	34	52	0.299	0.209	1.167	1.675
OPERATIONS PERSONNEL	1	0	4	5	0.011	0.000	0.078	0.089
HEALTH PHYSICS PERSONNEL	7	0	12	19	0.146	0.000	0.000	0.146
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	18	8	50	76	0.456	0.209	1.245	1.910
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	322 (135)	1071 (469)	4084 (2371)	5477(2975)	54.644	139.506	1664.295	1858.445
OPERATIONS PERSONNEL	335 (150)	95 (46)	767 (498)	1197 (694)	40.737	8.841	152.781	202.359
HEALTH PHYSICS PERSONNEL	291 (106)	11 (5)	587 (287)	889 (398)	42.414	0.572	196.434	239.420
SUPERVISORY PERSONNEL	10 (6)	5 (4)	29 (22)	44 (32)	0.340	0.284	2.776	3.400
ENGINEERING PERSONNEL	122 (51)	29 (19)	68 (35)	219 (105)	11.638	2.847	8.524	23.009
GRAND TOTALS	1080 (448)	1211 (543)	5535 (3213)	7826(4204)	149.773	152.050	2024.810	2326.633

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PERRY

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	0	2	5	0.619	0.000	0.545	1.164
OPERATIONS PERSONNEL	40	0	0	40	8.967	0.000	0.000	8.967
HEALTH PHYSICS PERSONNEL	31	0	13	44	9.010	0.000	3.720	12.730
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	1	3	0.385	0.012	0.084	0.481
TOTAL	76	0	16	92	18.981	0.012	4.349	23.342
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	43	0	46	89	6.615	0.000	10.122	16.737
OPERATIONS PERSONNEL	2	0	0	2	1.017	0.000	0.000	1.017
HEALTH PHYSICS PERSONNEL	7	0	0	7	3.952	0.000	0.000	3.952
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	0	2	0.400	0.150	0.067	0.617
TOTAL	54	0	46	100	11.984	0.150	10.189	22.323
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	1	1	0.034	0.000	0.265	0.299
OPERATIONS PERSONNEL	2	0	0	2	0.159	0.000	0.000	0.159
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.929	0.000	0.112	1.041
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	1	2	5	0.430	0.093	0.717	1.240
TOTAL	5	1	3	9	1.552	0.093	1.094	2.739
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	18	0	25	43	5.250	0.000	5.913	11.163
OPERATIONS PERSONNEL	0	0	0	0	0.476	0.000	0.005	0.481
HEALTH PHYSICS PERSONNEL	4	0	0	4	2.906	0.000	0.722	3.628
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	2	0	3	0.356	0.200	0.065	0.621
TOTAL	23	2	25	50	8.988	0.200	6.705	15.893
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	2	4	0.247	0.000	0.349	0.596
OPERATIONS PERSONNEL	8	0	2	10	1.445	0.000	1.944	3.389
HEALTH PHYSICS PERSONNEL	4	0	0	4	3.626	0.000	0.323	3.949
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.004	0.000	0.004
TOTAL	14	0	4	18	5.318	0.004	2.616	7.938
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	66	0	76	142	12.765	0.000	17.194	29.959
OPERATIONS PERSONNEL	52	0	2	54	12.064	0.000	1.949	14.013
HEALTH PHYSICS PERSONNEL	47	0	13	60	20.423	0.000	4.877	25.300
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	7	3	3	13	1.571	0.459	0.933	2.963
GRAND TOTALS	172	3	94	269	46.823	0.459	24.953	72.235

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PILGRIM

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	1	9	13	0.954	0.193	3.431	4.578
OPERATIONS PERSONNEL	22	27	3	52	7.633	10.755	2.097	20.485
HEALTH PHYSICS PERSONNEL	25	5	14	44	6.264	1.101	4.630	11.995
SUPERVISORY PERSONNEL	5	1	0	6	2.304	0.576	0.395	3.275
ENGINEERING PERSONNEL	9	4	5	18	3.102	1.667	1.492	6.261
TOTAL	64	38	31	133	20.257	14.292	12.045	46.594
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	81	6	187	274	33.256	2.910	94.213	130.379
OPERATIONS PERSONNEL	13	23	16	52	3.641	5.372	8.363	17.376
HEALTH PHYSICS PERSONNEL	36	5	28	69	11.438	1.340	8.433	21.211
SUPERVISORY PERSONNEL	7	2	6	15	2.459	0.625	2.445	5.529
ENGINEERING PERSONNEL	11	3	14	28	3.531	1.259	5.830	10.620
TOTAL	148	39	251	438	54.325	11.506	119.284	185.115
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	5	5	0.020	0.000	1.660	1.680
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.055	0.055
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.065	0.000	0.135	0.200
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.015	0.045
ENGINEERING PERSONNEL	0	0	0	0	0.045	0.047	0.025	0.117
TOTAL	0	0	5	5	0.160	0.047	1.890	2.097
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	37	3	69	109	13.373	1.040	28.424	42.837
OPERATIONS PERSONNEL	7	17	10	34	1.722	3.452	2.736	7.910
HEALTH PHYSICS PERSONNEL	18	3	5	26	6.692	1.044	2.055	9.791
SUPERVISORY PERSONNEL	3	2	3	8	1.040	0.647	1.445	3.132
ENGINEERING PERSONNEL	8	4	6	18	3.349	1.233	2.023	6.605
TOTAL	73	29	93	195	26.176	7.416	36.683	70.275
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	0	8	16	2.420	0.010	2.986	5.416
OPERATIONS PERSONNEL	6	1	1	8	1.580	0.175	0.180	1.935
HEALTH PHYSICS PERSONNEL	1	1	3	5	0.669	0.330	2.155	3.154
SUPERVISORY PERSONNEL	1	0	0	1	0.305	0.000	0.015	0.320
ENGINEERING PERSONNEL	0	0	0	0	0.047	0.075	0.000	0.122
TOTAL	16	2	12	30	5.021	0.590	5.336	10.947
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.490	0.490
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.040	0.040
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.010	0.000	0.130	0.140
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.010	0.000	0.660	0.670
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	129	10	278	417	50.023	4.153	131.204	185.380
OPERATIONS PERSONNEL	48	68	30	146	14.576	19.754	13.471	47.801
HEALTH PHYSICS PERSONNEL	80	14	50	144	25.138	3.815	17.538	46.491
SUPERVISORY PERSONNEL	16	5	9	30	6.138	1.848	4.315	12.301
ENGINEERING PERSONNEL	28	11	25	64	10.074	4.281	9.370	23.725
GRAND TOTALS	301	108	392	801	105.949	33.851	175.898	315.698

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *POINT BEACH 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	3.510	0.380	3.890
OPERATIONS PERSONNEL	0	0	0	0	23.590	0.000	0.000	23.590
HEALTH PHYSICS PERSONNEL	0	0	0	0	30.925	0.000	0.000	30.925
SUPERVISORY PERSONNEL	0	0	0	0	1.510	0.000	0.000	1.510
ENGINEERING PERSONNEL	0	0	0	0	0.120	0.000	0.000	0.120
TOTAL	0	0	0	0	56.145	3.510	0.380	60.035
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	35.790	22.990	0.000	58.780
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	35.790	22.990	0.000	58.780
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	3.120	2.980	6.800	12.900
OPERATIONS PERSONNEL	0	0	0	0	5.820	0.000	0.000	5.820
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	3.250	0.000	0.000	3.250
ENGINEERING PERSONNEL	0	0	0	0	0.270	0.000	0.000	0.270
TOTAL	0	0	0	0	12.460	2.980	6.800	22.240
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	5.780	3.010	205.370	214.160
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	5.780	3.010	205.370	214.160
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	9.670	9.670
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	1.140	0.000	0.000	1.140
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	1.140	0.000	9.670	10.810
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	10.560	6.890	0.000	17.450
OPERATIONS PERSONNEL	0	0	0	0	2.910	0.000	0.000	2.910
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
ENGINEERING PERSONNEL	0	0	0	0	0.850	0.000	0.000	0.850
TOTAL	0	0	0	0	14.340	6.890	0.000	21.230
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0 (65)	0 (0)	0 (0)	0 (65)	55.250	39.380	222.220	316.850
OPERATIONS PERSONNEL	0 (60)	0 (0)	0 (0)	0 (60)	32.320	0.000	0.000	32.320
HEALTH PHYSICS PERSONNEL	0 (40)	0 (0)	0 (0)	0 (40)	32.065	0.000	0.000	32.065
SUPERVISORY PERSONNEL	0 (11)	0 (0)	0 (0)	0 (11)	4.780	0.000	0.000	4.780
ENGINEERING PERSONNEL	0 (4)	0 (0)	0 (0)	0 (4)	1.240	0.000	0.000	1.240
GRAND TOTALS	0 (180)	0 (0)	0 (0)	0 (180)	125.655	39.380	222.220	387.255

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *PRAIRIE ISLAND 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	2	0	8	2.415	1.323	0.158	3.896
OPERATIONS PERSONNEL	22	0	0	22	6.025	0.034	0.000	6.059
HEALTH PHYSICS PERSONNEL	6	0	5	11	2.354	0.000	1.409	3.763
SUPERVISORY PERSONNEL	5	0	0	5	1.801	0.372	0.374	2.547
ENGINEERING PERSONNEL	1	0	0	1	0.520	0.000	0.032	0.552
TOTAL	40	2	5	47	13.115	1.729	1.973	16.817
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	13	28	0	41	3.450	9.705	0.202	13.357
OPERATIONS PERSONNEL	0	0	0	0	0.156	0.009	0.000	0.165
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.054	0.000	0.010	0.064
SUPERVISORY PERSONNEL	5	0	1	6	1.335	0.122	0.548	2.005
ENGINEERING PERSONNEL	8	0	0	8	1.624	0.000	0.000	1.624
TOTAL	26	28	1	55	6.619	9.836	0.760	17.215
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	56	50	115	2.432	22.476	24.305	49.213
OPERATIONS PERSONNEL	0	0	0	0	0.021	0.000	0.000	0.021
HEALTH PHYSICS PERSONNEL	0	0	16	16	0.130	0.000	3.582	3.712
SUPERVISORY PERSONNEL	2	0	10	12	0.525	0.155	4.087	4.767
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
TOTAL	11	56	76	143	3.128	22.631	31.974	57.733
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	35	90	37	162	14.022	29.588	14.535	58.145
OPERATIONS PERSONNEL	1	0	0	1	0.488	0.000	0.000	0.488
HEALTH PHYSICS PERSONNEL	9	0	14	23	2.190	0.000	3.704	5.894
SUPERVISORY PERSONNEL	3	0	19	22	0.898	0.354	5.263	6.515
ENGINEERING PERSONNEL	8	0	0	8	1.538	0.000	0.000	1.538
TOTAL	56	90	70	216	19.136	29.942	23.502	72.580
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	5	0	14	3.120	1.664	0.000	4.784
OPERATIONS PERSONNEL	1	0	0	1	0.583	0.000	0.000	0.583
HEALTH PHYSICS PERSONNEL	3	0	1	4	2.578	0.000	0.173	2.751
SUPERVISORY PERSONNEL	0	0	6	6	0.066	0.016	1.401	1.483
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	13	5	7	25	6.347	1.680	1.574	9.601
REFUELING								
MAINTENANCE PERSONNEL	32	30	0	62	10.493	9.695	0.065	20.253
OPERATIONS PERSONNEL	0	0	0	0	0.891	0.013	0.000	0.904
HEALTH PHYSICS PERSONNEL	3	0	12	15	0.776	0.000	2.333	3.109
SUPERVISORY PERSONNEL	3	1	1	5	0.953	0.154	0.512	1.619
ENGINEERING PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
TOTAL	38	31	13	82	13.118	9.862	2.910	25.890
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	104	211	87	402	35.932	74.451	39.265	149.648
OPERATIONS PERSONNEL	24	0	0	24	8.164	0.056	0.000	8.220
HEALTH PHYSICS PERSONNEL	21	0	48	69	8.082	0.000	11.211	19.293
SUPERVISORY PERSONNEL	18	1	37	56	5.578	1.173	12.185	18.936
ENGINEERING PERSONNEL	17	0	0	17	3.707	0.000	0.032	3.739
GRAND TOTALS	184	212	172	568	61.463	75.680	62.693	199.836

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *QUAD CITIES 1,2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	18	0	9	27	13.260	0.000	6.240	19.500
OPERATIONS PERSONNEL	97	0	4	101	49.420	0.000	1.880	51.300
HEALTH PHYSICS PERSONNEL	17	0	43	60	15.240	0.000	28.780	44.020
SUPERVISORY PERSONNEL	38	0	0	38	14.730	0.000	0.000	14.730
ENGINEERING PERSONNEL	12	1	2	15	3.300	0.140	0.460	3.900
TOTAL	182	1	58	241	95.950	0.140	37.360	133.450
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	120	2	262	384	85.110	0.210	184.640	269.960
OPERATIONS PERSONNEL	13	0	2	15	6.700	0.000	0.620	7.320
HEALTH PHYSICS PERSONNEL	24	0	53	77	19.490	0.000	35.750	55.240
SUPERVISORY PERSONNEL	35	0	0	35	14.000	0.000	0.000	14.000
ENGINEERING PERSONNEL	17	11	33	61	4.470	1.230	7.390	13.090
TOTAL	209	13	350	572	129.770	1.440	228.400	359.610
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	193	194	0.590	0.000	135.310	135.900
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	2	0	3	5	1.160	0.000	1.890	3.050
SUPERVISORY PERSONNEL	1	0	0	1	0.140	0.000	0.000	0.140
ENGINEERING PERSONNEL	7	13	37	57	1.810	1.440	8.130	11.380
TOTAL	11	13	233	257	3.700	1.440	145.330	150.470
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	5	18	164	187	2.350	8.750	114.590	125.690
OPERATIONS PERSONNEL	2	0	0	2	0.240	0.000	0.000	0.240
HEALTH PHYSICS PERSONNEL	2	0	2	4	0.430	0.000	0.740	1.170
SUPERVISORY PERSONNEL	1	0	0	1	0.330	0.000	0.000	0.330
ENGINEERING PERSONNEL	4	14	35	53	1.300	1.480	7.640	10.420
TOTAL	14	32	201	247	4.650	10.230	122.970	137.850
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	1	2	0.320	0.000	0.050	0.370
OPERATIONS PERSONNEL	20	0	3	23	10.050	0.000	1.630	11.680
HEALTH PHYSICS PERSONNEL	2	0	1	3	1.190	0.000	0.030	1.220
SUPERVISORY PERSONNEL	7	0	0	7	2.690	0.000	0.000	2.690
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	30	0	5	35	14.250	0.000	1.710	15.960
REFUELING								
MAINTENANCE PERSONNEL	13	0	1	14	10.250	0.000	0.020	10.270
OPERATIONS PERSONNEL	5	0	0	5	2.710	0.000	0.000	2.710
HEALTH PHYSICS PERSONNEL	2	0	0	2	1.340	0.000	0.000	1.340
SUPERVISORY PERSONNEL	4	0	0	4	1.390	0.000	0.000	1.390
ENGINEERING PERSONNEL	1	1	0	2	0.180	0.020	0.000	0.200
TOTAL	25	1	1	27	15.870	0.020	0.020	15.910
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	158	20	630	808	111.880	8.960	440.850	561.690
OPERATIONS PERSONNEL	137	0	9	146	69.120	0.000	4.130	73.250
HEALTH PHYSICS PERSONNEL	49	0	102	151	38.850	0.000	67.190	106.040
SUPERVISORY PERSONNEL	86	0	0	86	33.280	0.000	0.000	33.280
ENGINEERING PERSONNEL	41	40	107	188	11.060	4.310	23.620	38.990
GRAND TOTALS	471	60	848	1379	264.190	13.270	535.790	813.250

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *RANCHO SECO

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	45	0	28	73	1.242	0.000	0.635	1.877
OPERATIONS PERSONNEL	27	0	0	27	4.988	0.000	0.000	4.988
HEALTH PHYSICS PERSONNEL	32	0	16	48	1.465	0.000	0.961	2.426
SUPERVISORY PERSONNEL	1	0	1	2	0.086	0.000	0.010	0.096
ENGINEERING PERSONNEL	9	0	4	13	0.309	0.000	0.279	0.588
TOTAL	114	0	49	163	8.090	0.000	1.885	9.975
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	51	0	58	109	7.281	0.000	8.108	15.389
OPERATIONS PERSONNEL	21	0	0	21	0.597	0.000	0.000	0.597
HEALTH PHYSICS PERSONNEL	41	0	30	71	7.147	0.000	8.645	15.792
SUPERVISORY PERSONNEL	1	0	1	2	0.063	0.000	0.562	0.625
ENGINEERING PERSONNEL	9	0	4	13	0.750	0.000	0.227	0.977
TOTAL	123	0	93	216	15.838	0.000	17.542	33.380
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	0	9	15	0.149	0.000	0.207	0.356
OPERATIONS PERSONNEL	1	0	0	1	0.002	0.000	0.077	0.079
HEALTH PHYSICS PERSONNEL	7	0	6	13	0.085	0.000	0.000	0.085
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.034	0.034
ENGINEERING PERSONNEL	2	0	0	2	0.054	0.000	0.000	0.054
TOTAL	16	0	16	32	0.290	0.000	0.318	0.608
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	24	0	34	58	0.549	0.000	2.109	2.658
OPERATIONS PERSONNEL	2	0	0	2	0.011	0.000	0.000	0.011
HEALTH PHYSICS PERSONNEL	16	0	12	28	0.273	0.000	0.709	0.982
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.070	0.070
ENGINEERING PERSONNEL	3	0	0	3	0.143	0.000	0.000	0.143
TOTAL	45	0	47	92	0.976	0.000	2.888	3.864
WASTE PROCESSING								
MAINTENANCE PERSONNEL	36	0	23	59	2.232	0.000	1.484	3.716
OPERATIONS PERSONNEL	2	0	0	2	0.019	0.000	0.000	0.019
HEALTH PHYSICS PERSONNEL	33	0	19	52	7.184	0.000	1.210	8.394
SUPERVISORY PERSONNEL	1	0	1	2	0.055	0.000	0.012	0.067
ENGINEERING PERSONNEL	2	0	1	3	0.057	0.000	0.025	0.082
TOTAL	74	0	44	118	9.547	0.000	2.731	12.278
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	162	0	152	314	11.453	0.000	12.543	23.996
OPERATIONS PERSONNEL	53	0	0	53	5.617	0.000	0.077	5.694
HEALTH PHYSICS PERSONNEL	129	0	83	212	16.154	0.000	11.525	27.679
SUPERVISORY PERSONNEL	3	0	5	8	0.204	0.000	0.688	0.892
ENGINEERING PERSONNEL	25	0	9	34	1.313	0.000	0.531	1.844
GRAND TOTALS	372	0	249	621	34.741	0.000	25.364	60.105

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *RIVER BEND 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	8	0	2	10	2.843	0.000	0.425	3.268
OPERATIONS PERSONNEL	25	0	1	26	9.912	0.000	0.185	10.097
HEALTH PHYSICS PERSONNEL	22	0	4	26	10.986	0.000	3.444	14.430
SUPERVISORY PERSONNEL	0	0	1	1	0.005	0.000	0.180	0.185
ENGINEERING PERSONNEL	1	0	1	2	0.141	0.000	0.135	0.276
TOTAL	56	0	9	65	23.887	0.000	4.369	28.256
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	16	0	6	22	5.183	0.000	1.730	6.913
OPERATIONS PERSONNEL	1	0	0	1	0.550	0.000	0.005	0.555
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.616	0.000	0.085	0.701
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	2	4	0.245	0.000	0.334	0.579
TOTAL	20	0	8	28	6.594	0.000	2.154	8.748
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	2	2	0.030	0.000	0.275	0.305
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.095	0.000	0.050	0.145
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	2	3	0.185	0.000	0.255	0.440
TOTAL	1	0	4	5	0.310	0.000	0.580	0.890
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	62	0	26	88	26.607	0.000	13.425	40.032
OPERATIONS PERSONNEL	9	0	0	9	3.300	0.000	0.225	3.525
HEALTH PHYSICS PERSONNEL	8	0	4	12	4.456	0.000	2.649	7.105
SUPERVISORY PERSONNEL	1	0	1	2	0.235	0.000	0.195	0.430
ENGINEERING PERSONNEL	8	1	2	11	1.826	0.000	0.450	2.276
TOTAL	88	1	33	122	36.424	0.000	16.944	53.368
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.000	0.000	0.415	0.415
OPERATIONS PERSONNEL	1	0	6	7	0.270	0.000	6.300	6.570
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.823	0.000	0.835	1.658
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	8	11	1.093	0.000	7.550	8.643
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.120	0.000	0.120
TOTAL	0	0	0	0	0.000	0.120	0.000	0.120
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	86	0	37	123	34.663	0.000	16.270	50.933
OPERATIONS PERSONNEL	36	0	7	43	14.032	0.000	6.715	20.747
HEALTH PHYSICS PERSONNEL	33	0	9	42	16.976	0.000	7.063	24.039
SUPERVISORY PERSONNEL	1	0	2	3	0.240	0.000	0.375	0.615
ENGINEERING PERSONNEL	12	1	7	20	2.397	0.120	1.174	3.691
GRAND TOTALS	168	1	62	231	68.308	0.120	31.597	100.025

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *ROBINSON 2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	2	4	2.467	0.130	0.866	3.463
OPERATIONS PERSONNEL	35	0	0	35	17.305	0.000	2.492	19.797
HEALTH PHYSICS PERSONNEL	29	0	2	31	15.270	0.000	2.085	17.355
SUPERVISORY PERSONNEL	0	0	0	0	0.155	0.015	0.020	0.190
ENGINEERING PERSONNEL	4	0	2	6	2.867	0.805	1.670	5.342
TOTAL	70	0	6	76	38.064	0.950	7.133	46.147
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	27	3	1	31	8.386	1.105	1.801	11.292
OPERATIONS PERSONNEL	0	0	0	0	0.020	0.000	0.060	0.080
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.710	0.000	0.105	0.815
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.120	0.120
ENGINEERING PERSONNEL	1	0	5	6	0.350	0.005	0.960	1.315
TOTAL	30	3	7	40	9.466	1.110	3.046	13.622
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	14	4	14	32	9.470	2.975	5.400	17.845
OPERATIONS PERSONNEL	0	0	0	0	0.215	0.000	0.005	0.220
HEALTH PHYSICS PERSONNEL	3	0	3	6	1.090	0.000	0.820	1.910
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.020	0.020
ENGINEERING PERSONNEL	16	0	18	34	7.080	0.430	5.375	12.885
TOTAL	33	4	35	72	17.855	3.405	11.620	32.880
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	77	33	342	452	66.488	13.390	229.911	309.789
OPERATIONS PERSONNEL	13	0	9	22	3.920	0.000	2.465	6.385
HEALTH PHYSICS PERSONNEL	31	0	37	68	21.546	0.000	24.655	46.201
SUPERVISORY PERSONNEL	1	0	2	3	0.385	0.030	0.570	0.985
ENGINEERING PERSONNEL	26	8	139	173	9.215	2.705	74.086	86.006
TOTAL	148	41	529	718	101.554	16.125	331.687	449.366
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4	0	15	19	1.355	0.220	8.283	9.858
OPERATIONS PERSONNEL	0	0	0	0	0.040	0.000	0.105	0.145
HEALTH PHYSICS PERSONNEL	7	0	3	10	5.780	0.000	0.975	6.755
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	2	2	0.025	0.000	0.890	0.915
TOTAL	11	0	20	31	7.200	0.220	10.253	17.673
REFUELING								
MAINTENANCE PERSONNEL	10	4	28	42	2.400	1.745	8.490	12.635
OPERATIONS PERSONNEL	0	0	0	0	0.470	0.000	0.010	0.480
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.170	0.000	0.625	0.795
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	36	38	0.620	0.040	11.515	12.175
TOTAL	12	4	66	82	3.660	1.785	20.640	26.085
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	134	44	402	580	90.566	19.565	254.751	364.882
OPERATIONS PERSONNEL	48	0	9	57	21.970	0.000	5.137	27.107
HEALTH PHYSICS PERSONNEL	72	0	47	119	44.566	0.000	29.265	73.831
SUPERVISORY PERSONNEL	1	0	3	4	0.540	0.045	0.730	1.315
ENGINEERING PERSONNEL	49	8	202	259	20.157	3.985	94.496	118.638
GRAND TOTALS	304	52	663	1019	177.799	23.595	384.379	585.773

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SALEM 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.242	0.000	0.117	0.359
OPERATIONS PERSONNEL	0	0	0	0	0.270	0.000	0.018	0.288
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.096	0.000	0.000	0.096
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
TOTAL	0	0	0	0	0.617	0.000	0.135	0.752
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	53	0	57	110	20.518	0.162	28.130	48.810
OPERATIONS PERSONNEL	21	0	1	22	9.479	0.000	1.267	10.746
HEALTH PHYSICS PERSONNEL	39	0	1	40	5.375	0.000	1.524	6.899
SUPERVISORY PERSONNEL	0	1	3	4	0.000	0.812	0.483	1.295
ENGINEERING PERSONNEL	2	0	3	5	1.083	0.108	0.380	1.571
TOTAL	115	1	65	181	36.455	1.082	31.784	69.321
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	25	25	0.504	0.266	9.553	10.323
OPERATIONS PERSONNEL	0	0	0	0	0.012	0.000	0.158	0.170
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.079	0.000	0.117	0.196
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.052	0.471	0.523
ENGINEERING PERSONNEL	0	1	0	1	0.098	0.266	0.046	0.410
TOTAL	0	1	27	28	0.693	0.584	10.345	11.622
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	101	1	62	164	40.622	0.261	30.936	71.819
OPERATIONS PERSONNEL	1	0	2	3	2.846	0.000	0.580	3.426
HEALTH PHYSICS PERSONNEL	11	0	20	31	1.161	0.000	6.859	8.020
SUPERVISORY PERSONNEL	0	2	1	3	0.000	0.099	0.039	0.138
ENGINEERING PERSONNEL	1	0	0	1	0.064	0.047	0.023	0.134
TOTAL	114	3	85	202	44.693	0.407	38.437	83.537
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	10	10	0.078	0.000	3.239	3.317
OPERATIONS PERSONNEL	0	0	0	0	0.016	0.000	0.000	0.016
HEALTH PHYSICS PERSONNEL	24	0	5	29	4.134	0.000	1.704	5.838
SUPERVISORY PERSONNEL	0	2	0	2	0.000	0.148	0.002	0.150
ENGINEERING PERSONNEL	0	0	0	0	0.355	0.000	0.000	0.355
TOTAL	24	2	15	41	4.583	0.148	4.945	9.676
REFUELING								
MAINTENANCE PERSONNEL	104	2	395	501	48.494	0.447	163.402	212.343
OPERATIONS PERSONNEL	24	0	4	28	14.196	0.000	1.859	16.055
HEALTH PHYSICS PERSONNEL	30	0	132	162	8.321	0.095	59.945	68.361
SUPERVISORY PERSONNEL	0	10	2	12	0.061	2.417	0.784	3.262
ENGINEERING PERSONNEL	6	1	4	11	2.243	0.276	2.452	4.971
TOTAL	164	13	537	714	73.315	3.235	228.442	304.992
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	258	3	549	810	110.458	1.136	235.377	346.971
OPERATIONS PERSONNEL	46	0	7	53	26.819	0.000	3.882	30.701
HEALTH PHYSICS PERSONNEL	104	0	158	262	19.166	0.095	70.149	89.410
SUPERVISORY PERSONNEL	0	15	8	23	0.061	3.528	1.779	5.368
ENGINEERING PERSONNEL	9	2	7	18	3.852	0.697	2.901	7.450
GRAND TOTALS	417	20	729	1166	160.356	5.456	314.088	479.900

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SAN ONOFRE 1,2,3

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	12	2	13	27	0.518	0.011	0.448	0.977
OPERATIONS PERSONNEL	37	2	1	40	14.660	0.453	1.045	16.158
HEALTH PHYSICS PERSONNEL	59	2	102	163	30.351	0.248	47.720	78.319
SUPERVISORY PERSONNEL	1	0	0	1	0.009	0.000	0.000	0.009
ENGINEERING PERSONNEL	13	1	8	22	1.066	0.136	1.164	2.366
TOTAL	122	7	124	253	46.604	0.848	50.377	97.829
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	170	28	476	674	104.773	14.127	265.660	384.560
OPERATIONS PERSONNEL	20	1	4	25	0.986	0.004	1.796	2.786
HEALTH PHYSICS PERSONNEL	85	7	194	286	27.925	2.824	66.409	97.158
SUPERVISORY PERSONNEL	3	0	2	5	3.374	0.000	0.371	3.745
ENGINEERING PERSONNEL	105	3	170	278	31.774	1.052	86.057	118.883
TOTAL	383	39	846	1268	168.832	18.007	420.293	607.132
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	51	2	102	155	2.709	0.118	5.616	8.443
OPERATIONS PERSONNEL	4	0	2	6	0.214	0.000	0.019	0.233
HEALTH PHYSICS PERSONNEL	26	0	25	51	1.569	0.000	0.710	2.279
SUPERVISORY PERSONNEL	2	0	2	4	0.012	0.000	0.138	0.150
ENGINEERING PERSONNEL	82	1	40	123	6.499	0.083	3.252	9.834
TOTAL	165	3	171	339	11.003	0.201	9.735	20.939
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	1	1	0.000	0.000	0.009	0.009
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.012	0.000	0.000	0.012
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	2	0	1	3	0.012	0.000	0.009	0.021
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	2	26	42	0.256	0.783	1.120	2.159
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.007	0.007
HEALTH PHYSICS PERSONNEL	42	5	104	151	12.005	2.704	26.540	41.249
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	17	17	0.000	0.000	6.188	6.188
TOTAL	56	7	148	211	12.261	3.487	33.855	49.603
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	247 (172)	34 (28)	618 (481)	899 (681)	108.256	15.039	272.853	396.148
OPERATIONS PERSONNEL	61 (39)	3 (2)	8 (4)	72 (45)	15.860	0.457	2.867	19.184
HEALTH PHYSICS PERSONNEL	214 (103)	14 (7)	425 (224)	653 (334)	71.862	5.776	141.379	219.017
SUPERVISORY PERSONNEL	6 (3)	0 (0)	4 (3)	10 (6)	3.395	0.000	0.509	3.904
ENGINEERING PERSONNEL	200 (113)	5 (4)	235 (181)	440 (298)	39.339	1.271	96.661	137.271
GRAND TOTALS	728 (430)	56 (41)	1290 (893)	2074(1364)	238.712	22.543	514.269	775.524

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SEQUOYAH 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)								TOTAL PERSON-REM			
	STATION		UTILITY		CONTRACT		TOTAL		STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV												
MAINTENANCE PERSONNEL	740		17		19		776		29.719	0.393	0.343	30.455
OPERATIONS PERSONNEL	100		6		0		106		15.700	0.428	0.000	16.128
HEALTH PHYSICS PERSONNEL	53		0		12		65		12.556	0.000	3.878	16.434
SUPERVISORY PERSONNEL	76		25		9		110		4.756	0.803	0.060	5.619
ENGINEERING PERSONNEL	124		67		72		263		4.836	1.836	1.363	8.035
TOTAL	1093		115		112		1320		67.567	3.460	5.644	76.671
ROUTINE MAINTENANCE												
MAINTENANCE PERSONNEL	925		27		27		979		156.802	2.794	10.302	169.898
OPERATIONS PERSONNEL	85		2		1		88		0.756	0.018	0.000	0.774
HEALTH PHYSICS PERSONNEL	57		0		12		69		7.730	0.000	1.591	9.321
SUPERVISORY PERSONNEL	91		23		7		121		5.233	0.385	0.027	5.645
ENGINEERING PERSONNEL	145		78		69		292		12.993	2.510	0.791	16.294
TOTAL	1303		130		116		1549		183.514	5.707	12.711	201.932
IN-SERVICE INSPECTION												
MAINTENANCE PERSONNEL	182		1		1		184		23.478	0.075	0.015	23.568
OPERATIONS PERSONNEL	4		0		0		4		0.270	0.000	0.000	0.270
HEALTH PHYSICS PERSONNEL	46		0		7		53		17.011	0.000	0.080	17.091
SUPERVISORY PERSONNEL	25		12		1		38		2.338	1.954	0.180	4.472
ENGINEERING PERSONNEL	27		13		69		109		0.742	2.483	48.357	51.582
TOTAL	284		26		78		388		43.839	4.512	48.632	96.983
SPECIAL MAINTENANCE												
MAINTENANCE PERSONNEL	744		14		7		765		206.005	0.534	1.518	208.057
OPERATIONS PERSONNEL	16		0		0		16		0.058	0.000	0.000	0.058
HEALTH PHYSICS PERSONNEL	48		0		10		58		3.846	0.000	0.324	4.170
SUPERVISORY PERSONNEL	68		18		14		100		15.445	0.761	3.332	19.538
ENGINEERING PERSONNEL	135		79		96		310		36.574	13.548	47.587	97.709
TOTAL	1011		111		127		1249		261.928	14.843	52.761	329.532
WASTE PROCESSING												
MAINTENANCE PERSONNEL	179		0		5		184		2.219	0.000	0.000	2.219
OPERATIONS PERSONNEL	30		0		3		33		4.709	0.000	0.870	5.579
HEALTH PHYSICS PERSONNEL	43		0		6		49		2.661	0.000	0.000	2.661
SUPERVISORY PERSONNEL	6		1		2		9		0.001	0.001	0.654	0.656
ENGINEERING PERSONNEL	8		1		3		12		0.063	0.002	0.026	0.091
TOTAL	266		2		19		287		9.653	0.003	1.550	11.206
REFUELING												
MAINTENANCE PERSONNEL	6		0		0		6		0.060	0.000	0.000	0.060
OPERATIONS PERSONNEL	9		0		0		9		0.023	0.000	0.000	0.023
HEALTH PHYSICS PERSONNEL	6		0		1		7		0.000	0.000	0.005	0.005
SUPERVISORY PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1		1		0		2		0.000	0.000	0.000	0.000
TOTAL	22		1		1		24		0.083	0.000	0.005	0.088
TOTAL BY JOB FUNCTION												
MAINTENANCE PERSONNEL	2776	(952)	59	(16)	59	(26)	2894	(994)	418.283	3.796	12.178	434.257
OPERATIONS PERSONNEL	244	(77)	8	(1)	4	(3)	256	(81)	21.516	0.446	0.870	22.832
HEALTH PHYSICS PERSONNEL	253	(51)	0	(0)	48	(11)	301	(62)	43.804	0.000	5.878	49.682
SUPERVISORY PERSONNEL	266	(88)	79	(15)	33	(13)	378	(116)	27.773	3.904	4.253	35.930
ENGINEERING PERSONNEL	440	(86)	239	(37)	309	(158)	988	(281)	55.208	20.379	98.124	173.711
GRAND TOTALS	3979	(1254)	385	(69)	453	(211)	4817	(1534)	566.584	28.525	121.303	716.412

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *ST. LUCIE 1,2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	4	2	2	8	3.781	0.500	1.362	5.643
OPERATIONS PERSONNEL	24	0	14	38	13.657	0.050	4.888	18.595
HEALTH PHYSICS PERSONNEL	26	0	24	50	13.204	1.000	12.659	26.863
SUPERVISORY PERSONNEL	8	0	2	10	2.911	0.125	1.016	4.052
ENGINEERING PERSONNEL	1	0	0	1	0.616	0.139	0.344	1.099
TOTAL	63	2	42	107	34.169	1.814	20.269	56.252
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	126	26	144	296	57.899	7.024	58.926	123.849
OPERATIONS PERSONNEL	12	0	30	42	4.286	0.025	17.084	21.395
HEALTH PHYSICS PERSONNEL	6	0	1	7	1.440	0.000	0.320	1.760
SUPERVISORY PERSONNEL	4	0	2	6	1.710	0.040	1.879	3.629
ENGINEERING PERSONNEL	0	0	0	0	0.180	0.020	0.385	0.585
TOTAL	148	26	177	351	65.515	7.109	78.594	151.218
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	71	71	0.095	0.100	33.286	33.481
OPERATIONS PERSONNEL	11	1	8	20	3.515	0.315	3.670	7.500
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.110	0.000	0.035	0.145
SUPERVISORY PERSONNEL	2	1	5	8	0.395	0.160	1.180	1.735
ENGINEERING PERSONNEL	2	0	9	11	0.665	0.055	5.905	6.625
TOTAL	15	2	93	110	4.780	0.630	44.076	49.486
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	50	21	122	193	14.471	6.060	50.927	71.458
OPERATIONS PERSONNEL	8	0	39	47	5.035	0.005	15.360	20.400
HEALTH PHYSICS PERSONNEL	4	0	1	5	1.230	0.000	0.270	1.500
SUPERVISORY PERSONNEL	1	0	3	4	0.690	0.025	1.430	2.145
ENGINEERING PERSONNEL	0	0	5	5	0.175	0.000	1.340	1.515
TOTAL	63	21	170	254	21.601	6.090	69.327	97.018
WASTE PROCESSING								
MAINTENANCE PERSONNEL	13	0	23	36	5.176	0.055	11.460	16.691
OPERATIONS PERSONNEL	1	0	5	6	0.210	0.000	4.302	4.512
HEALTH PHYSICS PERSONNEL	3	0	2	5	1.260	0.000	1.235	2.495
SUPERVISORY PERSONNEL	1	0	0	1	1.425	0.000	0.010	1.435
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	18	0	30	48	8.071	0.055	17.007	25.133
REFUELING								
MAINTENANCE PERSONNEL	81	48	70	199	31.810	37.310	46.279	115.399
OPERATIONS PERSONNEL	29	0	83	112	11.332	0.010	52.610	63.952
HEALTH PHYSICS PERSONNEL	13	0	47	60	12.100	0.000	33.570	45.670
SUPERVISORY PERSONNEL	19	0	11	30	6.254	0.045	5.445	11.744
ENGINEERING PERSONNEL	1	0	25	26	0.360	0.060	17.855	18.275
TOTAL	143	48	236	427	61.856	37.425	155.759	255.040
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	274 (177)	97 (61)	432 (309)	803 (547)	113.232	51.049	202.240	366.521
OPERATIONS PERSONNEL	85 (56)	1 (1)	179 (147)	265 (204)	38.035	0.405	97.914	136.354
HEALTH PHYSICS PERSONNEL	52 (27)	0 (0)	75 (62)	127 (89)	29.344	1.000	48.089	78.433
SUPERVISORY PERSONNEL	35 (31)	1 (0)	23 (23)	59 (54)	13.385	0.395	10.960	24.740
ENGINEERING PERSONNEL	4 (5)	0 (0)	39 (38)	43 (43)	1.996	0.274	25.829	28.099
GRAND TOTALS	450 (296)	99 (62)	748 (579)	1297 (937)	195.992	53.123	385.032	634.147

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SUMMER 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	2	4	1.548	0.090	2.575	4.213
OPERATIONS PERSONNEL	23	0	2	25	5.940	0.070	1.256	7.266
HEALTH PHYSICS PERSONNEL	3	0	18	21	1.013	0.025	7.440	8.478
SUPERVISORY PERSONNEL	0	0	0	0	0.610	0.005	0.100	0.715
ENGINEERING PERSONNEL	0	0	11	11	0.348	0.000	3.040	3.388
TOTAL	28	0	33	61	9.459	0.190	14.411	24.060
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	15	0	61	76	5.502	0.105	22.001	27.608
OPERATIONS PERSONNEL	1	0	1	2	1.955	0.465	1.242	3.662
HEALTH PHYSICS PERSONNEL	2	0	35	37	0.558	0.154	10.612	11.324
SUPERVISORY PERSONNEL	2	0	0	2	0.510	0.025	0.025	0.560
ENGINEERING PERSONNEL	0	0	0	0	0.130	0.000	0.435	0.565
TOTAL	20	0	97	117	8.655	0.749	34.315	43.719
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	45	46	0.735	0.220	20.610	21.565
OPERATIONS PERSONNEL	8	0	3	11	3.540	0.120	1.335	4.995
HEALTH PHYSICS PERSONNEL	1	2	25	28	0.355	0.410	7.165	7.930
SUPERVISORY PERSONNEL	0	0	0	0	0.155	0.120	0.000	0.275
ENGINEERING PERSONNEL	0	0	12	12	0.015	0.000	3.760	3.775
TOTAL	10	2	85	97	4.800	0.870	32.870	38.540
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	54	1	217	272	20.946	0.525	79.621	101.092
OPERATIONS PERSONNEL	18	0	4	22	6.173	0.040	1.510	7.723
HEALTH PHYSICS PERSONNEL	4	1	87	92	1.665	0.220	26.770	28.655
SUPERVISORY PERSONNEL	6	0	1	7	2.350	0.040	0.126	2.516
ENGINEERING PERSONNEL	1	0	77	78	0.565	0.000	54.485	55.050
TOTAL	83	2	386	471	31.699	0.825	162.512	195.036
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.175	0.005	0.410	0.590
OPERATIONS PERSONNEL	0	0	3	3	0.235	0.105	0.994	1.334
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.367	0.030	1.418	1.815
SUPERVISORY PERSONNEL	0	0	0	0	0.005	0.005	0.000	0.010
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.020	0.020
TOTAL	1	0	5	6	0.782	0.145	2.842	3.769
REFUELING								
MAINTENANCE PERSONNEL	18	0	49	67	10.250	0.000	18.035	28.285
OPERATIONS PERSONNEL	4	0	7	11	1.605	0.005	1.705	3.315
HEALTH PHYSICS PERSONNEL	3	0	38	41	1.360	0.000	12.580	13.940
SUPERVISORY PERSONNEL	5	0	0	5	3.765	0.000	0.000	3.765
ENGINEERING PERSONNEL	0	0	4	4	0.065	0.000	1.740	1.805
TOTAL	30	0	98	128	17.045	0.005	34.060	51.110
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	90	1	374	465	39.156	0.945	143.252	183.353
OPERATIONS PERSONNEL	54	0	20	74	19.448	0.805	8.042	28.295
HEALTH PHYSICS PERSONNEL	14	3	205	222	5.318	0.839	65.985	72.142
SUPERVISORY PERSONNEL	13	0	1	14	7.395	0.195	0.251	7.841
ENGINEERING PERSONNEL	1	0	104	105	1.123	0.000	63.480	64.603
GRAND TOTALS	172	4	704	880	72.440	2.784	281.010	356.234

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SURRY 1,2

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	9	2	56	67	0.952	0.034	1.821	2.807
OPERATIONS PERSONNEL	125	8	10	143	46.574	0.154	0.237	46.965
HEALTH PHYSICS PERSONNEL	25	8	46	79	1.570	0.212	8.380	10.162
SUPERVISORY PERSONNEL	22	3	4	29	2.073	0.019	0.060	2.152
ENGINEERING PERSONNEL	63	23	39	125	3.336	0.679	3.385	7.400
TOTAL	244	44	155	443	54.505	1.098	13.883	69.486
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	176	106	1139	1421	167.470	23.669	490.446	681.585
OPERATIONS PERSONNEL	291	33	107	431	74.861	4.180	52.593	131.634
HEALTH PHYSICS PERSONNEL	78	14	291	383	46.662	3.671	301.119	351.452
SUPERVISORY PERSONNEL	74	12	27	113	12.422	0.159	16.245	28.826
ENGINEERING PERSONNEL	63	30	49	142	11.455	0.673	10.670	22.798
TOTAL	682	195	1613	2490	312.870	32.352	871.073	1216.295
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	40	41	0.141	0.000	0.451	0.592
OPERATIONS PERSONNEL	3	1	18	22	0.066	0.022	0.454	0.542
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	0.011	0.011
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	3	2	5	0.000	0.053	0.094	0.147
TOTAL	4	4	61	69	0.207	0.075	1.010	1.292
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	36	16	578	630	3.038	1.283	198.978	203.299
OPERATIONS PERSONNEL	39	10	40	89	2.592	0.940	1.980	5.512
HEALTH PHYSICS PERSONNEL	15	0	27	42	1.196	0.000	2.969	4.165
SUPERVISORY PERSONNEL	4	0	2	6	0.129	0.000	0.055	0.184
ENGINEERING PERSONNEL	15	8	17	40	0.850	0.209	0.650	1.709
TOTAL	109	34	664	807	7.805	2.432	204.632	214.869
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	0	5	13	0.120	0.000	0.076	0.196
OPERATIONS PERSONNEL	16	1	0	17	4.018	0.002	0.000	4.020
HEALTH PHYSICS PERSONNEL	20	0	9	29	1.369	0.000	0.757	2.126
SUPERVISORY PERSONNEL	6	0	0	6	1.021	0.000	0.000	1.021
ENGINEERING PERSONNEL	1	0	0	1	0.002	0.000	0.000	0.002
TOTAL	51	1	14	66	6.530	0.002	0.833	7.365
REFUELING								
MAINTENANCE PERSONNEL	73	2	254	329	7.445	0.040	42.226	49.711
OPERATIONS PERSONNEL	45	13	33	91	6.856	0.818	6.788	14.462
HEALTH PHYSICS PERSONNEL	18	2	53	73	1.964	0.235	4.506	6.705
SUPERVISORY PERSONNEL	11	1	3	15	0.862	0.029	1.417	2.308
ENGINEERING PERSONNEL	9	3	14	26	0.574	0.037	0.805	1.416
TOTAL	156	21	357	534	17.701	1.159	55.742	74.602
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	303	126	2072	2501	179.166	25.026	733.998	938.190
OPERATIONS PERSONNEL	519	66	208	793	134.967	6.116	62.052	203.135
HEALTH PHYSICS PERSONNEL	156	24	427	607	52.761	4.118	317.742	374.621
SUPERVISORY PERSONNEL	117	16	36	169	16.507	0.207	17.777	34.491
ENGINEERING PERSONNEL	151	67	121	339	16.217	1.651	15.604	33.472
GRAND TOTALS	1246	299	2864	4409	399.618	37.118	1147.173	1583.909

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SUSQUEHANNA 1,2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	0	2	0.230	0.000	0.000	0.230
OPERATIONS PERSONNEL	68	0	5	73	28.903	0.000	1.159	30.062
HEALTH PHYSICS PERSONNEL	14	0	35	49	9.232	0.000	20.224	29.456
SUPERVISORY PERSONNEL	1	1	0	2	0.175	0.000	0.000	0.175
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.214	0.000	0.214
TOTAL	85	1	40	126	38.540	0.214	21.383	60.137
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	71	217	268	556	35.244	123.446	124.090	282.780
OPERATIONS PERSONNEL	41	0	13	54	14.539	0.000	3.909	18.448
HEALTH PHYSICS PERSONNEL	14	2	121	137	8.528	1.027	56.466	66.021
SUPERVISORY PERSONNEL	26	6	0	32	6.761	2.937	0.000	9.698
ENGINEERING PERSONNEL	15	1	0	16	4.711	0.311	0.000	5.022
TOTAL	167	226	402	795	69.783	127.721	184.465	381.969
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	108	111	2.000	0.000	58.521	60.521
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	108	111	2.000	0.000	58.521	60.521
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	49	142	195	1.100	24.891	52.035	78.026
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.000	0.000	1.015	1.015
SUPERVISORY PERSONNEL	4	2	0	6	0.937	2.205	0.000	3.142
ENGINEERING PERSONNEL	1	0	0	1	0.203	0.000	0.000	0.203
TOTAL	9	51	146	206	2.240	27.096	53.050	82.386
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	4	1	8	0.366	2.735	0.118	3.219
OPERATIONS PERSONNEL	0	0	6	6	0.000	0.000	4.957	4.957
HEALTH PHYSICS PERSONNEL	3	0	10	13	1.243	0.000	3.664	4.907
SUPERVISORY PERSONNEL	1	0	0	1	0.305	0.000	0.000	0.305
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	7	4	17	28	1.914	2.735	8.739	13.388
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.845	0.000	0.000	0.845
OPERATIONS PERSONNEL	5	0	0	5	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	5	0	0	5	0.845	0.000	0.000	0.845
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	83	270	519	872	39.785	151.072	234.764	425.621
OPERATIONS PERSONNEL	114	0	24	138	43.442	0.000	10.025	53.467
HEALTH PHYSICS PERSONNEL	31	2	170	203	19.003	1.027	81.369	101.399
SUPERVISORY PERSONNEL	32	9	0	41	8.178	5.142	0.000	13.320
ENGINEERING PERSONNEL	16	1	0	17	4.914	0.525	0.000	5.439
GRAND TOTALS	276	282	713	1271	115.322	157.766	326.158	599.246

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *THREE MILE ISLAND 1

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	104	2	26	132	1.571	0.049	0.112	1.732
OPERATIONS PERSONNEL	81	0	5	86	15.455	0.000	0.055	15.510
HEALTH PHYSICS PERSONNEL	82	7	27	116	19.507	0.012	4.812	24.331
SUPERVISORY PERSONNEL	123	16	25	164	3.577	0.070	0.289	3.936
ENGINEERING PERSONNEL	59	10	7	76	2.189	0.088	0.030	2.307
TOTAL	449	35	90	574	42.299	0.219	5.298	47.816
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	167	15	310	492	25.882	0.065	7.534	33.481
OPERATIONS PERSONNEL	86	0	3	89	3.332	0.000	0.157	3.489
HEALTH PHYSICS PERSONNEL	38	0	6	44	1.463	0.000	0.146	1.609
SUPERVISORY PERSONNEL	184	22	41	247	3.468	0.237	2.270	5.975
ENGINEERING PERSONNEL	70	29	53	152	1.311	0.084	0.814	2.209
TOTAL	545	66	413	1024	35.456	0.386	10.921	46.763
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	99	3	152	254	0.398	0.000	15.667	16.065
OPERATIONS PERSONNEL	18	1	3	22	0.322	0.010	0.596	0.928
HEALTH PHYSICS PERSONNEL	6	0	3	9	0.117	0.000	0.023	0.140
SUPERVISORY PERSONNEL	122	25	42	189	2.437	0.104	1.253	3.794
ENGINEERING PERSONNEL	57	26	40	123	1.131	0.117	3.217	4.465
TOTAL	302	55	240	597	4.405	0.231	20.756	25.392
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	131	5	401	537	12.718	0.080	54.130	66.928
OPERATIONS PERSONNEL	45	0	2	47	1.696	0.000	0.071	1.767
HEALTH PHYSICS PERSONNEL	25	0	11	36	1.157	0.000	0.298	1.455
SUPERVISORY PERSONNEL	49	1	34	84	1.917	0.005	1.456	3.378
ENGINEERING PERSONNEL	31	8	45	84	3.422	0.220	4.660	8.302
TOTAL	281	14	493	788	20.910	0.305	60.615	81.830
WASTE PROCESSING								
MAINTENANCE PERSONNEL	100	0	29	129	4.407	0.000	0.054	4.461
OPERATIONS PERSONNEL	61	0	3	64	12.664	0.000	0.606	13.270
HEALTH PHYSICS PERSONNEL	55	0	29	84	2.893	0.000	0.194	3.087
SUPERVISORY PERSONNEL	27	1	8	36	2.028	0.002	0.001	2.031
ENGINEERING PERSONNEL	8	0	6	14	0.117	0.000	0.043	0.160
TOTAL	251	1	75	327	22.109	0.002	0.898	23.009
REFUELING								
MAINTENANCE PERSONNEL	83	0	19	102	12.014	0.000	6.914	18.928
OPERATIONS PERSONNEL	75	2	1	78	3.995	0.005	0.094	4.094
HEALTH PHYSICS PERSONNEL	18	0	6	24	0.928	0.000	0.127	1.055
SUPERVISORY PERSONNEL	86	2	5	93	3.371	0.000	0.157	3.528
ENGINEERING PERSONNEL	11	10	5	26	0.478	0.258	0.382	1.118
TOTAL	273	14	36	323	20.786	0.263	7.674	28.723
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	684 (207)	25 (19)	937 (439)	1646 (665)	56.990	0.194	84.411	141.595
OPERATIONS PERSONNEL	366 (106)	3 (3)	17 (7)	386 (116)	37.464	0.015	1.579	39.058
HEALTH PHYSICS PERSONNEL	224 (92)	7 (7)	82 (38)	313 (137)	26.065	0.012	5.600	31.677
SUPERVISORY PERSONNEL	591 (261)	67 (58)	155 (73)	813 (392)	16.798	0.418	5.426	22.642
ENGINEERING PERSONNEL	236 (87)	83 (59)	156 (75)	475 (221)	8.648	0.767	9.146	18.561
GRAND TOTALS	2101 (753)	185 (146)	1347 (632)	3633(1531)	145.965	1.406	106.162	253.533

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *THREE MILE ISLAND 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	15	0	173	188	0.036	0.000	11.812	11.848
OPERATIONS PERSONNEL	38	0	2	40	1.208	0.000	0.000	1.208
HEALTH PHYSICS PERSONNEL	63	0	91	154	5.240	0.000	7.828	13.068
SUPERVISORY PERSONNEL	108	3	20	131	1.045	0.144	0.889	2.078
ENGINEERING PERSONNEL	13	1	32	46	1.168	0.000	0.728	1.896
TOTAL	237	4	318	559	8.697	0.144	21.257	30.098
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	93	2	224	319	6.085	0.000	8.483	14.568
OPERATIONS PERSONNEL	81	0	7	88	0.552	0.000	0.115	0.667
HEALTH PHYSICS PERSONNEL	86	4	100	190	10.291	0.013	11.938	22.242
SUPERVISORY PERSONNEL	182	18	65	265	2.787	0.088	1.089	3.964
ENGINEERING PERSONNEL	30	1	69	100	0.489	0.000	0.776	1.265
TOTAL	472	25	465	962	20.204	0.101	22.401	42.706
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	0	3	7	0.047	0.000	0.150	0.197
OPERATIONS PERSONNEL	4	0	0	4	0.049	0.000	0.000	0.049
HEALTH PHYSICS PERSONNEL	27	1	53	81	0.439	0.002	1.296	1.737
SUPERVISORY PERSONNEL	12	3	1	16	0.040	0.011	0.040	0.091
ENGINEERING PERSONNEL	5	0	4	9	0.056	0.000	0.353	0.409
TOTAL	52	4	61	117	0.631	0.013	1.839	2.483
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	98	1	358	457	53.969	0.068	510.712	564.749
OPERATIONS PERSONNEL	101	1	13	115	70.156	0.101	9.487	79.744
HEALTH PHYSICS PERSONNEL	53	1	79	133	48.262	0.008	76.030	124.300
SUPERVISORY PERSONNEL	67	15	69	151	3.216	0.370	66.998	70.584
ENGINEERING PERSONNEL	20	0	98	118	2.821	0.000	61.142	63.963
TOTAL	339	18	617	974	178.424	0.547	724.369	903.340
WASTE PROCESSING								
MAINTENANCE PERSONNEL	67	8	87	162	32.448	0.019	11.483	43.950
OPERATIONS PERSONNEL	48	0	5	53	7.198	0.000	2.138	9.336
HEALTH PHYSICS PERSONNEL	42	3	71	116	7.321	0.002	10.623	17.946
SUPERVISORY PERSONNEL	60	19	21	100	3.734	0.019	0.361	4.114
ENGINEERING PERSONNEL	15	3	22	40	0.945	0.000	1.097	2.042
TOTAL	232	33	206	471	51.646	0.040	25.702	77.388
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	277 (106)	11 (10)	845 (373)	1133 (489)	92.585	0.087	542.640	635.312
OPERATIONS PERSONNEL	272 (109)	1 (1)	27 (14)	300 (124)	79.163	0.101	11.740	91.004
HEALTH PHYSICS PERSONNEL	271 (90)	9 (5)	394 (108)	674 (203)	71.553	0.025	107.715	179.293
SUPERVISORY PERSONNEL	429 (208)	58 (43)	176 (96)	663 (347)	10.822	0.632	69.377	80.831
ENGINEERING PERSONNEL	83 (38)	5 (5)	225 (120)	313 (163)	5.479	0.000	64.096	69.575
GRAND TOTALS	1332 (551)	84 (64)	1667 (711)	3083(1326)	259.602	0.845	795.568	1056.015

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *TROJAN

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	156	163	3.180	0.100	81.320	84.600
OPERATIONS PERSONNEL	25	0	0	25	8.470	0.000	0.030	8.500
HEALTH PHYSICS PERSONNEL	18	0	69	87	5.720	0.000	26.690	32.410
SUPERVISORY PERSONNEL	5	2	23	30	2.610	0.820	8.560	11.990
ENGINEERING PERSONNEL	2	11	5	18	1.360	3.080	2.300	6.740
TOTAL	57	13	253	323	21.340	4.000	118.900	144.240
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	131	2	286	419	57.980	0.570	113.380	171.930
OPERATIONS PERSONNEL	0	0	0	0	0.110	0.000	0.010	0.120
HEALTH PHYSICS PERSONNEL	25	0	38	63	9.660	0.000	21.170	30.830
SUPERVISORY PERSONNEL	6	4	64	74	2.920	1.700	23.240	27.860
ENGINEERING PERSONNEL	1	4	25	30	0.380	1.090	25.030	26.500
TOTAL	163	10	413	586	71.050	3.360	182.830	257.240
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	27	28	0.570	0.000	14.360	14.930
OPERATIONS PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
HEALTH PHYSICS PERSONNEL	1	0	7	8	0.470	0.000	3.480	3.950
SUPERVISORY PERSONNEL	0	0	10	10	0.180	0.000	3.340	3.520
ENGINEERING PERSONNEL	1	0	26	27	0.620	0.180	14.530	15.330
TOTAL	3	0	70	73	1.870	0.180	35.710	37.760
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	5	6	0.210	0.000	1.780	1.990
OPERATIONS PERSONNEL	1	0	0	1	0.570	0.000	0.000	0.570
HEALTH PHYSICS PERSONNEL	24	0	6	30	7.930	0.000	2.650	10.580
SUPERVISORY PERSONNEL	0	0	1	1	0.160	0.000	0.340	0.500
ENGINEERING PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
TOTAL	26	0	12	38	8.880	0.000	4.770	13.650
REFUELING								
MAINTENANCE PERSONNEL	10	0	18	28	3.870	0.000	7.920	11.790
OPERATIONS PERSONNEL	1	0	0	1	0.430	0.000	0.000	0.430
HEALTH PHYSICS PERSONNEL	7	0	38	45	4.460	0.000	21.580	26.040
SUPERVISORY PERSONNEL	3	0	9	12	1.140	0.040	7.130	8.310
ENGINEERING PERSONNEL	0	0	19	19	0.100	0.000	35.440	35.540
TOTAL	21	0	84	105	10.000	0.040	72.070	82.110
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	150 (122)	2 (1)	492 (335)	644 (458)	65.810	0.670	218.760	285.240
OPERATIONS PERSONNEL	27 (22)	0 (0)	0 (0)	27 (22)	9.610	0.000	0.040	9.650
HEALTH PHYSICS PERSONNEL	75 (45)	0 (0)	158 (105)	233 (150)	28.240	0.000	75.570	103.810
SUPERVISORY PERSONNEL	14 (8)	6 (5)	107 (74)	127 (87)	7.010	2.560	42.610	52.180
ENGINEERING PERSONNEL	4 (3)	15 (8)	75 (87)	94 (98)	2.470	4.350	77.300	84.120
GRAND TOTALS	270 (200)	23 (14)	832 (601)	1125 (815)	113.140	7.580	414.280	535.000

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *TURKEY POINT 3,4 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	24	1	6	31	4.695	0.725	2.490	7.910
OPERATIONS PERSONNEL	25	1	0	26	7.480	0.255	0.005	7.740
HEALTH PHYSICS PERSONNEL	12	0	5	17	1.525	0.010	1.765	3.300
SUPERVISORY PERSONNEL	6	0	0	6	0.625	0.020	0.165	0.810
ENGINEERING PERSONNEL	1	0	0	1	0.645	0.145	0.860	1.650
TOTAL	68	2	11	81	14.970	1.155	5.285	21.410
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	244	5	443	692	139.205	1.875	203.960	345.040
OPERATIONS PERSONNEL	36	0	2	38	18.770	0.085	0.395	19.250
HEALTH PHYSICS PERSONNEL	33	0	127	160	18.440	0.025	77.630	96.095
SUPERVISORY PERSONNEL	11	0	26	37	5.200	0.050	9.720	14.970
ENGINEERING PERSONNEL	21	2	58	81	7.645	1.485	21.625	30.755
TOTAL	345	7	656	1008	189.260	3.520	313.330	506.110
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	144	145	1.450	0.000	79.510	80.960
OPERATIONS PERSONNEL	1	0	0	1	0.185	0.000	0.010	0.195
HEALTH PHYSICS PERSONNEL	1	0	24	25	0.720	0.000	9.630	10.350
SUPERVISORY PERSONNEL	3	0	9	12	0.695	0.015	7.240	7.950
ENGINEERING PERSONNEL	1	4	3	8	0.155	1.440	3.020	4.615
TOTAL	7	4	180	191	3.205	1.455	99.410	104.070
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	78	0	332	410	32.340	0.120	137.385	169.845
OPERATIONS PERSONNEL	1	0	0	1	0.435	0.005	0.000	0.440
HEALTH PHYSICS PERSONNEL	6	0	17	23	1.600	0.000	5.130	6.730
SUPERVISORY PERSONNEL	5	0	27	32	1.240	0.000	11.460	12.700
ENGINEERING PERSONNEL	7	1	29	37	2.220	0.280	14.410	16.910
TOTAL	97	1	405	503	37.835	0.405	168.385	206.625
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	5	7	0.905	0.000	2.685	3.590
OPERATIONS PERSONNEL	0	0	0	0	0.065	0.000	0.000	0.065
HEALTH PHYSICS PERSONNEL	9	0	6	15	2.750	0.000	2.145	4.895
SUPERVISORY PERSONNEL	1	0	0	1	1.520	0.000	0.085	1.605
ENGINEERING PERSONNEL	1	0	0	1	0.490	0.000	0.000	0.490
TOTAL	13	0	11	24	5.730	0.000	4.915	10.645
REFUELING								
MAINTENANCE PERSONNEL	1	0	55	56	0.590	0.000	31.835	32.425
OPERATIONS PERSONNEL	1	0	0	1	0.455	0.000	0.000	0.455
HEALTH PHYSICS PERSONNEL	0	0	5	5	0.270	0.000	2.205	2.475
SUPERVISORY PERSONNEL	0	0	0	0	0.190	0.000	0.535	0.725
ENGINEERING PERSONNEL	1	0	10	11	0.305	0.005	4.955	5.265
TOTAL	3	0	70	73	1.810	0.005	39.530	41.345
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	350 (251)	6 (5)	985 (645)	1341 (901)	179.185	2.720	457.865	639.770
OPERATIONS PERSONNEL	64 (42)	1 (1)	2 (2)	67 (45)	27.390	0.345	0.410	28.145
HEALTH PHYSICS PERSONNEL	61 (34)	0 (0)	184 (129)	245 (163)	25.305	0.035	98.505	123.845
SUPERVISORY PERSONNEL	26 (16)	0 (0)	62 (34)	88 (50)	9.470	0.085	29.205	38.760
ENGINEERING PERSONNEL	32 (24)	7 (6)	100 (79)	139 (109)	11.460	3.355	44.870	59.685
GRAND TOTALS	533 (367)	14 (12)	1333 (889)	1880(1268)	252.810	6.540	630.855	890.205

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *VERMONT YANKEE

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	0	7	10	1.006	0.000	3.477	4.483
OPERATIONS PERSONNEL	39	0	3	42	12.970	0.000	1.251	14.221
HEALTH PHYSICS PERSONNEL	17	0	5	22	5.518	0.000	2.085	7.603
SUPERVISORY PERSONNEL	0	0	0	0	0.042	0.000	0.015	0.057
ENGINEERING PERSONNEL	0	0	0	0	0.175	0.000	0.017	0.192
TOTAL	59	0	15	74	19.711	0.000	6.845	26.556
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	57	0	81	138	14.678	0.015	32.020	46.713
OPERATIONS PERSONNEL	5	0	1	6	1.739	0.000	0.103	1.842
HEALTH PHYSICS PERSONNEL	14	0	8	22	4.584	0.000	2.799	7.383
SUPERVISORY PERSONNEL	0	0	0	0	0.149	0.000	0.000	0.149
ENGINEERING PERSONNEL	1	0	0	1	0.250	0.000	0.128	0.378
TOTAL	77	0	90	167	21.400	0.015	35.050	56.465
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	49	49	3.805	0.015	17.320	21.140
OPERATIONS PERSONNEL	4	0	0	4	1.341	0.000	0.031	1.372
HEALTH PHYSICS PERSONNEL	6	0	11	17	1.353	0.000	3.713	5.066
SUPERVISORY PERSONNEL	0	0	0	0	0.024	0.000	0.000	0.024
ENGINEERING PERSONNEL	0	0	1	1	0.147	0.000	0.183	0.330
TOTAL	10	0	61	71	6.670	0.015	21.247	27.932
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	1	7	2.043	0.000	1.144	3.187
OPERATIONS PERSONNEL	6	0	0	6	2.119	0.000	0.044	2.163
HEALTH PHYSICS PERSONNEL	6	0	3	9	4.560	0.000	1.898	6.458
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.006	0.000	0.000	0.006
TOTAL	18	0	4	22	8.728	0.000	3.086	11.814
REFUELING								
MAINTENANCE PERSONNEL	0	0	2	2	0.137	0.000	0.597	0.734
OPERATIONS PERSONNEL	0	0	1	1	0.103	0.000	0.206	0.309
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.015	0.000	0.073	0.088
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.083	0.000	0.020	0.103
TOTAL	0	0	3	3	0.338	0.000	0.896	1.234
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	66	0	140	206	21.669	0.030	54.558	76.257
OPERATIONS PERSONNEL	54	0	5	59	18.272	0.000	1.635	19.907
HEALTH PHYSICS PERSONNEL	43	0	27	70	16.030	0.000	10.568	26.598
SUPERVISORY PERSONNEL	0	0	0	0	0.215	0.000	0.015	0.230
ENGINEERING PERSONNEL	1	0	1	2	0.661	0.000	0.348	1.009
GRAND TOTALS	164	0	173	337	56.847	0.030	67.124	124.001

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *VOGTLE 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	5	6	1.458	0.004	4.547	6.009
OPERATIONS PERSONNEL	1	0	0	1	0.827	0.000	0.158	0.985
HEALTH PHYSICS PERSONNEL	2	0	10	12	1.014	0.000	4.288	5.302
SUPERVISORY PERSONNEL	0	0	0	0	0.047	0.000	0.146	0.193
ENGINEERING PERSONNEL	0	0	0	0	0.077	0.000	0.329	0.406
TOTAL	4	0	15	19	3.423	0.004	9.468	12.895
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	63	65	1.596	0.004	24.623	26.223
OPERATIONS PERSONNEL	6	0	1	7	2.100	0.000	0.311	2.411
HEALTH PHYSICS PERSONNEL	4	0	27	31	1.308	0.000	8.877	10.185
SUPERVISORY PERSONNEL	1	0	0	1	0.226	0.000	0.274	0.500
ENGINEERING PERSONNEL	0	0	1	1	0.095	0.000	0.803	0.898
TOTAL	13	0	92	105	5.325	0.004	34.888	40.217
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	0	21	25	1.839	0.004	8.991	10.834
OPERATIONS PERSONNEL	1	0	0	1	0.544	0.000	0.089	0.633
HEALTH PHYSICS PERSONNEL	4	0	8	12	1.650	0.015	3.703	5.368
SUPERVISORY PERSONNEL	0	0	1	1	0.010	0.000	0.308	0.318
ENGINEERING PERSONNEL	0	0	6	6	0.062	0.000	1.929	1.991
TOTAL	9	0	36	45	4.105	0.019	15.020	19.144
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	26	1	58	85	7.898	0.114	21.510	29.522
OPERATIONS PERSONNEL	2	0	1	3	1.279	0.000	0.508	1.787
HEALTH PHYSICS PERSONNEL	5	0	14	19	1.143	0.000	3.994	5.137
SUPERVISORY PERSONNEL	0	0	1	1	0.074	0.000	0.473	0.547
ENGINEERING PERSONNEL	0	0	5	5	0.215	0.000	1.472	1.687
TOTAL	33	1	79	113	10.609	0.114	27.957	38.680
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	1.011	0.004	3.448	4.463
OPERATIONS PERSONNEL	1	0	1	2	0.555	0.000	0.746	1.301
HEALTH PHYSICS PERSONNEL	7	0	5	12	2.810	0.000	3.147	5.957
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.101	0.111
ENGINEERING PERSONNEL	0	0	0	0	0.019	0.000	0.228	0.247
TOTAL	8	0	7	15	4.405	0.004	7.670	12.079
REFUELING								
MAINTENANCE PERSONNEL	2	0	16	18	1.667	0.004	6.925	8.596
OPERATIONS PERSONNEL	1	0	1	2	0.665	0.000	0.220	0.885
HEALTH PHYSICS PERSONNEL	2	0	9	11	0.525	0.000	3.777	4.302
SUPERVISORY PERSONNEL	1	0	0	1	0.276	0.000	0.101	0.377
ENGINEERING PERSONNEL	1	0	2	3	0.235	0.000	0.508	0.743
TOTAL	7	0	28	35	3.368	0.004	11.531	14.903
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	35	1	164	200	15.469	0.134	70.044	85.647
OPERATIONS PERSONNEL	12	0	4	16	5.970	0.000	2.032	8.002
HEALTH PHYSICS PERSONNEL	24	0	73	97	8.450	0.015	27.786	36.251
SUPERVISORY PERSONNEL	2	0	2	4	0.643	0.000	1.403	2.046
ENGINEERING PERSONNEL	1	0	14	15	0.703	0.000	5.269	5.972
GRAND TOTALS	74	1	257	332	31.235	0.149	106.534	137.918

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *WASHINGTON NUCLEAR 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	21	0	1	22	9.806	0.000	0.125	9.931
OPERATIONS PERSONNEL	30	0	0	30	25.746	0.000	0.000	25.746
HEALTH PHYSICS PERSONNEL	26	0	13	39	25.451	0.000	5.280	30.731
SUPERVISORY PERSONNEL	12	0	0	12	6.947	0.030	0.130	7.107
ENGINEERING PERSONNEL	7	8	3	18	2.321	2.118	0.935	5.374
TOTAL	96	8	17	121	70.271	2.148	6.470	78.889
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	83	0	61	144	44.517	0.067	20.239	64.823
OPERATIONS PERSONNEL	4	0	0	4	2.817	0.000	0.000	2.817
HEALTH PHYSICS PERSONNEL	4	0	5	9	7.233	0.000	3.712	10.945
SUPERVISORY PERSONNEL	1	0	1	2	0.358	0.421	0.143	0.922
ENGINEERING PERSONNEL	6	8	6	20	1.445	3.230	2.124	6.799
TOTAL	98	8	73	179	56.370	3.718	26.218	86.306
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	14	15	0.895	0.000	5.210	6.105
OPERATIONS PERSONNEL	0	0	0	0	0.288	0.000	0.000	0.288
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.283	0.000	0.045	1.328
SUPERVISORY PERSONNEL	1	0	0	1	0.298	0.349	0.040	0.687
ENGINEERING PERSONNEL	0	3	5	8	0.141	1.107	0.900	2.148
TOTAL	3	3	19	25	2.905	1.456	6.195	10.556
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	108	0	80	188	79.180	0.219	30.556	109.955
OPERATIONS PERSONNEL	2	0	0	2	2.145	0.000	0.000	2.145
HEALTH PHYSICS PERSONNEL	10	0	18	28	15.739	0.000	11.098	26.837
SUPERVISORY PERSONNEL	3	1	2	6	0.970	0.461	0.452	1.883
ENGINEERING PERSONNEL	13	10	13	36	3.394	3.580	6.117	13.091
TOTAL	136	11	113	260	101.428	4.260	48.223	153.911
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	0	2	1.152	0.000	0.000	1.152
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	1	0	1	2	1.092	0.000	2.820	3.912
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	1	4	2.244	0.000	2.820	5.064
REFUELING								
MAINTENANCE PERSONNEL	8	0	2	10	7.084	0.004	0.277	7.365
OPERATIONS PERSONNEL	1	0	0	1	0.595	0.000	0.000	0.595
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.575	0.000	1.168	1.743
SUPERVISORY PERSONNEL	1	0	0	1	0.644	0.000	0.000	0.644
ENGINEERING PERSONNEL	1	0	0	1	0.260	0.052	0.054	0.366
TOTAL	11	0	6	17	9.158	0.056	1.499	10.713
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	223	0	158	381	142.634	0.290	56.407	199.331
OPERATIONS PERSONNEL	37	0	0	37	31.591	0.000	0.000	31.591
HEALTH PHYSICS PERSONNEL	42	0	41	83	51.373	0.000	24.123	75.496
SUPERVISORY PERSONNEL	18	1	3	22	9.217	1.261	0.765	11.243
ENGINEERING PERSONNEL	27	29	27	83	7.561	10.087	10.130	27.778
GRAND TOTALS	347	30	229	606	242.376	11.638	91.425	345.439

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *WATERFORD 3

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	1	1	0.732	0.000	2.841	3.573
OPERATIONS PERSONNEL	38	0	40	78	11.821	0.000	19.484	31.305
HEALTH PHYSICS PERSONNEL	20	0	81	101	6.821	0.000	26.654	33.475
SUPERVISORY PERSONNEL	3	0	2	5	1.675	0.007	1.372	3.054
ENGINEERING PERSONNEL	4	0	23	27	1.603	0.028	5.804	7.435
TOTAL	65	0	147	212	22.652	0.035	56.155	78.842
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	45	0	270	315	17.611	0.000	91.546	109.157
OPERATIONS PERSONNEL	2	0	7	9	1.001	0.000	2.618	3.619
HEALTH PHYSICS PERSONNEL	9	0	5	14	2.172	0.000	2.092	4.264
SUPERVISORY PERSONNEL	1	0	0	1	0.244	0.007	0.353	0.604
ENGINEERING PERSONNEL	0	0	0	0	0.123	0.000	0.163	0.286
TOTAL	57	0	282	339	21.151	0.007	96.772	117.930
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	4	4	0.086	0.000	2.664	2.750
OPERATIONS PERSONNEL	0	0	4	4	0.227	0.000	0.676	0.903
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.040	0.000	0.092	0.132
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.330	0.330
ENGINEERING PERSONNEL	0	0	1	1	0.201	0.000	0.540	0.741
TOTAL	0	0	9	9	0.554	0.000	4.302	4.856
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	7	0	15	22	1.640	0.000	6.842	8.482
OPERATIONS PERSONNEL	1	0	18	19	0.283	0.000	7.458	7.741
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.048	0.000	0.111	0.159
SUPERVISORY PERSONNEL	0	0	1	1	0.004	0.000	0.356	0.360
ENGINEERING PERSONNEL	0	0	1	1	0.066	0.001	0.961	1.028
TOTAL	8	0	35	43	2.041	0.001	15.728	17.770
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	1	3	0.613	0.000	1.593	2.206
OPERATIONS PERSONNEL	11	0	70	81	2.745	0.000	25.138	27.883
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.726	0.000	0.961	1.687
SUPERVISORY PERSONNEL	1	0	0	1	0.162	0.000	0.029	0.191
ENGINEERING PERSONNEL	0	0	0	0	0.023	0.000	0.000	0.023
TOTAL	15	0	73	88	4.269	0.000	27.721	31.990
REFUELING								
MAINTENANCE PERSONNEL	1	0	4	5	0.566	0.000	1.569	2.135
OPERATIONS PERSONNEL	0	0	16	16	0.316	0.000	4.794	5.110
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.006	0.000	0.249	0.255
SUPERVISORY PERSONNEL	0	0	0	0	0.009	0.000	0.203	0.212
ENGINEERING PERSONNEL	0	0	1	1	0.039	0.000	0.217	0.256
TOTAL	1	0	21	22	0.936	0.000	7.032	7.968
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	55 (51)	0 (0)	295 (293)	350 (344)	21.248	0.000	107.055	128.303
OPERATIONS PERSONNEL	52 (51)	0 (0)	155 (120)	207 (171)	16.393	0.000	60.168	76.561
HEALTH PHYSICS PERSONNEL	30 (22)	0 (0)	88 (85)	118 (107)	9.813	0.000	30.159	39.972
SUPERVISORY PERSONNEL	5 (5)	0 (0)	3 (7)	8 (12)	2.094	0.014	2.643	4.751
ENGINEERING PERSONNEL	4 (6)	0 (0)	26 (27)	30 (33)	2.055	0.029	7.685	9.769
GRAND TOTALS	146 (135)	0 (0)	567 (532)	713 (667)	51.603	0.043	207.710	259.356

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *WOLF CREEK 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	37	0	68	105	8.737	0.109	21.742	30.588
OPERATIONS PERSONNEL	16	0	6	22	3.532	0.133	1.456	5.121
HEALTH PHYSICS PERSONNEL	21	2	33	56	6.587	0.808	9.275	16.670
SUPERVISORY PERSONNEL	7	0	2	9	2.444	0.064	0.666	3.174
ENGINEERING PERSONNEL	4	1	15	20	1.398	0.953	4.482	6.833
TOTAL	85	3	124	212	22.698	2.067	37.621	62.386
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	56	1	131	188	21.169	0.237	39.388	60.794
OPERATIONS PERSONNEL	3	0	7	10	1.629	0.098	3.277	5.004
HEALTH PHYSICS PERSONNEL	15	1	52	68	3.690	0.211	13.550	17.451
SUPERVISORY PERSONNEL	8	0	3	11	3.279	0.039	1.288	4.606
ENGINEERING PERSONNEL	3	0	16	19	1.635	0.246	5.573	7.454
TOTAL	85	2	209	296	31.402	0.831	63.076	95.309
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	42	45	2.144	0.000	14.171	16.315
OPERATIONS PERSONNEL	0	1	3	4	0.200	0.158	0.753	1.111
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.503	0.145	2.191	2.839
SUPERVISORY PERSONNEL	2	0	2	4	0.917	0.000	0.618	1.535
ENGINEERING PERSONNEL	0	0	6	6	0.183	0.033	2.259	2.475
TOTAL	5	1	54	60	3.947	0.336	19.992	24.275
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	42	0	58	100	14.626	0.048	16.470	31.144
OPERATIONS PERSONNEL	2	0	1	3	0.712	0.079	0.474	1.265
HEALTH PHYSICS PERSONNEL	5	0	4	9	1.718	0.056	2.440	4.214
SUPERVISORY PERSONNEL	4	0	0	4	1.594	0.000	0.379	1.973
ENGINEERING PERSONNEL	1	0	13	14	0.735	0.011	3.359	4.105
TOTAL	54	0	76	130	19.385	0.194	23.122	42.701
WASTE PROCESSING								
MAINTENANCE PERSONNEL	19	0	23	42	5.740	0.058	11.419	17.217
OPERATIONS PERSONNEL	0	1	1	2	0.663	0.110	0.676	1.449
HEALTH PHYSICS PERSONNEL	12	1	11	24	6.032	0.358	5.322	11.712
SUPERVISORY PERSONNEL	3	0	1	4	1.038	0.000	0.244	1.282
ENGINEERING PERSONNEL	1	1	4	6	0.193	0.685	1.819	2.697
TOTAL	35	3	40	78	13.666	1.211	19.480	34.357
REFUELING								
MAINTENANCE PERSONNEL	48	0	29	77	19.846	0.000	9.731	29.577
OPERATIONS PERSONNEL	2	0	1	3	0.823	0.004	0.426	1.253
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.796	0.012	1.342	2.150
SUPERVISORY PERSONNEL	7	0	3	10	1.941	0.075	0.831	2.847
ENGINEERING PERSONNEL	1	0	5	6	0.483	0.003	1.181	1.667
TOTAL	59	0	39	98	23.889	0.094	13.511	37.494
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	205 (82)	1 (3)	351 (220)	557 (305)	72.262	0.452	112.921	185.635
OPERATIONS PERSONNEL	23 (27)	2 (1)	19 (12)	44 (40)	7.559	0.582	7.062	15.203
HEALTH PHYSICS PERSONNEL	54 (31)	4 (2)	102 (89)	160 (122)	19.326	1.590	34.120	55.036
SUPERVISORY PERSONNEL	31 (23)	0 (1)	11 (7)	42 (31)	11.213	0.178	4.026	15.417
ENGINEERING PERSONNEL	10 (9)	2 (2)	59 (41)	71 (52)	4.627	1.931	18.673	25.231
GRAND TOTALS	323 (172)	9 (9)	542 (369)	874 (550)	114.987	4.733	176.802	296.522

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *YANKEE-ROWE

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	14	0	9	23	3.035	0.000	4.595	7.630
OPERATIONS PERSONNEL	39	0	0	39	13.127	0.180	1.660	14.967
HEALTH PHYSICS PERSONNEL	10	0	3	13	4.095	0.011	3.178	7.284
SUPERVISORY PERSONNEL	2	0	0	2	0.813	0.011	0.000	0.824
ENGINEERING PERSONNEL	4	5	0	9	1.524	2.459	0.408	4.391
TOTAL	69	5	12	86	22.594	2.661	9.841	35.096
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	27	0	83	110	14.741	0.000	36.104	50.845
OPERATIONS PERSONNEL	8	0	0	8	3.134	0.000	0.005	3.139
HEALTH PHYSICS PERSONNEL	6	0	23	29	2.052	0.011	7.643	9.706
SUPERVISORY PERSONNEL	1	0	0	1	0.424	0.000	0.000	0.424
ENGINEERING PERSONNEL	7	1	0	8	4.056	0.786	0.167	5.009
TOTAL	49	1	106	156	24.407	0.797	43.919	69.123
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	39	40	0.399	0.000	25.095	25.494
OPERATIONS PERSONNEL	0	0	0	0	0.202	0.000	0.000	0.202
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.040	0.000	0.156	0.196
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	3	1	5	0.423	1.053	0.140	1.616
TOTAL	2	3	40	45	1.064	1.053	25.391	27.508
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	49	50	0.781	0.000	21.554	22.335
OPERATIONS PERSONNEL	0	0	0	0	0.253	0.000	0.000	0.253
HEALTH PHYSICS PERSONNEL	0	0	9	9	0.178	0.000	1.858	2.036
SUPERVISORY PERSONNEL	0	0	0	0	0.011	0.000	0.000	0.011
ENGINEERING PERSONNEL	0	0	0	0	0.286	0.241	0.045	0.572
TOTAL	1	0	58	59	1.509	0.241	23.457	25.207
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.106	0.000	0.163	0.269
OPERATIONS PERSONNEL	5	0	0	5	2.526	0.000	0.000	2.526
HEALTH PHYSICS PERSONNEL	5	0	32	37	6.325	0.000	13.831	20.156
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	0	2	0.764	0.093	0.000	0.857
TOTAL	12	0	32	44	9.721	0.093	13.994	23.808
REFUELING								
MAINTENANCE PERSONNEL	19	0	41	60	4.938	0.000	11.902	16.840
OPERATIONS PERSONNEL	9	0	0	9	2.699	0.000	0.000	2.699
HEALTH PHYSICS PERSONNEL	8	0	39	47	4.163	0.004	19.842	24.009
SUPERVISORY PERSONNEL	4	0	0	4	1.370	0.000	0.000	1.370
ENGINEERING PERSONNEL	4	0	0	4	1.443	0.164	0.015	1.622
TOTAL	44	0	80	124	14.613	0.168	31.759	46.540
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	62	0	221	283	24.000	0.000	99.413	123.413
OPERATIONS PERSONNEL	61	0	0	61	21.941	0.180	1.665	23.786
HEALTH PHYSICS PERSONNEL	29	0	106	135	16.853	0.026	46.508	63.387
SUPERVISORY PERSONNEL	7	0	0	7	2.618	0.011	0.000	2.629
ENGINEERING PERSONNEL	18	9	1	28	8.496	4.796	0.775	14.067
GRAND TOTALS	177	9	328	514	73.908	5.013	148.361	227.282

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *ZION 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	18	280	299	0.160	2.753	8.089	11.002
OPERATIONS PERSONNEL	61	0	5	66	12.430	0.000	1.738	14.168
HEALTH PHYSICS PERSONNEL	8	0	27	35	1.584	0.000	3.531	5.115
SUPERVISORY PERSONNEL	31	0	0	31	6.031	0.000	0.000	6.031
ENGINEERING PERSONNEL	5	4	39	48	0.779	0.362	0.511	1.652
TOTAL	106	22	351	479	20.984	3.115	13.869	37.968
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	126	32	420	578	89.981	4.842	370.021	464.844
OPERATIONS PERSONNEL	44	0	36	80	9.133	0.000	1.335	10.468
HEALTH PHYSICS PERSONNEL	15	0	104	119	2.793	0.000	113.371	116.164
SUPERVISORY PERSONNEL	117	0	0	117	22.690	0.000	0.000	22.690
ENGINEERING PERSONNEL	82	92	48	222	14.393	7.765	34.482	56.640
TOTAL	384	124	608	1116	138.990	12.607	519.209	670.806
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	4	280	285	0.245	0.633	246.638	247.516
OPERATIONS PERSONNEL	1	0	5	6	0.128	0.000	0.174	0.302
HEALTH PHYSICS PERSONNEL	1	0	27	28	0.056	0.000	30.250	30.306
SUPERVISORY PERSONNEL	2	0	0	2	0.464	0.000	0.000	0.464
ENGINEERING PERSONNEL	24	17	39	80	4.399	1.427	28.318	34.144
TOTAL	29	21	351	401	5.292	2.060	305.380	312.732
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	15	72	89	1.378	2.194	63.657	67.229
OPERATIONS PERSONNEL	5	0	2	7	0.977	0.000	0.062	1.039
HEALTH PHYSICS PERSONNEL	4	0	2	6	0.818	0.000	2.106	2.924
SUPERVISORY PERSONNEL	2	0	0	2	0.285	0.000	0.000	0.285
ENGINEERING PERSONNEL	6	3	1	10	0.992	0.217	0.417	1.626
TOTAL	19	18	77	114	4.450	2.411	66.242	73.103
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	10	11	0.002	0.000	8.830	8.832
OPERATIONS PERSONNEL	1	0	14	15	0.025	0.000	0.547	0.572
HEALTH PHYSICS PERSONNEL	1	0	1	2	1.047	0.000	0.056	1.103
SUPERVISORY PERSONNEL	2	0	0	2	0.502	0.000	0.000	0.502
ENGINEERING PERSONNEL	24	0	1	25	0.034	0.000	0.030	0.064
TOTAL	29	0	26	55	1.610	0.000	9.463	11.073
REFUELING								
MAINTENANCE PERSONNEL	2	0	128	130	8.699	0.000	112.249	120.948
OPERATIONS PERSONNEL	2	0	0	2	7.280	0.000	0.000	7.280
HEALTH PHYSICS PERSONNEL	5	0	2	7	2.120	0.000	2.449	4.569
SUPERVISORY PERSONNEL	2	0	0	2	3.939	0.000	0.000	3.939
ENGINEERING PERSONNEL	1	10	20	31	0.908	0.823	14.641	16.372
TOTAL	12	10	150	172	22.946	0.823	129.339	153.108
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	133 (145)	69 (69)	1190 (919)	1392(1133)	100.465	10.422	809.484	920.371
OPERATIONS PERSONNEL	114 (149)	0 (0)	62 (104)	176 (253)	29.973	0.000	3.856	33.829
HEALTH PHYSICS PERSONNEL	34 (45)	0 (0)	163 (139)	197 (184)	8.418	0.000	151.763	160.181
SUPERVISORY PERSONNEL	156 (174)	0 (0)	0 (0)	156 (174)	33.911	0.000	0.000	33.911
ENGINEERING PERSONNEL	142 (123)	126 (126)	148 (110)	416 (359)	21.505	10.594	78.399	110.498
GRAND TOTALS	579 (636)	195 (195)	1563 (1272)	2337(2103)	194.272	21.016	1043.502	1258.790

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *BRAIDWOOD 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	9	0	5	14	0.699	0.000	0.148	0.847
OPERATIONS PERSONNEL	80	0	0	80	2.561	0.000	0.000	2.561
HEALTH PHYSICS PERSONNEL	6	0	1	7	0.955	0.000	0.155	1.110
SUPERVISORY PERSONNEL	25	0	0	25	0.214	0.000	0.000	0.214
ENGINEERING PERSONNEL	20	3	12	35	0.474	0.085	0.033	0.592
TOTAL	140	3	18	161	4.903	0.085	0.336	5.324
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	126	0	933	1059	11.228	0.000	28.510	39.738
OPERATIONS PERSONNEL	52	32	0	84	1.689	0.033	0.000	1.722
HEALTH PHYSICS PERSONNEL	40	0	35	75	6.357	0.000	9.304	15.661
SUPERVISORY PERSONNEL	162	0	0	162	1.325	0.000	0.000	1.325
ENGINEERING PERSONNEL	55	87	379	521	1.309	0.491	1.152	2.952
TOTAL	435	119	1347	1901	21.908	0.524	38.966	61.398
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	2	3	0.070	0.000	0.037	0.107
OPERATIONS PERSONNEL	0	8	0	8	0.000	0.008	0.000	0.008
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.060	0.000	0.226	0.286
SUPERVISORY PERSONNEL	3	0	0	3	0.024	0.000	0.000	0.024
ENGINEERING PERSONNEL	25	14	62	101	0.582	0.053	0.188	0.823
TOTAL	30	22	65	117	0.736	0.061	0.451	1.248
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	18	0	31	49	1.957	0.000	1.077	3.034
OPERATIONS PERSONNEL	11	3	0	14	0.370	0.003	0.000	0.373
HEALTH PHYSICS PERSONNEL	3	0	1	4	0.401	0.000	0.258	0.659
SUPERVISORY PERSONNEL	15	0	0	15	0.119	0.000	0.000	0.119
ENGINEERING PERSONNEL	3	0	7	10	0.081	0.000	0.023	0.104
TOTAL	50	3	39	92	2.928	0.003	1.358	4.289
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	34	35	0.024	0.000	1.016	1.040
OPERATIONS PERSONNEL	4	0	2	6	0.123	0.000	0.878	1.001
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.249	0.000	0.361	0.610
SUPERVISORY PERSONNEL	6	0	0	6	0.047	0.000	0.000	0.047
ENGINEERING PERSONNEL	1	2	2	5	0.010	0.007	0.004	0.021
TOTAL	14	2	39	55	0.453	0.007	2.259	2.719
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	155	0	1005	1160	13.978	0.000	30.788	44.766
OPERATIONS PERSONNEL	147	43	2	192	4.743	0.044	0.878	5.665
HEALTH PHYSICS PERSONNEL	52	0	39	91	8.022	0.000	10.304	18.326
SUPERVISORY PERSONNEL	211	0	0	211	1.729	0.000	0.000	1.729
ENGINEERING PERSONNEL	104	106	462	672	2.456	0.636	1.400	4.492
GRAND TOTALS	669	149	1508	2326	30.928	0.680	43.370	74.978

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *FERMI 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	5	0	2	7	1.273	0.000	0.610	1.883
OPERATIONS PERSONNEL	36	0	6	42	10.519	0.000	1.140	11.659
HEALTH PHYSICS PERSONNEL	28	0	14	42	10.043	0.000	3.857	13.900
SUPERVISORY PERSONNEL	0	0	0	0	0.480	0.000	0.283	0.763
ENGINEERING PERSONNEL	3	0	0	3	0.904	0.009	0.352	1.265
TOTAL	72	0	22	94	23.219	0.009	6.242	29.470
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	22	26	2.429	0.037	10.061	12.527
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.126	0.126
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
SUPERVISORY PERSONNEL	0	0	0	0	0.360	0.000	0.302	0.662
ENGINEERING PERSONNEL	0	0	0	0	0.129	0.005	0.285	0.419
TOTAL	4	0	22	26	2.927	0.042	10.774	13.743
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	15	18	1.265	0.000	3.466	4.731
OPERATIONS PERSONNEL	0	0	0	0	0.446	0.000	0.087	0.533
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.621	0.000	0.170	0.791
SUPERVISORY PERSONNEL	0	0	0	0	0.105	0.000	0.164	0.269
ENGINEERING PERSONNEL	1	0	4	5	0.384	0.000	0.773	1.157
TOTAL	4	0	19	23	2.821	0.000	4.660	7.481
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	14	0	105	119	4.618	0.032	30.353	35.003
OPERATIONS PERSONNEL	0	0	13	13	0.250	0.000	3.008	3.258
HEALTH PHYSICS PERSONNEL	11	0	12	23	2.284	0.000	2.830	5.114
SUPERVISORY PERSONNEL	1	0	1	2	0.735	0.009	0.897	1.641
ENGINEERING PERSONNEL	0	0	0	0	0.210	0.000	0.533	0.743
TOTAL	26	0	131	157	8.097	0.041	37.621	45.759
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.041	0.000	0.090	0.131
OPERATIONS PERSONNEL	0	0	21	21	0.034	0.000	4.919	4.953
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.207	0.000	0.320	0.527
SUPERVISORY PERSONNEL	0	0	0	0	0.013	0.000	0.026	0.039
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.009	0.009
TOTAL	0	0	22	22	0.295	0.000	5.364	5.659
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	26	0	144	170	9.626	0.069	44.580	54.275
OPERATIONS PERSONNEL	36	0	40	76	11.249	0.000	9.280	20.529
HEALTH PHYSICS PERSONNEL	39	0	27	66	13.164	0.000	7.177	20.341
SUPERVISORY PERSONNEL	1	0	1	2	1.693	0.009	1.672	3.374
ENGINEERING PERSONNEL	4	0	4	8	1.627	0.014	1.952	3.593
GRAND TOTALS	106	0	216	322	37.359	0.092	64.661	102.112

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *NINE MILE POINT 2

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	245	0	100	345	2.457	0.000	0.671	3.128
OPERATIONS PERSONNEL	1247	9	304	1560	21.391	0.195	0.592	22.178
HEALTH PHYSICS PERSONNEL	836	0	157	993	10.097	0.000	1.459	11.556
SUPERVISORY PERSONNEL	18	2	97	117	1.461	0.000	0.030	1.491
ENGINEERING PERSONNEL	103	0	4	107	0.141	0.030	1.343	1.514
TOTAL	2449	11	662	3122	35.547	0.225	4.095	39.867
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	409	26	1056	1491	5.844	0.183	12.523	18.550
OPERATIONS PERSONNEL	107	0	15	122	1.000	0.000	0.075	1.075
HEALTH PHYSICS PERSONNEL	399	0	82	481	3.261	0.000	0.670	3.931
SUPERVISORY PERSONNEL	77	14	169	260	0.879	0.000	0.474	1.353
ENGINEERING PERSONNEL	26	0	75	101	0.190	0.158	1.595	1.943
TOTAL	1018	40	1397	2455	11.174	0.341	15.337	26.852
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	40	0	621	661	0.000	0.000	7.441	7.441
OPERATIONS PERSONNEL	6	0	0	6	11.174	0.000	0.000	11.174
HEALTH PHYSICS PERSONNEL	22	0	4	26	0.461	0.000	0.035	0.496
SUPERVISORY PERSONNEL	13	5	199	217	0.001	0.020	0.230	0.251
ENGINEERING PERSONNEL	1	1	23	25	0.135	0.032	3.553	3.720
TOTAL	82	6	847	935	11.771	0.052	11.259	23.082
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	25	1	197	223	0.183	0.002	2.086	2.271
OPERATIONS PERSONNEL	6	0	1	7	0.020	0.000	0.005	0.025
HEALTH PHYSICS PERSONNEL	7	0	2	9	0.085	0.000	0.010	0.095
SUPERVISORY PERSONNEL	9	13	60	82	0.018	0.032	0.125	0.175
ENGINEERING PERSONNEL	3	2	16	21	0.047	0.081	0.565	0.693
TOTAL	50	16	276	342	0.353	0.115	2.791	3.259
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	1	3	0.022	0.000	0.001	0.023
OPERATIONS PERSONNEL	205	12	31	248	1.616	0.054	0.181	1.851
HEALTH PHYSICS PERSONNEL	71	0	1	72	0.876	0.000	0.005	0.881
SUPERVISORY PERSONNEL	3	0	24	27	0.067	0.000	0.000	0.067
ENGINEERING PERSONNEL	6	0	0	6	0.022	0.000	0.232	0.254
TOTAL	287	12	57	356	2.603	0.054	0.419	3.076
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	721 (136)	27 (13)	1975 (229)	2723 (378)	8.506	0.185	22.722	31.413
OPERATIONS PERSONNEL	1571 (101)	21 (3)	351 (28)	1943 (132)	35.201	0.249	0.853	36.303
HEALTH PHYSICS PERSONNEL	1335 (43)	0 (0)	246 (18)	1581 (61)	14.780	0.000	2.179	16.959
SUPERVISORY PERSONNEL	120 (27)	34 (1)	549 (20)	703 (48)	2.426	0.052	0.859	3.337
ENGINEERING PERSONNEL	139 (49)	3 (17)	118 (123)	260 (189)	0.535	0.301	7.288	8.124
GRAND TOTALS	3886 (356)	85 (34)	3239 (418)	7210 (808)	61.448	0.787	33.901	96.136

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SHOREHAM

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
GRAND TOTALS	0	0	0	0	0.000	0.000	0.000	0.000

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *SOUTH TEXAS

TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.533	0.000	0.000	0.533
OPERATIONS PERSONNEL	1	0	3	4	0.537	0.000	0.459	0.996
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.963	0.000	0.000	0.963
SUPERVISORY PERSONNEL	2	0	0	2	0.508	0.000	0.018	0.526
ENGINEERING PERSONNEL	0	0	1	1	0.219	0.000	0.139	0.358
TOTAL	4	0	4	8	2.760	0.000	0.616	3.376
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.281	0.000	0.000	0.281
OPERATIONS PERSONNEL	0	0	0	0	0.115	0.000	0.042	0.157
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.312	0.000	0.000	0.312
SUPERVISORY PERSONNEL	0	0	0	0	0.076	0.000	0.000	0.076
ENGINEERING PERSONNEL	0	0	0	0	0.057	0.000	0.000	0.057
TOTAL	0	0	0	0	0.841	0.000	0.042	0.883
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	0	2	0.565	0.000	0.000	0.565
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.014	0.014
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.024	0.000	0.000	0.024
SUPERVISORY PERSONNEL	0	0	0	0	0.017	0.000	0.000	0.017
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	2	0	0	2	0.606	0.000	0.014	0.620
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.149	0.000	0.000	0.149
OPERATIONS PERSONNEL	0	0	1	1	0.065	0.000	0.463	0.528
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.144	0.000	0.000	0.144
SUPERVISORY PERSONNEL	0	0	0	0	0.029	0.000	0.000	0.029
ENGINEERING PERSONNEL	0	0	0	0	0.101	0.000	0.000	0.101
TOTAL	0	0	1	1	0.488	0.000	0.463	0.951
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.008	0.000	0.000	0.008
OPERATIONS PERSONNEL	0	0	0	0	0.167	0.000	0.000	0.167
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.152	0.000	0.000	0.152
SUPERVISORY PERSONNEL	0	0	0	0	0.011	0.000	0.000	0.011
ENGINEERING PERSONNEL	0	0	0	0	0.015	0.000	0.000	0.015
TOTAL	0	0	0	0	0.353	0.000	0.000	0.353
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.008	0.008
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.003	0.000	0.008	0.011
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2	0	0	2	1.539	0.000	0.000	1.539
OPERATIONS PERSONNEL	1	0	4	5	0.884	0.000	0.986	1.870
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.595	0.000	0.000	1.595
SUPERVISORY PERSONNEL	2	0	0	2	0.641	0.000	0.018	0.659
ENGINEERING PERSONNEL	0	0	1	1	0.392	0.000	0.139	0.531
GRAND TOTALS	6	0	5	11	5.051	0.000	1.143	6.194

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION

1988

PLANT: *LACROSSE

TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)								TOTAL PERSON-REM			
	STATION		UTILITY		CONTRACT		TOTAL		STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV												
MAINTENANCE PERSONNEL	14		0		0		14		5.517	0.000	0.030	5.547
OPERATIONS PERSONNEL	6		0		0		6		2.047	0.000	0.020	2.067
HEALTH PHYSICS PERSONNEL	6		0		0		6		3.640	0.000	0.000	3.640
SUPERVISORY PERSONNEL	5		0		0		5		1.000	0.020	0.000	1.020
ENGINEERING PERSONNEL	1		0		0		1		0.182	0.000	0.060	0.242
TOTAL	32		0		0		32		12.386	0.020	0.110	12.516
ROUTINE MAINTENANCE												
MAINTENANCE PERSONNEL	2		0		0		2		0.610	0.000	0.000	0.610
OPERATIONS PERSONNEL	2		0		0		2		0.541	0.000	0.000	0.541
HEALTH PHYSICS PERSONNEL	0		0		0		0		0.074	0.000	0.000	0.074
SUPERVISORY PERSONNEL	1		0		0		1		0.128	0.000	0.000	0.128
ENGINEERING PERSONNEL	0		0		0		0		0.025	0.000	0.000	0.025
TOTAL	5		0		0		5		1.378	0.000	0.000	1.378
IN-SERVICE INSPECTION												
MAINTENANCE PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
TOTAL	0		0		0		0		0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE												
MAINTENANCE PERSONNEL	7		0		0		7		1.760	0.000	0.000	1.760
OPERATIONS PERSONNEL	1		0		0		1		0.557	0.000	0.000	0.557
HEALTH PHYSICS PERSONNEL	0		0		0		0		0.092	0.000	0.000	0.092
SUPERVISORY PERSONNEL	0		0		0		0		0.059	0.000	0.000	0.059
ENGINEERING PERSONNEL	2		0		0		2		0.633	0.000	0.020	0.653
TOTAL	10		0		0		10		3.101	0.000	0.020	3.121
WASTE PROCESSING												
MAINTENANCE PERSONNEL	5		0		0		5		1.143	0.000	0.000	1.143
OPERATIONS PERSONNEL	1		0		0		1		0.725	0.000	0.000	0.725
HEALTH PHYSICS PERSONNEL	6		0		0		6		5.234	0.000	0.000	5.234
SUPERVISORY PERSONNEL	3		0		0		3		2.003	0.000	0.000	2.003
ENGINEERING PERSONNEL	2		0		0		2		1.640	0.000	0.000	1.640
TOTAL	17		0		0		17		10.745	0.000	0.000	10.745
REFUELING												
MAINTENANCE PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
TOTAL	0		0		0		0		0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION												
MAINTENANCE PERSONNEL	28	(15)	0	(0)	0	(0)	28	(15)	9.030	0.000	0.030	9.060
OPERATIONS PERSONNEL	10	(7)	0	(0)	0	(0)	10	(7)	3.870	0.000	0.020	3.890
HEALTH PHYSICS PERSONNEL	12	(6)	0	(0)	0	(0)	12	(6)	9.040	0.000	0.000	9.040
SUPERVISORY PERSONNEL	9	(6)	0	(0)	0	(0)	9	(6)	3.190	0.020	0.000	3.210
ENGINEERING PERSONNEL	5	(3)	0	(0)	0	(0)	5	(3)	2.480	0.000	0.080	2.560
GRAND TOTALS	64	(37)	0	(0)	0	(0)	64	(37)	27.610	0.020	0.130	27.760

*Workers may be counted in more than one category. Numbers in parentheses are total numbers of individuals.

APPENDIX E

Graphical Representation of Collective Dose Trends by Year and Job Function for Each Site

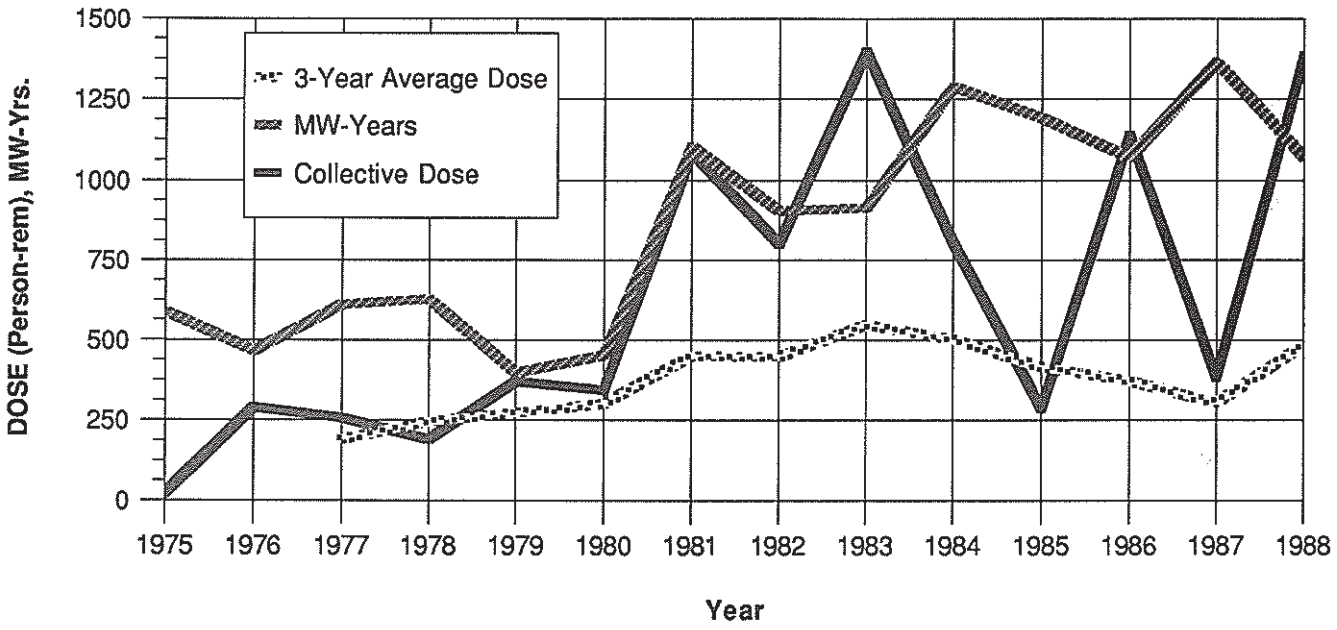
1973-1988

APPENDIX E

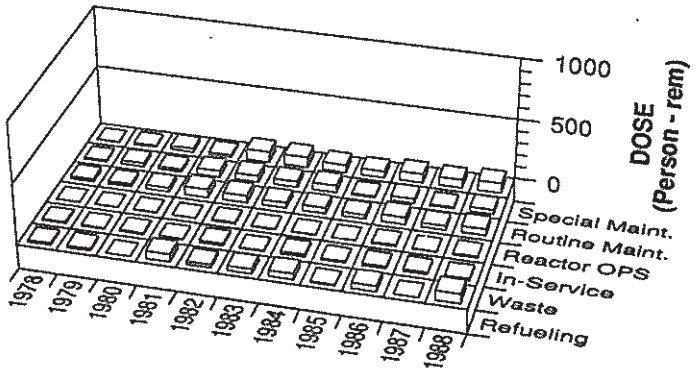
ARKANSAS 1,2

PWR

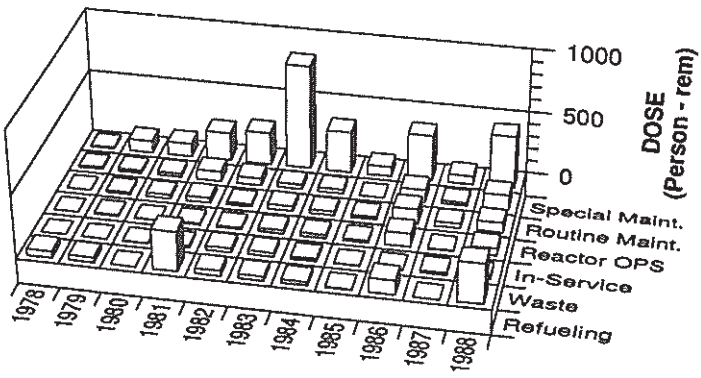
Dose-Performance Indicators



Breakdown By Job Function



Plant



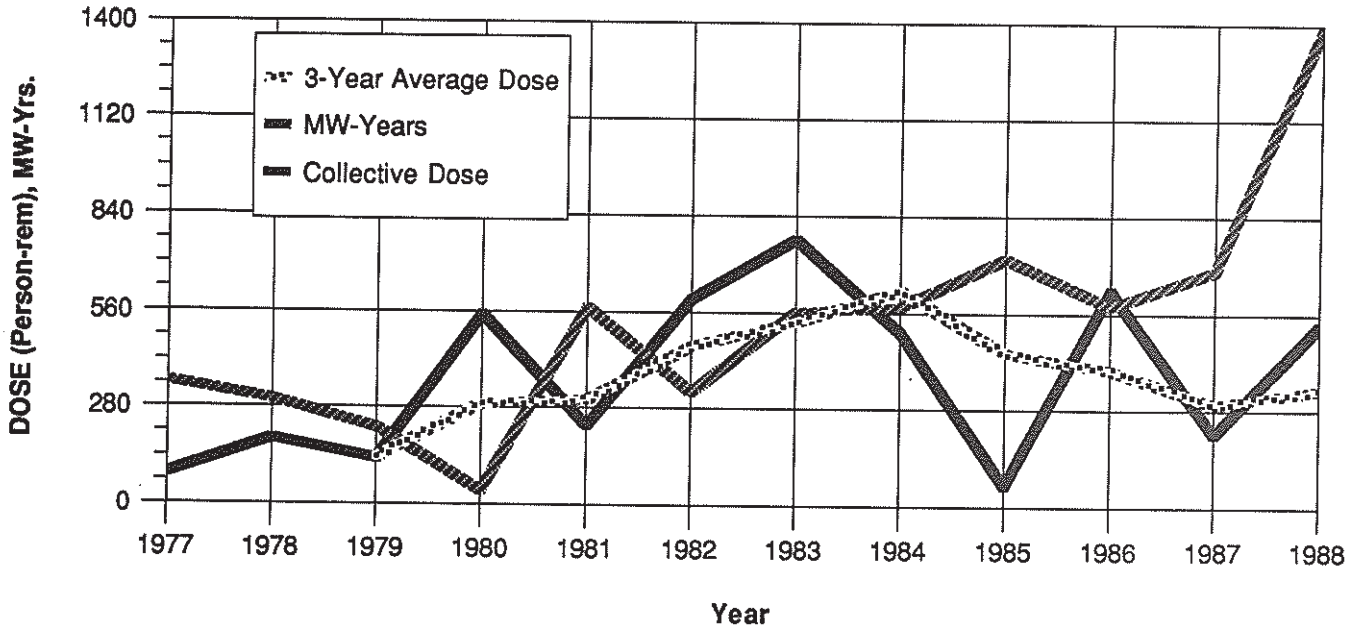
Contract

APPENDIX E (continued)

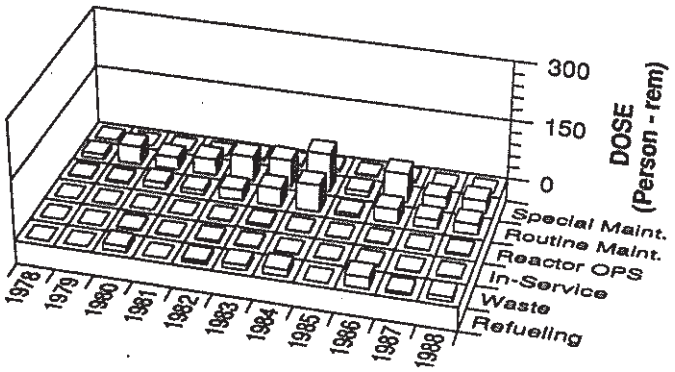
BEAVER VALLEY

PWR

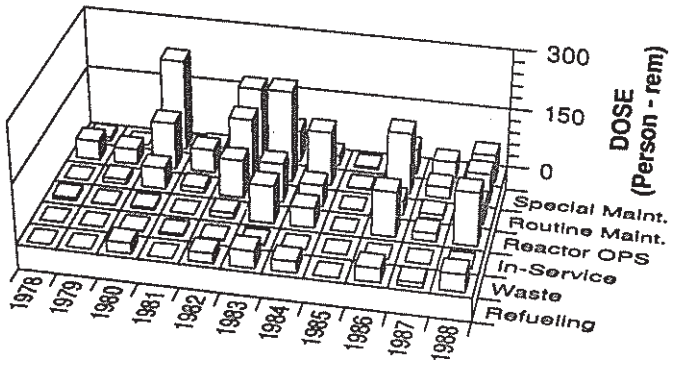
Dose-Performance Indicators



Breakdown By Job Function



Plant



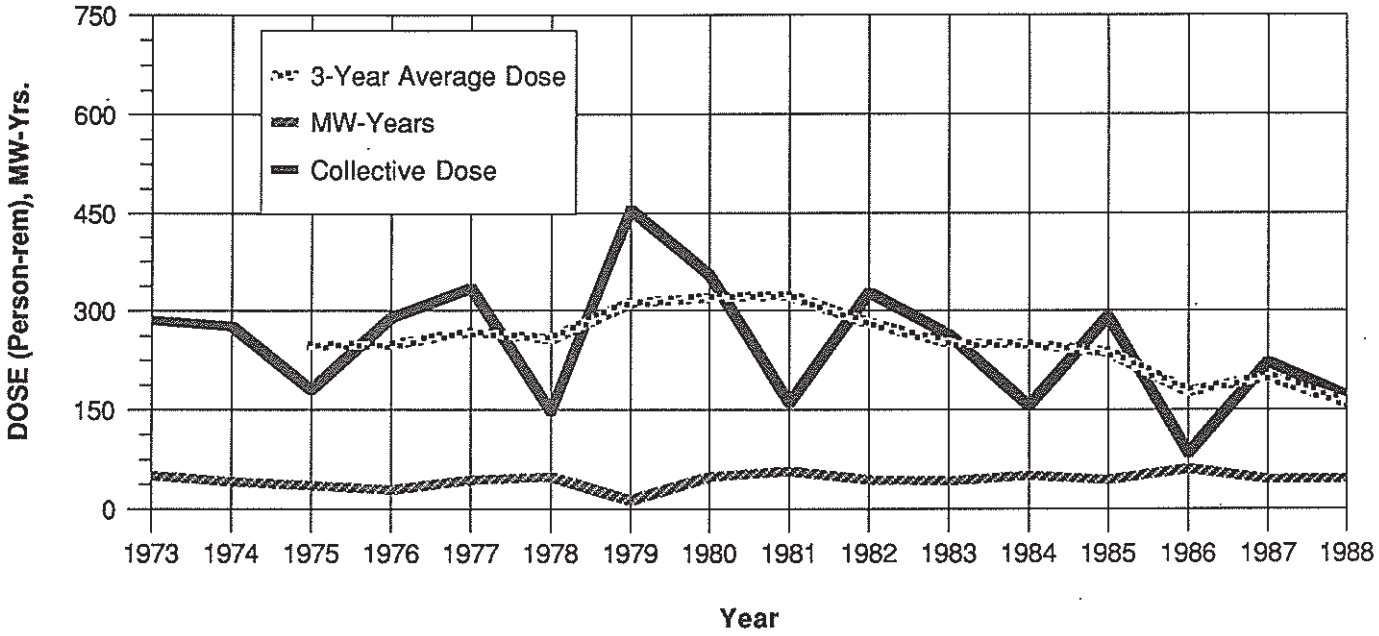
Contract

APPENDIX E (continued)

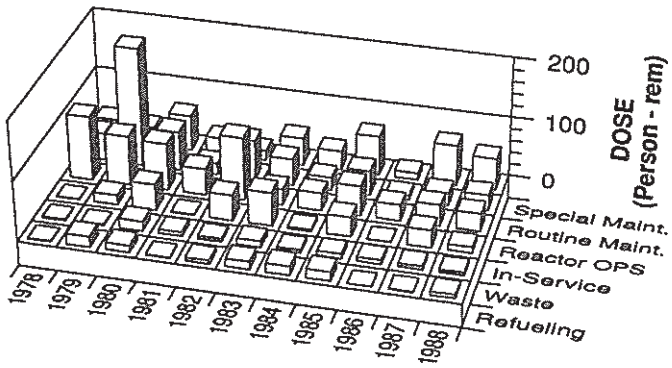
BIG ROCK POINT

BWR

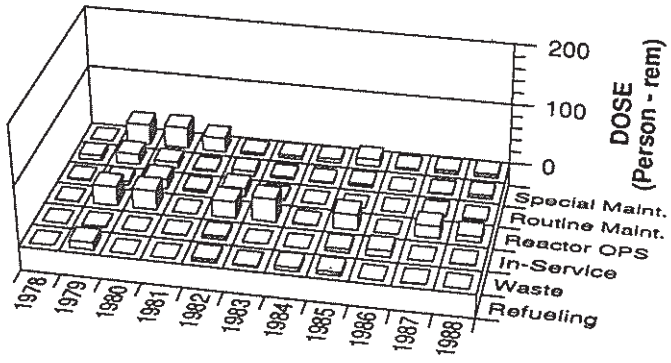
Dose-Performance Indicators



Breakdown By Job Function



Plant



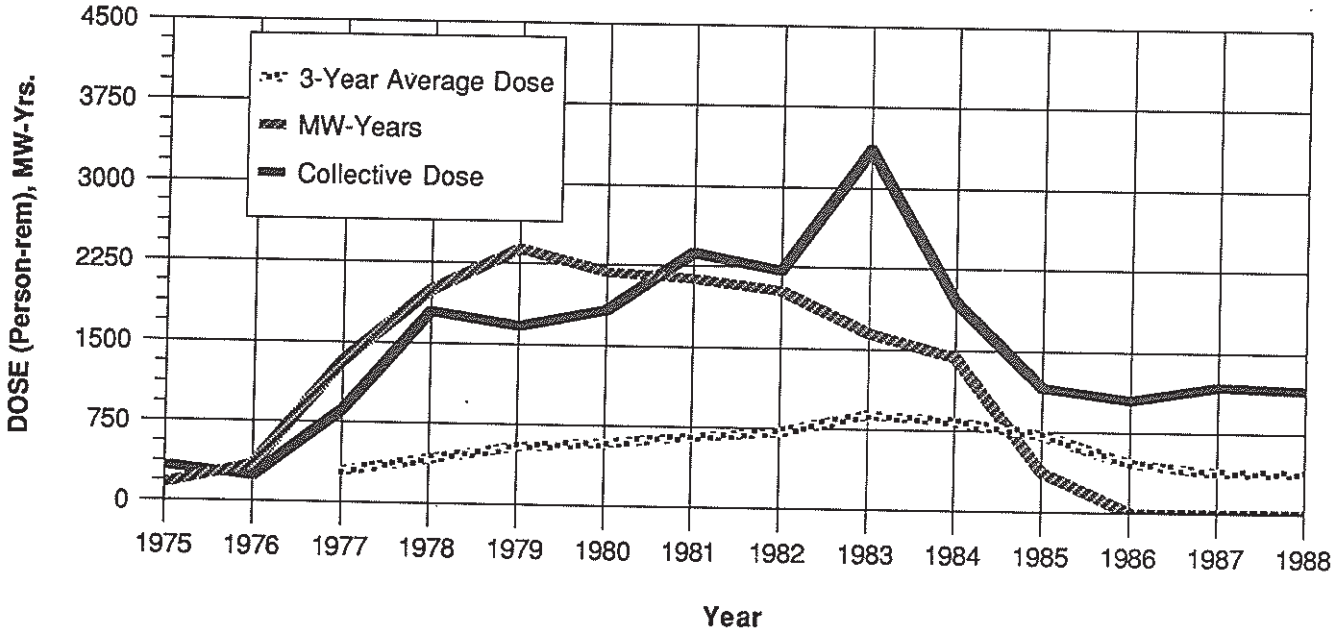
Contract

APPENDIX E (continued)

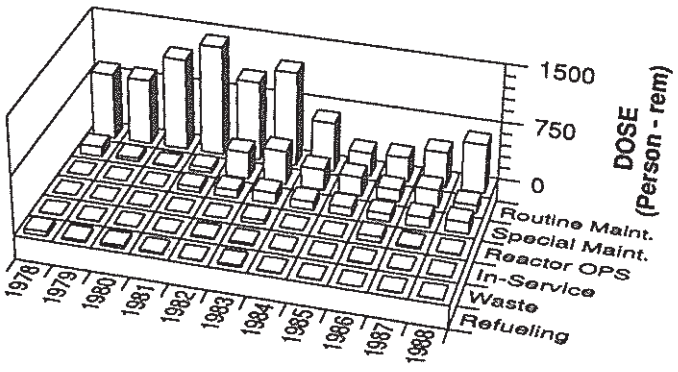
BROWNS FERRY 1,2,3

BWR

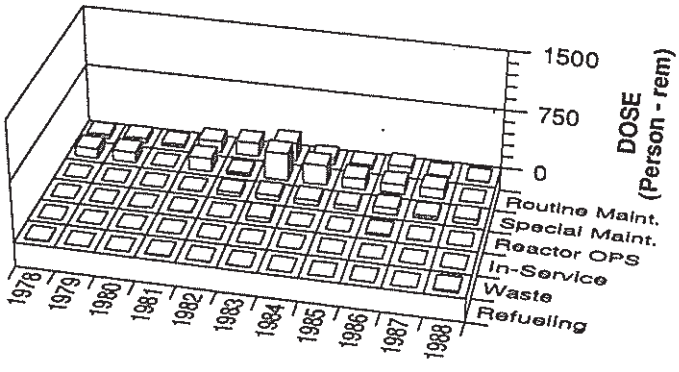
Dose-Performance Indicators



Breakdown By Job Function



Plant



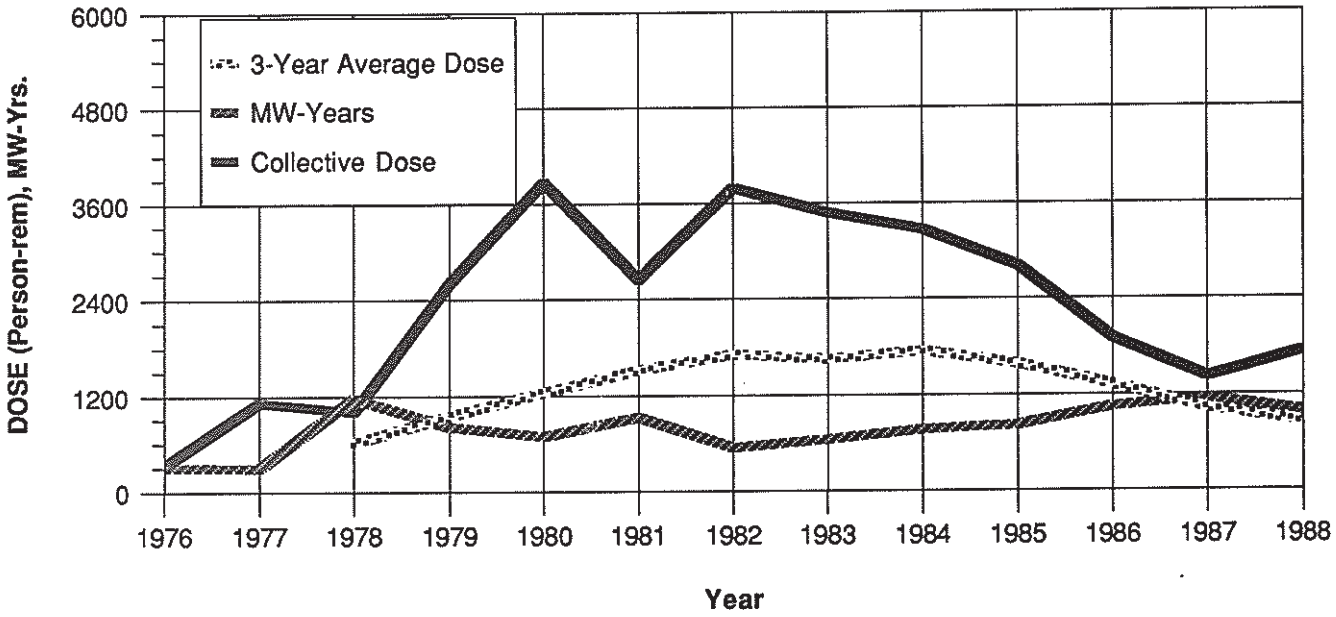
Contract

APPENDIX E (continued)

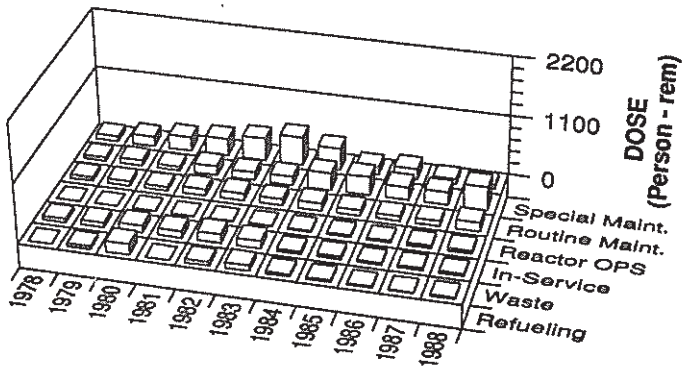
BRUNSWICK 1,2

BWR

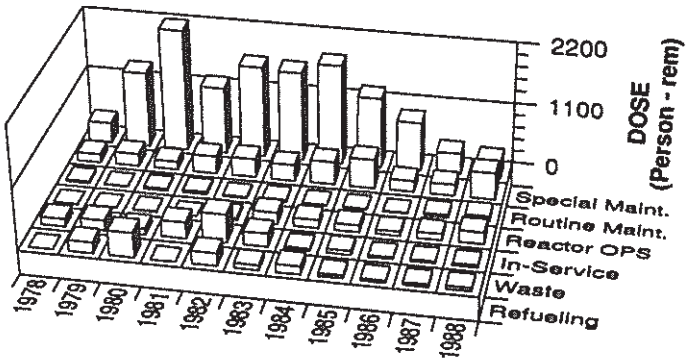
Dose-Performance Indicators



Breakdown By Job Function



Plant



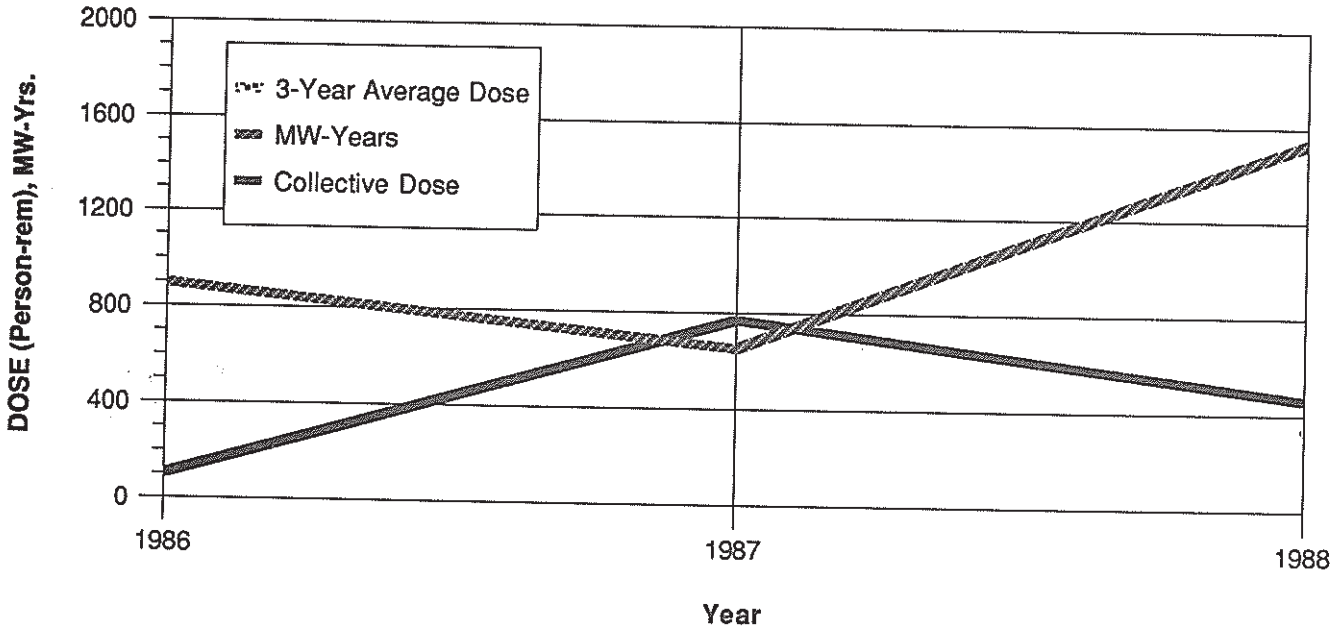
Contract

APPENDIX E (continued)

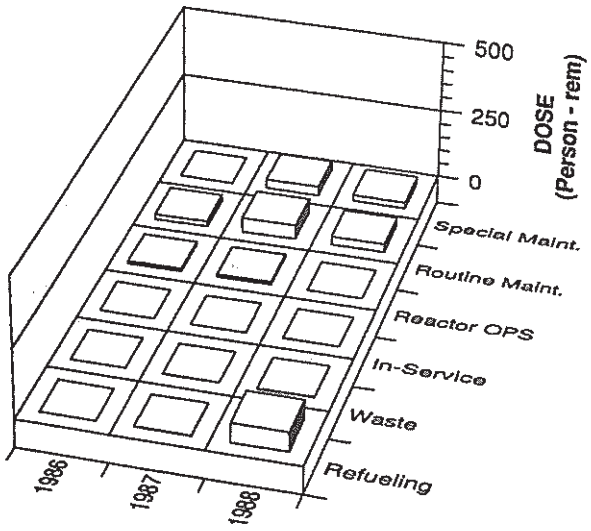
BYRON 1, 2

PWR

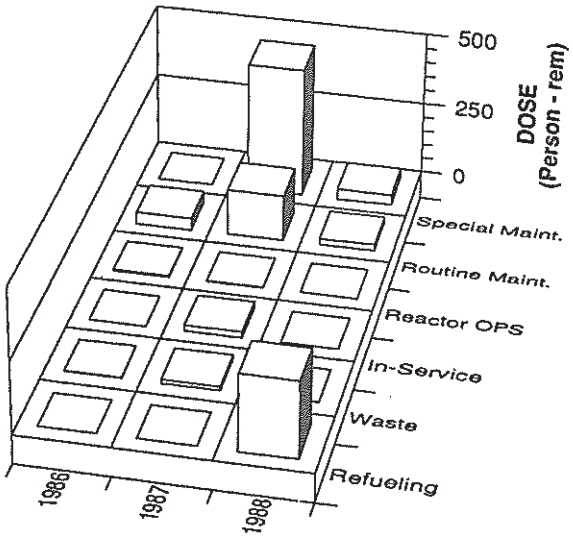
Dose-Performance Indicators



Breakdown By Job Function



Plant



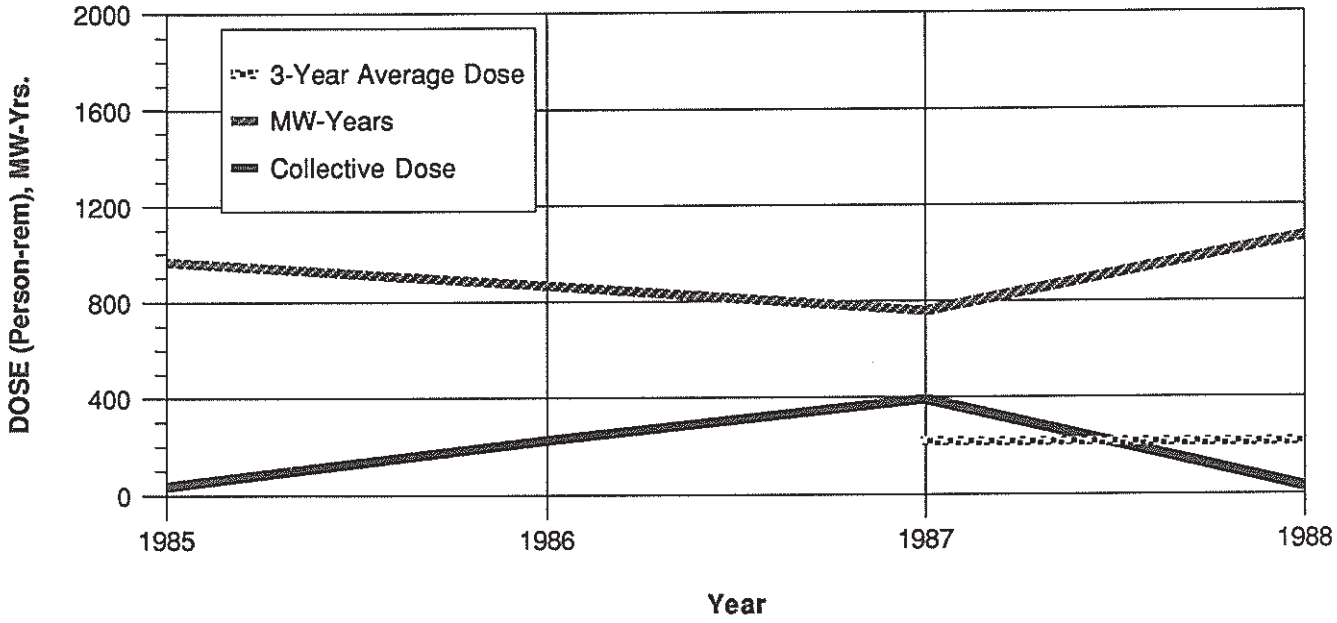
Contract

APPENDIX E (continued)

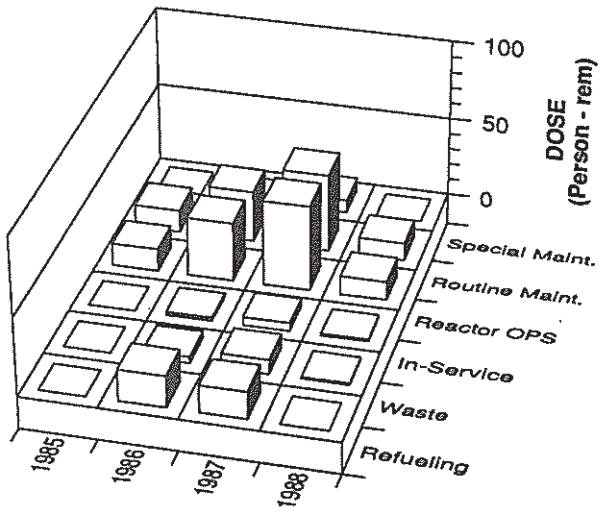
CALLAWAY

PWR

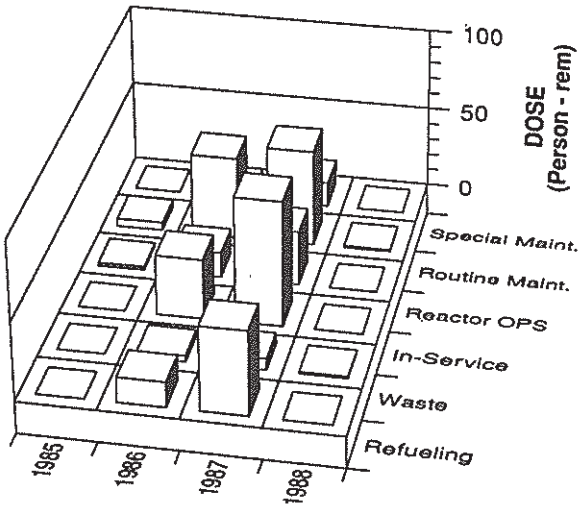
Dose-Performance Indicators



Breakdown By Job Function



Plant



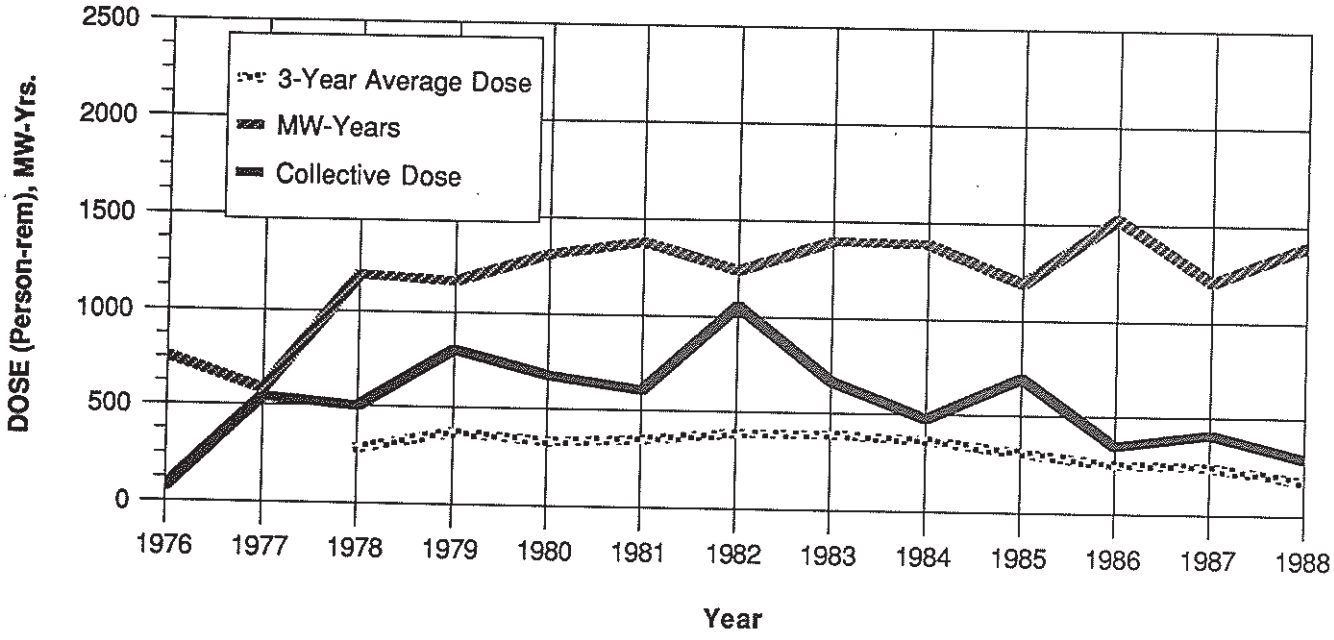
Contract

APPENDIX E (continued)

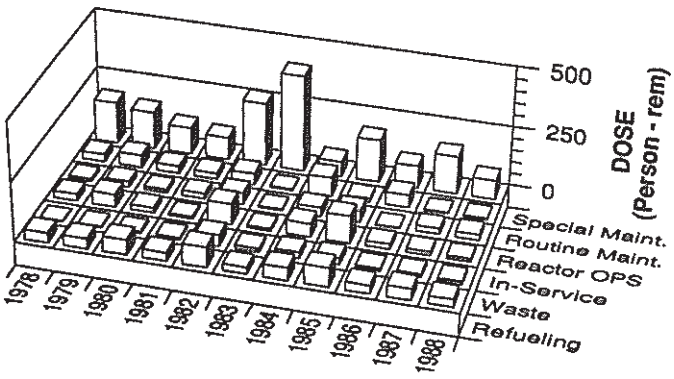
CALVERT CLIFFS 1,2

PWR

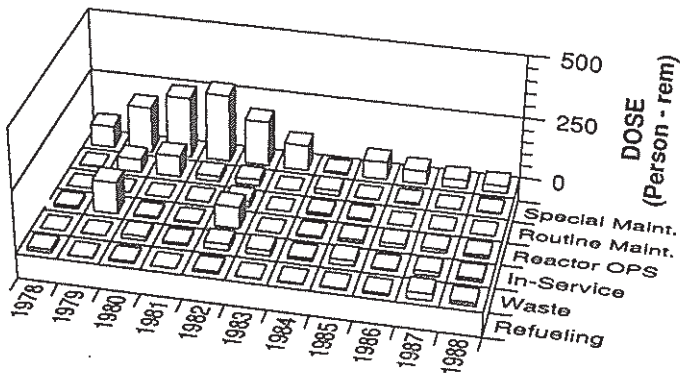
Dose-Performance Indicators



Breakdown By Job Function



Plant



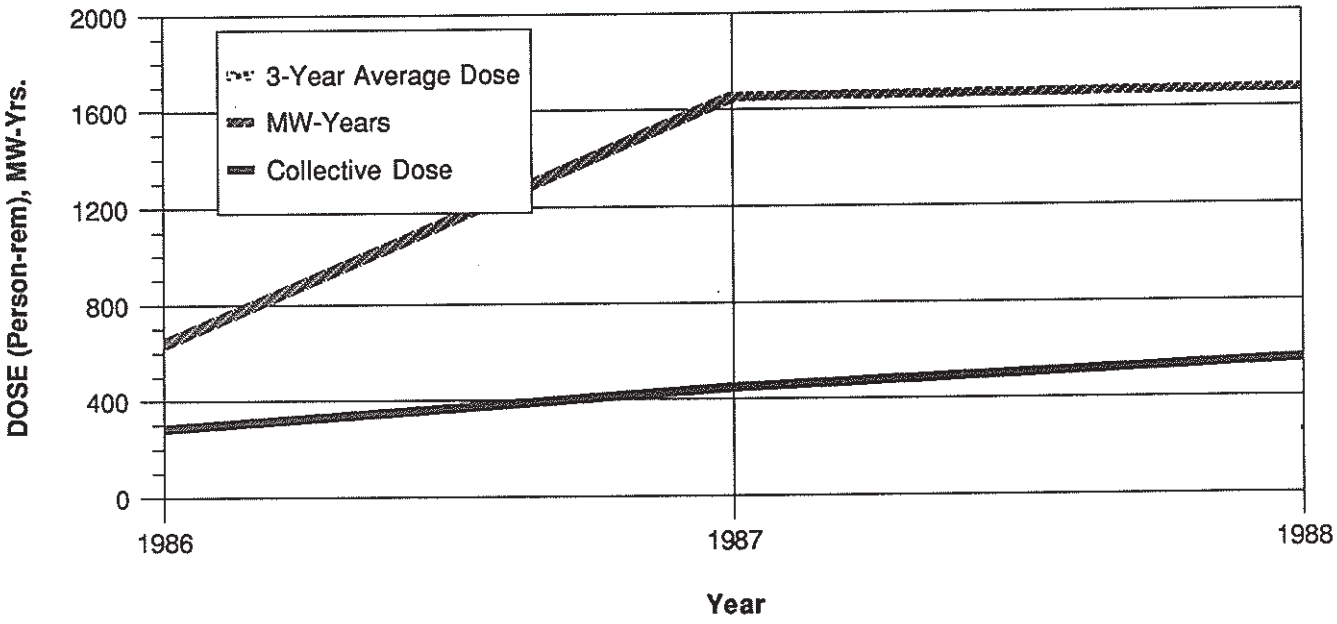
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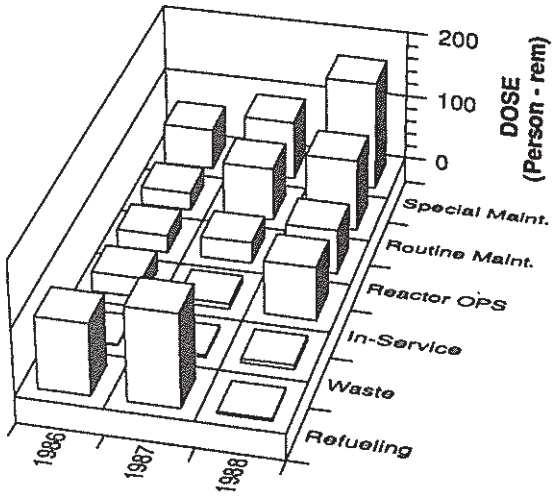
CATAWBA 1,2

PWR

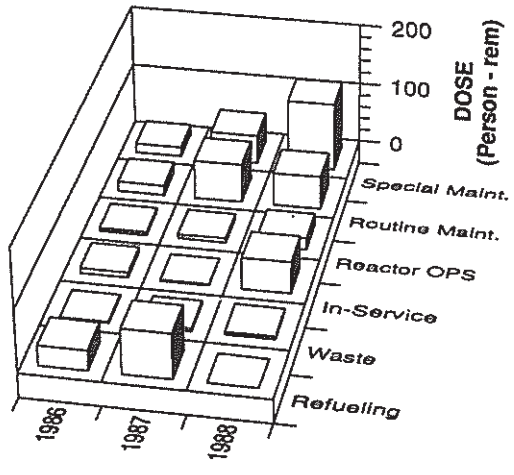
Dose-Performance Indicators



Breakdown By Job Function



Plant



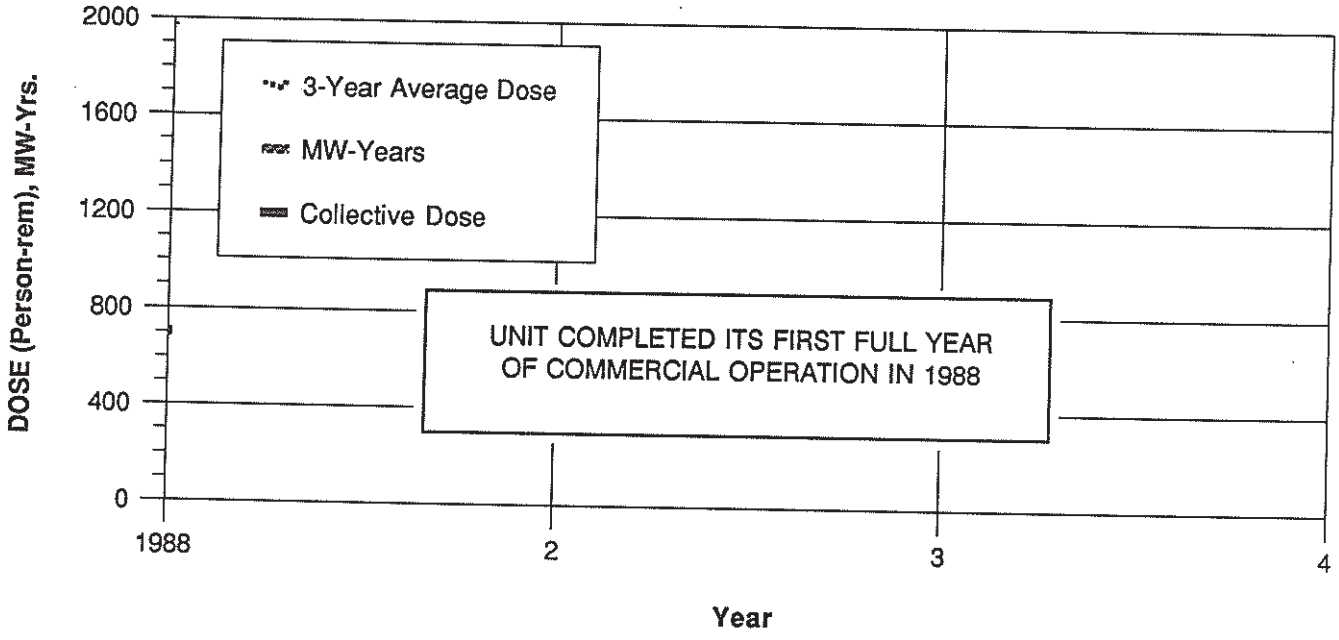
Contract

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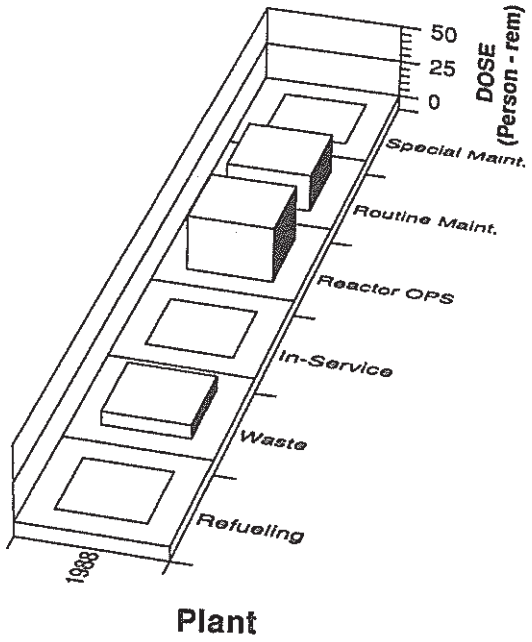
CLINTON

BWR

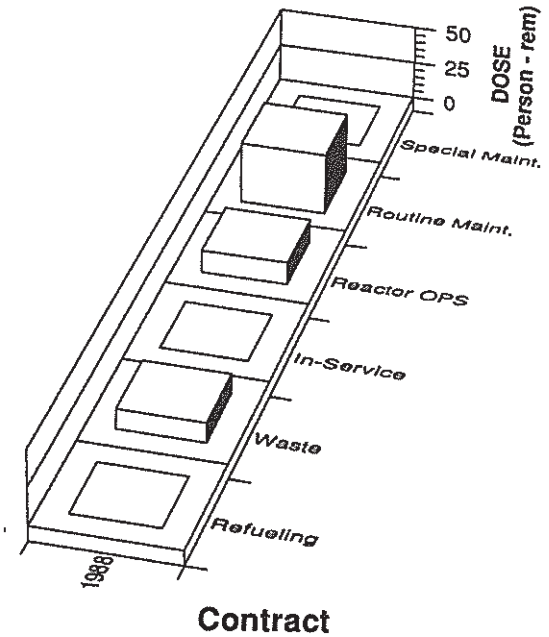
Dose-Performance Indicators



Breakdown By Job Function



Plant



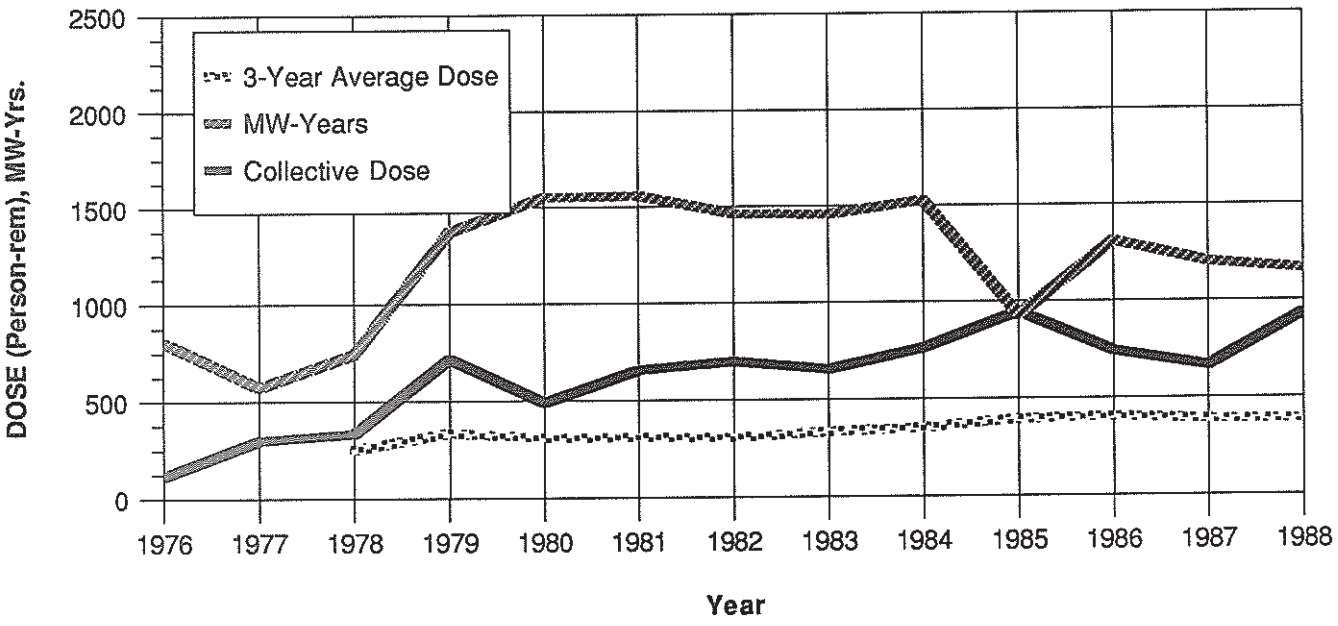
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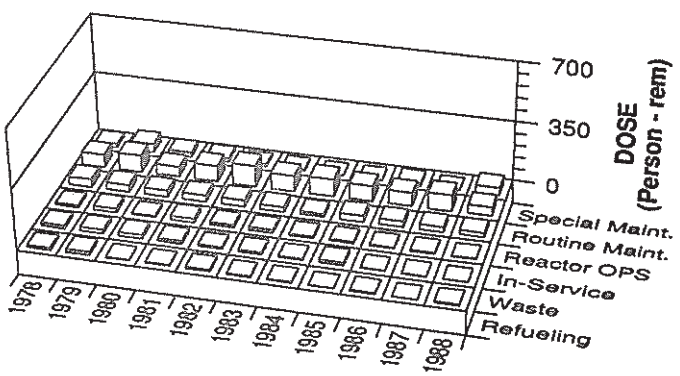
COOK 1,2

PWR

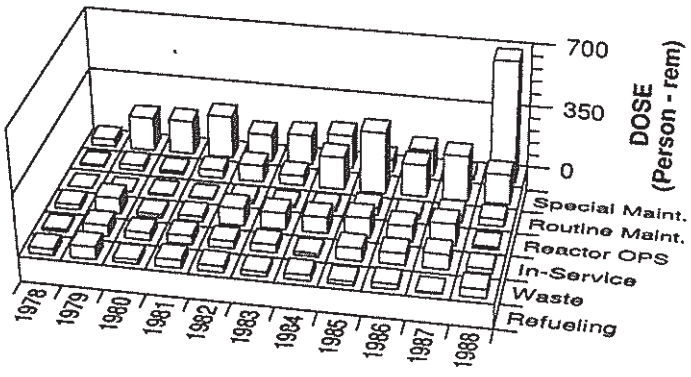
Dose-Performance Indicators



Breakdown By Job Function



Plant



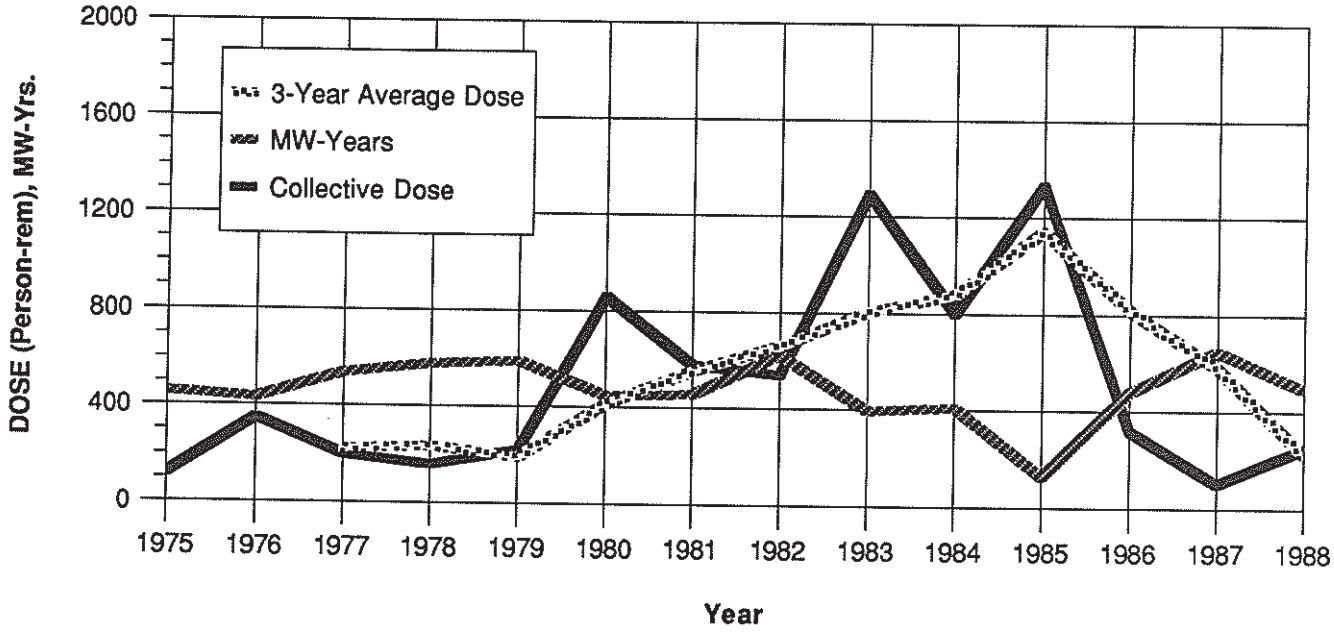
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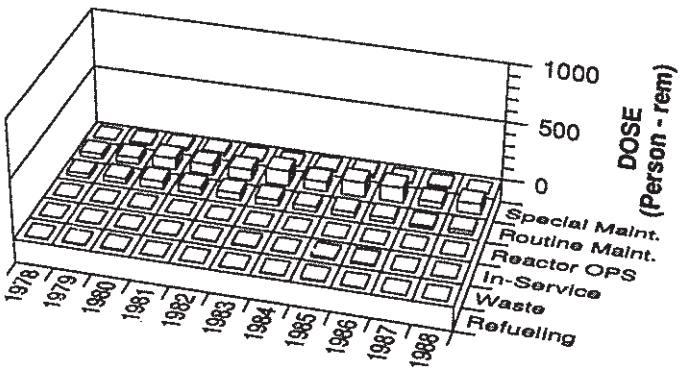
COOPER STATION

BWR

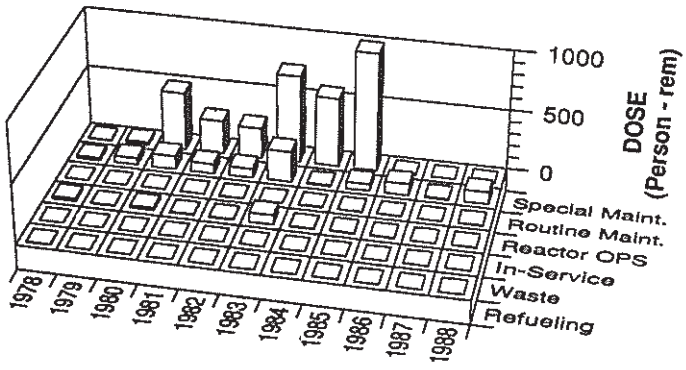
Dose-Performance Indicators



Breakdown By Job Function



Plant



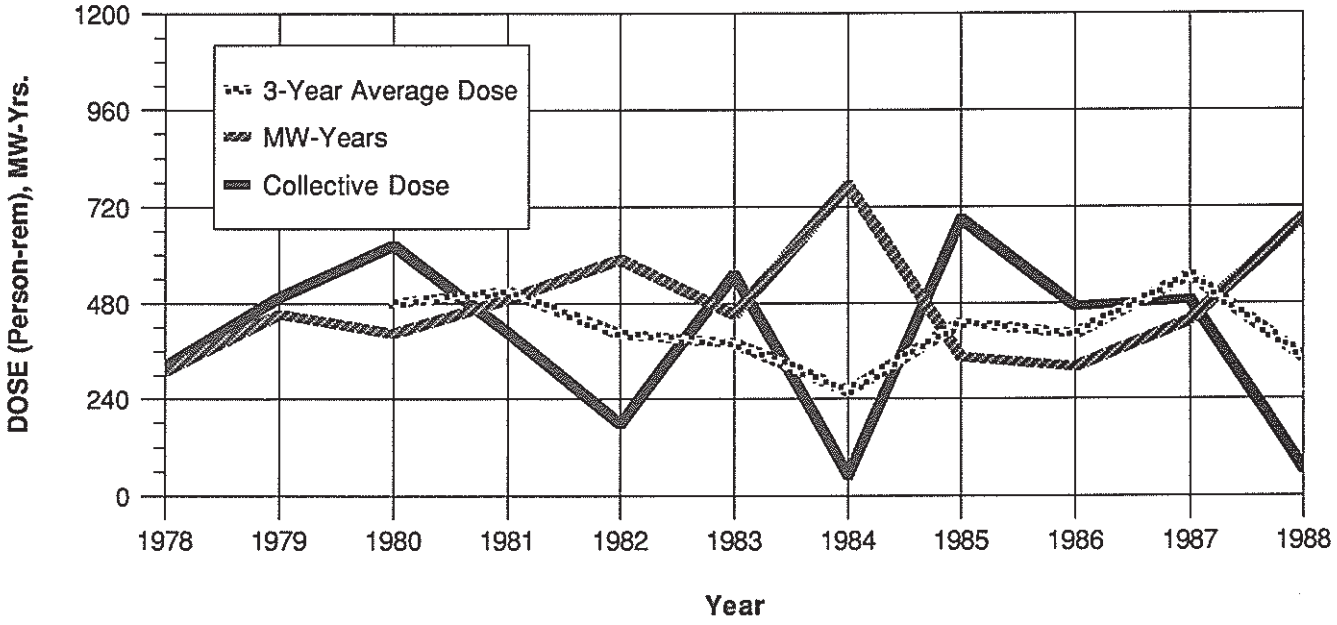
Contract

APPENDIX E (continued)

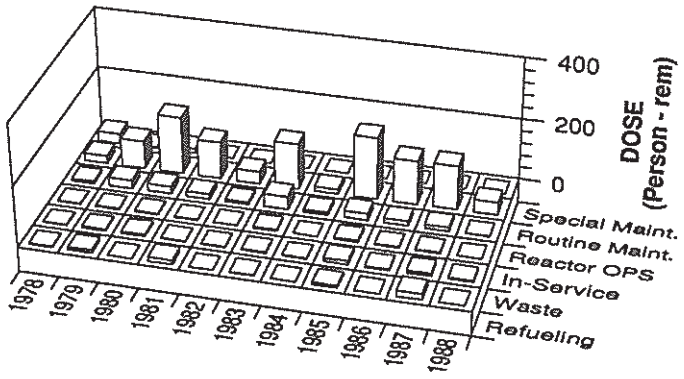
CRYSTAL RIVER 3

PWR

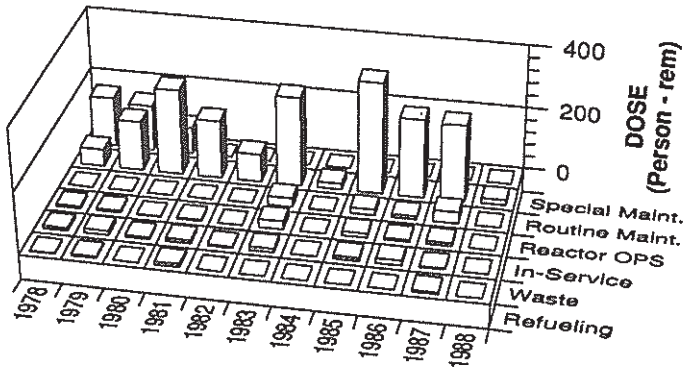
Dose-Performance Indicators



Breakdown By Job Function



Plant



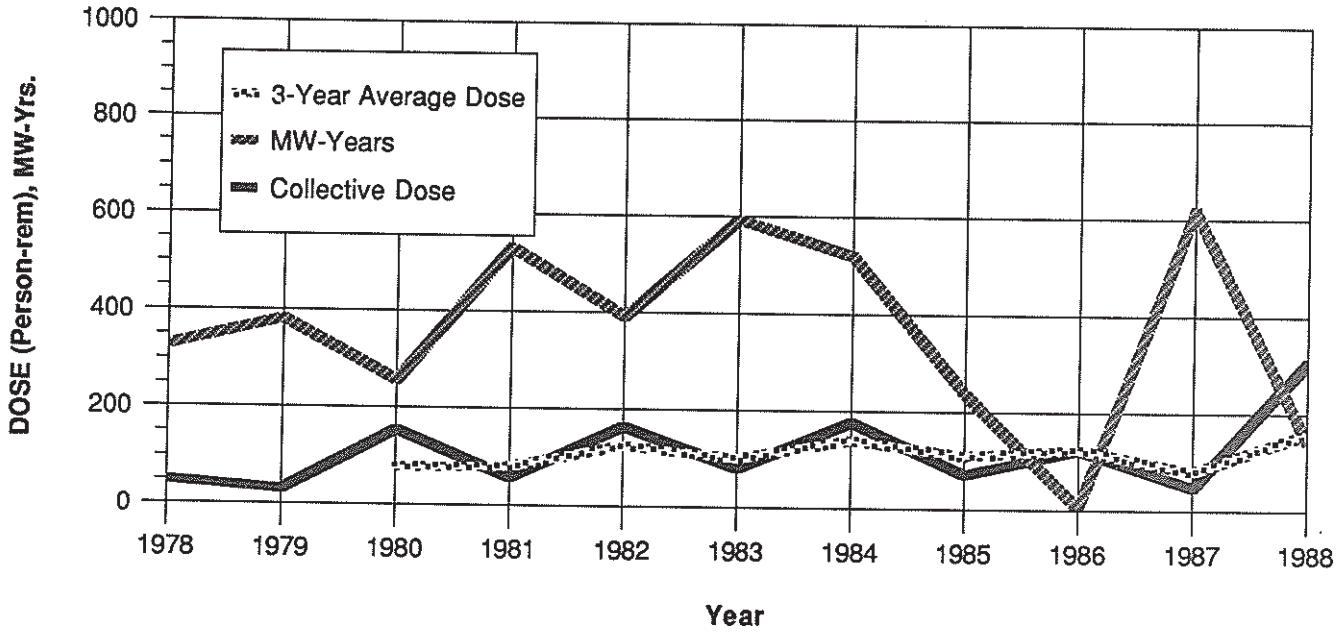
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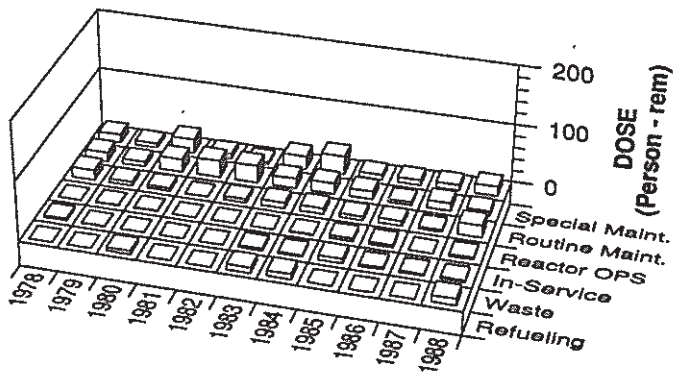
DAVIS-BESSE

PWR

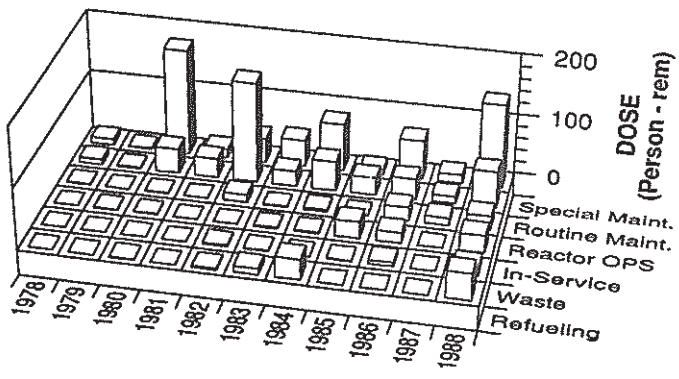
Dose-Performance Indicators



Breakdown By Job Function



Plant



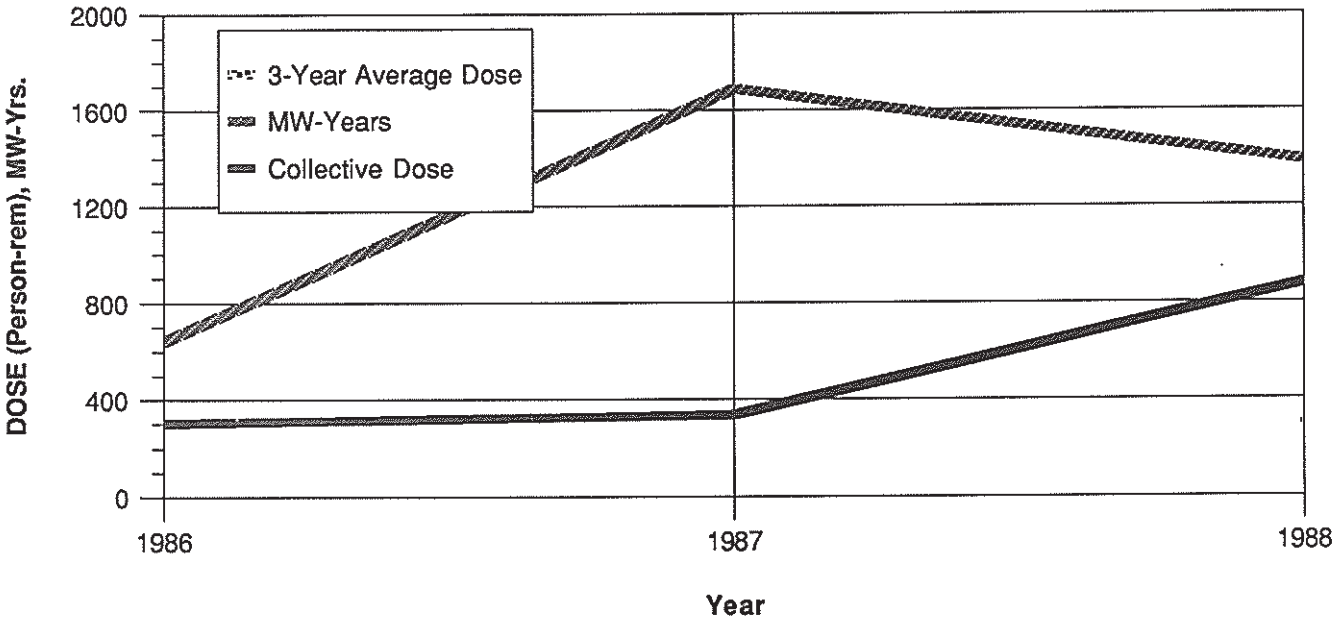
Contract

APPENDIX E (continued)

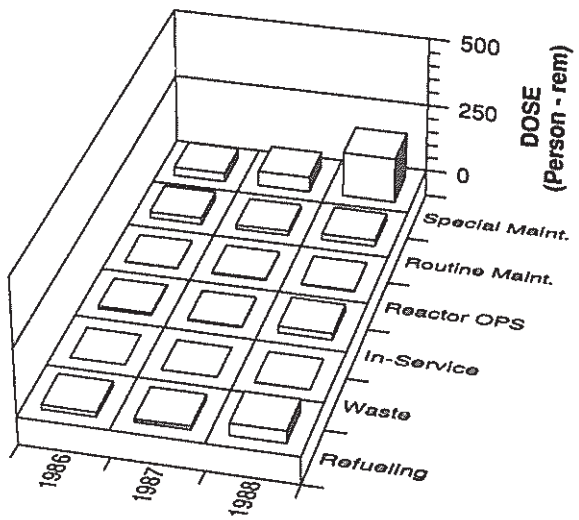
DIABLO CANYON 1,2

PWR

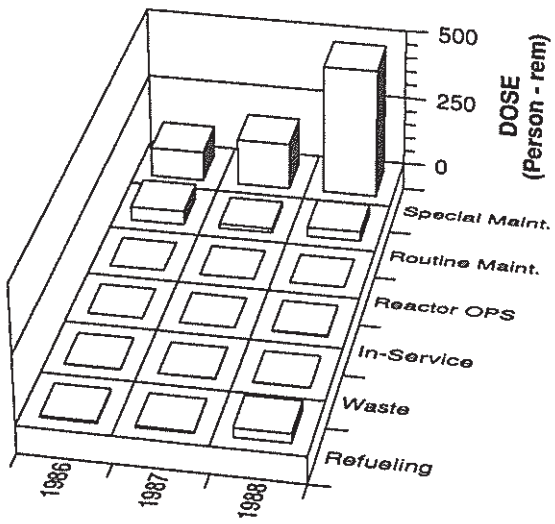
Dose-Performance Indicators



Breakdown By Job Function



Plant



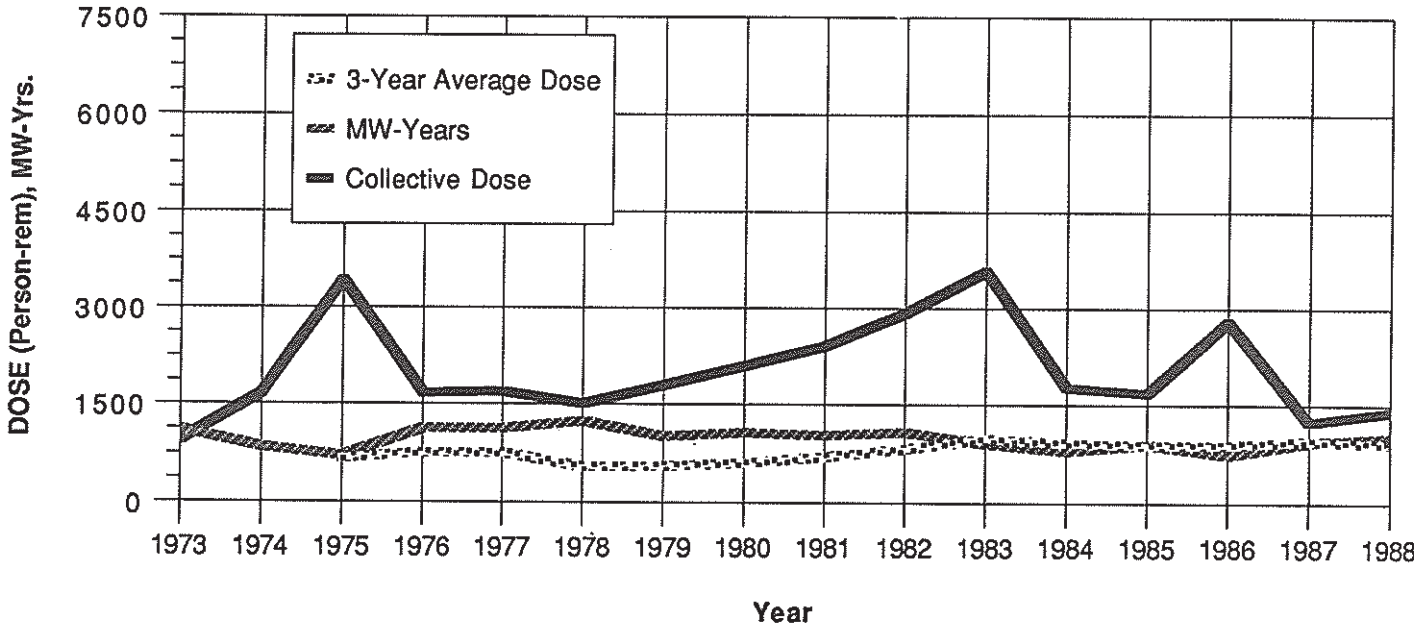
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APPENDIX E (continued)

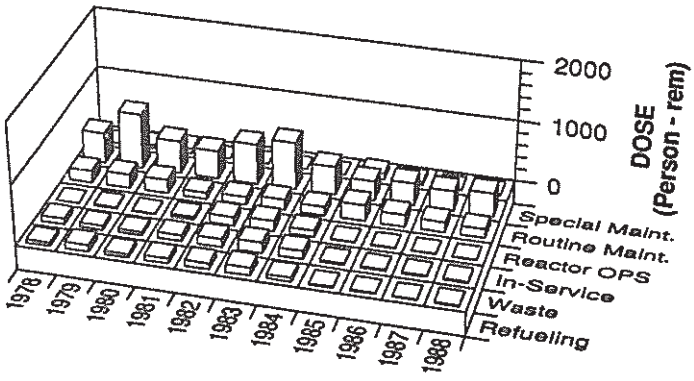
DRESDEN 2,3

BWR

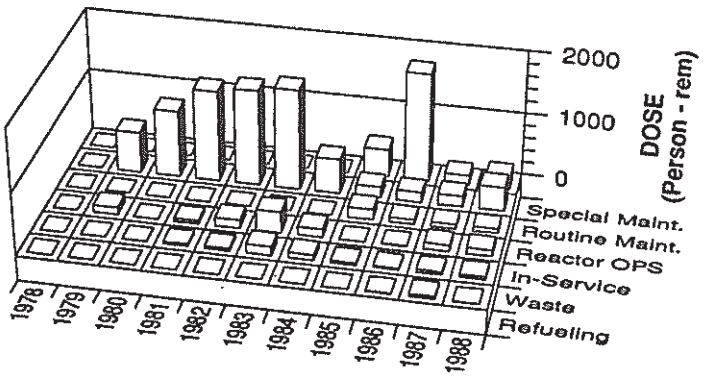
Dose-Performance Indicators



Breakdown By Job Function



Plant



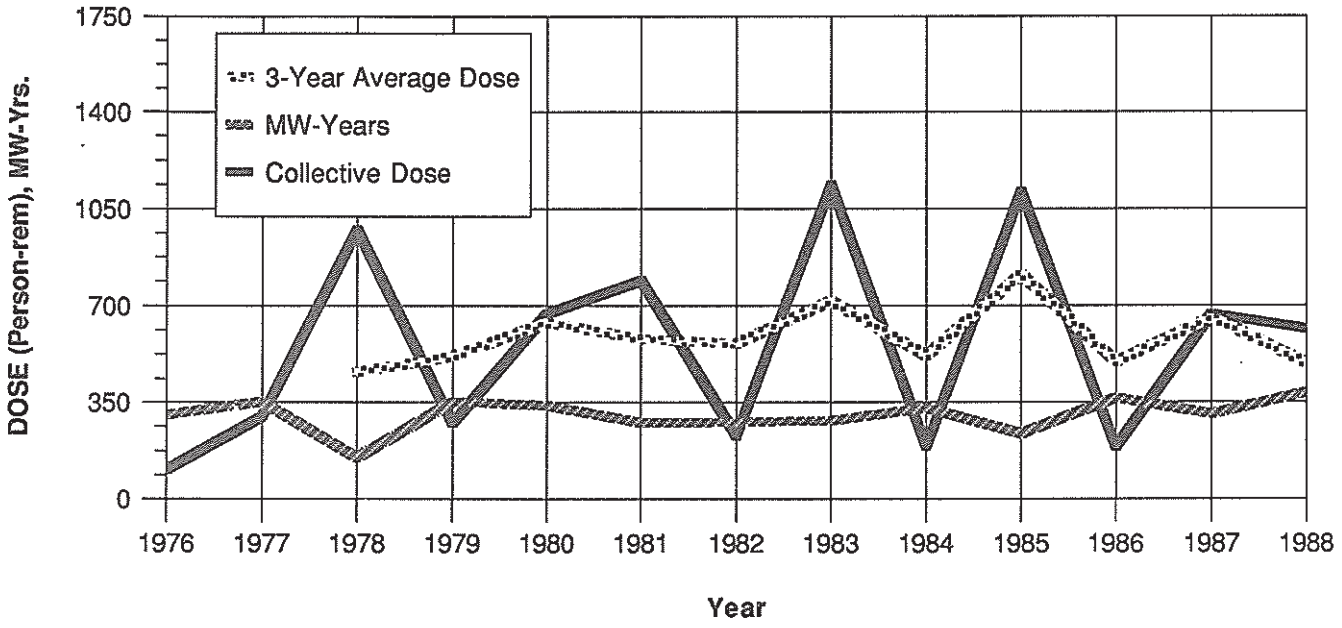
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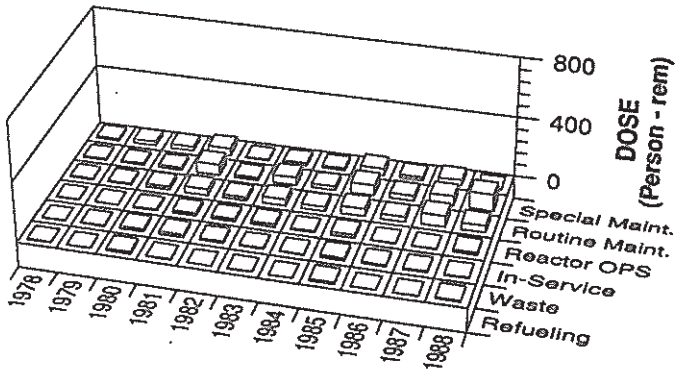
DUANE ARNOLD

BWR

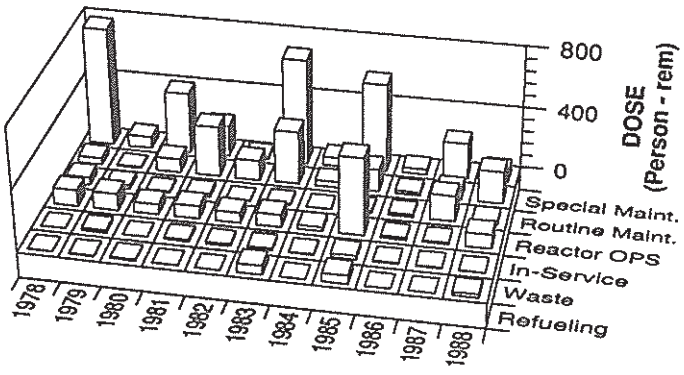
Dose-Performance Indicators



Breakdown By Job Function



Plant



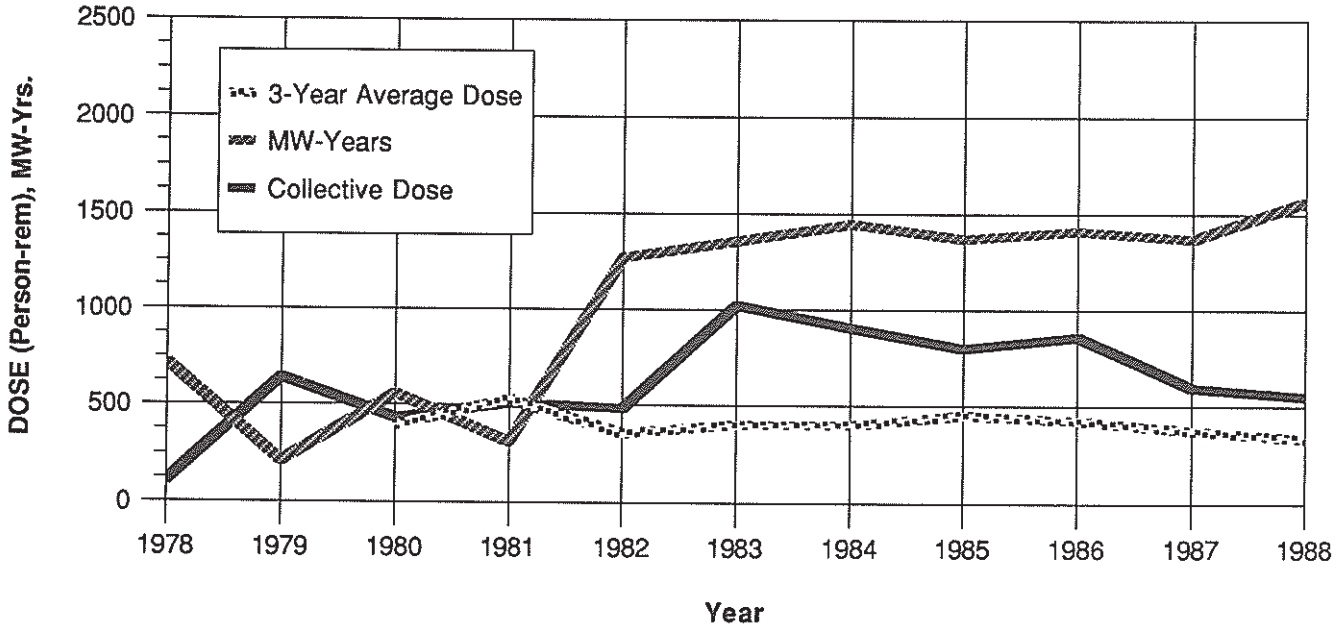
Contract

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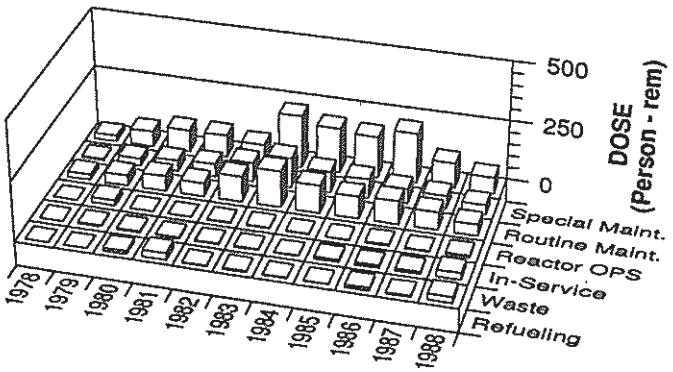
FARLEY 1,2

PWR

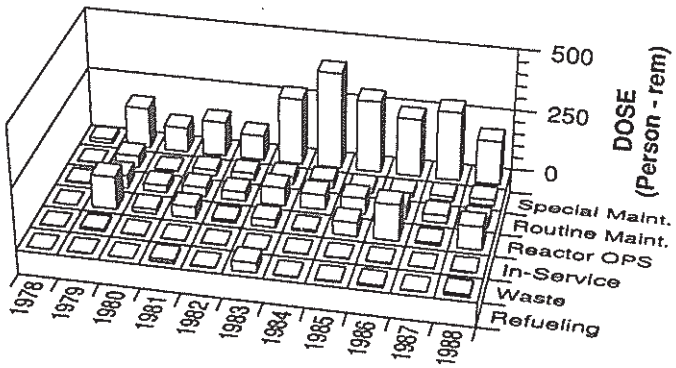
Dose-Performance Indicators



Breakdown By Job Function



Plant



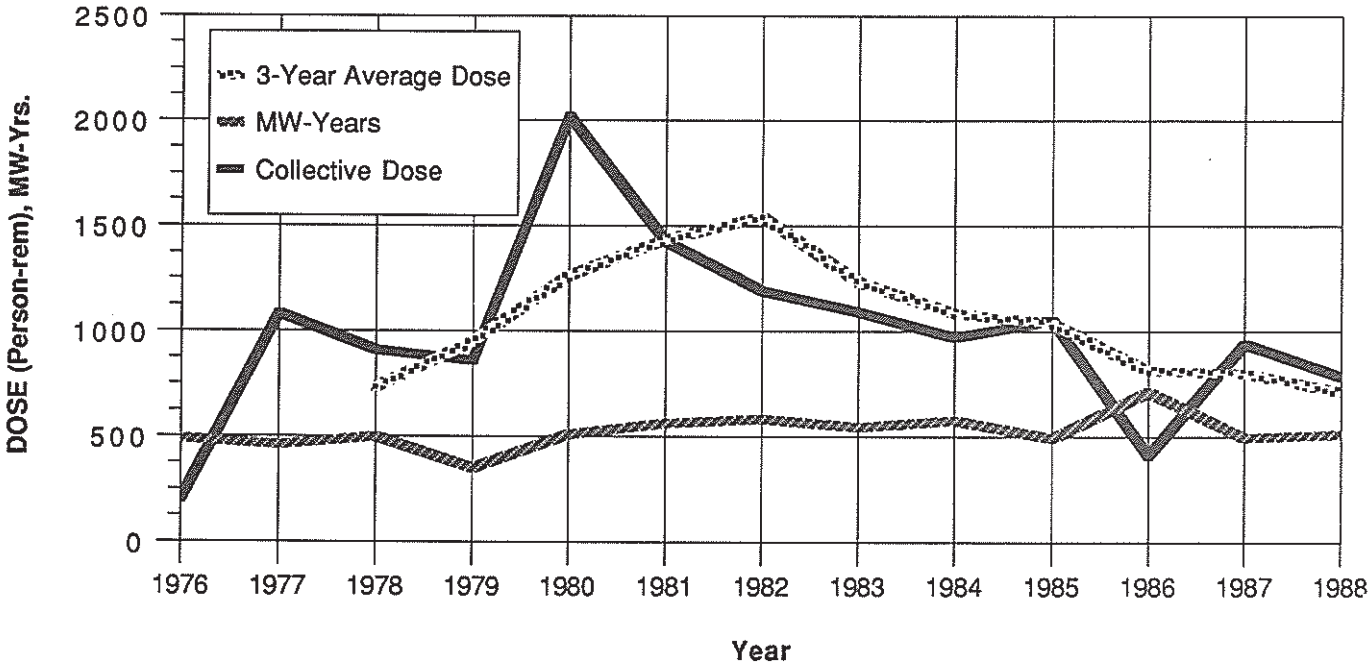
Contract

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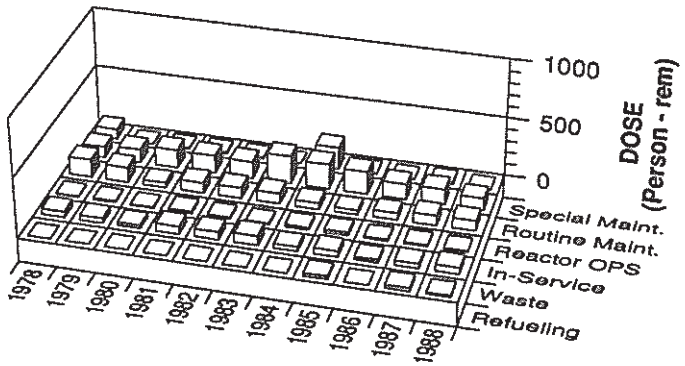
FITZPATRICK

BWR

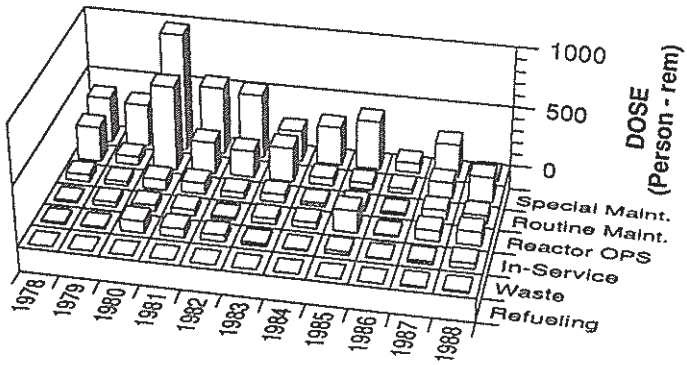
Dose-Performance Indicators



Breakdown By Job Function



Plant



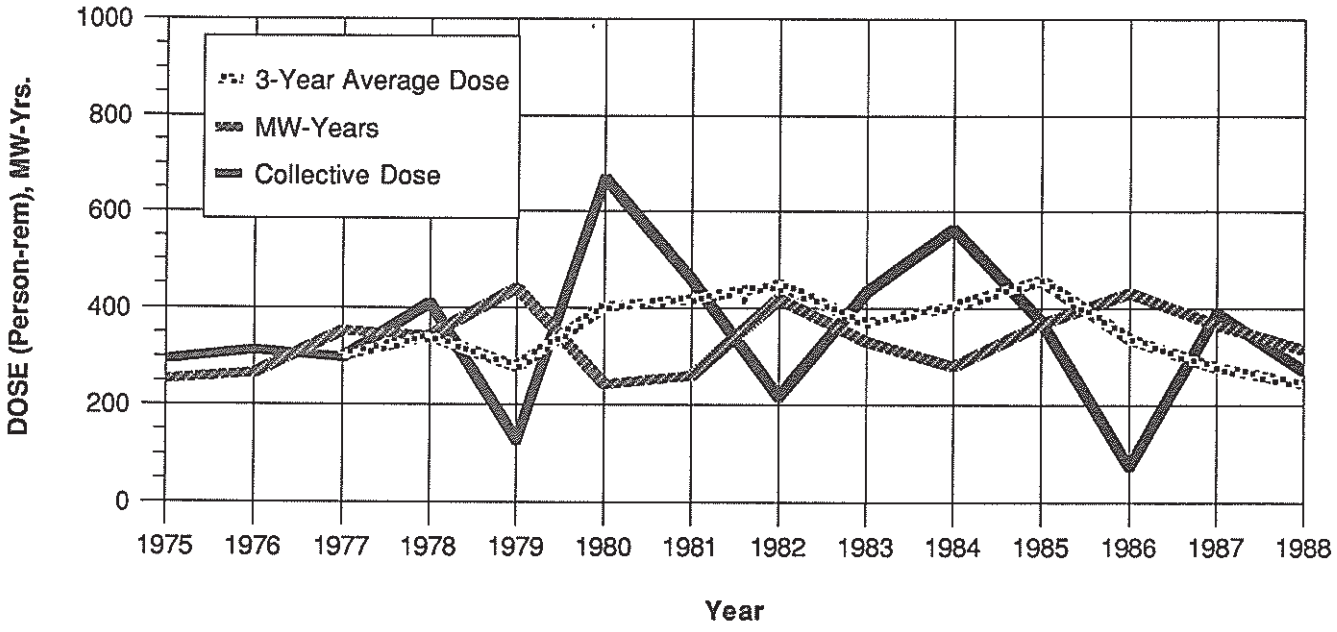
Contract

APPENDIX E (continued)

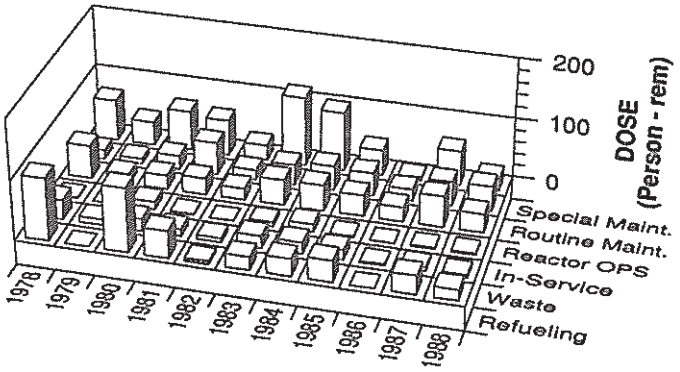
FORT CALHOUN

PWR

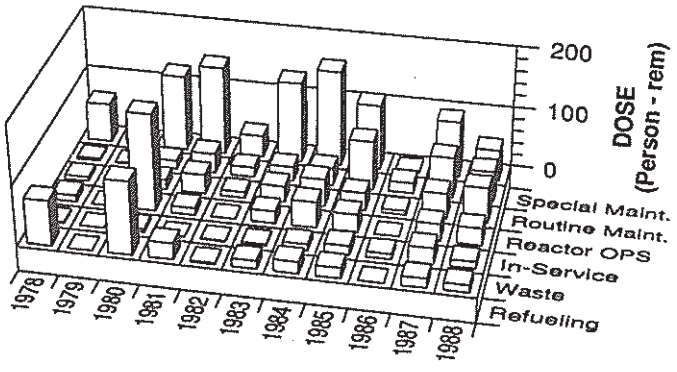
Dose-Performance Indicators



Breakdown By Job Function



Plant



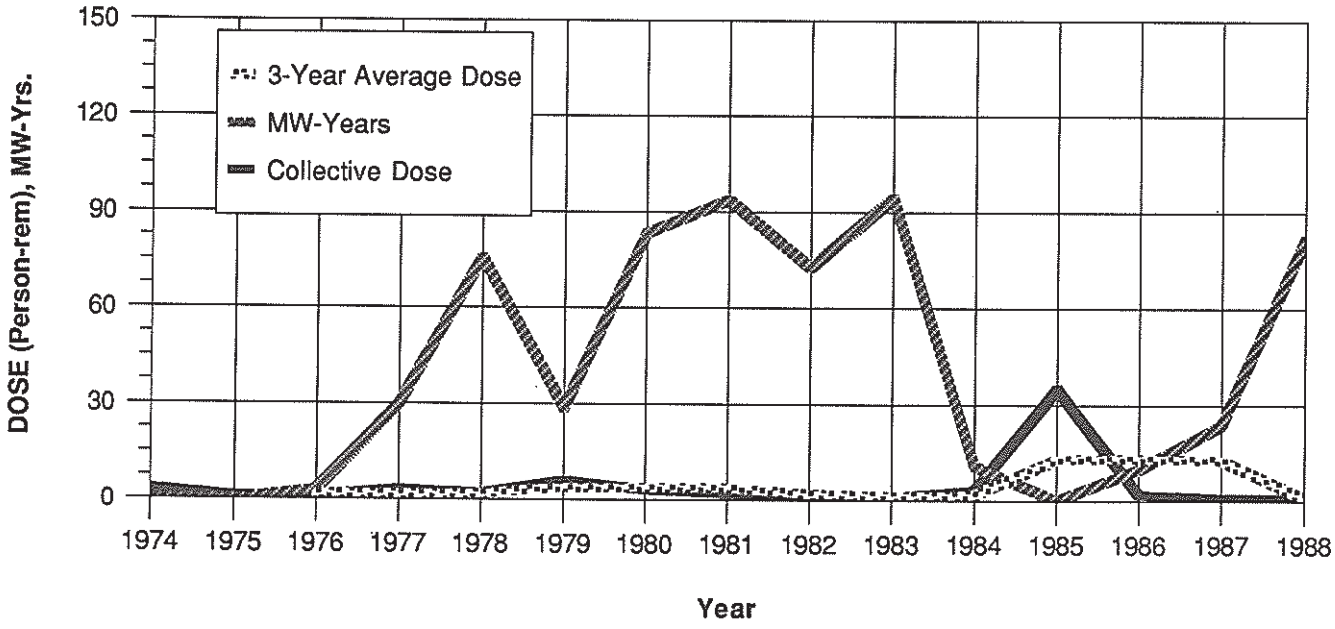
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APPENDIX E (continued)

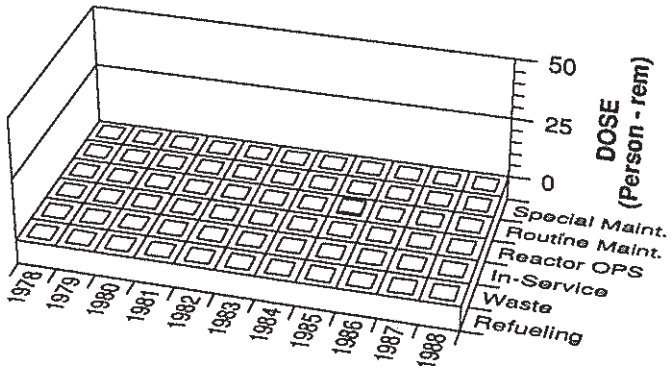
FORT ST. VRAIN

HTGR

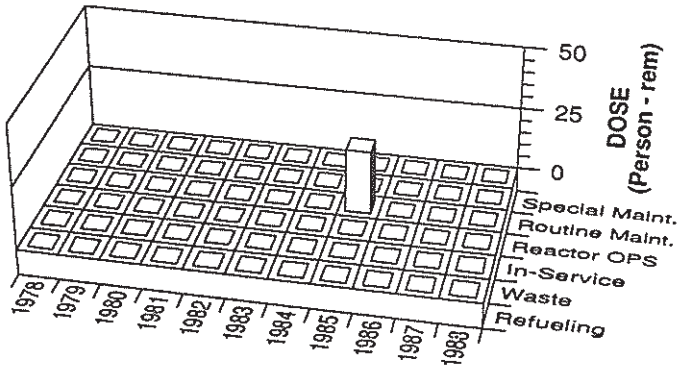
Dose-Performance Indicators



Breakdown By Job Function



Plant



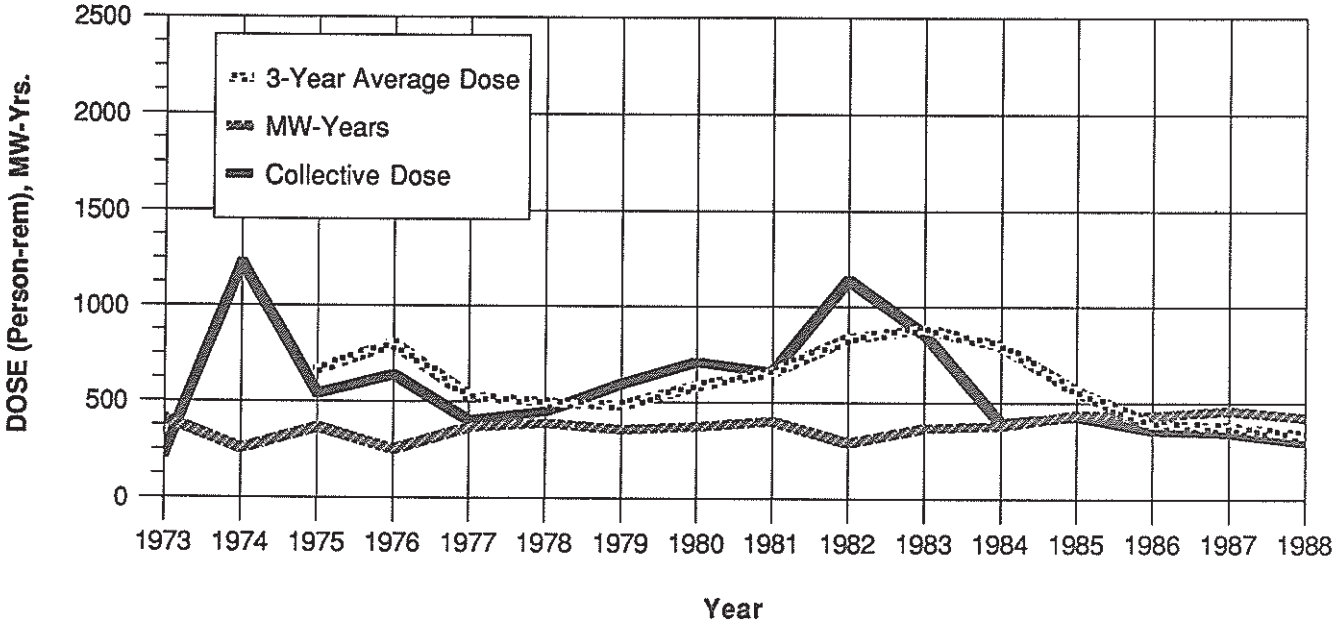
Contract

APPENDIX E (continued)

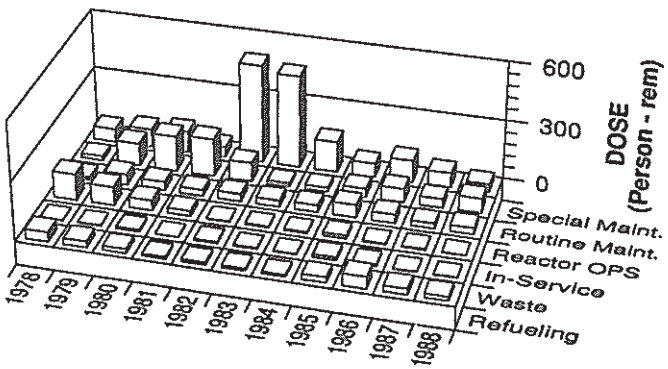
GINNA

PWR

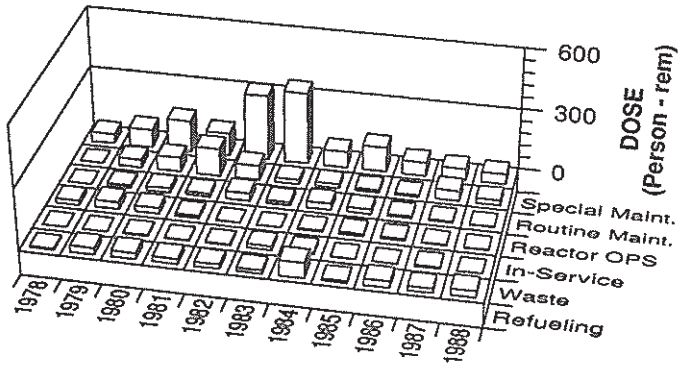
Dose-Performance Indicators



Breakdown By Job Function



Plant



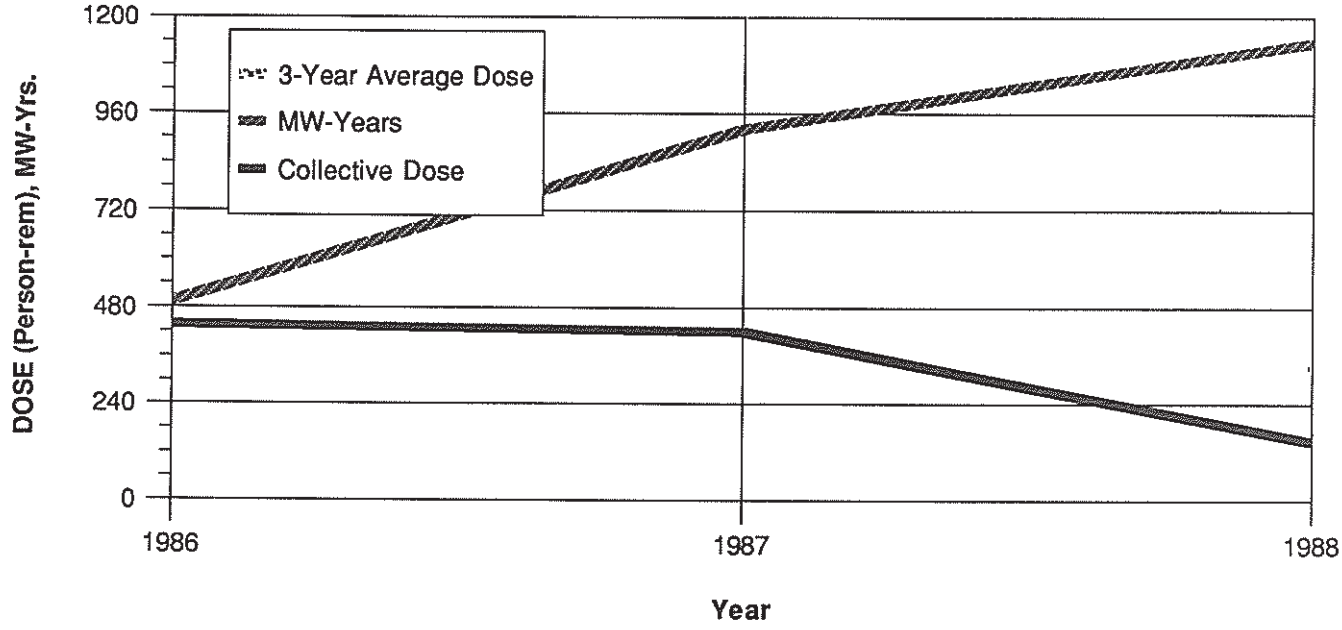
Contract

APPENDIX E (continued)

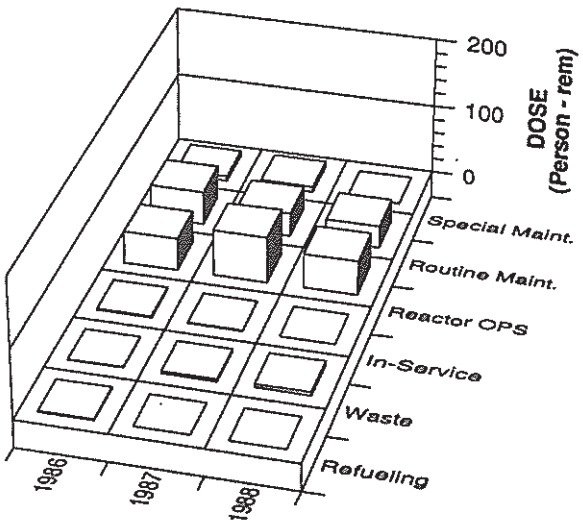
GRAND GULF

BWR

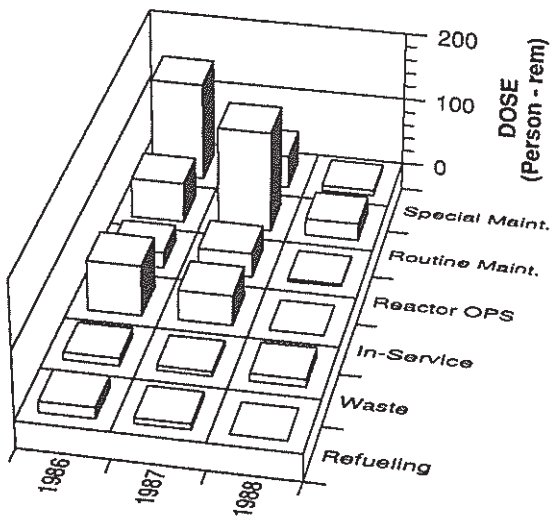
Dose-Performance Indicators



Breakdown By Job Function



Plant



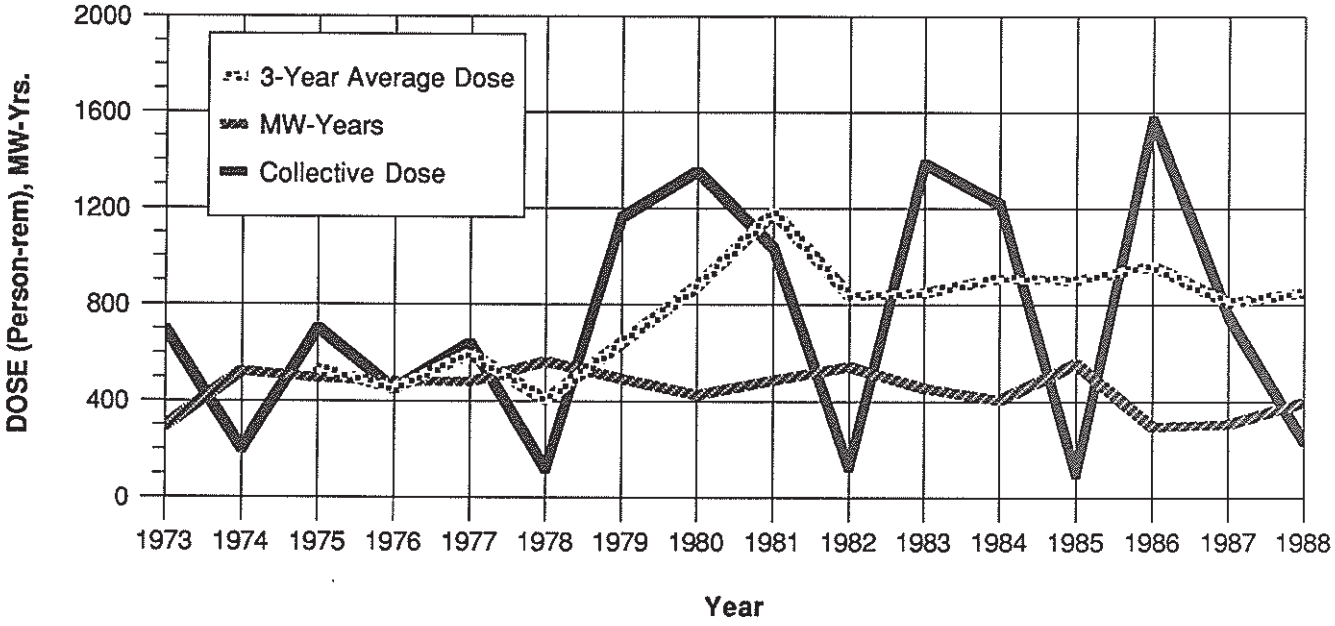
Contract

APPENDIX E (continued)

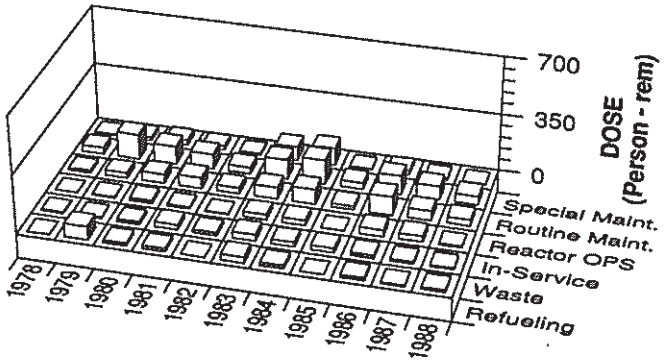
HADDAM NECK

PWR

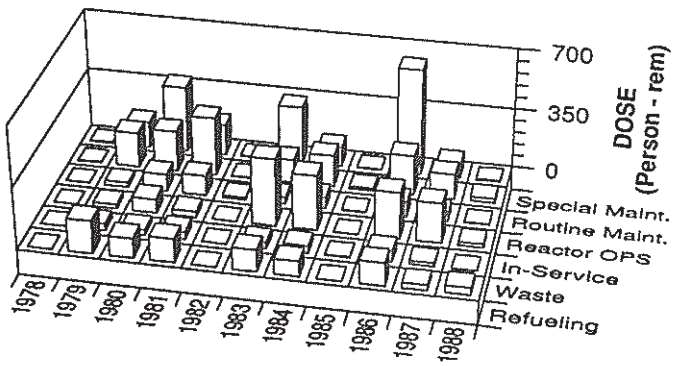
Dose-Performance Indicators



Breakdown By Job Function



Plant



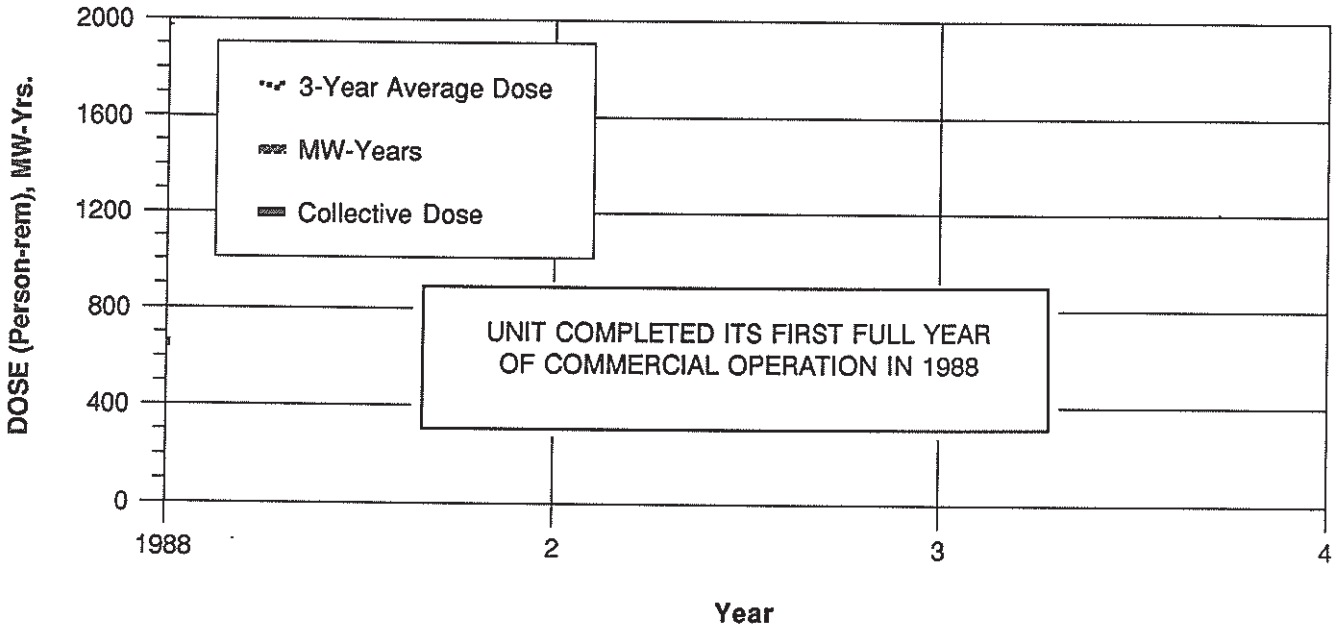
Contract

APPENDIX E (continued)

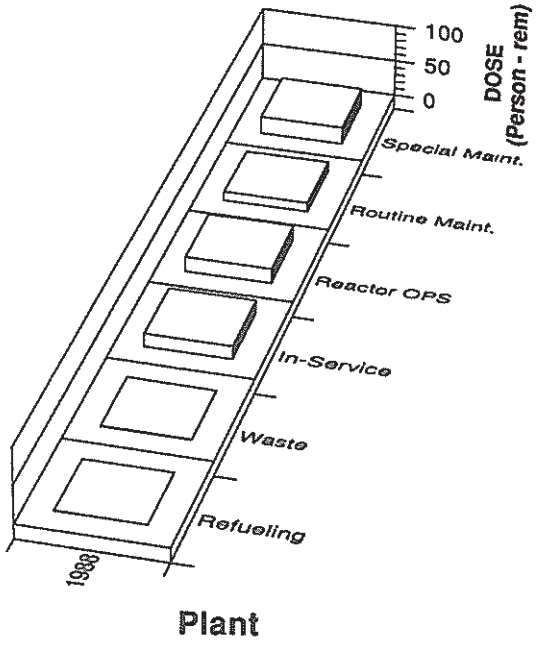
HARRIS

PWR

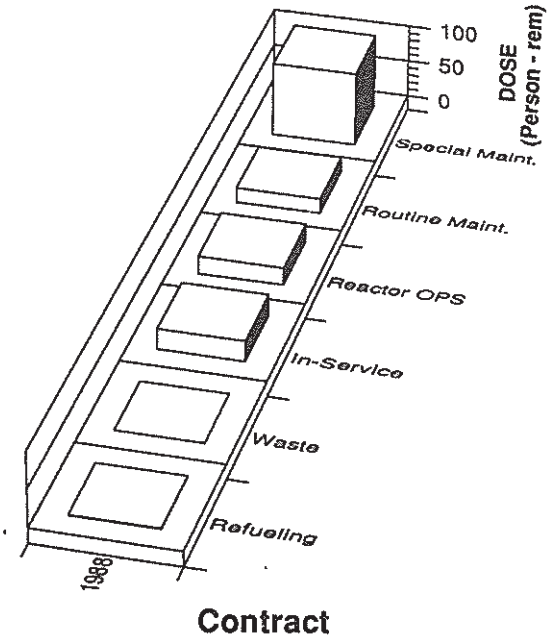
Dose-Performance Indicators



Breakdown By Job Function



Plant



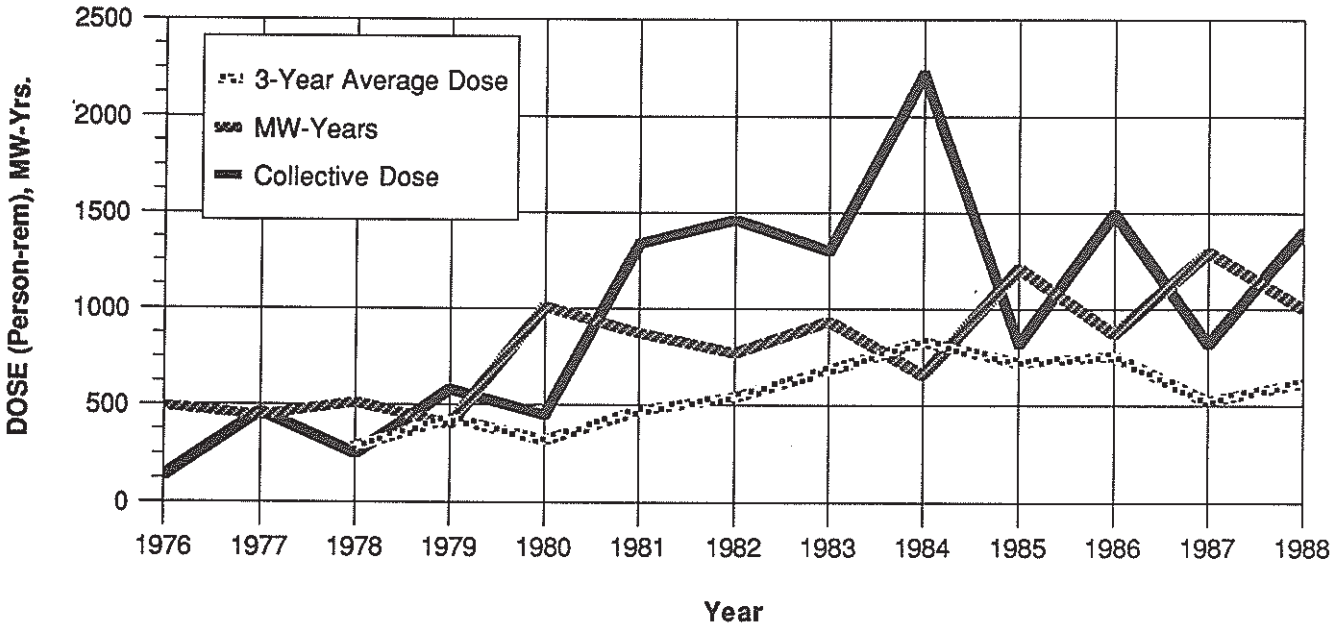
Contract

APPENDIX E (continued)

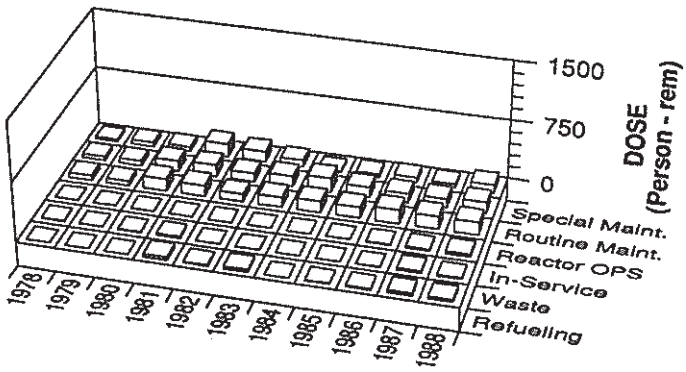
HATCH 1,2

BWR

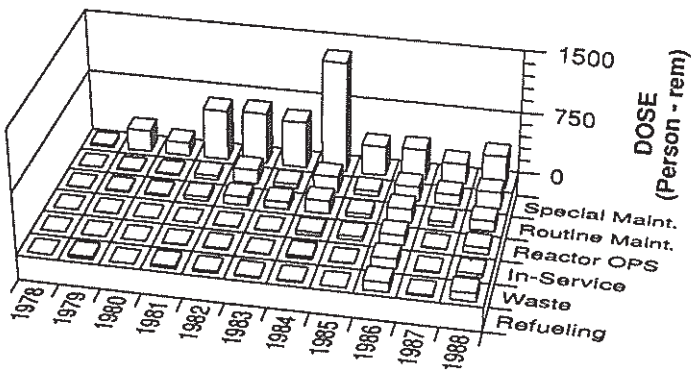
Dose-Performance Indicators



Breakdown By Job Function



Plant



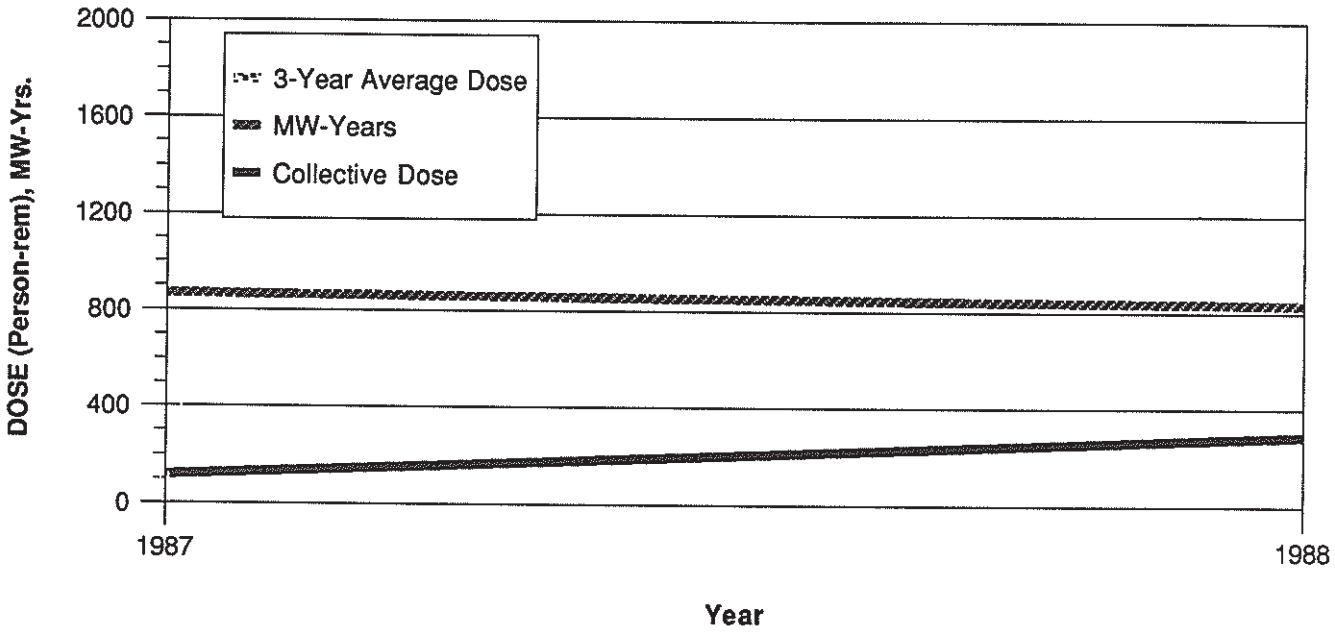
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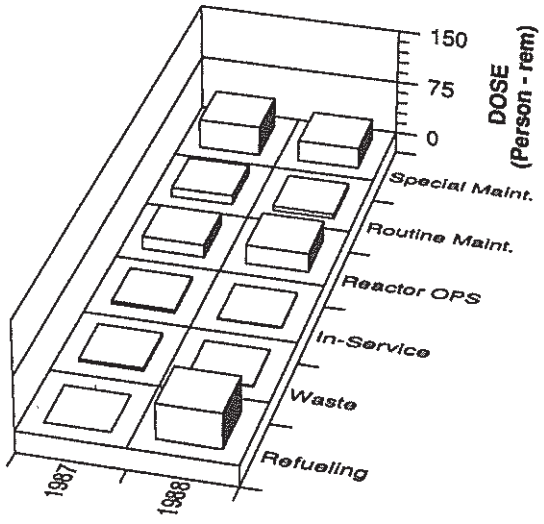
HOPE CREEK

BWR

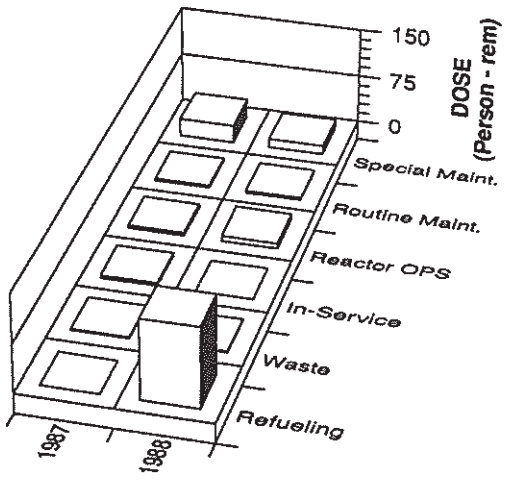
Dose-Performance Indicators



Breakdown By Job Function



Plant



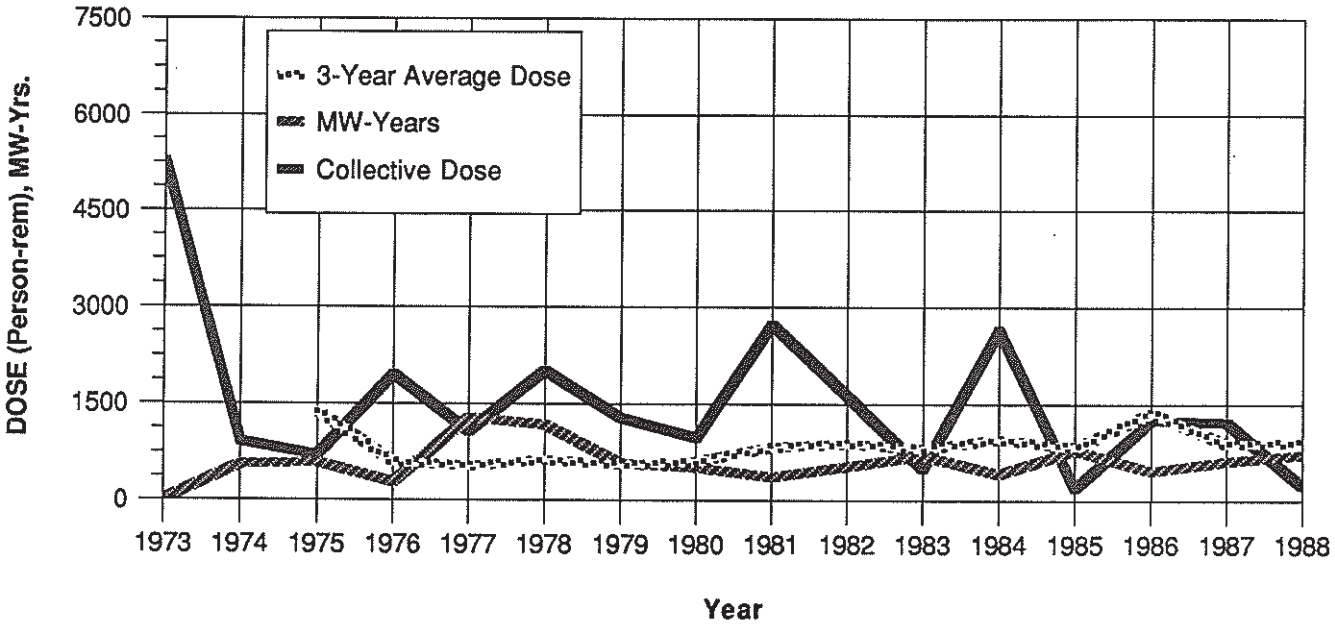
Contract

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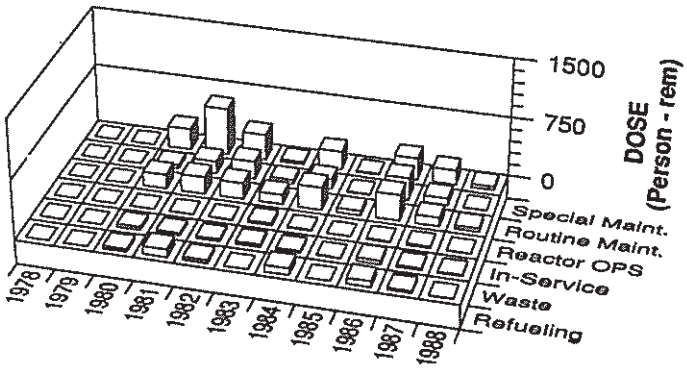
INDIAN POINT 2

PWR

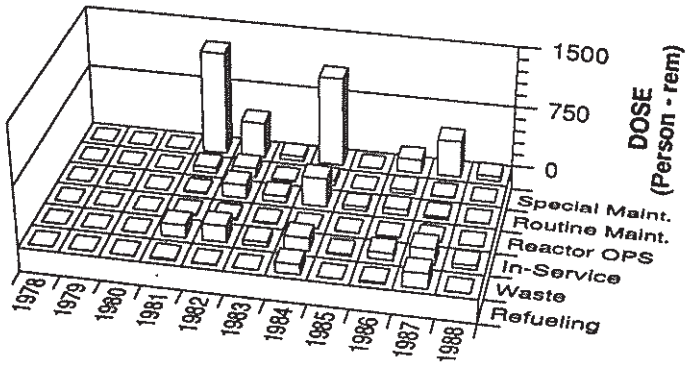
Dose-Performance Indicators



Breakdown By Job Function



Plant



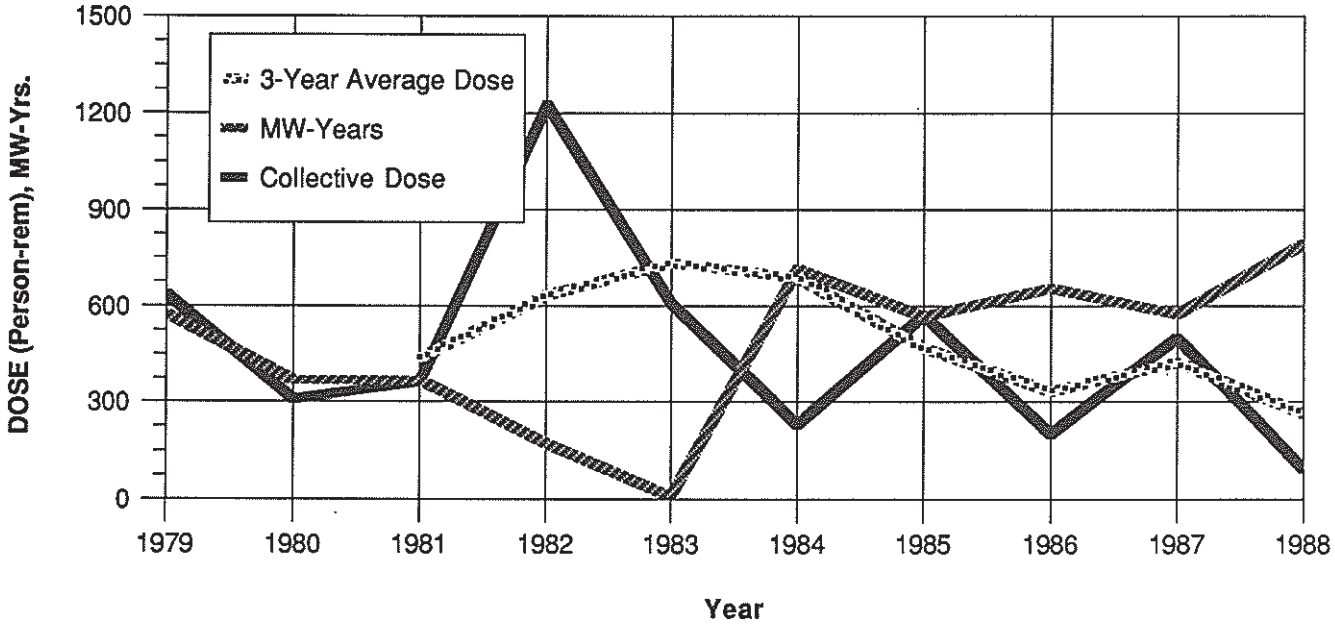
Contract

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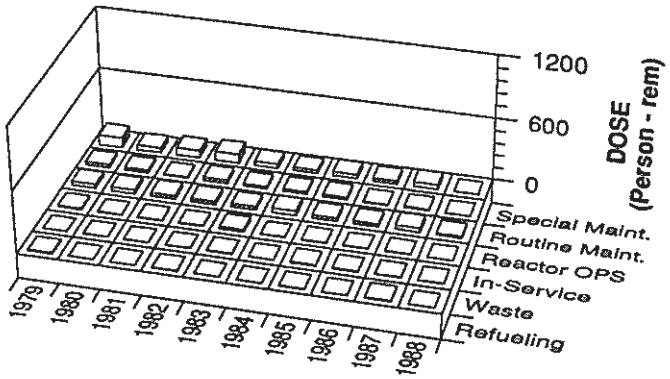
INDIAN POINT 3

PWR

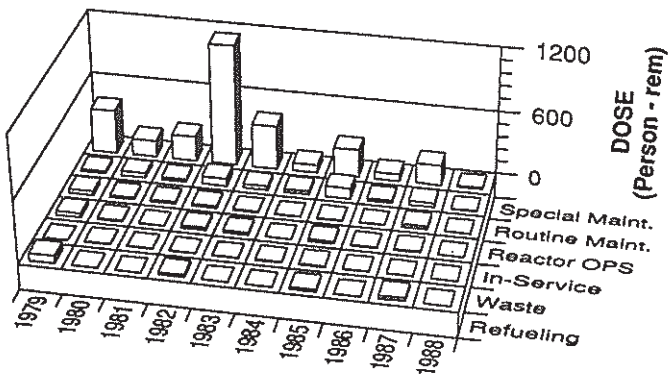
Dose-Performance Indicators



Breakdown By Job Function



Plant



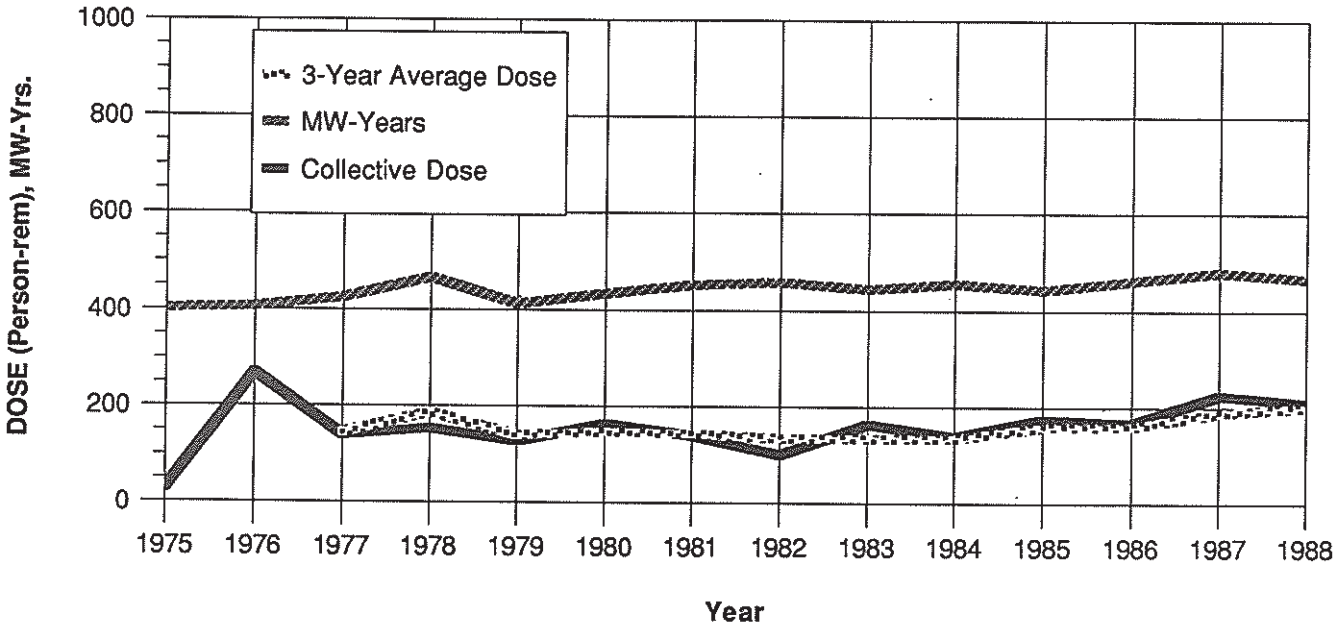
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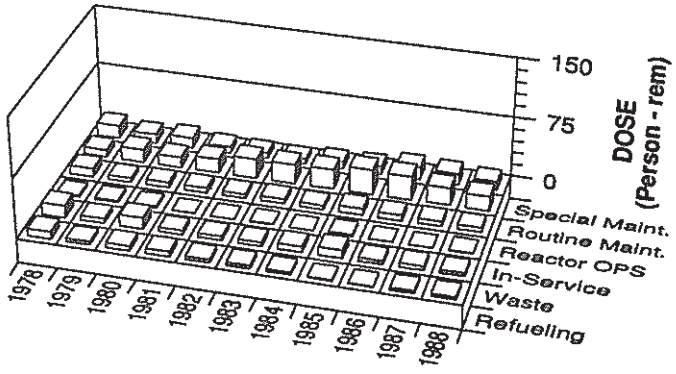
KEWAUNEE

PWR

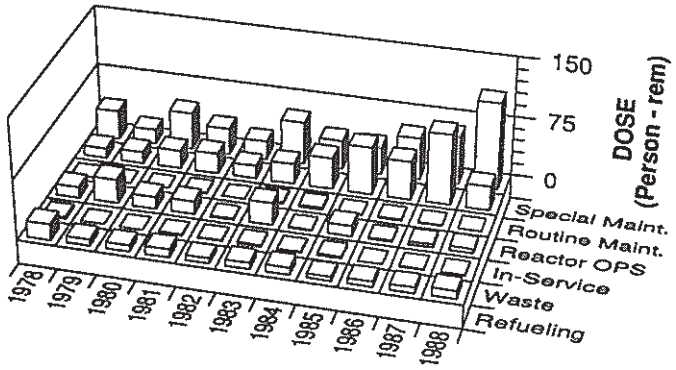
Dose-Performance Indicators



Breakdown By Job Function



Plant



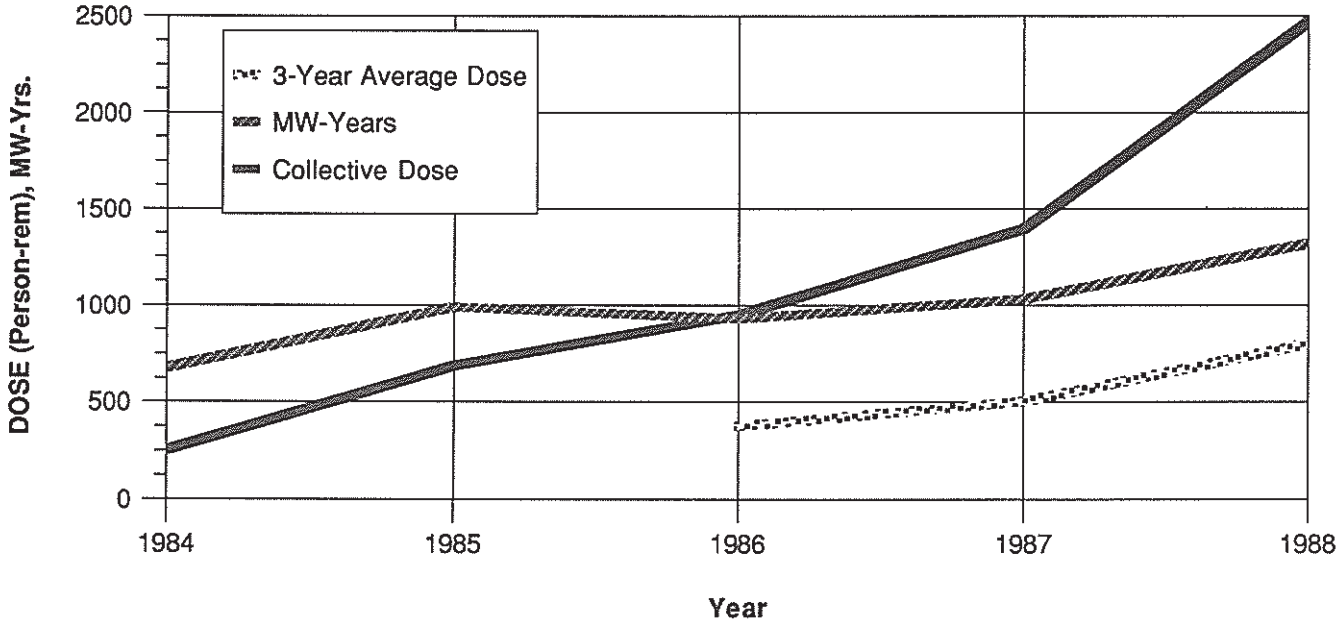
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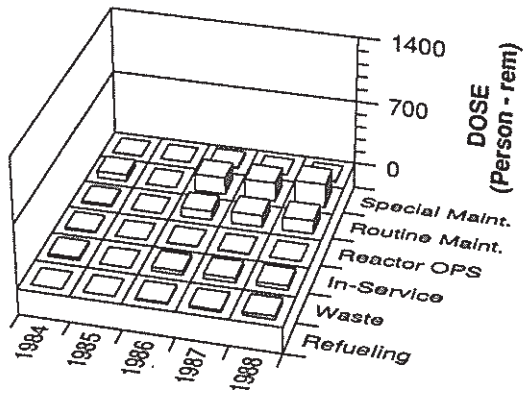
LASALLE 1,2

BWR

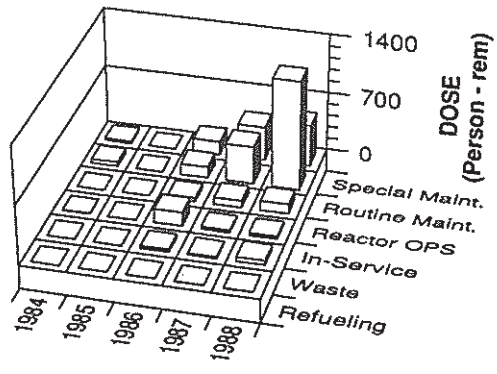
Dose-Performance Indicators



Breakdown By Job Function



Plant



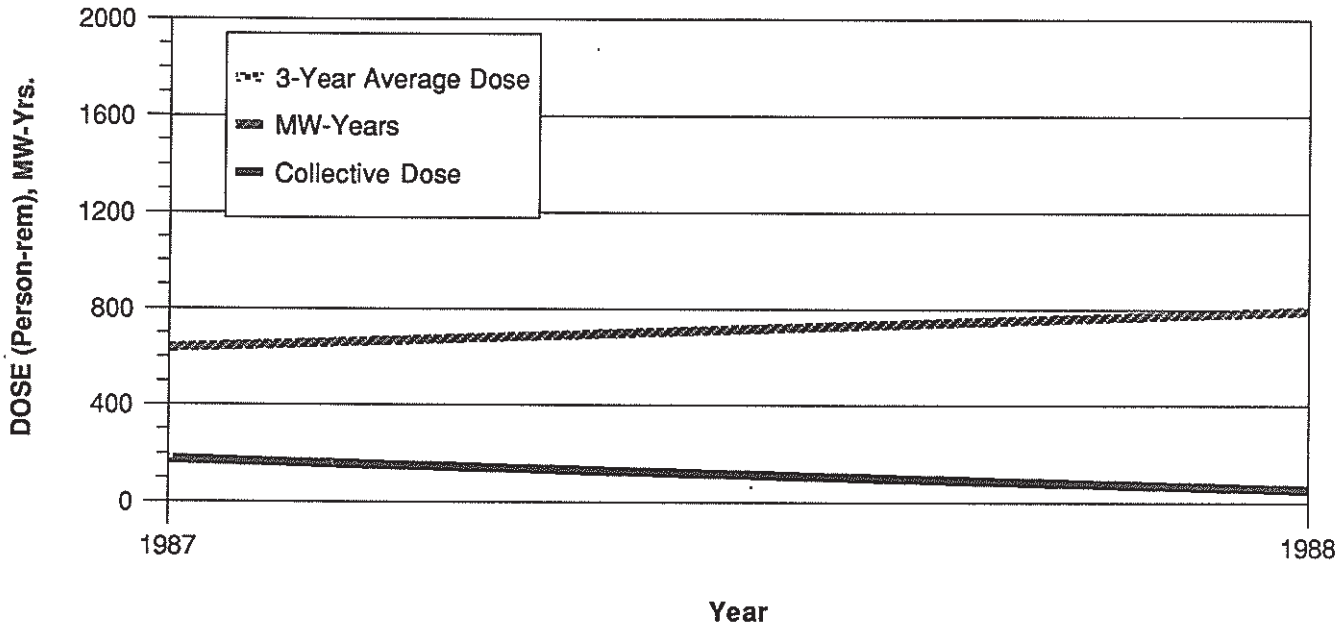
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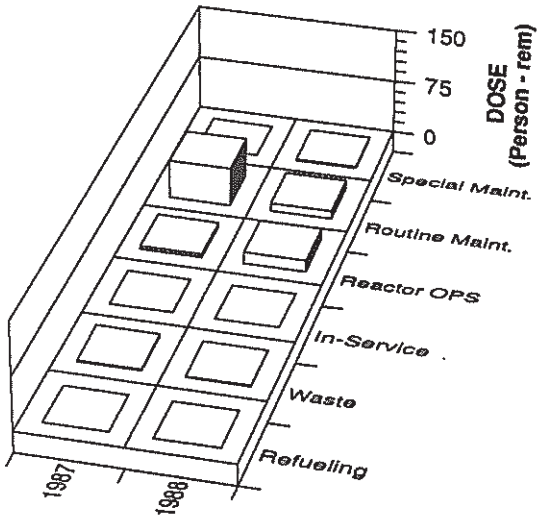
LIMERICK

BWR

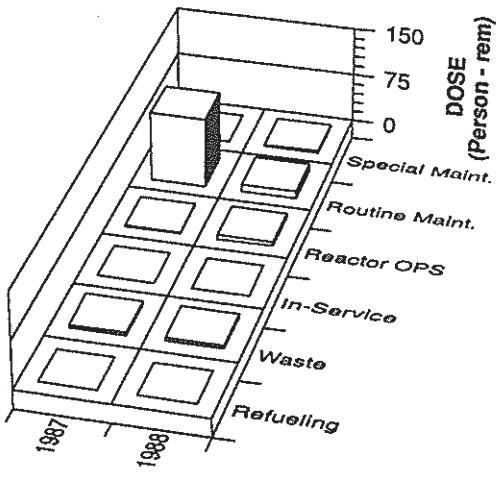
Dose-Performance Indicators



Breakdown By Job Function



Plant



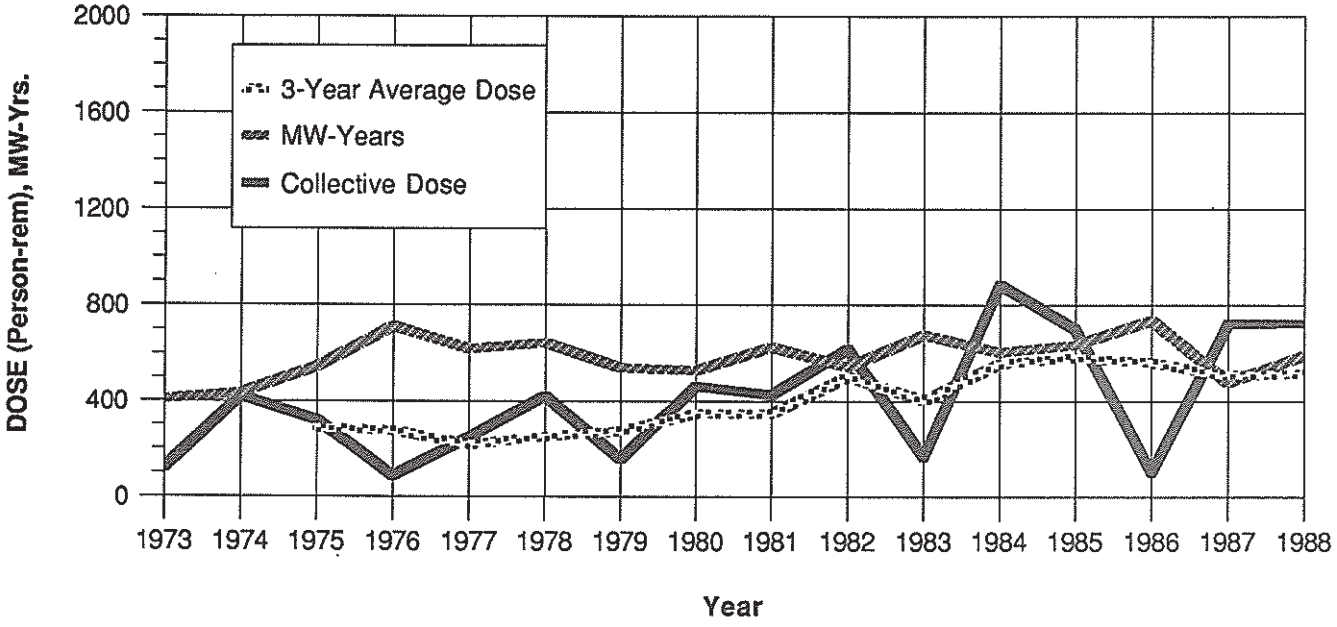
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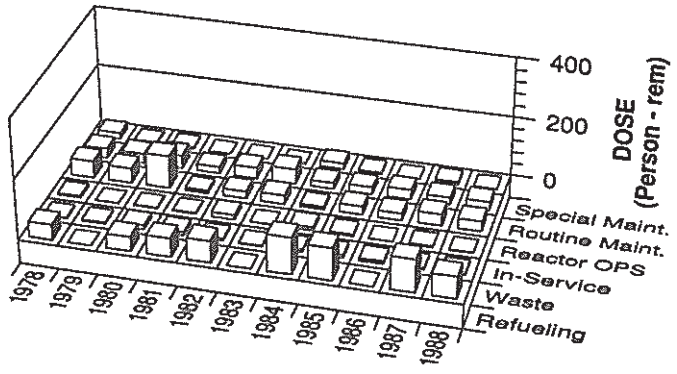
MAINE YANKEE

PWR

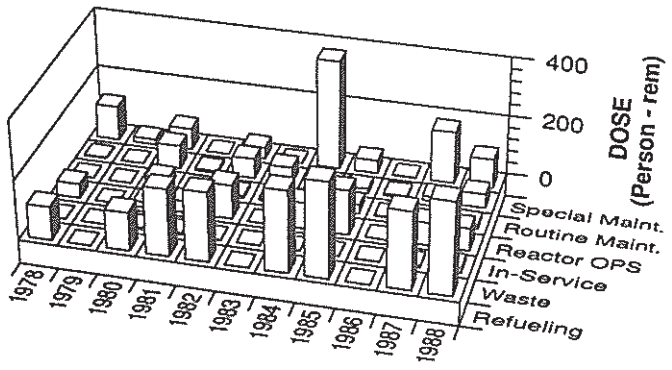
Dose-Performance Indicators



Breakdown By Job Function



Plant



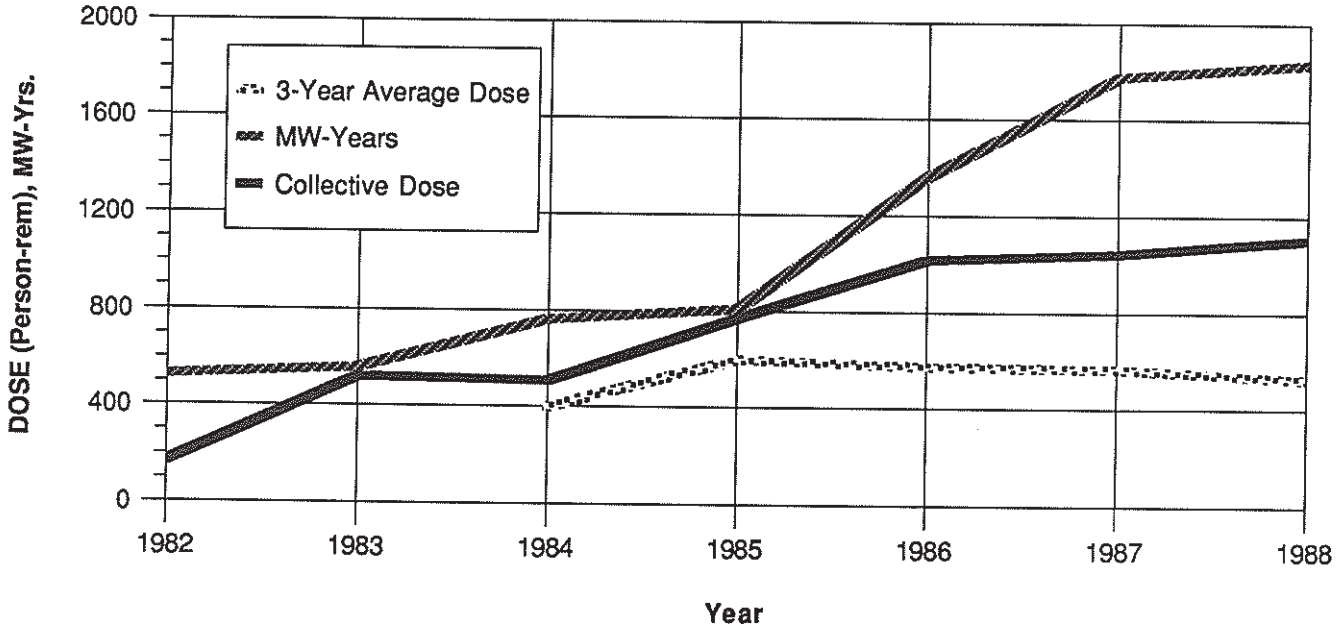
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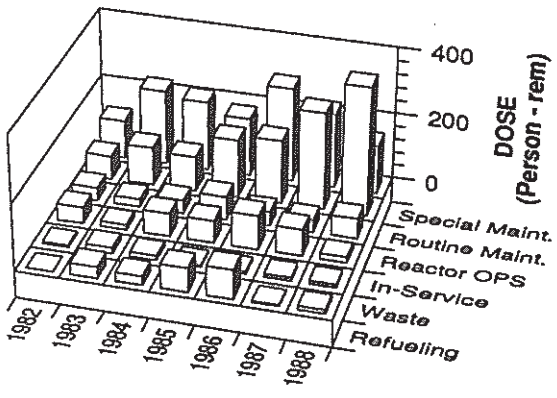
MCGUIRE 1,2

PWR

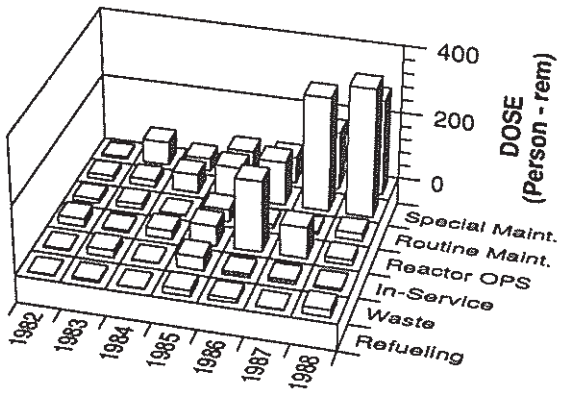
Dose-Performance Indicators



Breakdown By Job Function



Plant



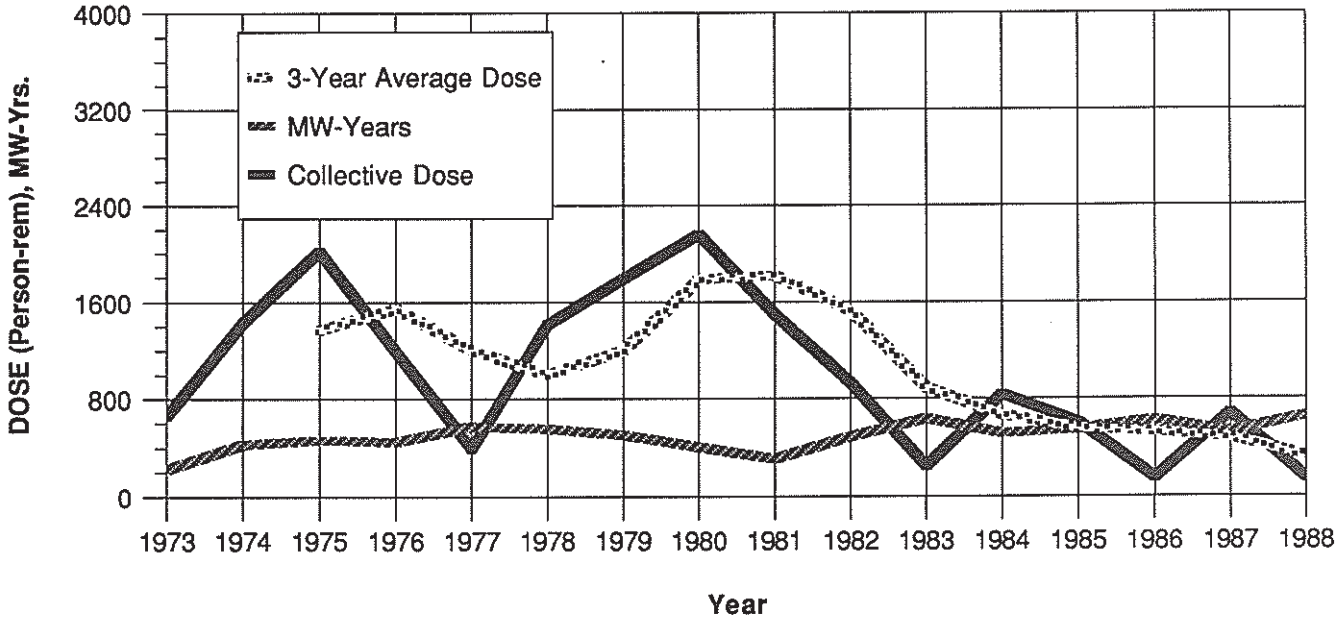
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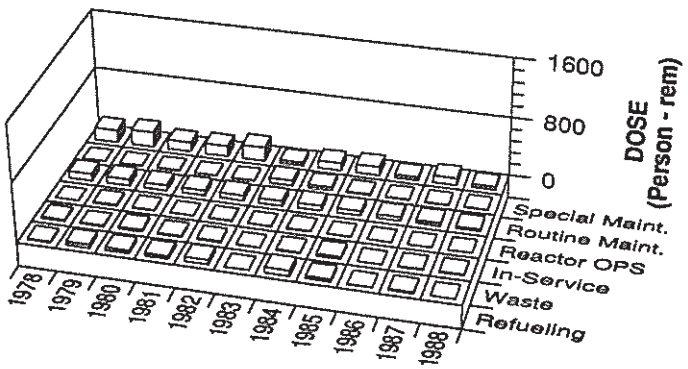
MILLSTONE POINT 1

BWR

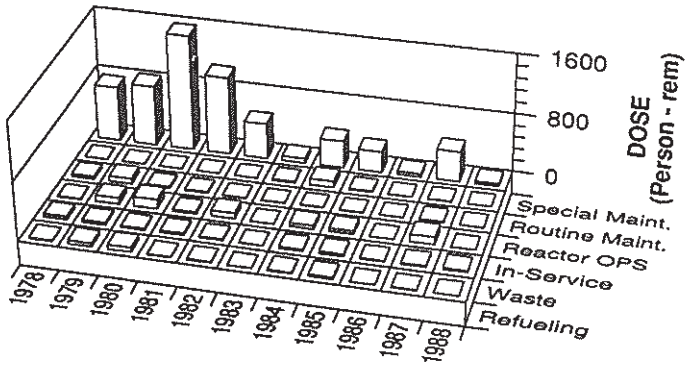
Dose-Performance Indicators



Breakdown By Job Function



Plant



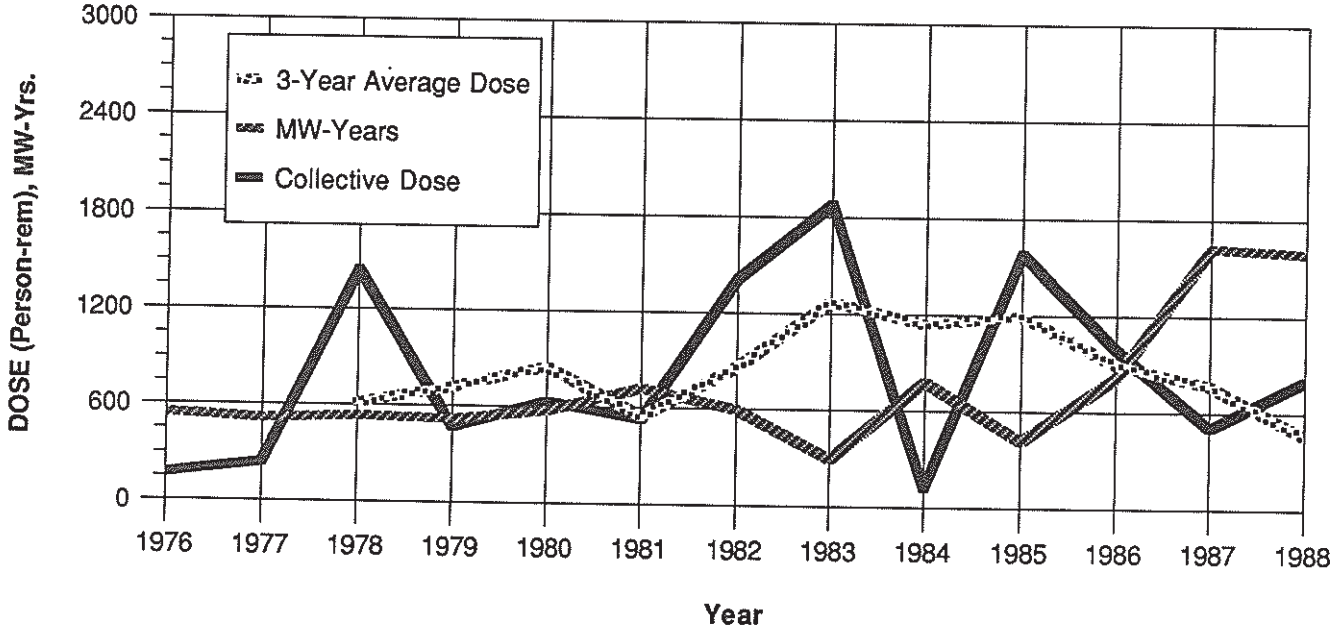
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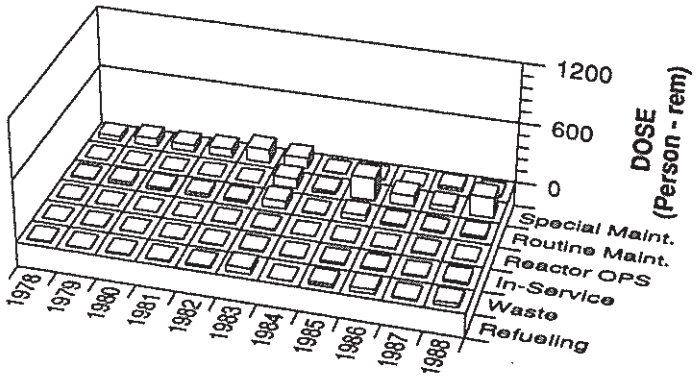
MILLSTONE POINT 2,3

PWR

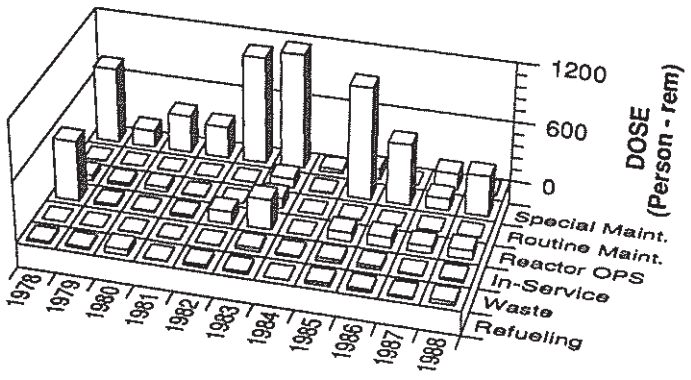
Dose-Performance Indicators



Breakdown By Job Function



Plant



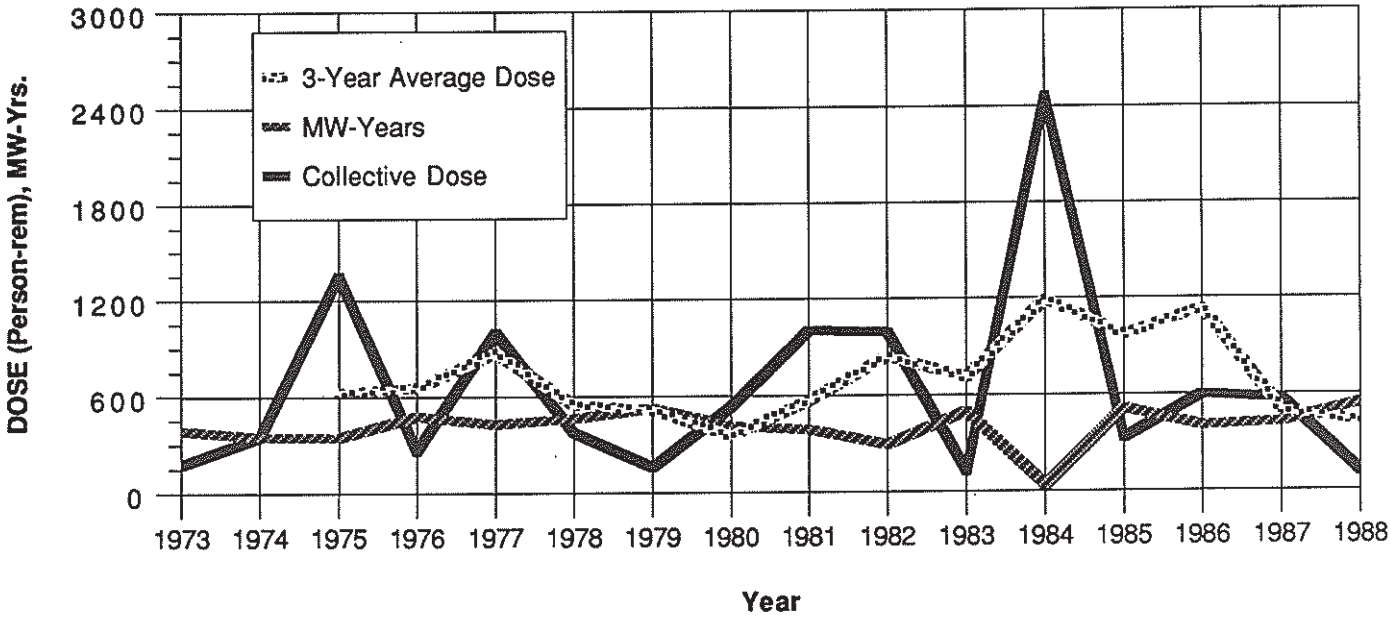
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APPENDIX E (continued)

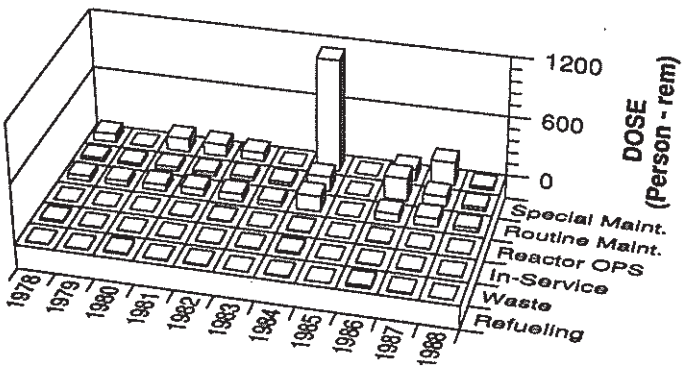
MONTICELLO

BWR

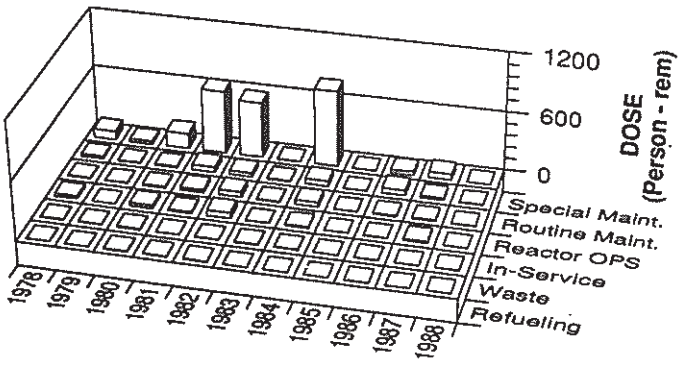
Dose-Performance Indicators



Breakdown By Job Function



Plant



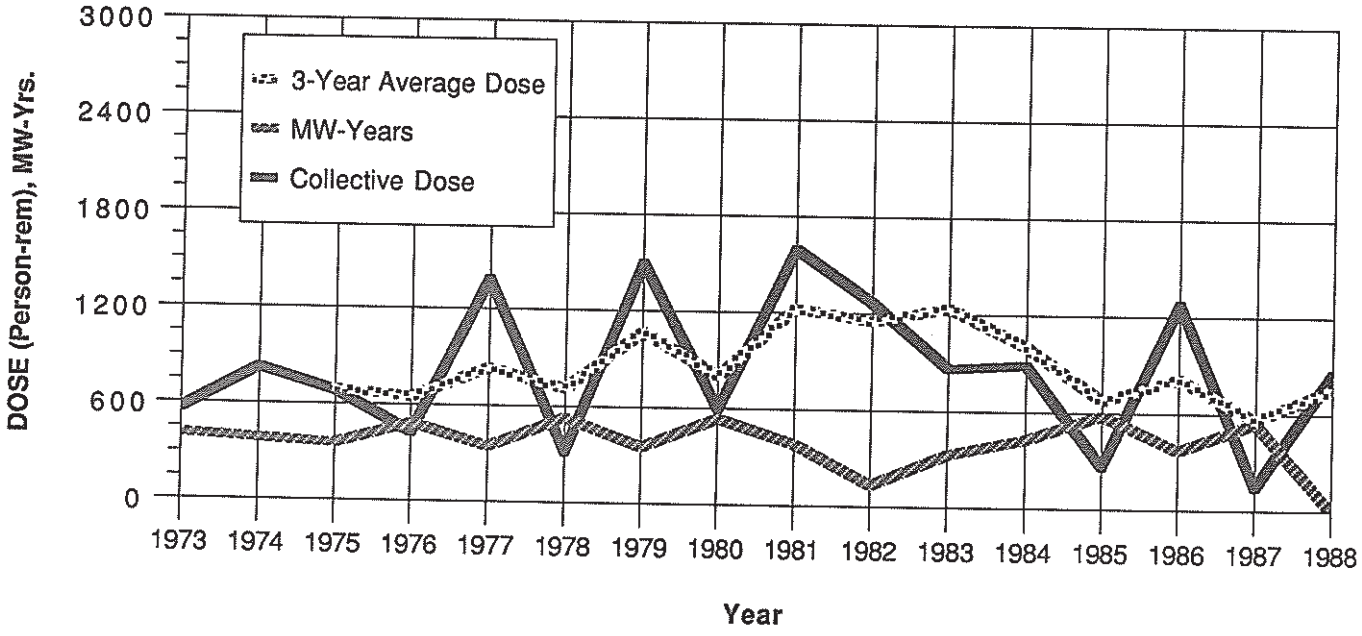
Contract

APPENDIX E (continued)

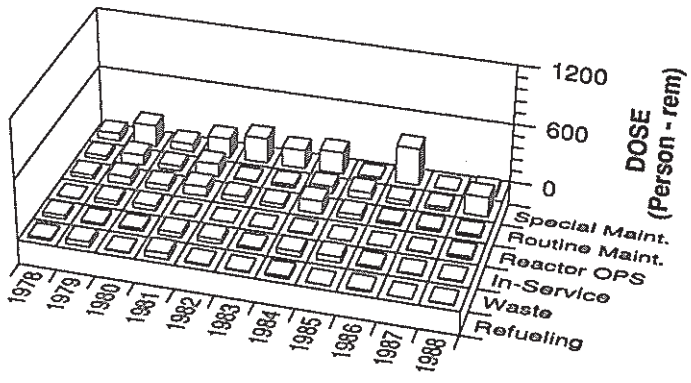
NINE MILE POINT 1

BWR

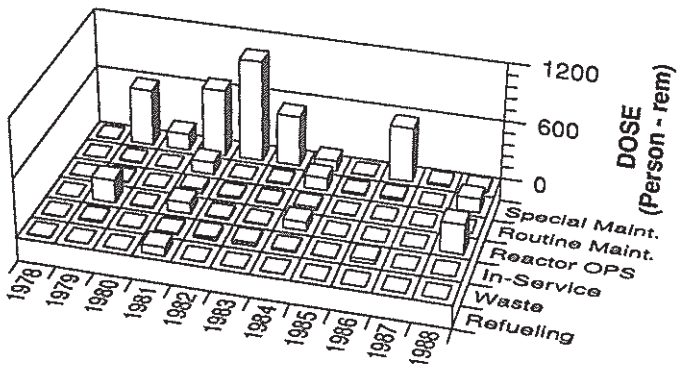
Dose-Performance Indicators



Breakdown By Job Function



Plant



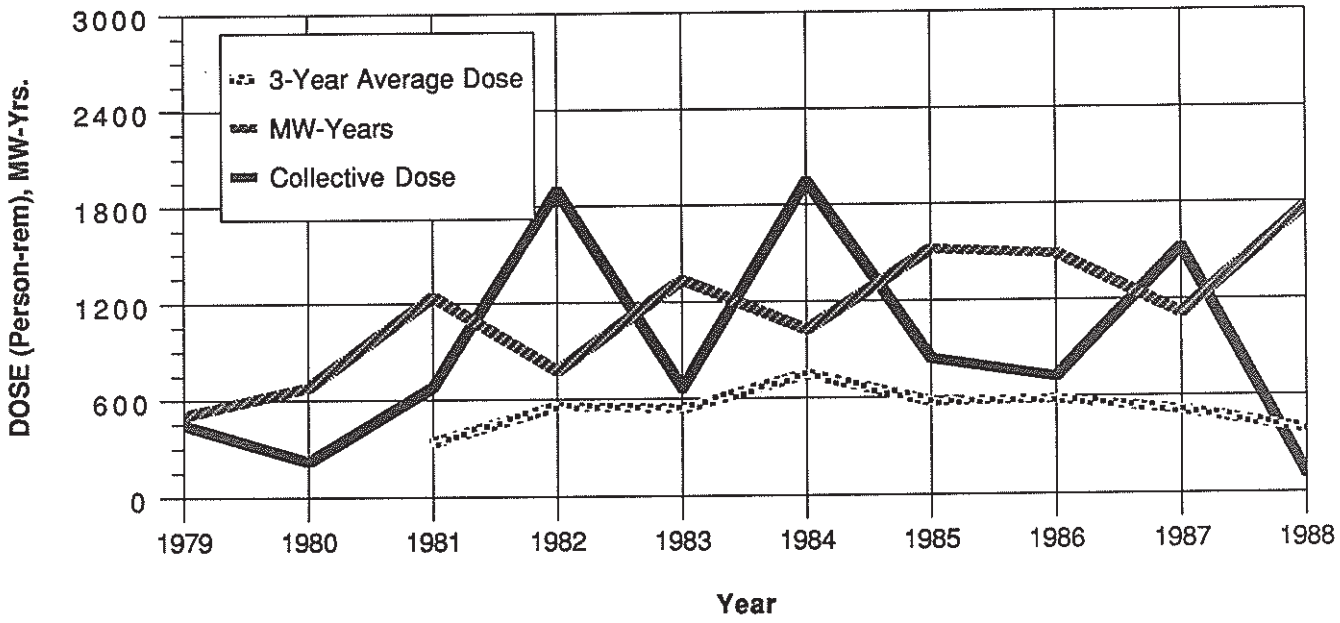
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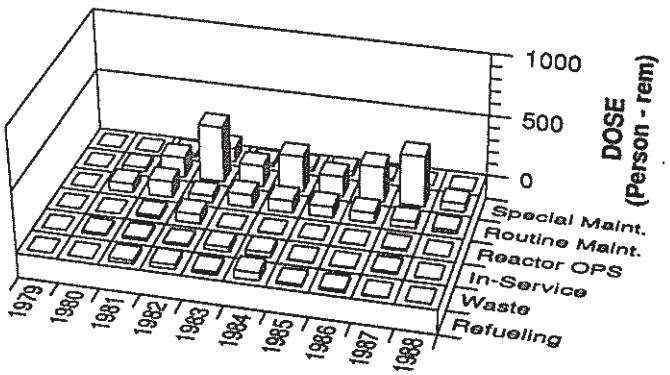
NORTH ANNA 1,2

PWR

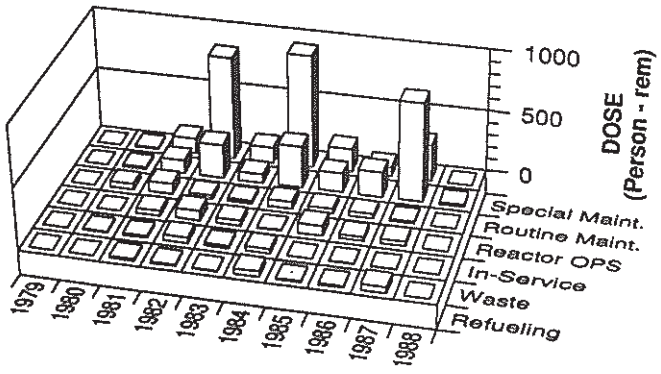
Dose-Performance Indicators



Breakdown By Job Function



Plant



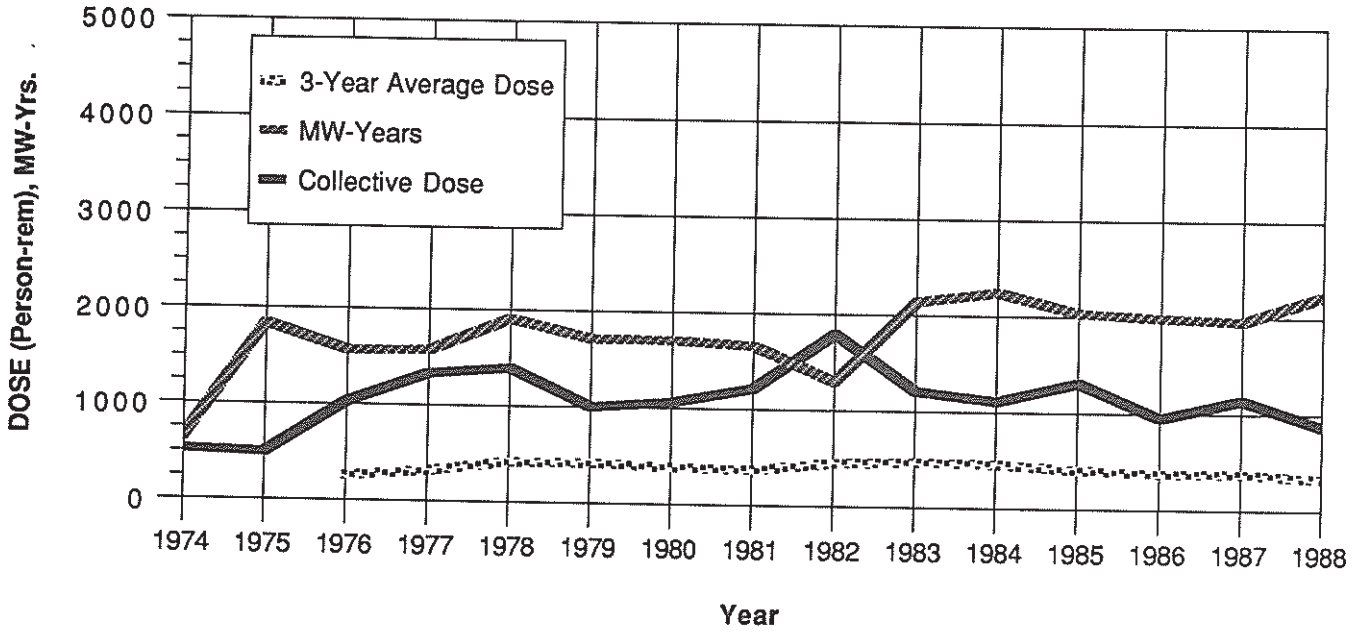
Contract

APPENDIX E (continued)

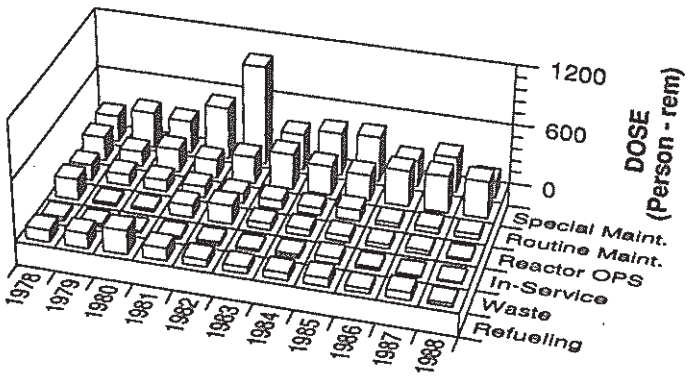
OCONEE 1,2,3

PWR

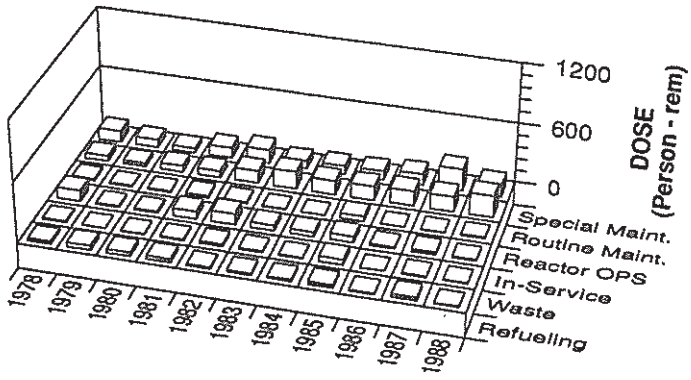
Dose-Performance Indicators



Breakdown By Job Function



Plant



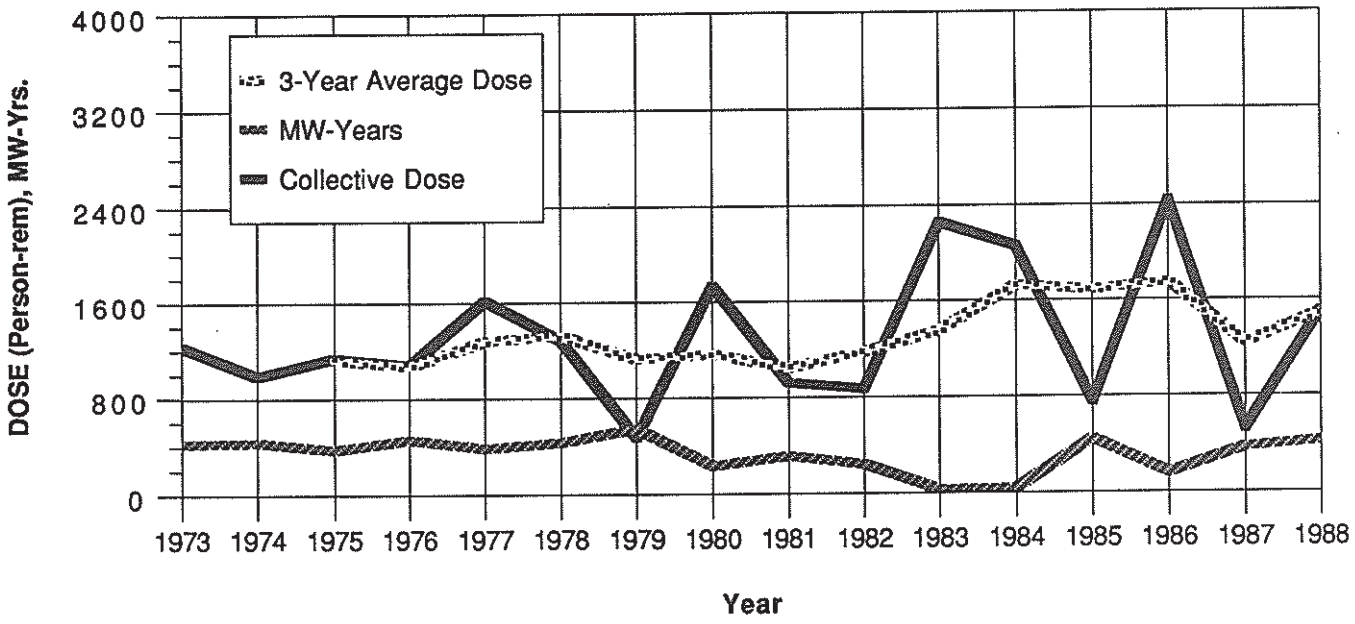
Contract

APPENDIX E (continued)

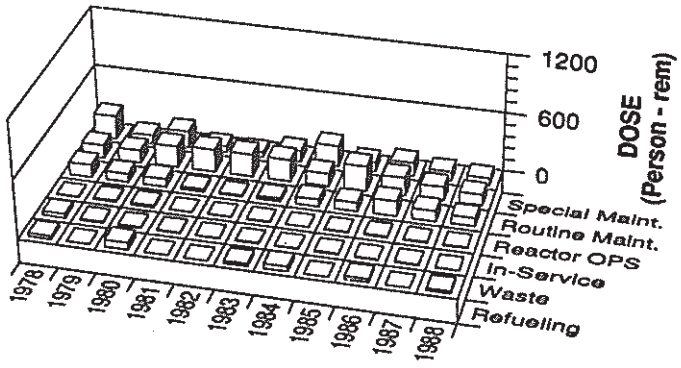
OYSTER CREEK

BWR

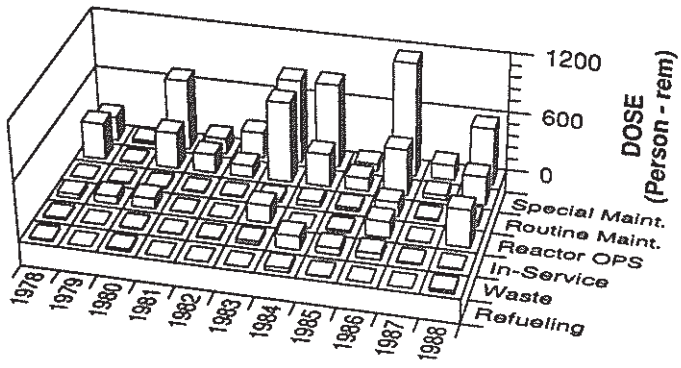
Dose-Performance Indicators



Breakdown By Job Function



Plant



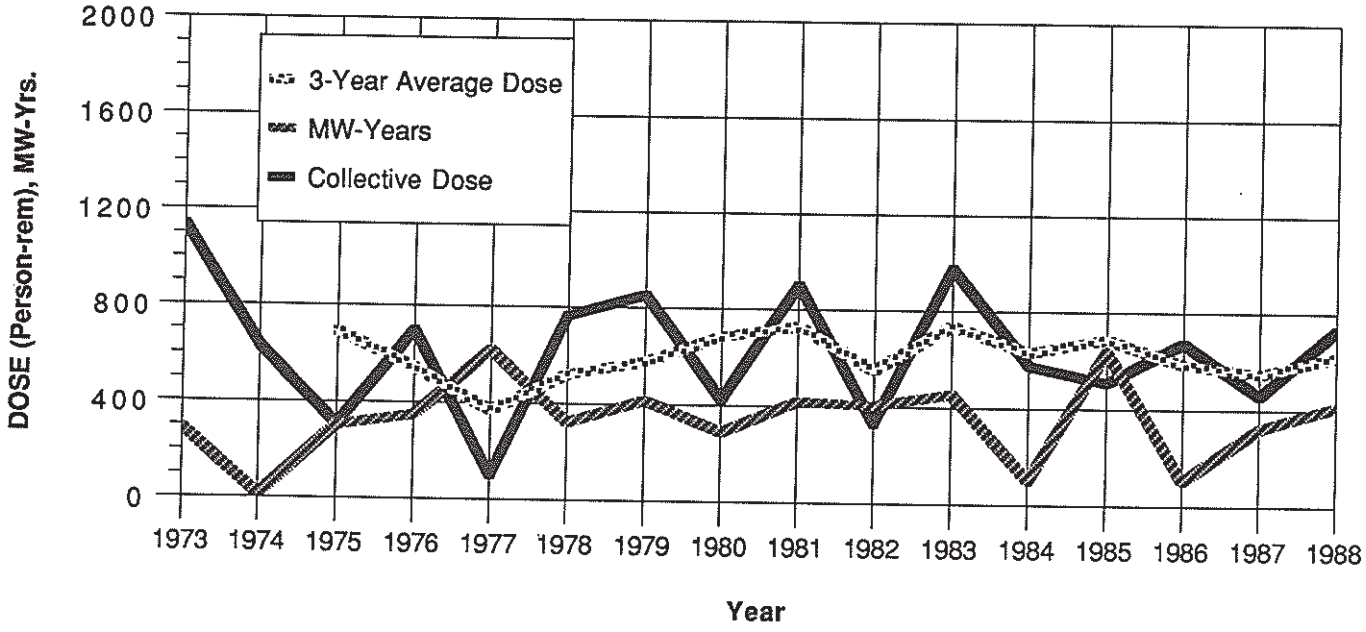
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APPENDIX E (continued)

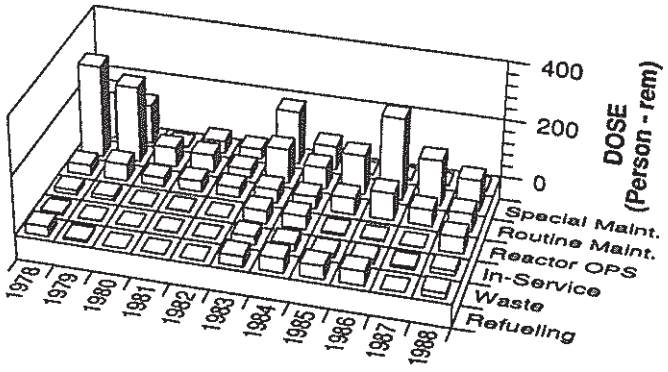
PALISADES

PWR

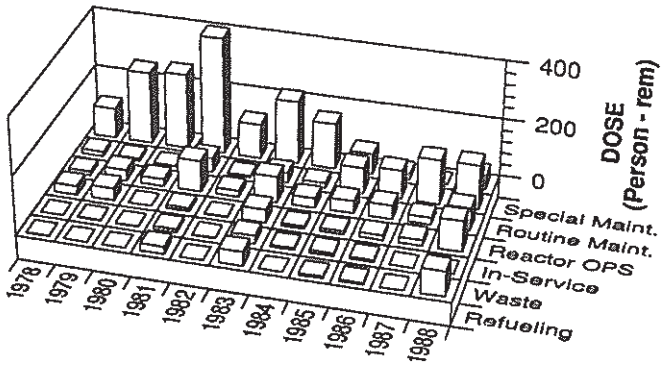
Dose-Performance Indicators



Breakdown By Job Function



Plant



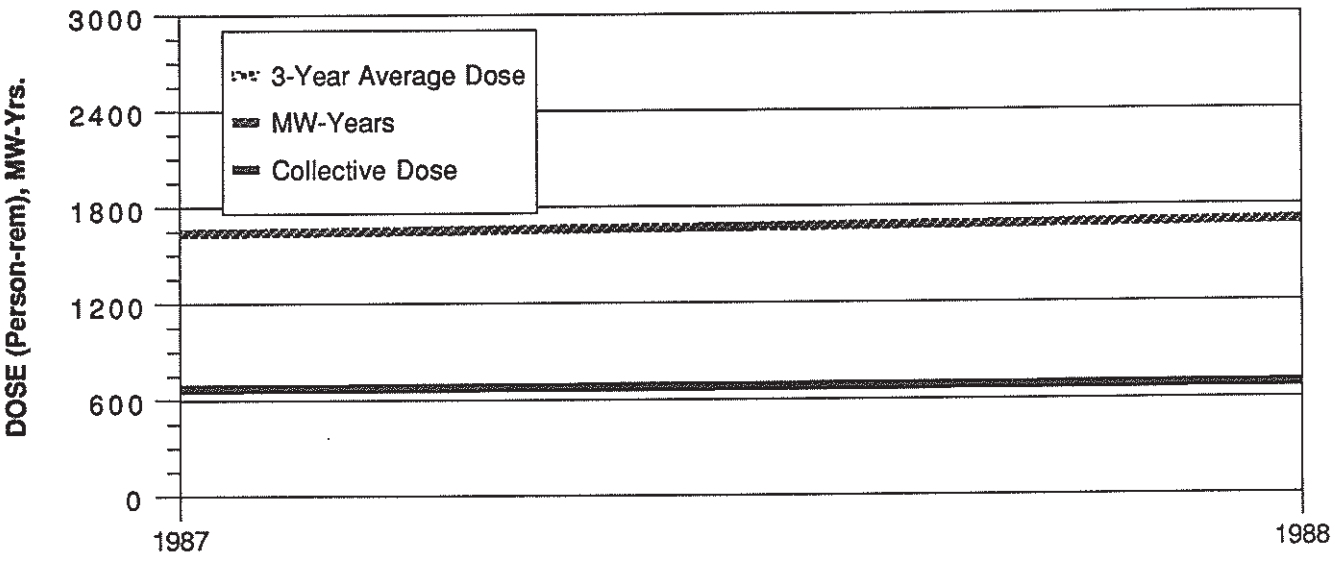
Contract

APPENDIX E (continued)

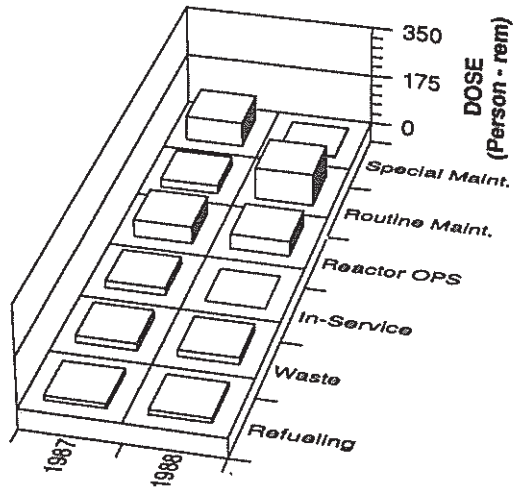
PALO VERDE 1,2

PWR

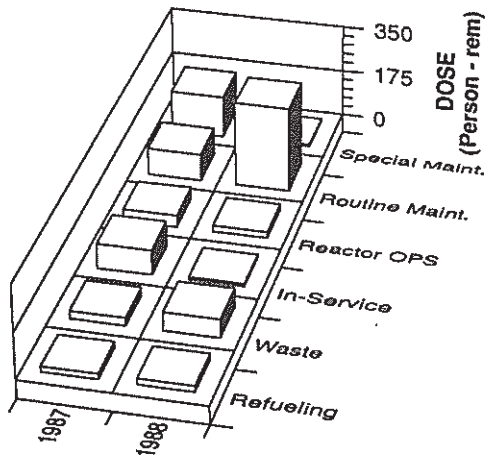
Dose-Performance Indicators



Breakdown By Job Function



Plant



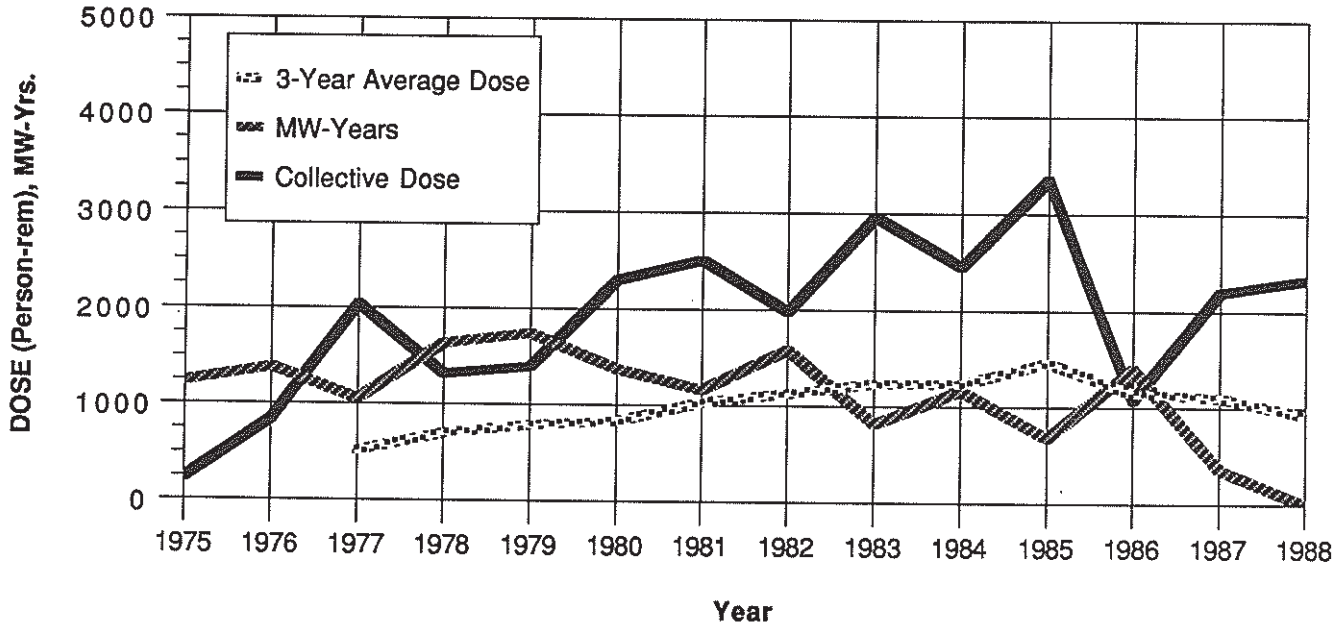
Contract

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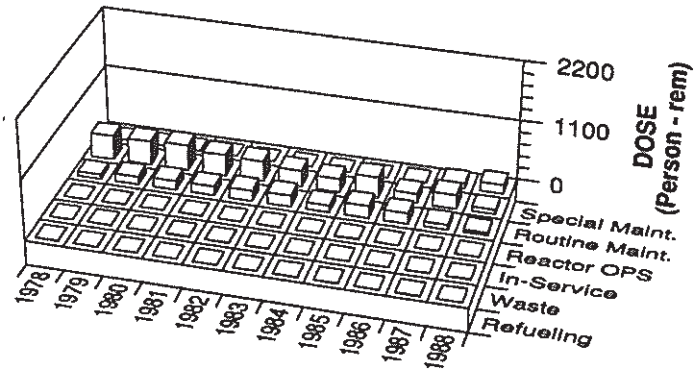
PEACH BOTTOM 2,3

BWR

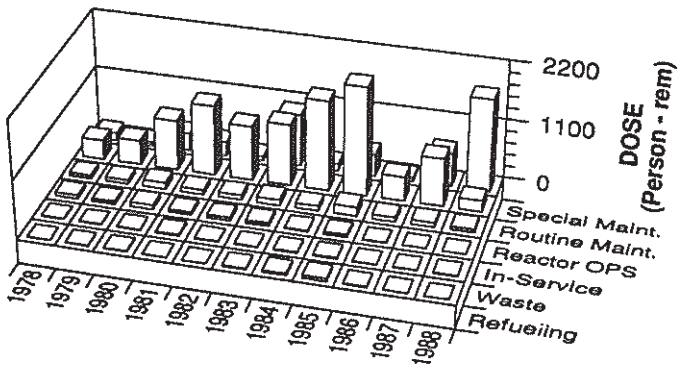
Dose-Performance Indicators



Breakdown By Job Function



Plant



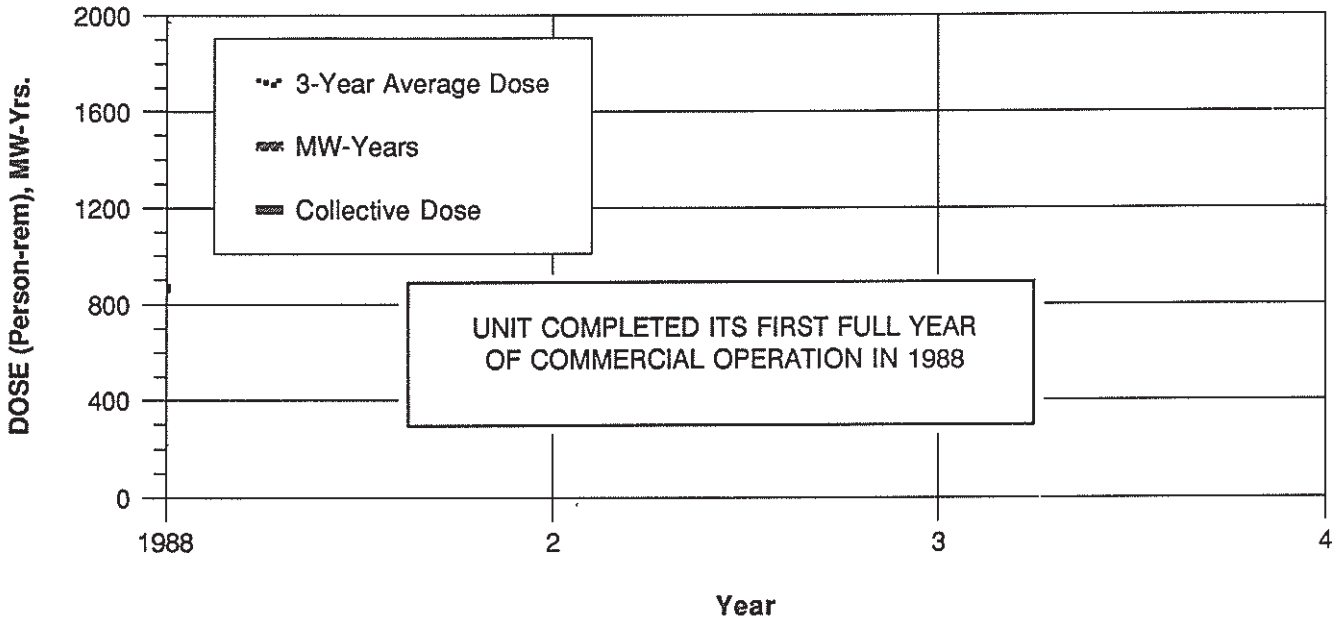
Contract

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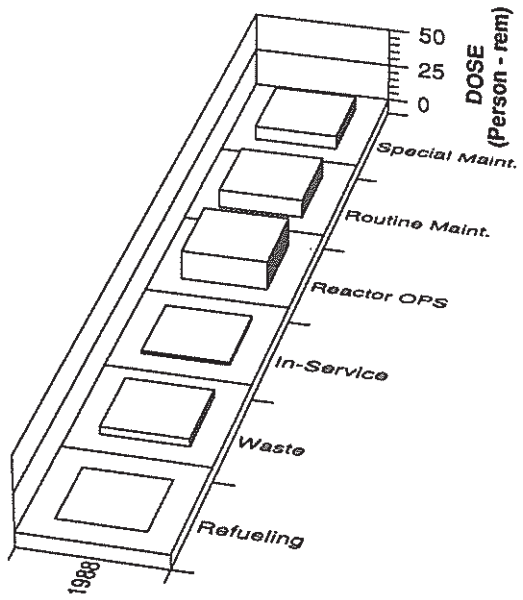
PERRY

BWR

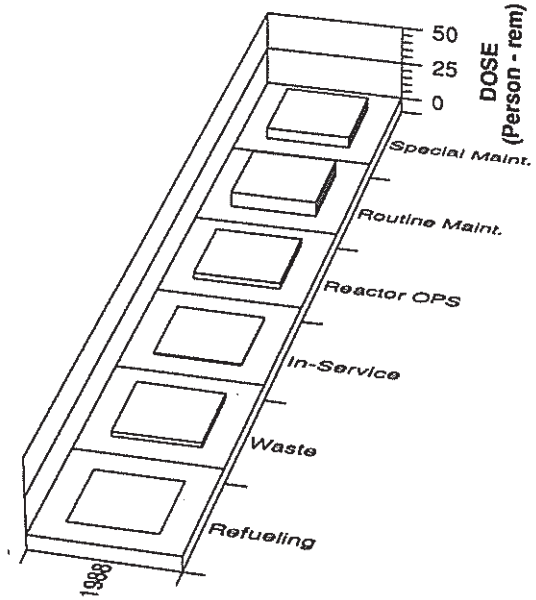
Dose-Performance Indicators



Breakdown By Job Function



Plant



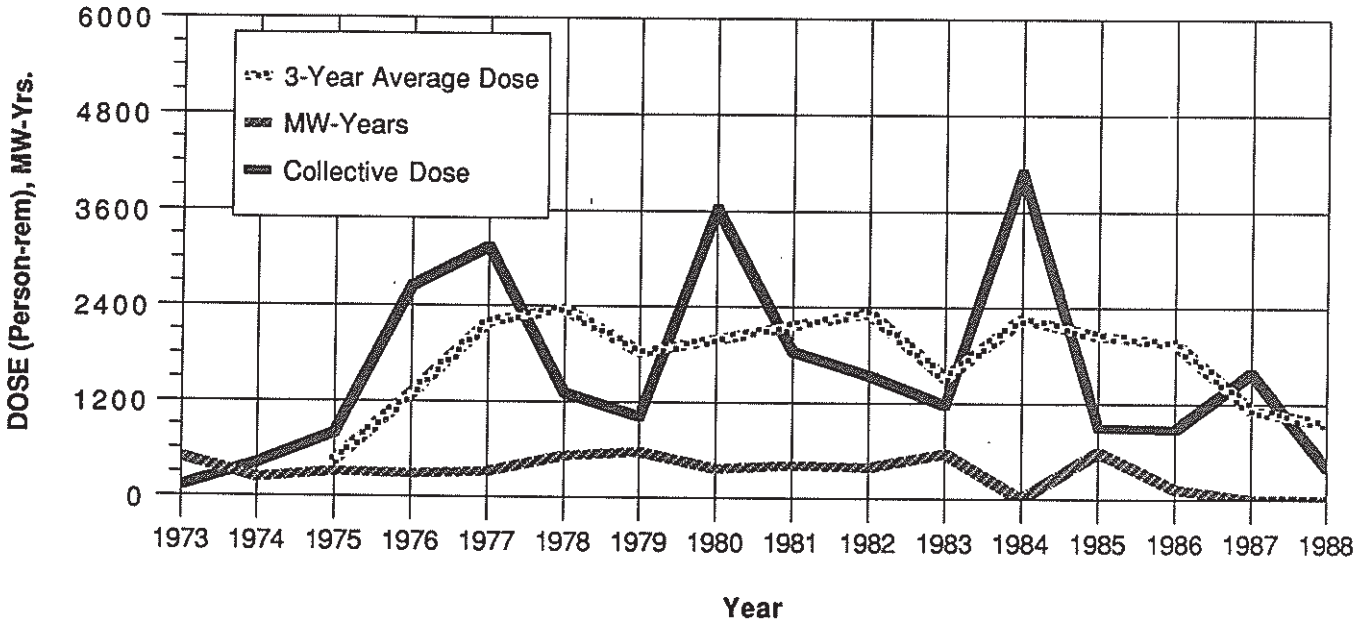
Contract

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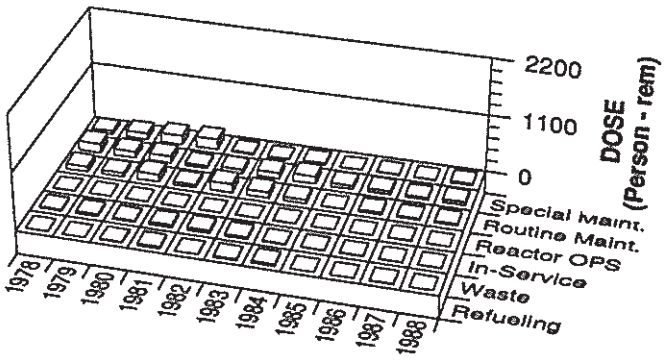
PILGRIM

BWR

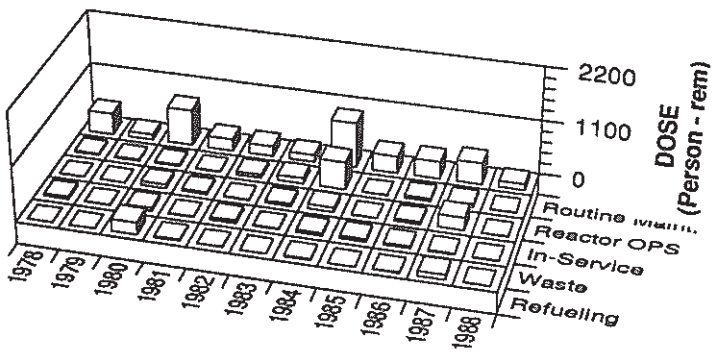
Dose-Performance Indicators



Breakdown By Job Function



Plant



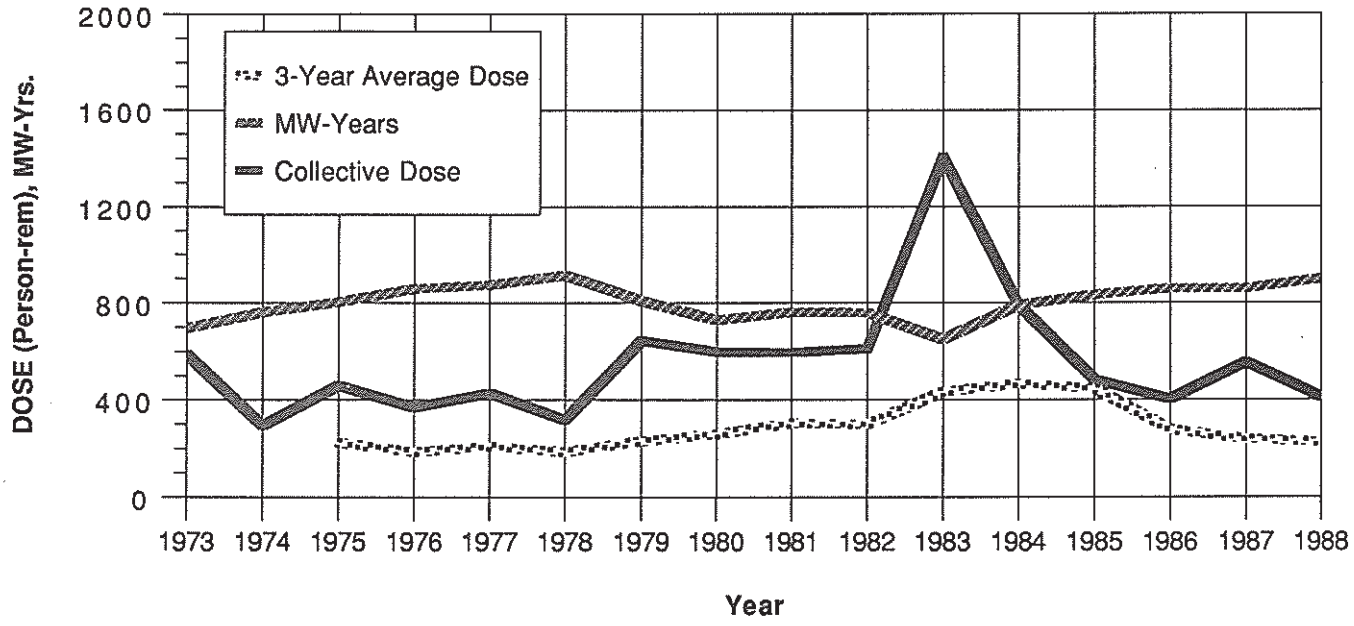
Contract

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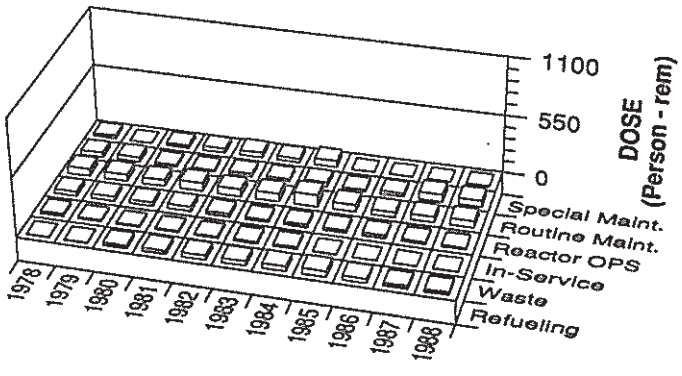
POINT BEACH 1,2

PWR

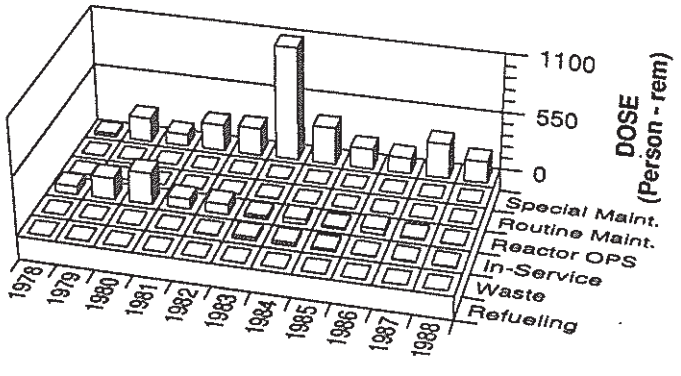
Dose-Performance Indicators



Breakdown By Job Function



Plant



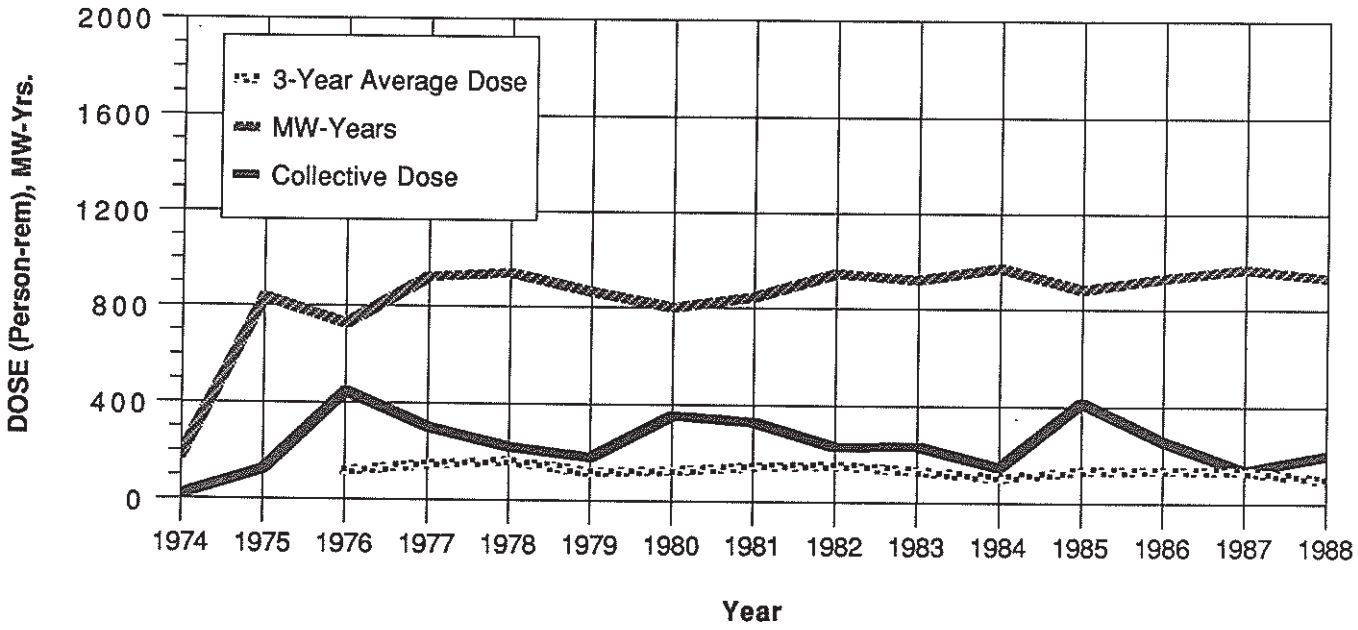
Contract

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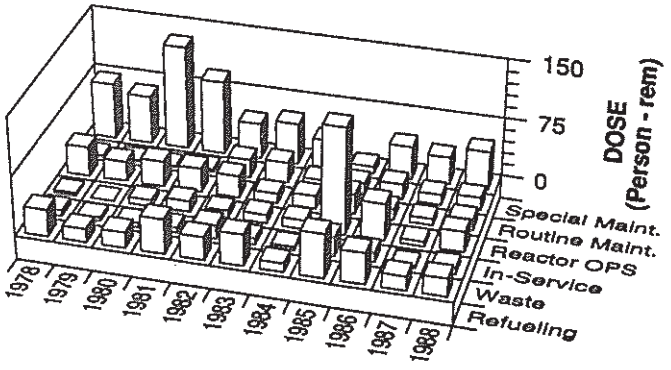
PRAIRIE ISLAND 1,2

PWR

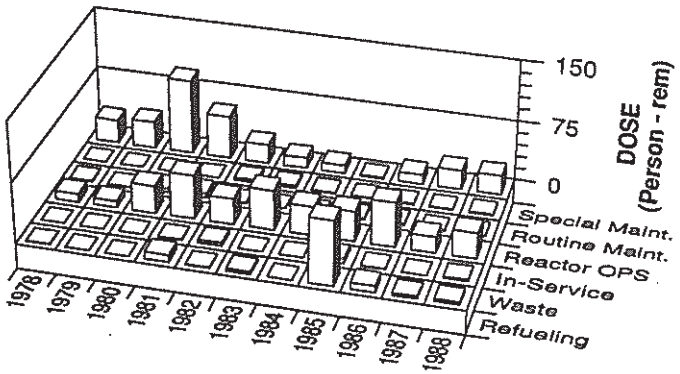
Dose-Performance Indicators



Breakdown By Job Function



Plant



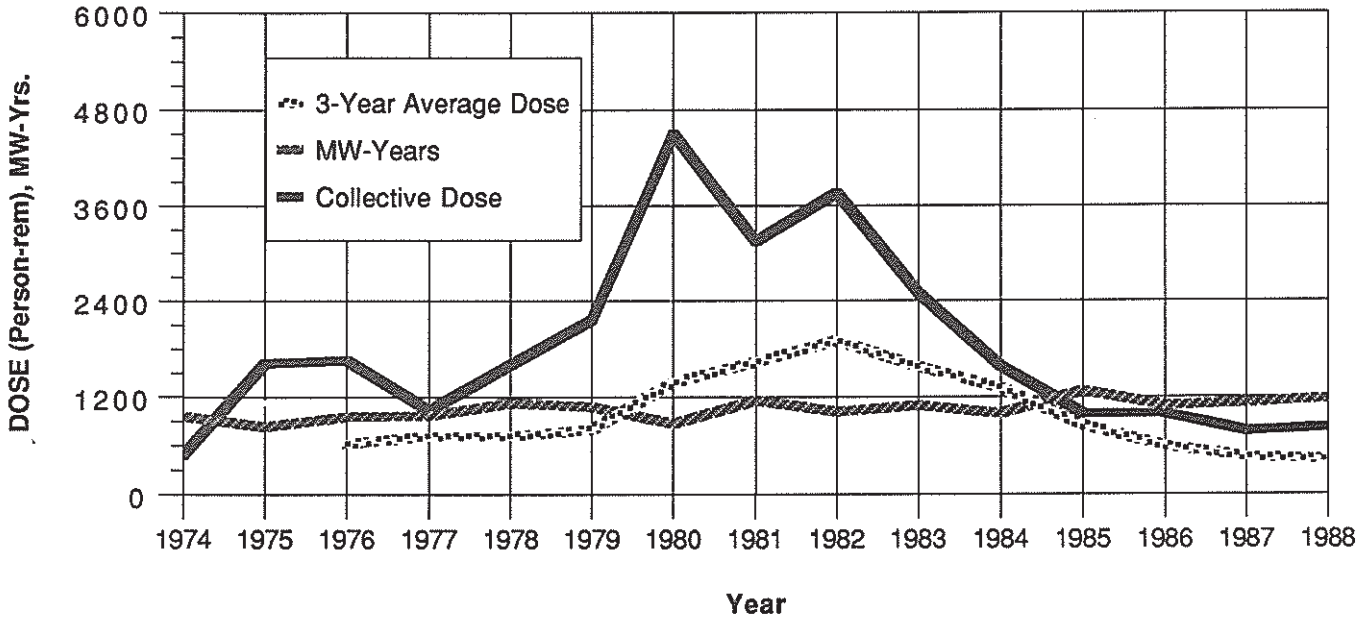
Contract

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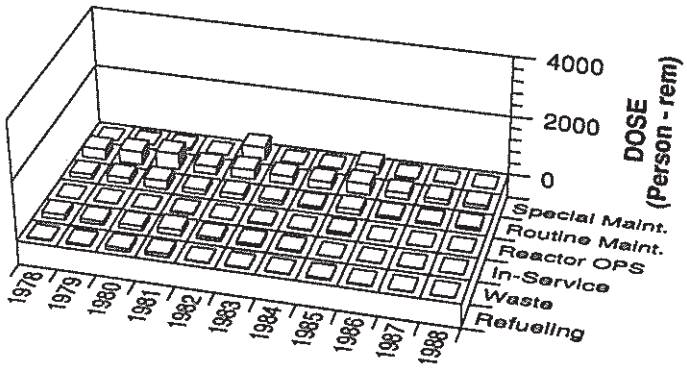
QUAD CITIES 1,2

BWR

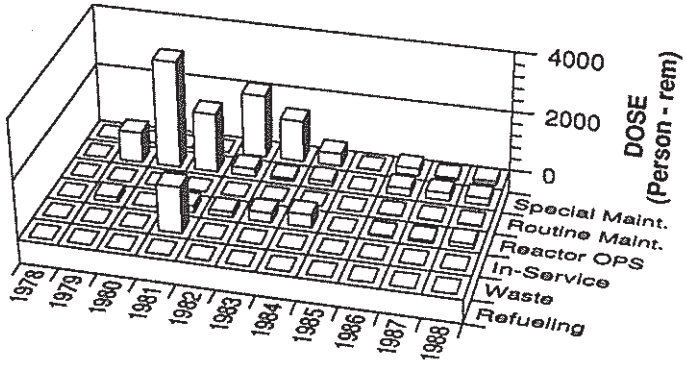
Dose-Performance Indicators



Breakdown By Job Function



Plant



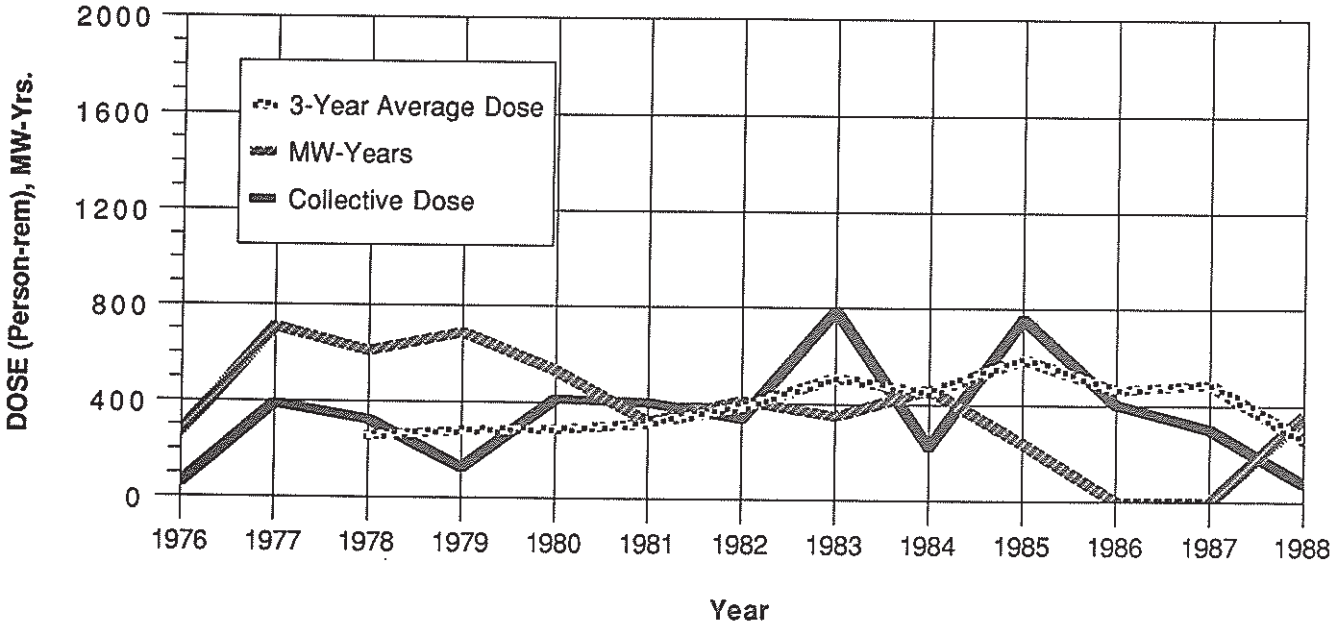
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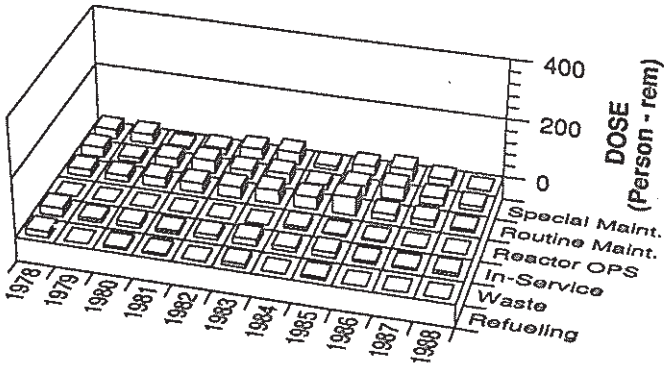
RANCHO SECO

PWR

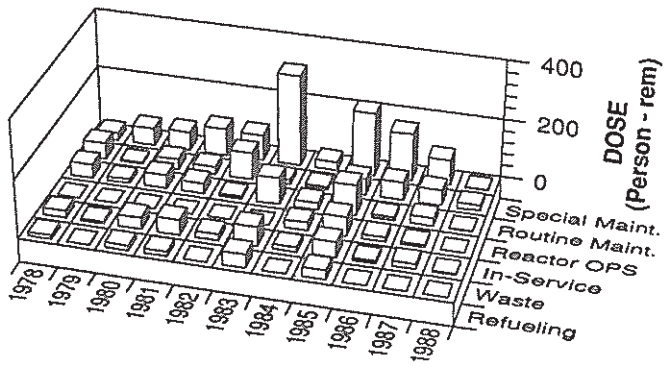
Dose-Performance Indicators



Breakdown By Job Function



Plant



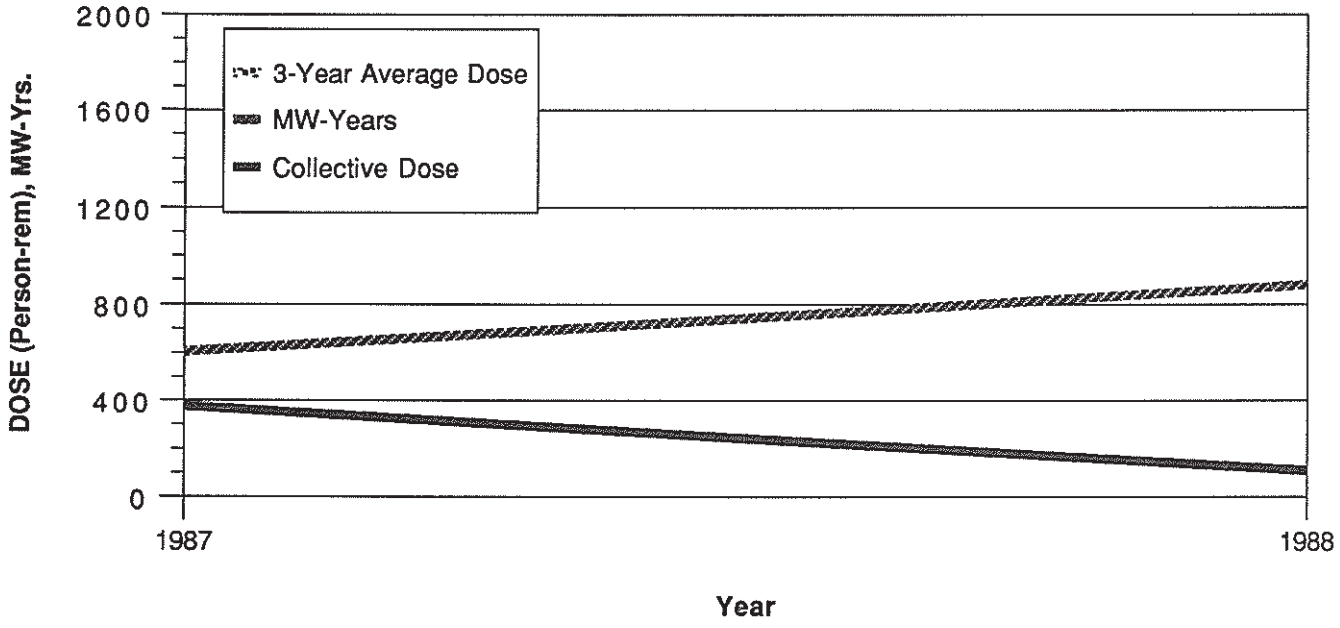
Contract

APPENDIX E (continued)

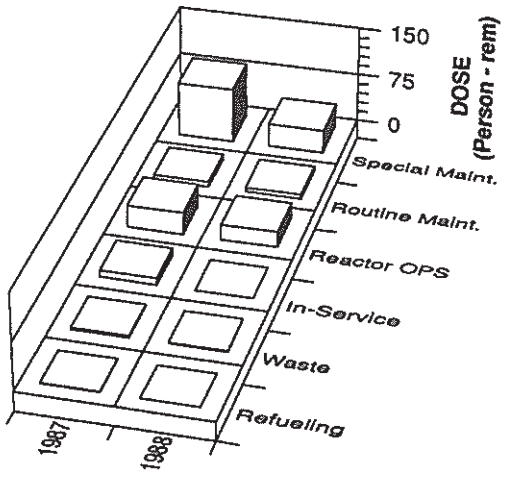
RIVER BEND

BWR

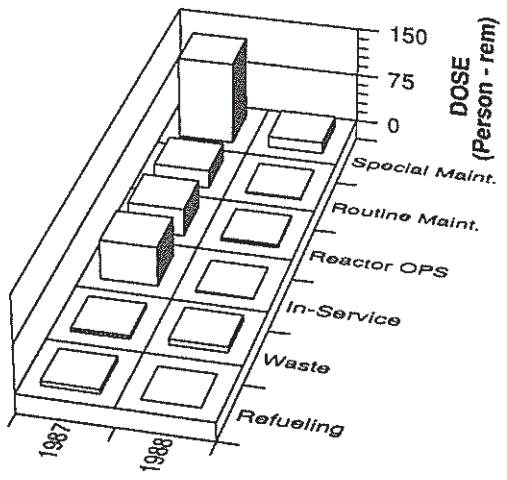
Dose-Performance Indicators



Breakdown By Job Function



Plant



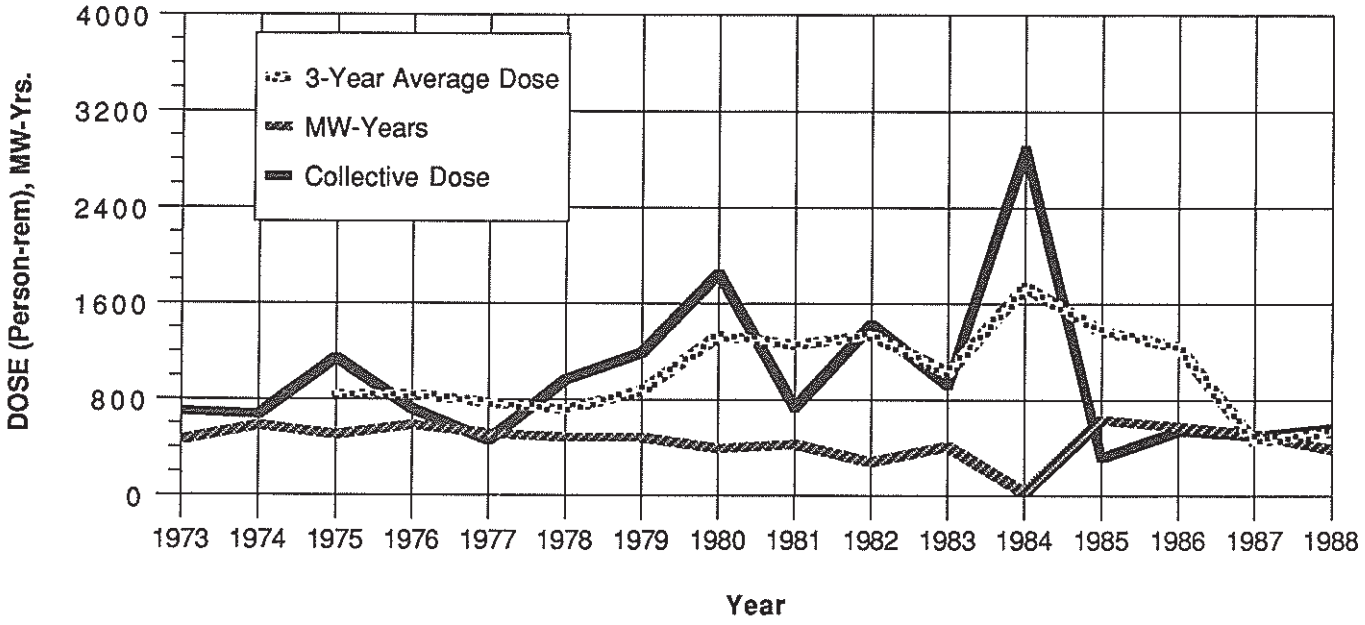
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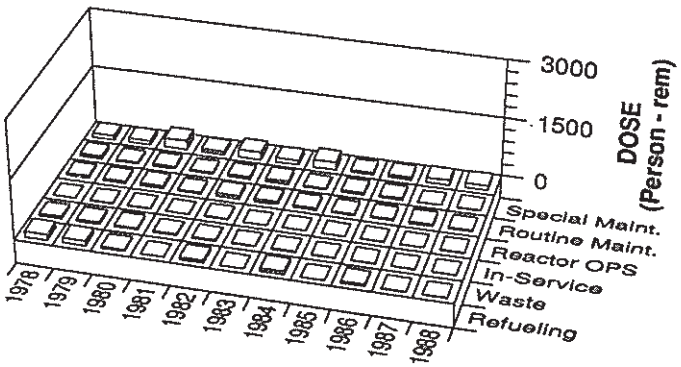
ROBINSON 2

PWR

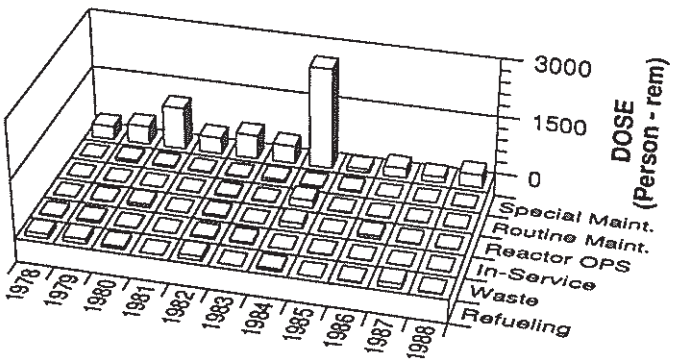
Dose-Performance Indicators



Breakdown By Job Function



Plant



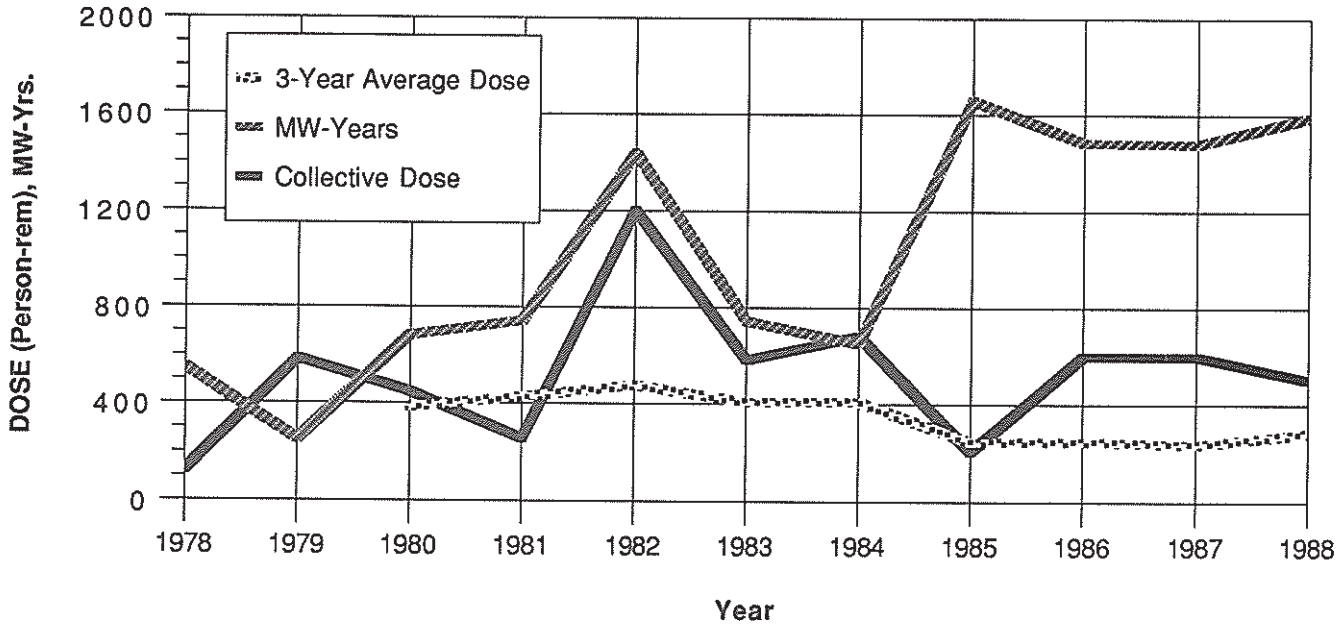
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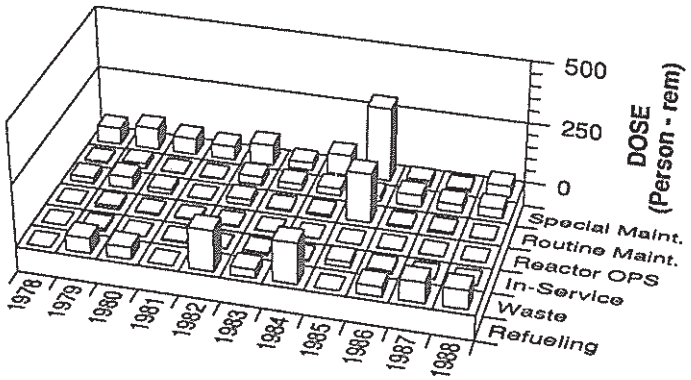
SALEM 1,2

PWR

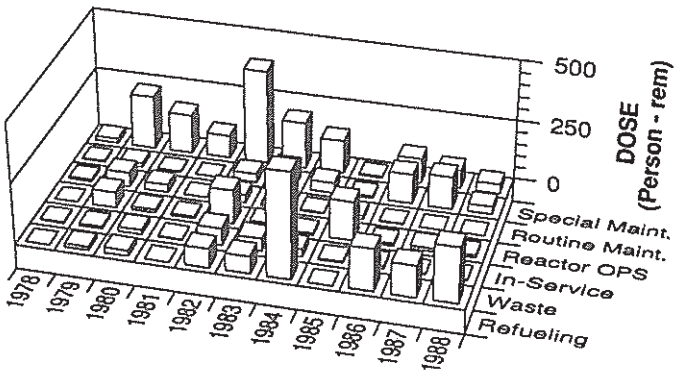
Dose-Performance Indicators



Breakdown By Job Function



Plant



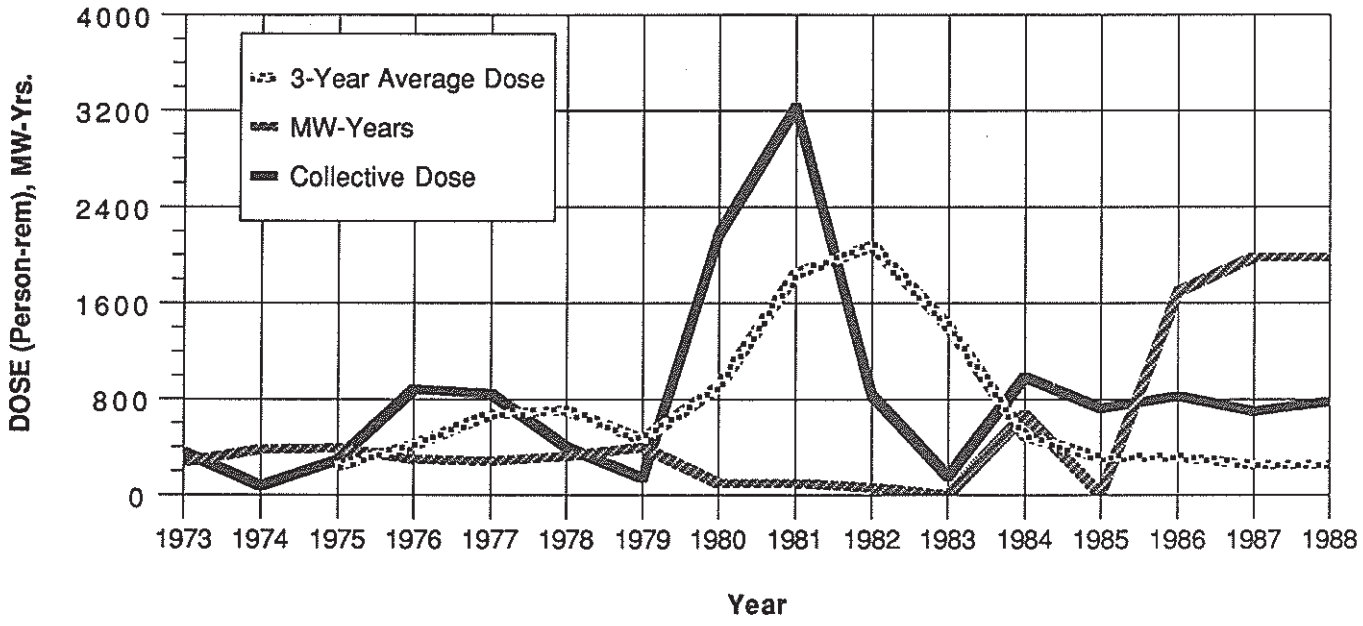
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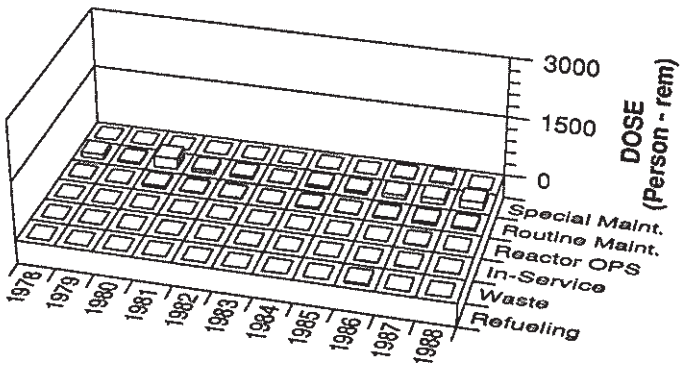
SAN ONOFRE 1,2,3

PWR

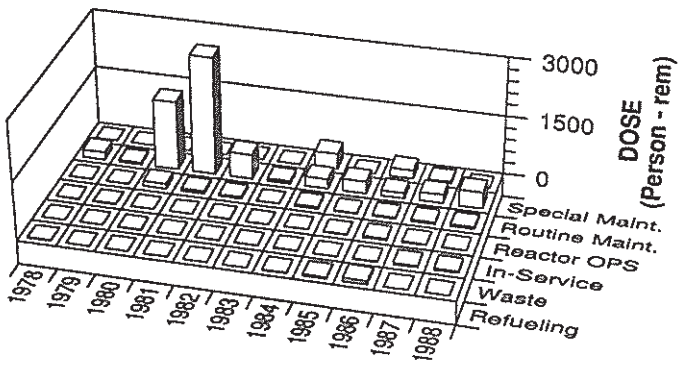
Dose-Performance Indicators



Breakdown By Job Function



Plant



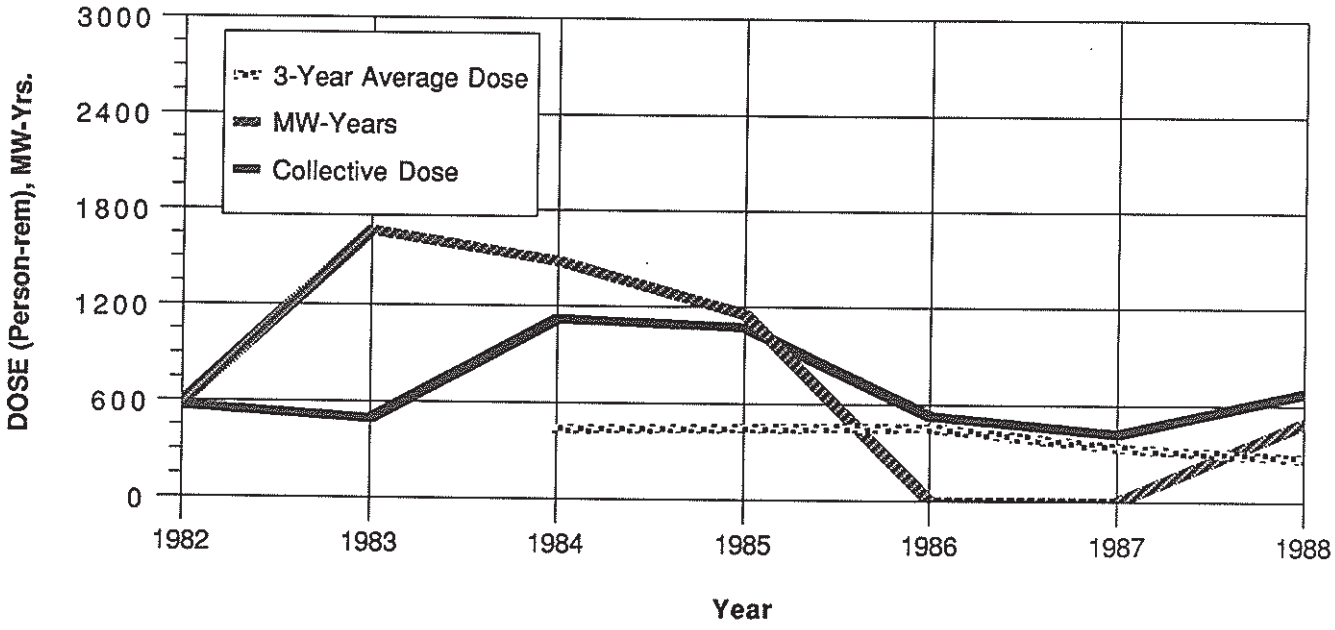
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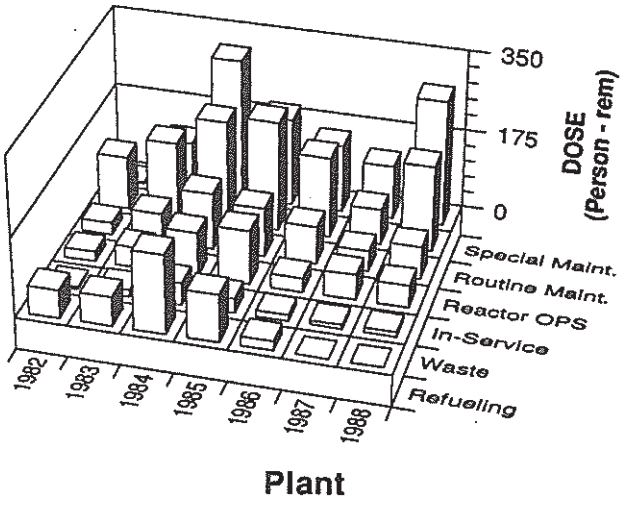
SEQUOYAH 1,2

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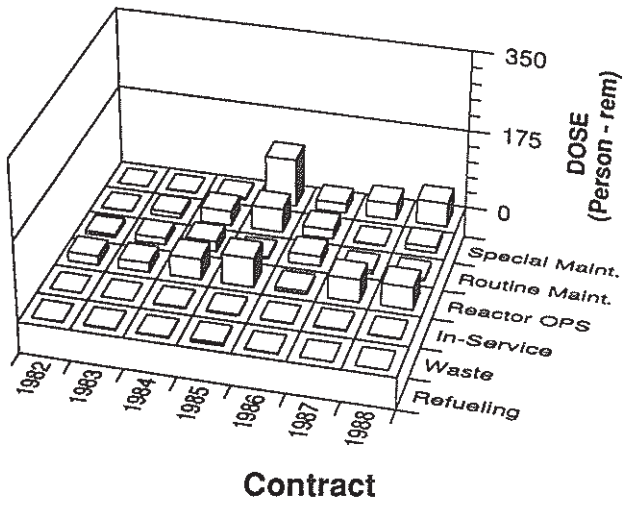
Dose-Performance Indicators



Breakdown By Job Function



Plant



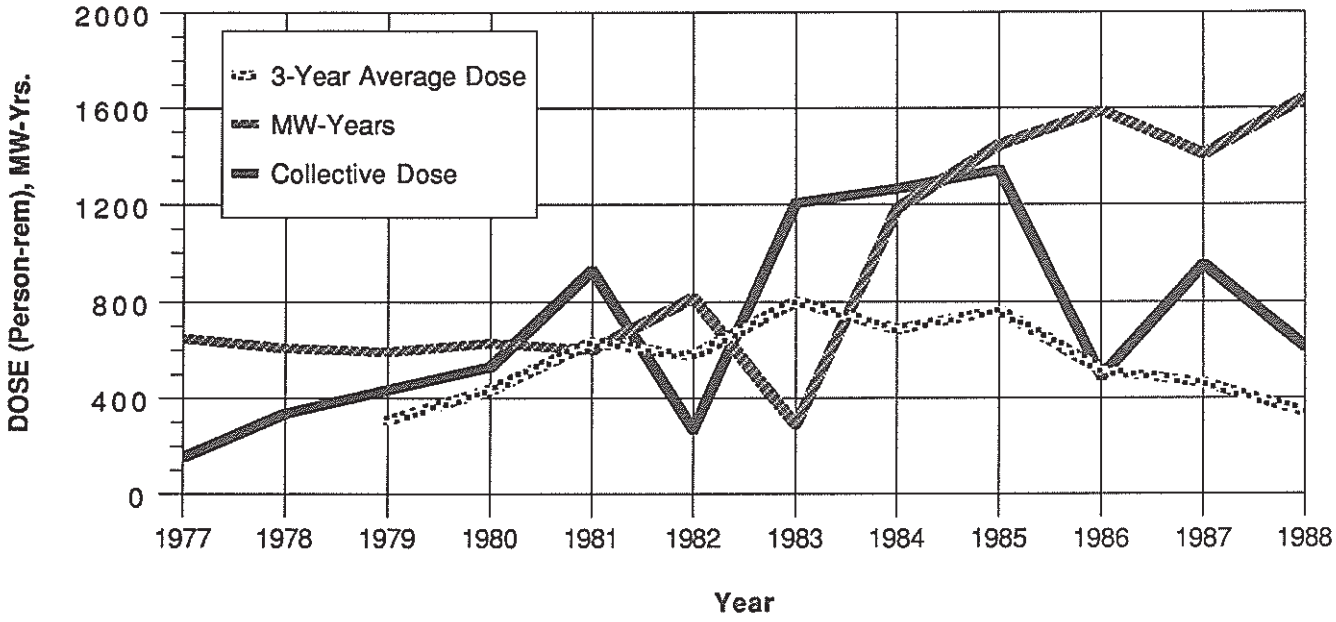
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APPENDIX E (continued)

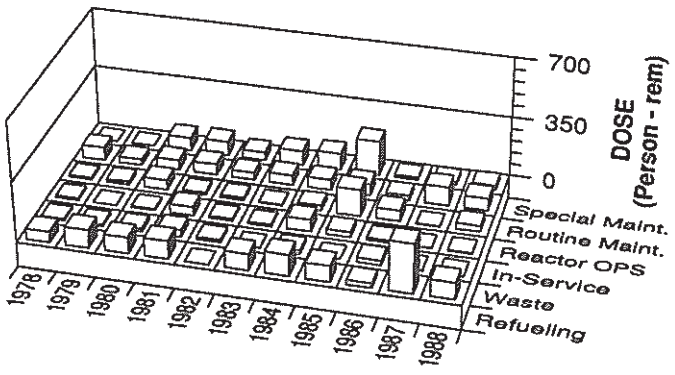
ST. LUCIE 1,2

PWR

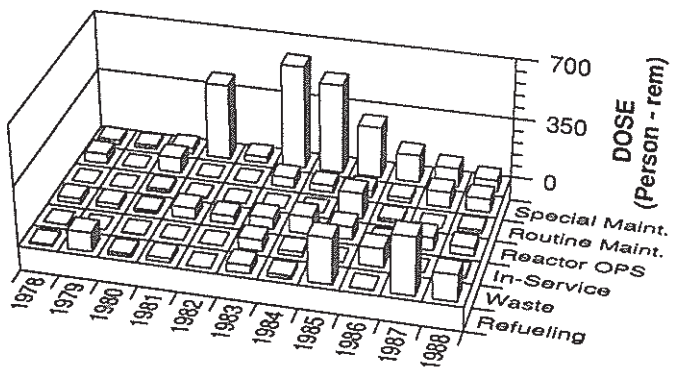
Dose-Performance Indicators



Breakdown By Job Function



Plant



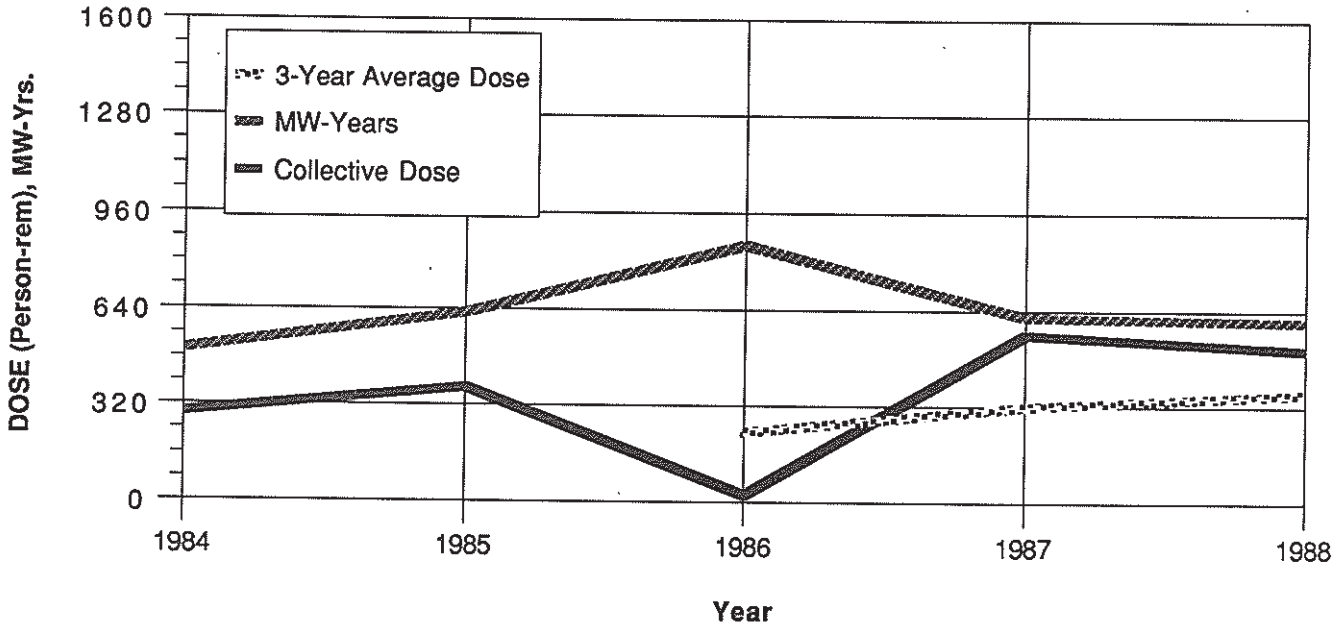
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APPENDIX E (continued)

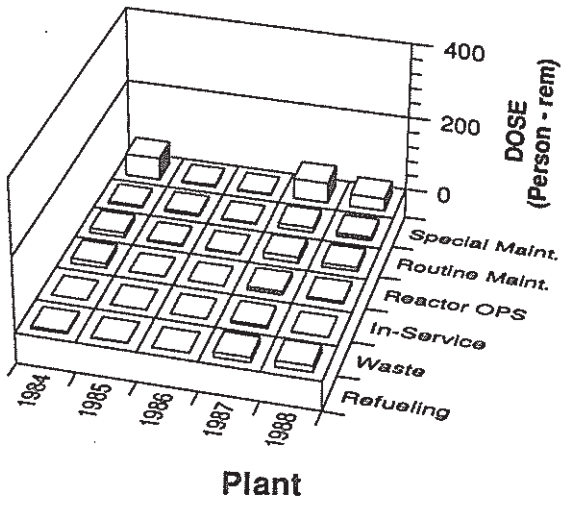
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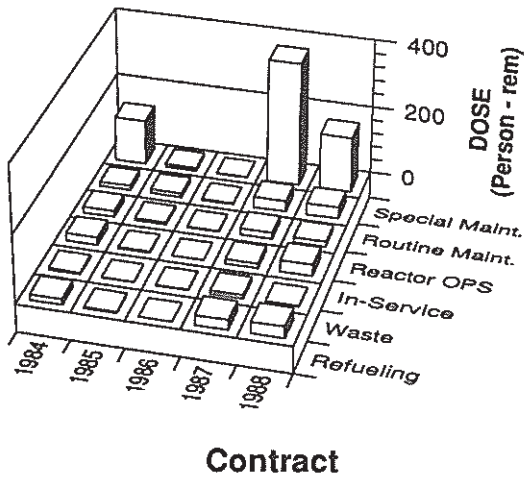
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Dose-Performance Indicators



Breakdown By Job Function



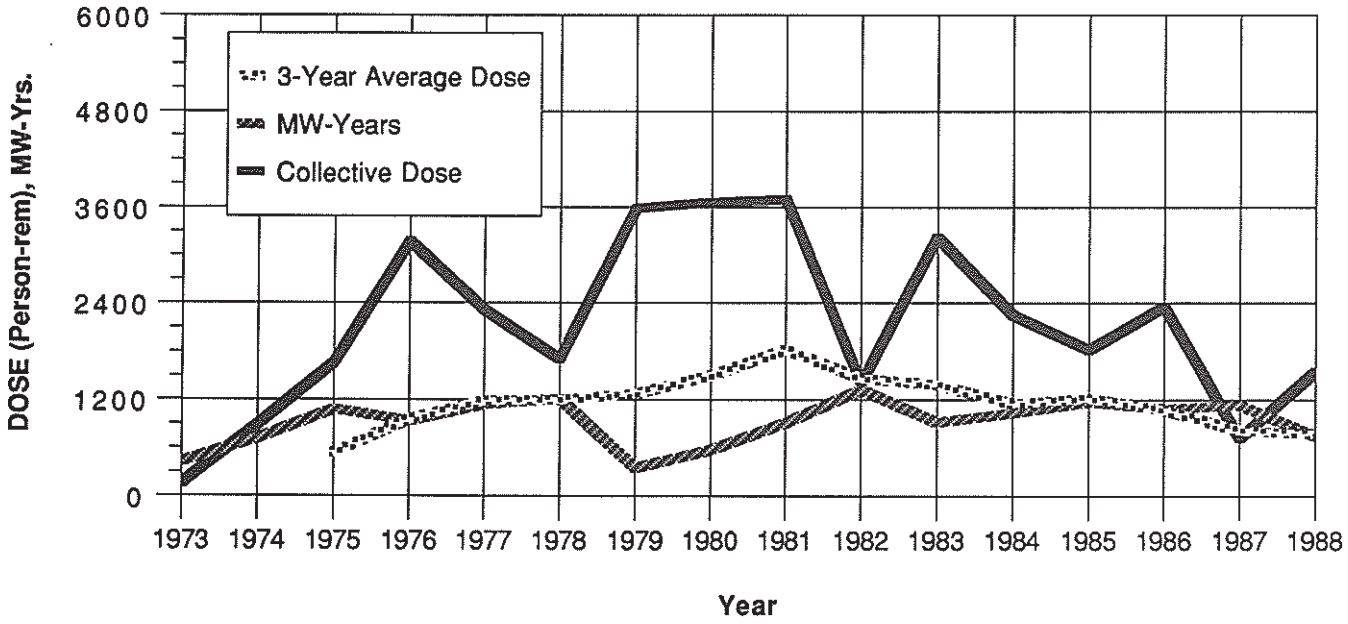


APPENDIX E (continued)

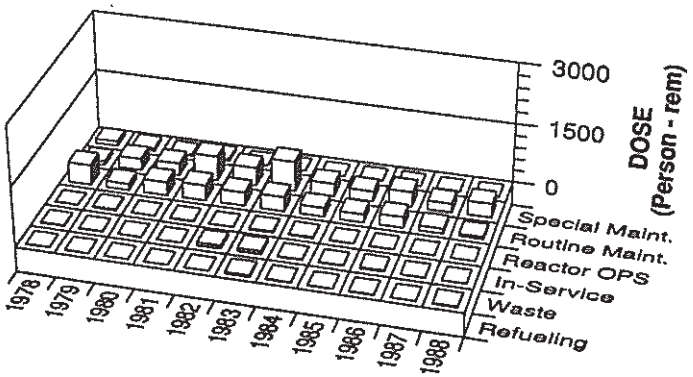
SURRY 1,2

PWR

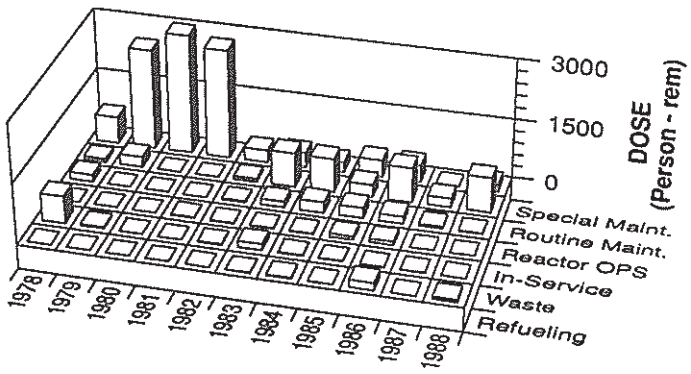
Dose-Performance Indicators



Breakdown By Job Function



Plant



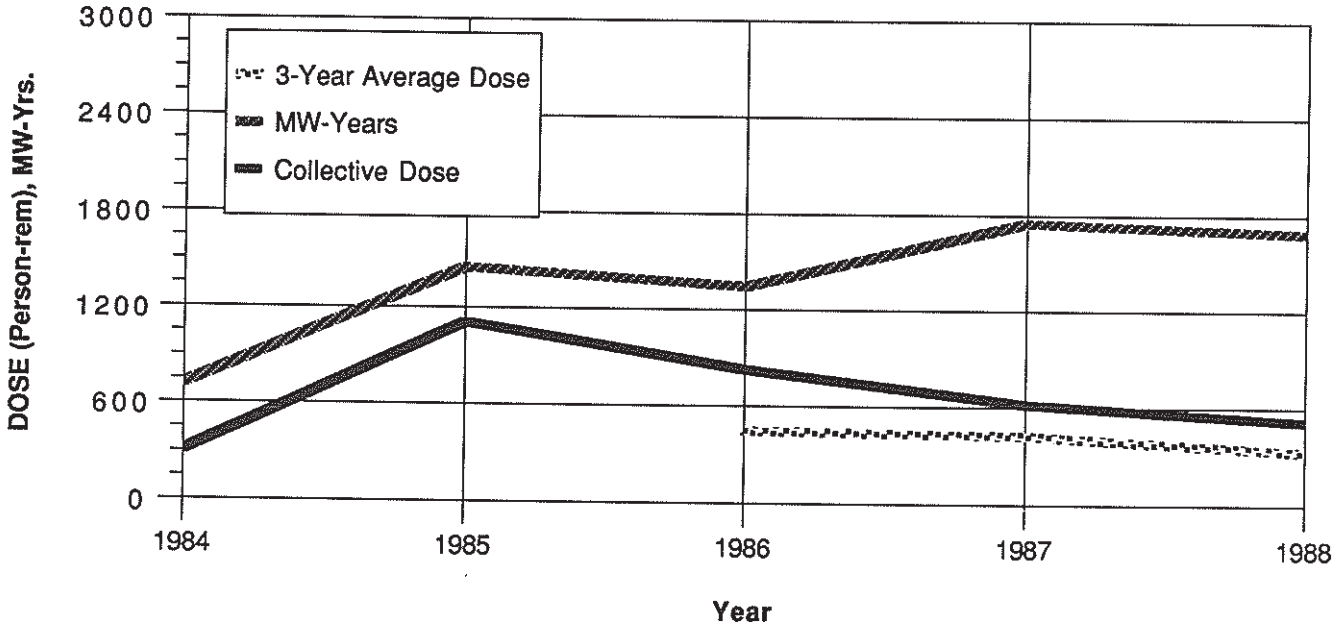
Contract

APPENDIX E (continued)

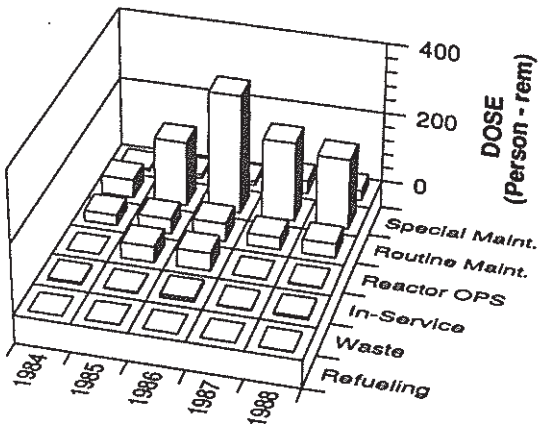
SUSQUEHANNA 1,2

BWR

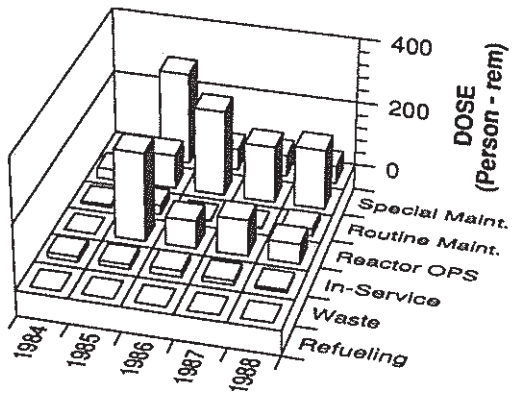
Dose-Performance Indicators



Breakdown By Job Function



Plant



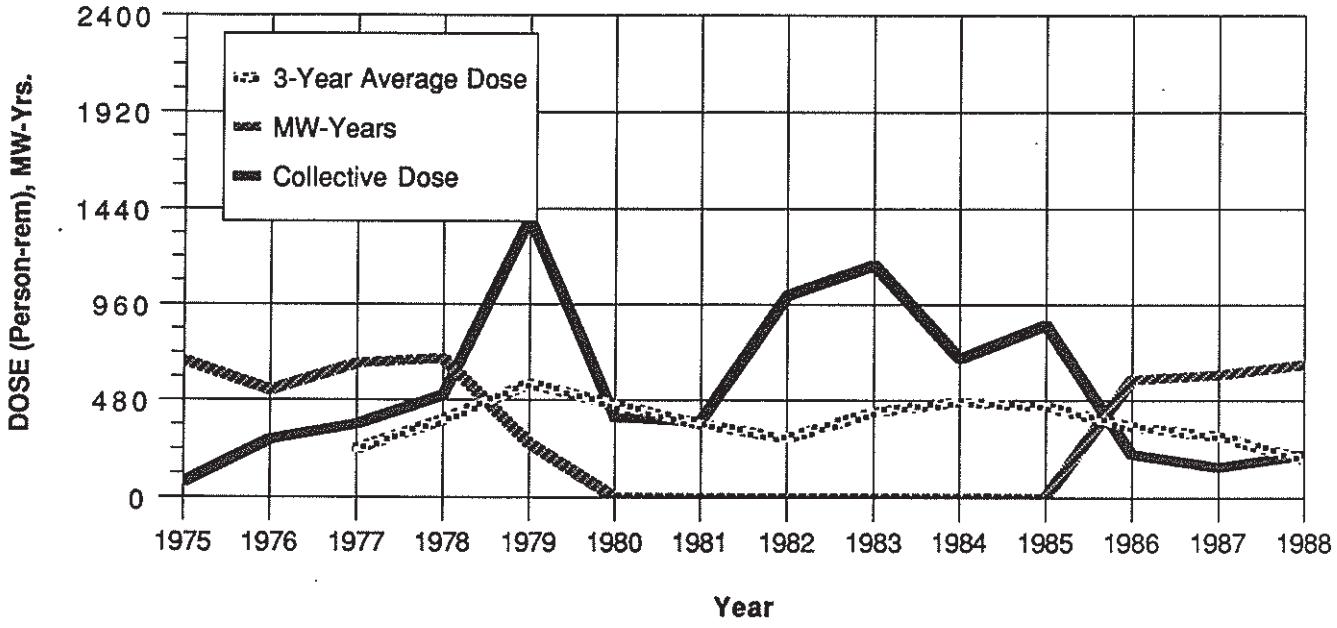
Contract

APPENDIX E (continued)

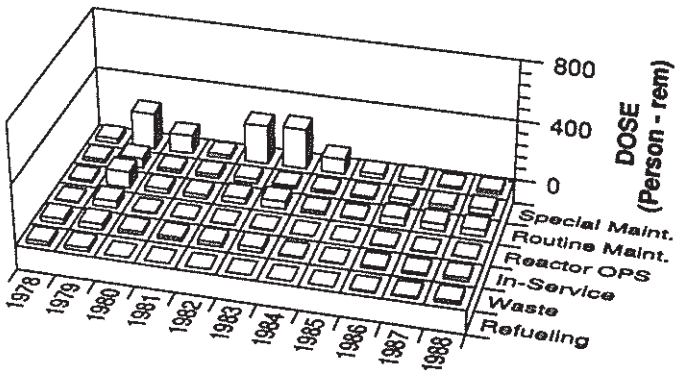
THREE MILE ISLAND 1

PWR

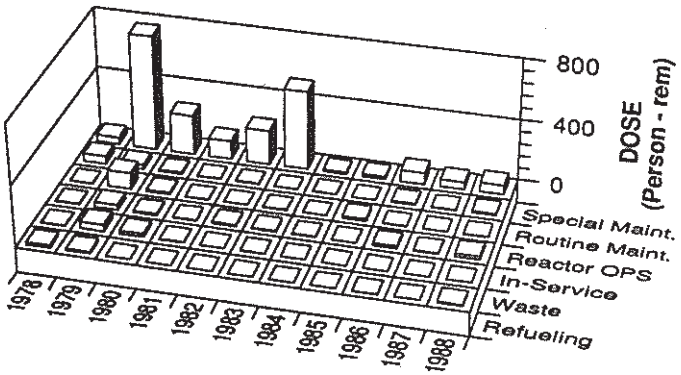
Dose-Performance Indicators



Breakdown By Job Function



Plant



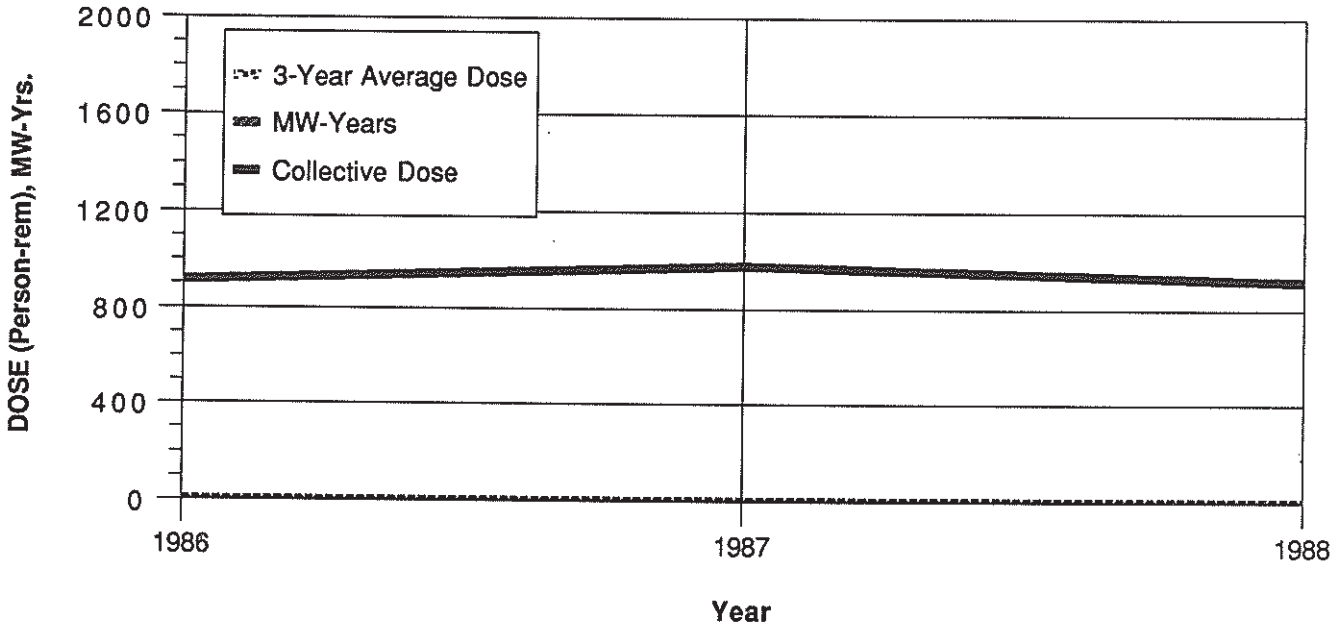
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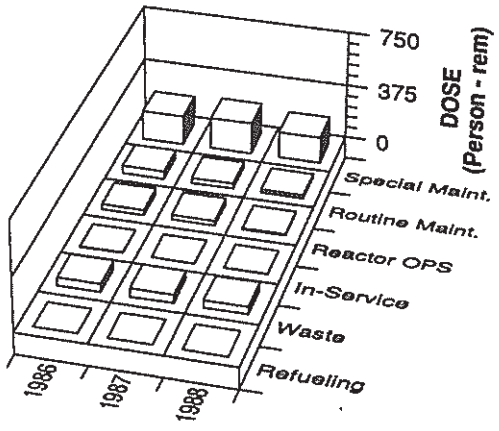
THREE MILE ISLAND 2

PWR

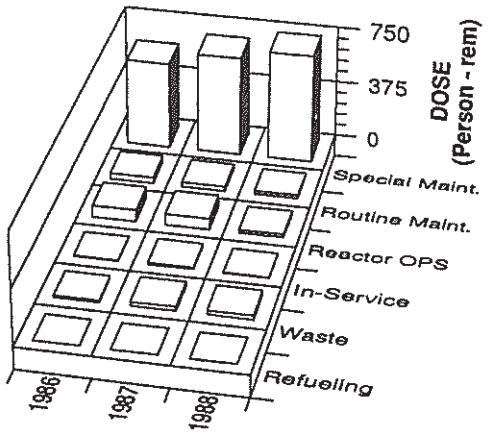
Dose-Performance Indicators



Breakdown By Job Function



Plant



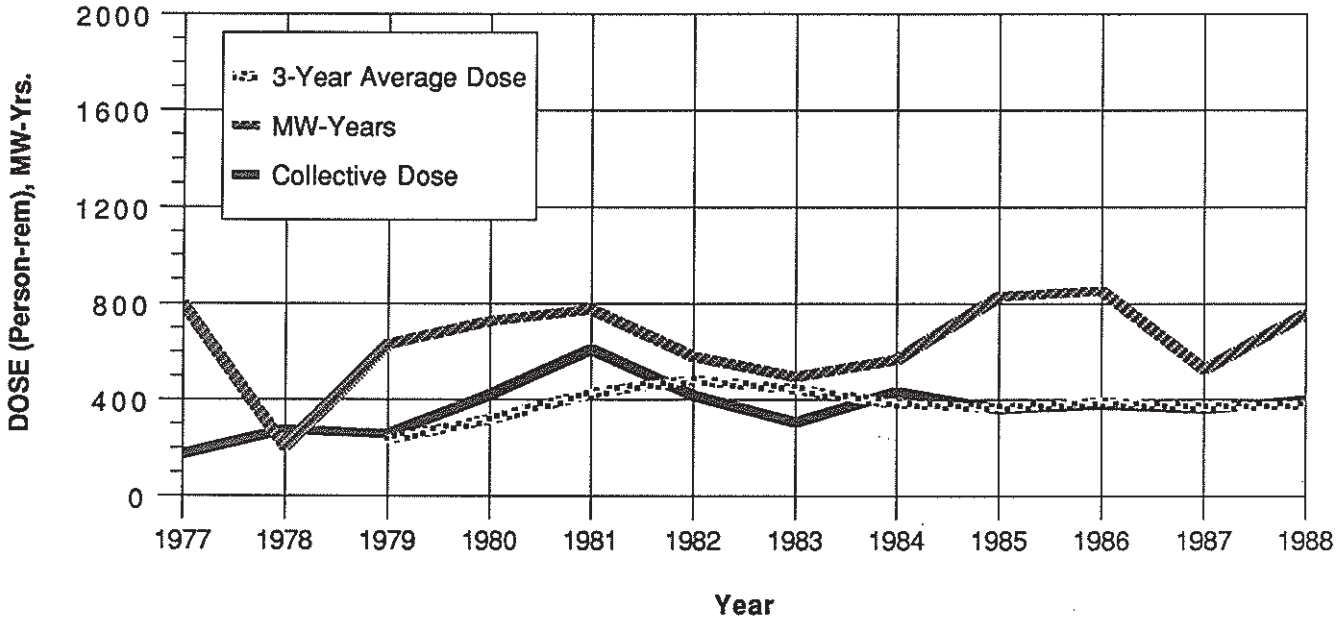
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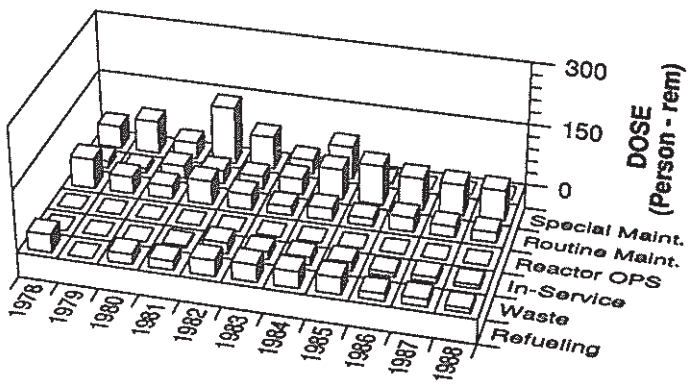
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PWR

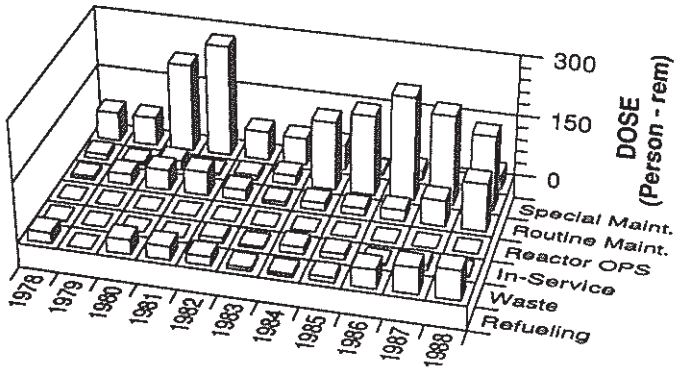
Dose-Performance Indicators



Breakdown By Job Function



Plant



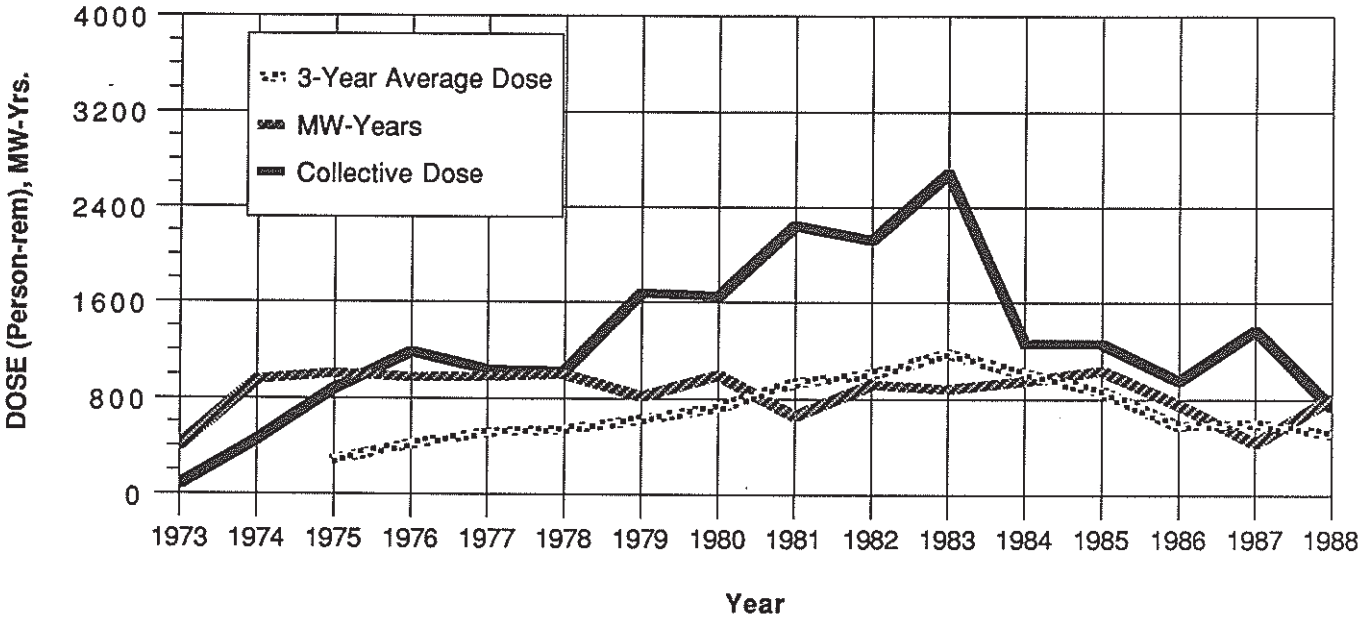
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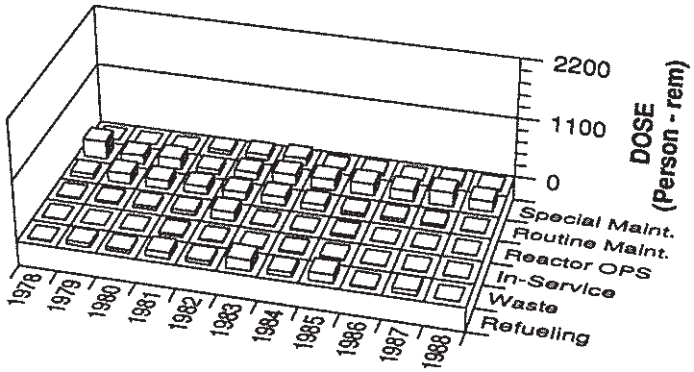
TURKEY POINT 3,4

PWR

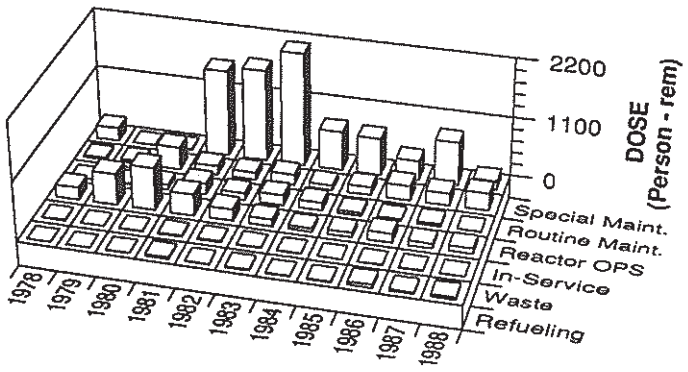
Dose-Performance Indicators



Breakdown By Job Function



Plant



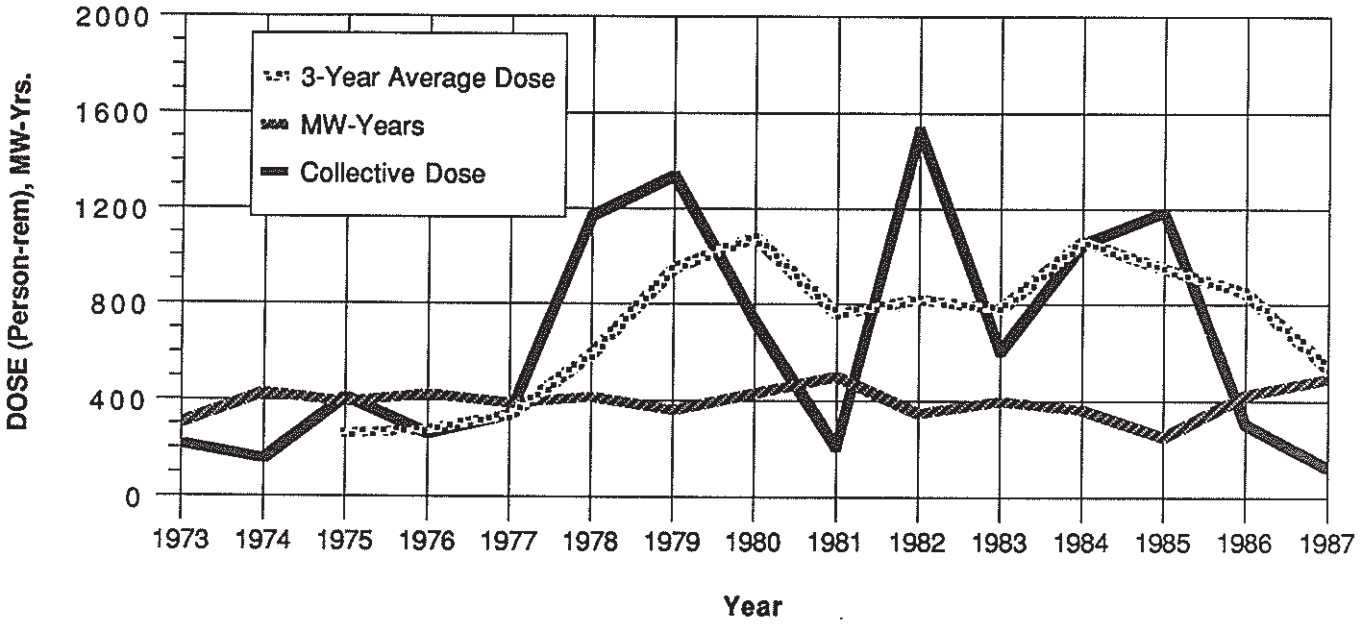
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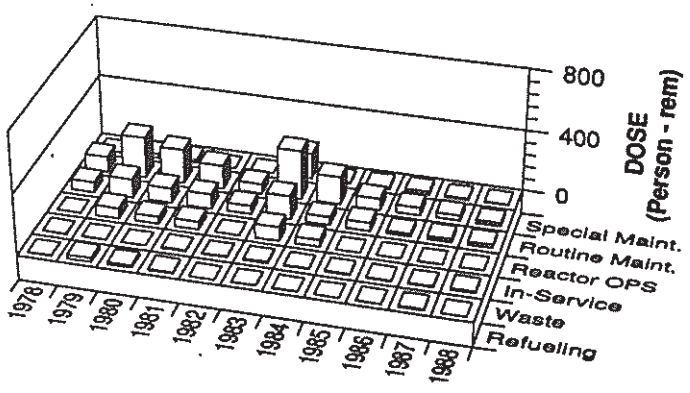
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BWR

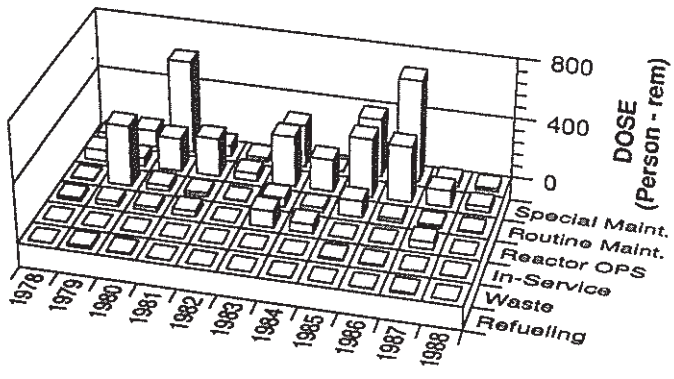
Dose-Performance Indicators



Breakdown By Job Function



Plant



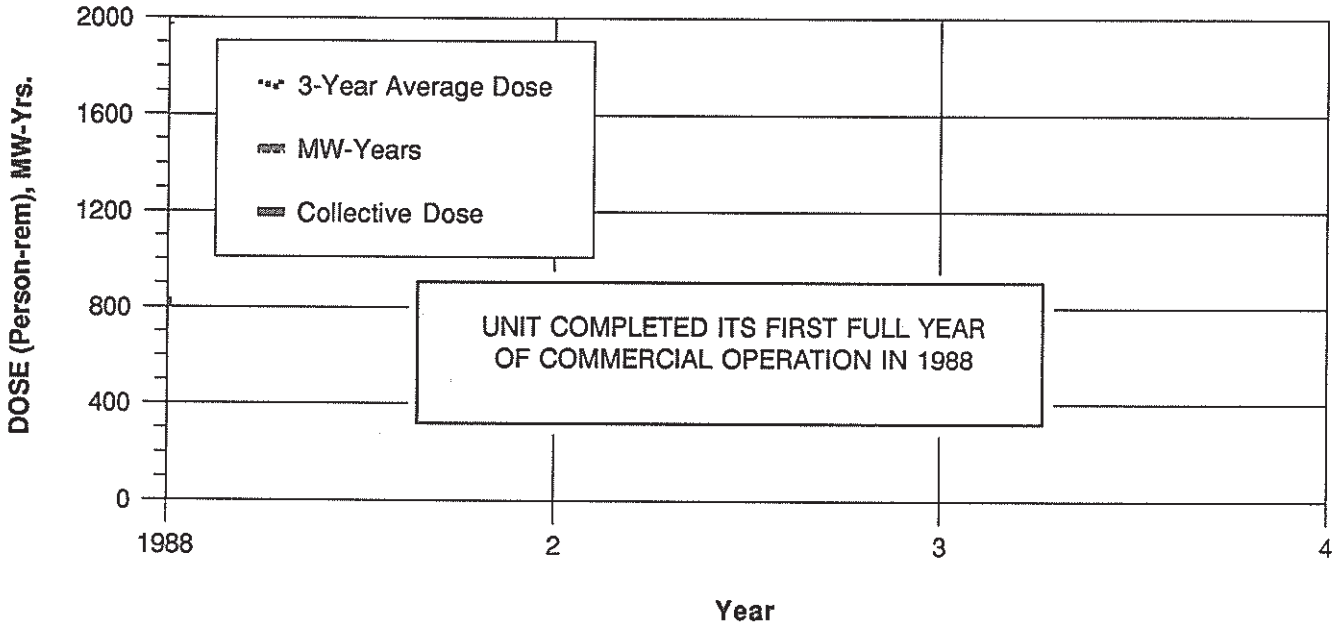
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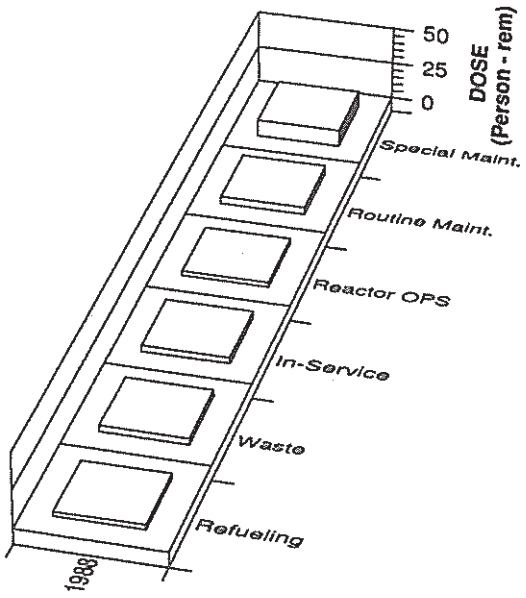
VOGTLE

PWR

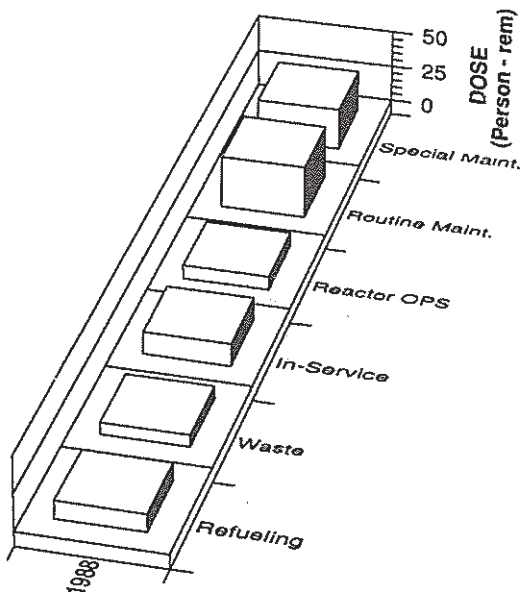
Dose-Performance Indicators



Breakdown By Job Function



Plant



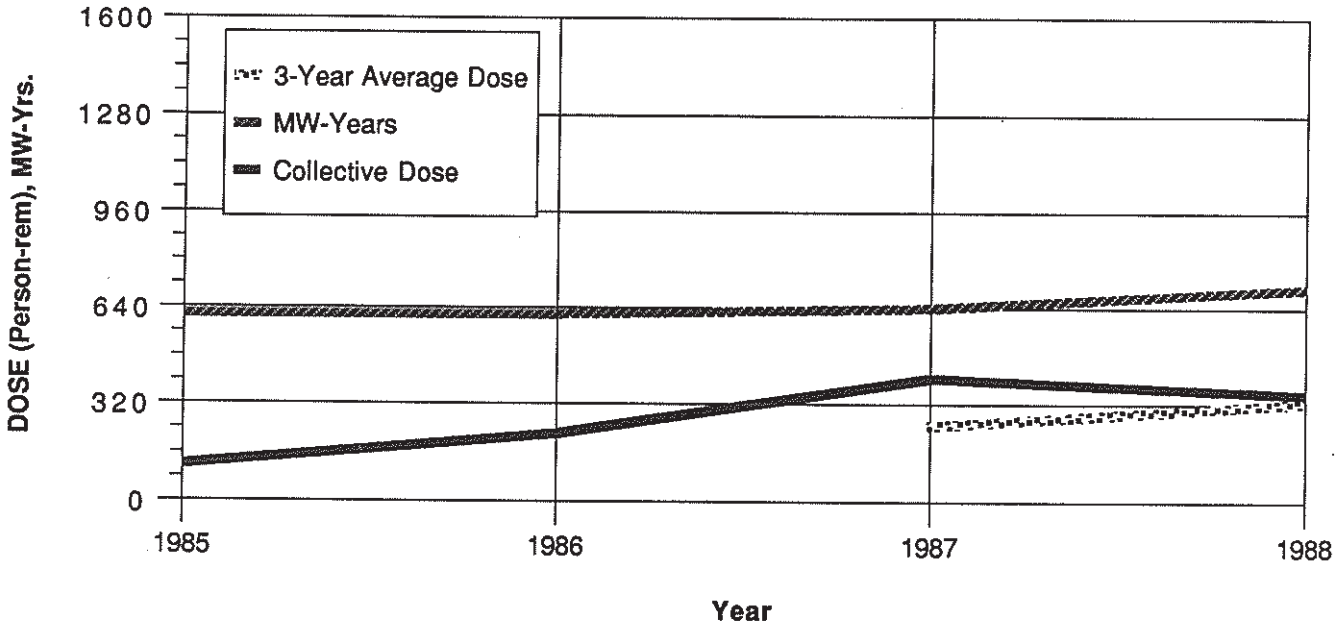
Contract

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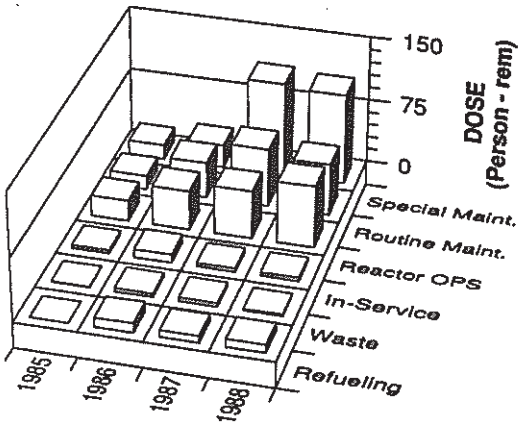
WASHINGTON NUCLEAR 2

BWR

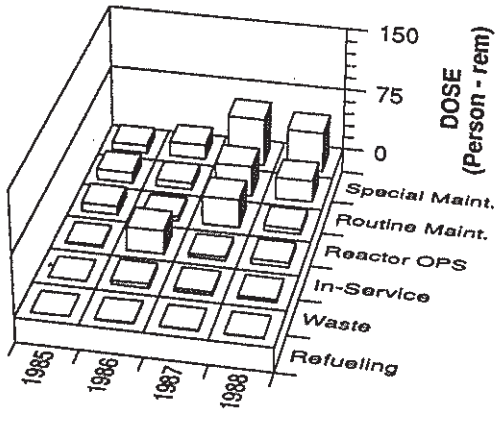
Dose-Performance Indicators



Breakdown By Job Function



Plant



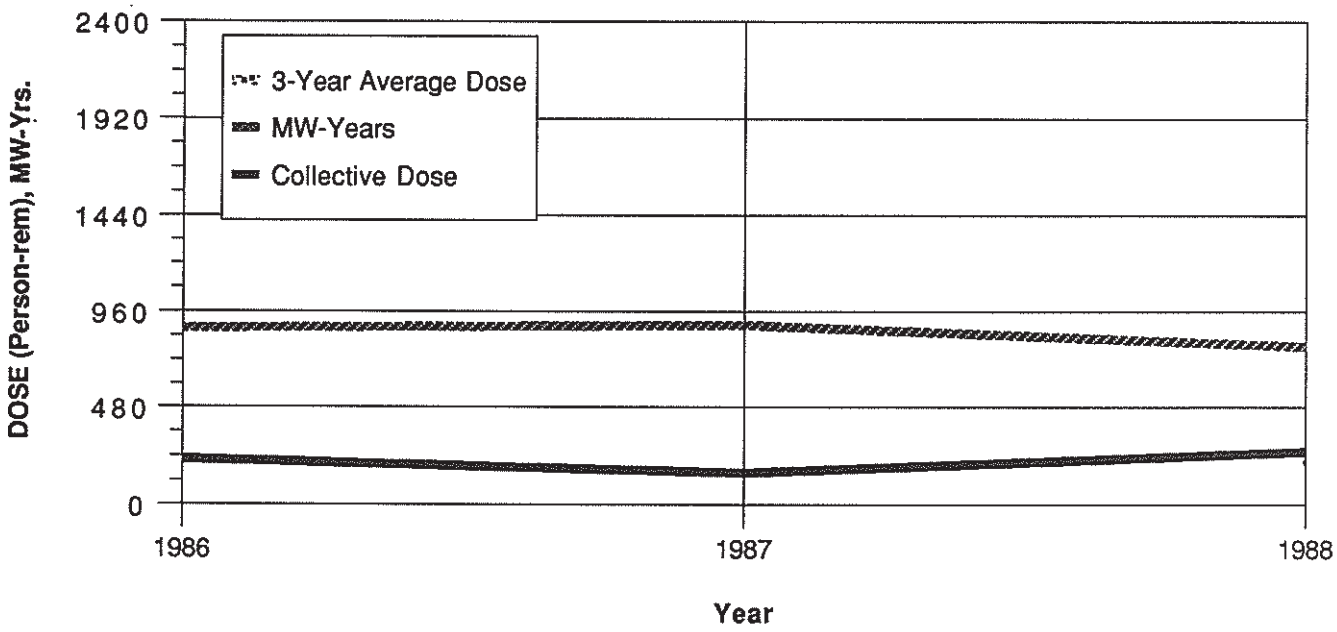
Contract

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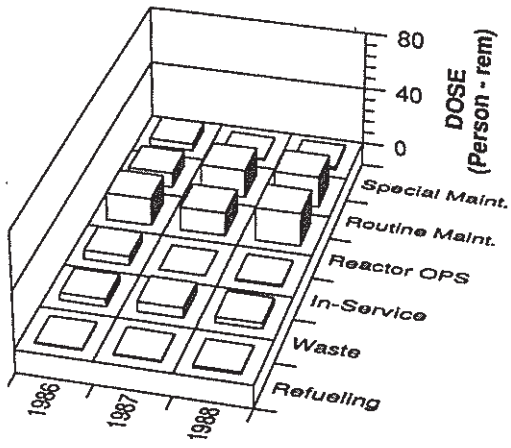
WATERFORD 3

PWR

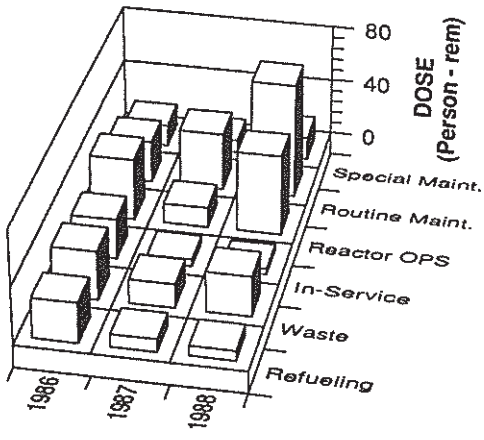
Dose-Performance Indicators



Breakdown By Job Function



Plant



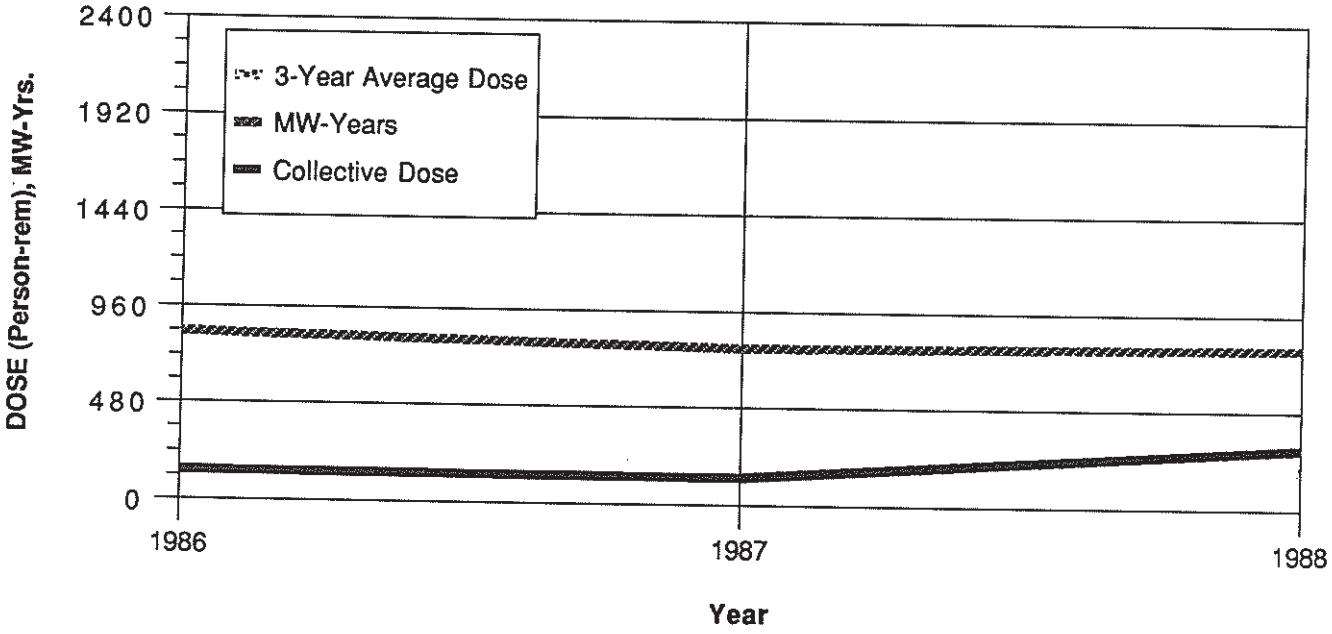
Contract

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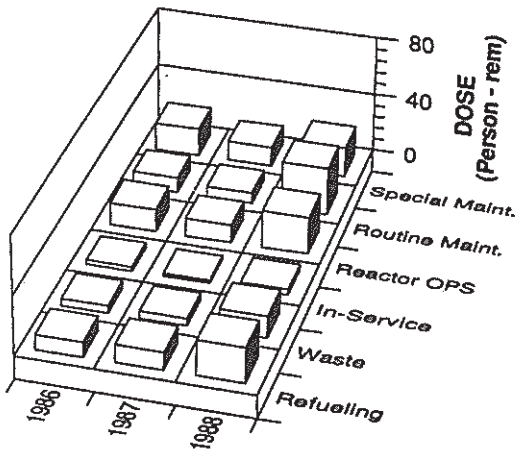
WOLF CREEK

PWR

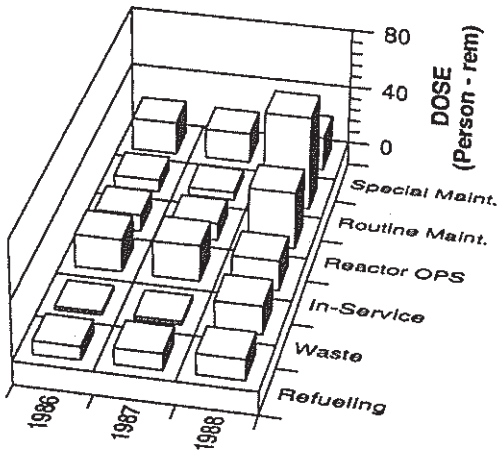
Dose-Performance Indicators



Breakdown By Job Function



Plant



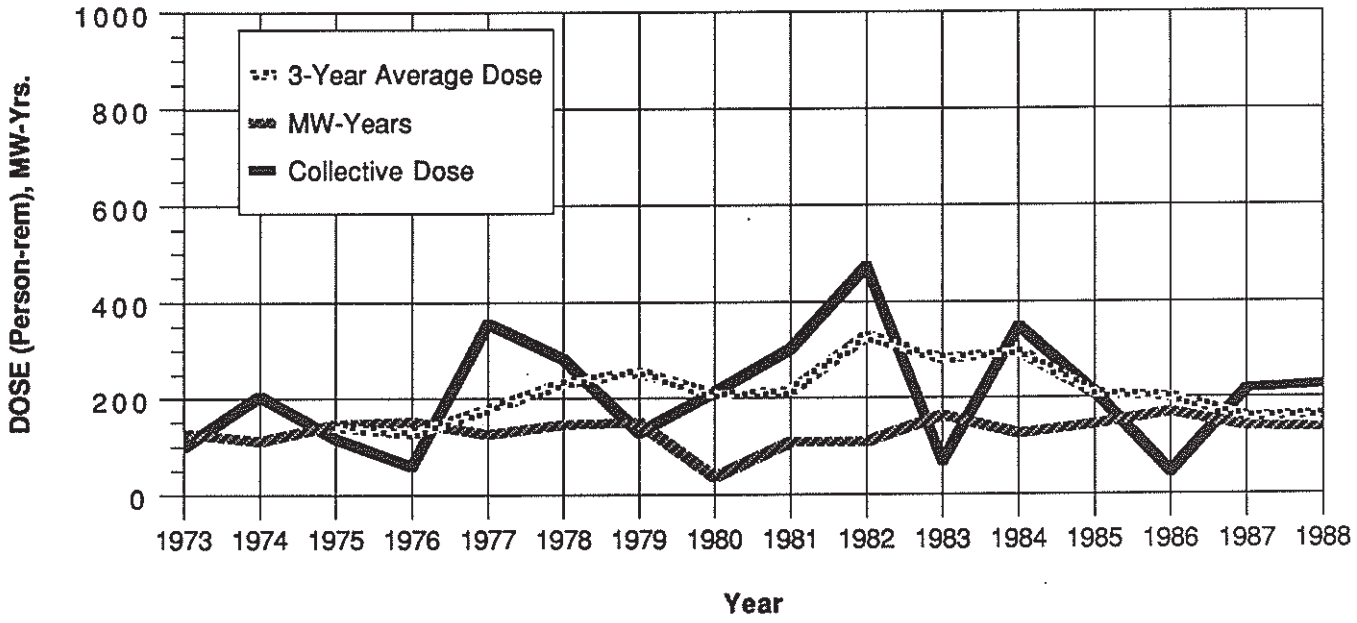
Contract

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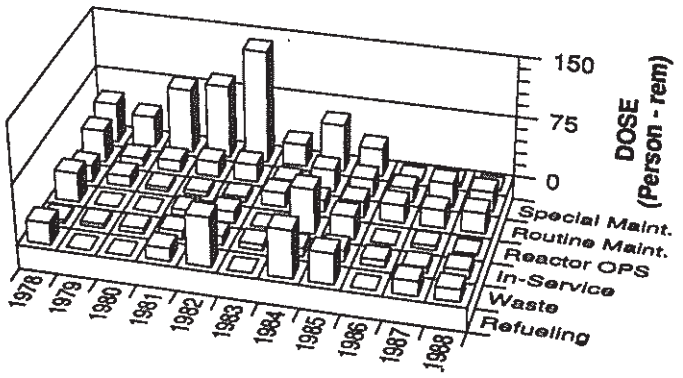
YANKEE-ROWE

PWR

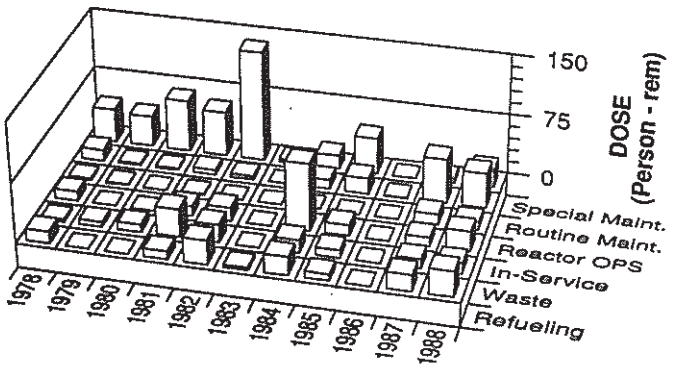
Dose-Performance Indicators



Breakdown By Job Function



Plant



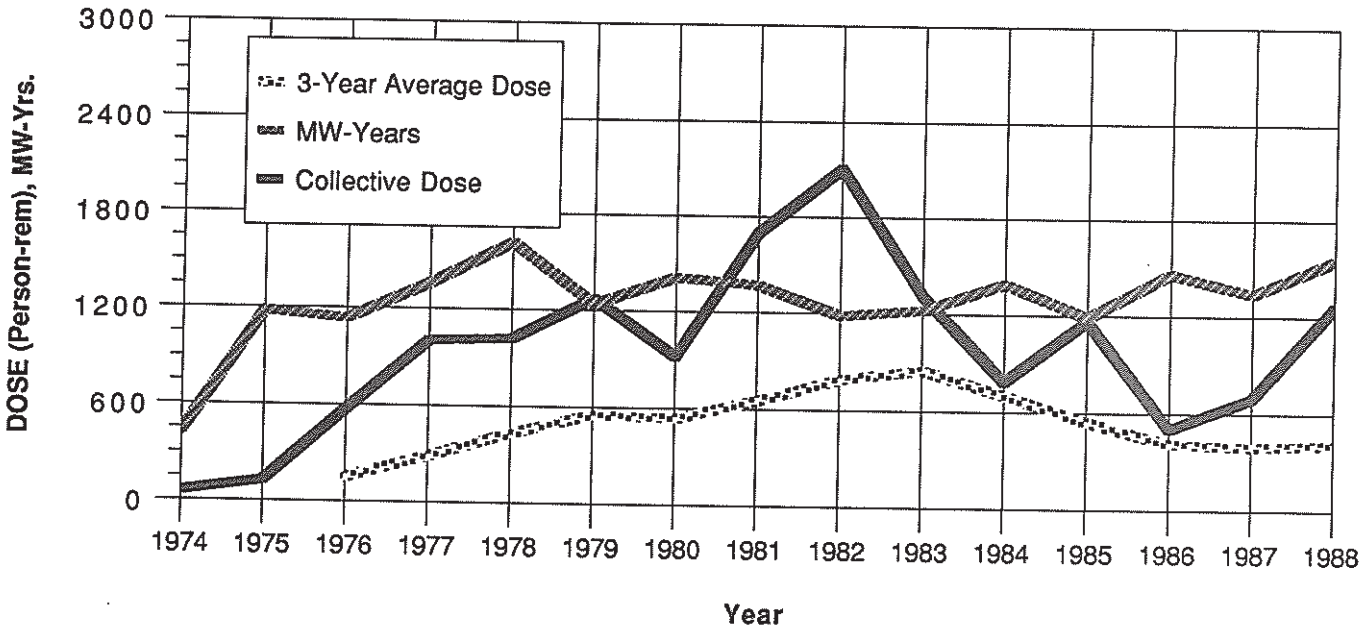
Contract

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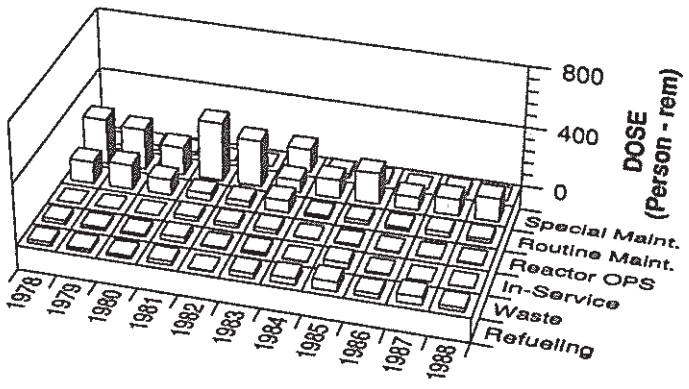
ZION 1,2

PWR

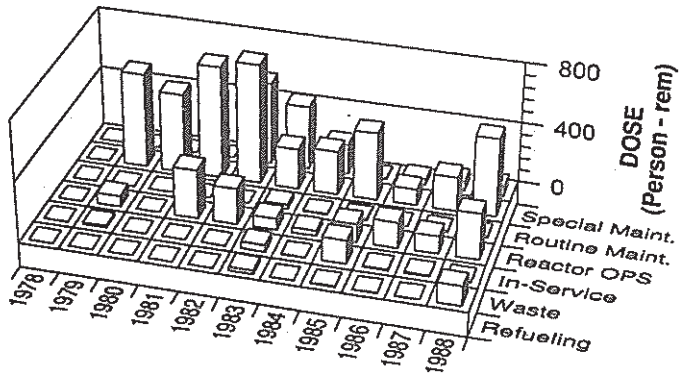
Dose-Performance Indicators



Breakdown By Job Function



Plant



Contract

APPENDIX F

Summary of Annual Whole Body Dose Distributions by Year and Reactor Type

1982-1988

APPENDIX F*
SUMMARY OF ANNUAL WHOLE BODY DOSE DISTRIBUTIONS BY YEAR AND REACTOR TYPE
1982-1988

YEAR AND REACTOR TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLEC-TIVE DOSE
	No Meas-urable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.0-5.0	5-6.0	6-7.0	7-8.0	8-9.0	9-10	10-12	>12			
1988 - BWRs	47,679	16,044	6,736	5,609	3,311	2,397	4,859	1,129	215	5								87,984	40,305	17,986
1988 - PWRs	49,079	27,178	11,014	9,260	5,563	3,541	5,405	829	127	4		1						112,001	62,922	22,854
1988 - LWRs	96,758	43,222	17,750	14,869	8,874	5,938	10,264	1,958	342	9		1						199,985	103,227	40,840
1987 - BWRs	43,688	17,711	7,027	5,739	3,447	2,383	4,578	723	117	12								85,425	41,737	16,870
1987 - PWRs	49,648	27,070	10,795	8,827	5,152	3,441	6,187	987	124	10								112,241	62,593	23,720
1987 - LWRs	93,336	44,781	17,822	14,566	8,599	5,824	10,765	1,710	241	22								197,666	104,330	40,590
1986 - BWRs	29,232	15,075	5,865	4,962	2,996	2,121	5,084	1,426	354	45								67,160	37,928	19,570
1986 - PWRs	44,365	29,754	10,131	8,160	4,784	3,058	5,594	1,244	239	30								107,359	62,994	23,083
1986 - LWRs	73,597	44,829	15,996	13,122	7,780	5,179	10,678	2,670	593	75								174,519	100,922	42,653
1985 - BWRs	22,061	14,446	5,957	5,218	3,107	2,295	4,973	1,731	468	42								60,298	38,237	20,573
1985 - PWRs	42,409	25,545	8,158	6,761	4,107	2,602	5,584	1,586	248	42								97,042	54,633	22,469
1985 - LWRs	64,470	39,991	14,115	11,979	7,214	4,897	10,557	3,317	716	84								157,340	92,870	43,042
1984 - BWRs	21,741	14,997	6,165	4,907	3,033	2,398	5,679	2,714	994	218								62,846	41,105	27,097
1984 - PWRs	37,875	24,887	8,599	6,585	4,133	2,998	6,774	2,253	681	77								94,862	56,987	28,138
1984 - LWRs	59,616	39,884	14,764	11,492	7,166	5,396	12,453	4,967	1,675	295								157,708	98,092	55,235
1983 - BWRs	17,721	10,475	4,317	4,036	2,607	1,925	5,659	2,890	1,252	299	63	16	4					51,194	33,473	27,455
1983 - PWRs	33,350	21,425	7,894	6,260	3,863	2,783	6,512	2,421	698	315	2							85,523	52,173	29,017
1983 - LWRs	51,071	31,900	12,211	10,296	6,470	4,708	12,171	5,311	1,950	544	65	16	4					136,717	85,646	56,472
1982 - BWRs	15,661	9,944	4,431	4,403	2,839	2,046	4,794	2,358	1,183	230	7							47,896	32,235	24,437
1982 - PWRs	29,232	21,536	8,262	6,411	3,900	2,749	6,061	2,328	631	202	49	13	4	0	1			81,378	52,146	27,753
1982 - LWRs	44,893	31,480	12,693	10,814	6,739	4,795	10,855	4,686	1,814	432	56	13	4	0	1			129,274	84,381	52,190

* Figures contained herein are uncorrected for multiple reporting of transient individuals, and include only those reactors that have completed a full year of commercial operation in each of the years indicated.

NRC FORM 335 (2-89) NRCM 1102, 3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

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Twenty First Annual Report

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C. T. Raddatz, D. Hagemeyer*

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Washington, DC 20555

*Science Applications International Corporation
1710 Goodridge Drive
McLean, VA 22102

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Division of Regulatory Applications
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555

10. SUPPLEMENTARY NOTES

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11. ABSTRACT *(200 words or less)*

This report summarizes the occupational radiation exposure information that has been reported to the NRC's Radiation Exposure Information Reporting System (REIRS) by nuclear power facilities and certain other categories of NRC licensees during the years 1969 through 1988. The bulk of the data presented in the report was obtained from annual radiation exposure reports submitted in accordance with the requirements of 10 CFR 20.407 and the technical specifications of nuclear power plants. Data on workers terminating their employment at certain NRC licensed facilities were obtained from reports submitted pursuant to 10 CFR 20.408. The 1988 annual reports submitted by about 429 licensees indicated that approximately 220,048 individuals were monitored, 113,000 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.20 rem (cSv) and an average measurable dose of 0.41 (cSv). Termination radiation exposure reports were analyzed to reveal that about 113,072 individuals completed their employment with one or more of the 429 covered licensees during 1988. Some 80,211 of these individuals terminated from power reactor facilities, and about 8,760 of them were considered to be transient workers who received an average dose of 0.27 rem (cSv).

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

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industrial radiography
power reactors
collective dose
average dose
transient workers
fuel fabricators

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